



## Confucius Institutes and FDI flows from China to Africa



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### ABSTRACT

Is the establishment of new Confucius Institutes (CIs) in African countries motivated by resource seeking? We focus on uncovering new empirical evidence about the establishment of CIs, whether they are related to natural resources, and the extent to which the establishment of new CIs and Chinese foreign aid flows affect one another. Whereas Chinese aid flows do indeed appear to be empirically associated with African countries' natural resources, the evidence we report suggests that CIs are established based on a distinct set of motives. We find that CIs, Chinese foreign aid flows to Africa and natural resources have joint predictive power on the subsequent year's Chinese FDI outflows. CIs are not, however, positively associated with the subsequent year's aid flows. And aid flows are not positively associated with the subsequent year's expected number of CIs. We interpret this as evidence that CIs reflect an economically significant expression of Chinese soft power. The goals underlying the expression of this soft power are not subsumed by natural resource seeking and are not easily compressed to a single dimension. The data show that CIs and aid flows are not positive predictors of each other and are not subsumed (i.e., made to disappear) by the inclusion of controls for natural resources. Thus, the presence of a CI reveals independent, novel, and economically significant information about future trade flows that cannot be explained away by differences in resources or other control variables commonly found in empirical models of trade flows. The empirical evidence suggests that CIs are indeed an effective instrument for increasing China's soft power but that this soft power is not motivated solely (if at all) by resource seeking.

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## 1. Introduction

This paper addresses two broad empirical questions relating to debate about the Chinese government and its strategic use of Confucius Institutes (CIs) as an expression of soft power. Although debate over CIs located in the U.S. and U.K. receives considerable attention, our research question draws motivation from debate about the presence of CIs in Africa, which we interpret as an expression of Chinese soft power. Critics sometimes express suspicion that the proliferation of new CIs in Africa reflects ulterior motives of the Chinese government, namely, seeking African countries' natural resources.

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The first empirical question we address concerns the extent to which commonly used measures of natural resources across African countries can explain the effects of CIs on FDI outflows from China to Africa.<sup>1</sup> By controlling for foreign aid from China and natural resources in a particular African country and year, we undertake to measure the effect of the presence of a CI on FDI outflows from China to African country-years. A second, more broadly-framed empirical issue concerns how CIs, when interpreted as an expression of China's soft power, fit together within the large empirical literature on Chinese foreign aid flows into Africa (Taylor, 1998; Woods, 2008; Lum et al., 2009; Tan-Mullins, Mohan, and Power, 2010; Bräutigam, 2011; Dreher and Fuchs, 2011). Once again, critics of the Chinese government suggest a range of ulterior (and sometimes nefarious) motives which (at the risk of over-simplifying) follow the common narrative that Chinese aid to Africa reflects motives focused on expanding access to and control over African natural resources.<sup>2</sup>

To provide background and context for our empirical question regarding CIs in Africa, we group the extant literature into three broad themes relating to our work: (i) Chinese aid to Africa; (ii) the extent to which Chinese aid reflects soft power; and (iii) links between Chinese foreign aid and China's desire for Africa's natural resources. These questions have attracted the attention of many fine empirical researchers, precisely because the empirical record on these three themes contains interesting inconsistencies and sensitivities making it difficult to characterize with broad generalizations.

For example, Esteban (2010) argues that Chinese foreign aid to African countries can be interpreted as negative soft power, insofar as citizens in aid-receiving African countries regard those aid payments from China as bribes paid to unpopular African government officials. The evidence appears solid that Chinese aid is positively associated with FDI flows from China into aid-receiving African countries. The interpretation of Chinese aid to Africa as an expression of soft power (in the context of other potential mechanisms for expressing soft power), however, remains an open question.

We therefore focus on generating new evidence addressing the empirical question of how the presence of CIs and Chinese foreign aid flows jointly affect FDI outflows from China to Africa. In particular, we test whether controlling for foreign aid from China into African country-years causes the effect of CIs on Chinese FDI outflows to Africa to disappear. The data show that this effect does not disappear. Therefore, our analysis shows that the data contain evidence of an independent effect of CIs on FDI, net of the presence of foreign aid flows from China into Africa, by which the presence of CIs exerts a positive statistical influence on FDI outflows from China to Africa.

Our main empirical question draws motivation from the following four observations. First, China's FDI flows into Africa are, without doubt, resource related (Cheung and Qian, 2009; Sanfilippo, 2010; Kolstad and Wiig, 2012; Busse, Erdogan and Mühlen, 2014; Kaplinsky and Morris, 2009; Chen, Dollar and Tang, 2015). Second, the positive effect of the presence of CIs on subsequent FDI flows from China to the host country is already established empirically (Lien et al., 2012). Third, evidence suggests that the presence of CIs is positively correlated with foreign aid flows from China (Chen et al., 2015).<sup>3</sup> And fourth, hard evidence supports the view that Chinese aid to Africa is linked to natural resources (Sun, 2014).

Based on these four observations, we expect CIs, Chinese foreign aid, and the natural resources available in African country-years to each have positive effects on Chinese FDI outflows to African country-years. To the best of our knowledge, our empirical analysis is the first to measure these three effects simultaneously. Doing so enables us to address the two main empirical questions as stated above: (1) Is the spatial distribution of CIs measurably "resource-oriented," in the sense that including information about natural resources into empirical models of African country-years' FDI outflows from China makes the effects of CIs disappear?; and (2) How do the presence of CIs and foreign aid outflows from China into African country-years affect each other?

Our data speak rather clearly in answering those two questions. The empirical models we estimate suggest that CIs are established with their own distinct objectives which cannot be explained away completely by the presence of natural resources. Regarding the second question, CIs appear to exert strong effects on FDI after controlling for both the recipient country's natural resources and whether it is a recipient of Chinese foreign aid. Thus, previous studies together with our new evidence jointly support the interpretation that CIs serve to expand China's soft power and that decision making about where and when to establish new CIs reflects a larger set of *multiple* Chinese objectives that includes resource seeking while very clearly going beyond that single motive.

The paper is organized as follows. Section 2 provides contextualization with the overlapping but discursive literatures on Chinese FDI, Chinese aid, CIs, and soft power. Section 3 describes the data. Section 4 reports empirical results, and Section 5 concludes.

## 2. CIs, foreign aid from China to African countries, resource targeting, and FDI

### 2.1. Gap between objective magnitudes of FDI flows into Africa and anti-Chinese-FDI rhetoric

The recent rise of investment and trade flows between China and African countries suggests that new attitudes and behaviors, among both Chinese and Africans, could beneficially position both sides for a symbiotic relationship with multiple positive spill-

<sup>1</sup> Several studies precede ours concerning statistical associations between the presence of CIs (or number of CIs) in a particular country and year and various economic outcomes (Lien, Oh, and Selmier, 2012; Lien and Co, 2013; Lien, Ghosh, and Yamarik, 2014; Kim et al., 2015; Xiang and Huang, 2015; Xu, Yao, and Zhang, 2015).

<sup>2</sup> Sun's (2014) Brookings Institution article suggests that China's "tied aid" for infrastructure projects typically favors Chinese companies. In another study linking trade and popular political views, Hanusch (2012) finds that Africans' attitudes toward Chinese trade and FDI are equivalent to those they hold for Western countries.

<sup>3</sup> In our data (described in detail in the next section covering 41 countries over nine years), the pairwise correlation between the presence of CIs and being a recipient of Chinese foreign aid is 0.18 ( $p = 0.00$ ) using China.AidData.org data and 0.20 ( $p = 0.00$ ) using Rand aid data.

over effects flowing for years to come. Opinion data show that Africans have relatively positive attitudes toward Chinese FDI. Similarly, what China reports as *outward direct investment* (ODI)<sup>4</sup> compared to FDI from Western-owned businesses is regarded favorably in the available opinion data.<sup>5</sup>

Despite this positive reception among Africans of trade with China as reflected in the polling data (acknowledging that Africa exports more energy and mineral products to China than any other destination country), the absolute levels of Chinese FDI to African countries remain substantially lower than Western countries' ODI. According to the *World Investment Report* (2015), the most recently (2013–2014) measured flows of Chinese FDI,<sup>6</sup> China accounted for only about 7% of total FDI flow into Africa, which may strike some readers as surprising small given the intense criticism that Chinese FDI has elicited from some segments of Western news media (relative to FDI outflows from France, Greece and the U.S. into Africa).

Ignoring time trends for a moment, one could be forgiven for wondering why there is a gap between objective rankings source countries' FDI outflows to Africa and anti-FDI rhetoric aimed at China. The intensity of criticism of Chinese FDI outflow to Africa would seem at odds with the relatively small absolute levels of FDI actually flowing from China to Africa (compared to flows from other source countries). We simply note this gap and interpret it as motivation for further empirical analysis of the determinants of FDI flows into Africa in general, and for our analysis of the influence of CIs on Chinese FDI flows into Africa in particular, allowing for a multiplicity of objectives which include (but are not restricted exclusively to) Africa's natural resources.

Possible explanations for gaps between objective rankings and FDI-related criticism of China might include that Chinese FDI outflows tend to be concentrated on a small number of African countries and, consequently, China's presence might appear more noticeable in particular African destinations than China's 7% overall share of global FDI flows into Africa would suggest. African countries favored by Chinese FDI investors tend to be resource-rich and have unfortunate track records of poor governance. In particular, 92% of total Chinese ODI between 2003 and 2009 flowed to just 13 Sub-Saharan African countries (Angola, Botswana, the Democratic Republic of the Congo (DRC), Ethiopia, Ghana, Kenya, Madagascar, Niger, Nigeria, South Africa, Sudan, Tanzania, and Zambia), which constitute 78% of sub-Saharan African GDP (Weisbrod and Whalley, 2011).

During the time period in which substantial new investment flows from China (FDI) into sub-Saharan Africa began, the entire Sub-Saharan region's GDP growth achieved an astonishingly fast rate of growth, reaching 9.8% in 2008 (just before follow-on effects from the Great Financial Crisis), which was 2 percentage points above that region's mean annual growth rate in the preceding 10 years. Out-performance of sub-Saharan countries' GDP growth rates raises an intriguing question regarding the positive effects of Chinese FDI on African growth more generally, which includes direct effects as well as indirect positive externalities within and across national borders.

## 2.2. Background literature on Chinese FDI and African countries' natural resources

Natural resources are considered to be among the most important determinants of Chinese FDI according to most theoretical predictions motivating the extensive empirical literature. The empirical evidence demonstrating the importance of natural resources for FDI flows is, in some cases, strong although far more mixed than theory would generally predict. For example, Cheung and Qian (2009) find that host countries' natural resources attract Chinese FDI. Buckley et al. (2007) find no statistically significant effect of a host country's natural resources on FDI inflows in the years 1984–1991 but report positive and significant effects in later years of their sample covering 1992–2001. In contrast, Cheng and Ma (2010) exclude natural resources and institutional quality from their empirical model of Chinese FDI; they find that GDP, cultural proximity, and geographic proximity (i.e., sharing a border with China) are the main determinants of Chinese FDI. Kolstad and Wiig (2012) report that market size is an important determinant of Chinese FDI, which suggests that FDI flows from China are positively associated with host countries' stocks of natural resources and negatively associated with a rank measure of institutional quality. Kolstad and Wiig (2012) also examine an interaction term—natural resource endowment  $\times$  quality of political institutions—finding that host countries that are endowed with larger stocks of natural resources and worse-than-average institutional quality tend to attract FDI inflows, consistent with Asiedu and Lien (2011).

Consistent with our a priori agnostic view, Claassen, Loots, and Bezuidenhout (2011) argue that Chinese FDI to Africa is not driven solely by natural resources (e.g., agricultural land, oil, rare earth metals, etc.) but that market size remains a powerful determinant of Chinese FDI outflows. Their data suggest that African countries with poor institutions and political instability are especially attractive to Chinese FDI insofar as private Chinese investors seek value for money and are willing to accept institutional risks that other FDI investors have avoided. They find that China invests in African countries where agricultural land is particularly underutilized or into countries that enjoy special complementarities with China's domestic agricultural production that can substantially improve China's food security.

<sup>4</sup> China reports ODI, which is well-known in the FDI literature. Although the definitions of ODI and FDI are not identical, for our purposes, we treat them as synonyms and refer to ODI as FDI throughout.

<sup>5</sup> In the other direction, 70% of survey participants in China have favorable views toward Chinese FDI, which is substantially more than the Chinese's 41% favorability rating toward Western FDI (Pew Global Attitudes Survey, 2015).

<sup>6</sup> According to World Investment Report (2014), total FDI inflows to Africa are \$54b measured. The top-five African recipients of FDI from the rest of the world are: South Africa (\$5.7b), Congo (\$5.5b), Mozambique (\$4.9b), Egypt (\$4.8b), and Nigeria (\$4.7b). In the other direction, the World Investment Report does not appear to directly state figures measuring the top investors sending FDI flows into Africa. Using FDI markets (as published in *FDI intelligence*, Financial Times, 2015), it appears that France is the top-ranking FDI investor, responsible for \$18.3b of FDI flowing into Africa in 2014, followed by Greece, the U.S., China and Belgium. Chinese FDI reportedly accounted for 7% of greenfield investment into Africa in 2014, investing a total of \$6.1bn.

Asiedu (2006) examines FDI outflows from the rest of the world into 22 African countries. She finds that natural resources are indeed a significant determinant of FDI flows to the African countries in her study. Other analyses of Chinese FDI to the rest of the world generally support the resource-seeking motives commonly cited (Antkiewicz and Whalley, 2007; Rui and Yip, 2008). Using aggregate data, Cheng and Ma (2007) and Cheung and Qian (2009), for example, show that both market-seeking and resource-seeking motives can explain Chinese FDI outflows.

Critics of Chinese aid to Africa note that aid transfers from the Chinese government to African countries have increased from \$5b in 2006 to \$20b in 2012. Many observers believe that China follows a resource-credit-swap model in which Chinese issuance of aid-backed credit lines for African countries are repaid in local primary goods (e.g., cattle hides in Mali, cotton in Egypt, or copper in Zambia; see, for example, Strange et al., 2013). China watchers criticize China's financing of overseas development projects as unnecessarily complex and opaque (Huang and Wang, 2011). These issues provide further motivation for our empirical investigation into the data-generating process that determines Chinese aid and FDI outflows to Africa.

### 2.3. Background literature on Chinese FDI and African countries' institutional quality

Cheung et al. (2012) find that China's investment into Africa is influenced by market size, political risk, and endowments of host countries' natural resources. They find that FDI flows to African countries are positively associated political stability, corruption, and having stronger prior economic ties to China (e.g., larger trade flows or greater numbers of contracted projects with China). Their evidence also suggests that the resource-seeking motive for FDI outflows from China into Africa is stronger in the recent years (2003–2007) of the timeframe they studied.

Chen et al. (2015) also find empirical support for the view that Chinese FDI is driven by endowments of natural resources in host countries, but they argue that this association is even stronger for Western countries' FDI outflows to Africa. One difference they note, however, is that Western investors tend to stay away from African countries that have a track record of poor governance whereas Chinese investors seem to be especially attracted to investing in such countries.

Buckley et al. (2007) examine contrasting samples of OECD and non-OECD countries, finding—perhaps counterintuitively—that political risk is positively associated with Chinese FDI: a 1% improvement in a host country's political institutions (using political risk indices scaled so that higher values indicate greater stability and lower political risk) is associated with a 1.8% decrease in Chinese FDI. The authors provide several possible explanations for this unexpected empirical relationship. Political risk might, for example, be positively associated with Chinese FDI outflows if Chinese investors find especially profitable opportunities by focusing on relatively high-risk African countries that Western investors avoided because of ethical concerns or human rights. Another possible explanation is that, because Chinese FDI is dominated by state-owned companies, the “private” Chinese investors that make decision about which countries to establish new FDI projects in might reflect political connections between the host and receiving country's governments rather than purely private profit-seeking motives (independent of preferences among government officials). In contrast to the findings of Buckley et al. (2007), Cheung and Qian (2009) find no evidence of any significant effects of political risk (as measured by commonly used indices of institutional quality) on Chinese FDI.

Lum et al. (2009) criticize Chinese aid to Africa, arguing that Chinese aid to Africa is primarily determined by China's desire for natural resources (Morrison, 2009). Foster et al. (2008) similarly criticize African investment projects funded by the Chinese government (which, like many governments, often describes its projects as reflecting purely altruistic rather than strategic motives) as having the primary aim of obtaining natural resources from sub-Saharan Africa to China. Dreher and Fuchs' (2011) empirical model, however, reveals few, if any, robust relationships between Chinese aid payments and recipient countries' relative endowments of natural resources. Some researchers further argue that Chinese aid to Africa depends primarily on political regime types and that the pattern of aid flows can be best understood as reflecting China's preference for African countries that Western governments have stopped supporting based on humanitarian concerns, alleged corruption or bad governance (Kurlantzick, 2006; Human Rights Watch, 2011).

### 2.4. Confucius Institutes and Chinese FDI

The Confucius Institute Headquarters in Beijing is referred to as Hanban (the parent planning organization that directs Chinese government funding to the development of CIs worldwide).<sup>7</sup> Hanban states that its decisions about where to locate a new Confucius Institute (and related policies and development plans) are based primarily on the objectives of: (i) promoting Chinese language and culture internationally, and (ii) strengthening relationships between China and the rest of the world. There are currently 500 CIs worldwide (i.e., outside of China), 46 of which are in Africa. The 46 African CIs are located in 32 of the 54 countries that comprise Africa.<sup>8</sup> South Africa and Kenya have the largest numbers, with five and four CIs, respectively. African countries that have two CIs include Tanzania, Ghana, Egypt, Madagascar, Nigeria, Morocco and Ethiopia. The spatial and temporal distribution of CIs across African country-years is non-uniform concentrations that do not appear easy to explain by population alone. This

<sup>7</sup> <http://english.hanban.org/> [accessed March 6, 2016].

<sup>8</sup> In total, 32 among 54 African countries have one or more CIs. There is another related institution for Chinese language learning and cultural outreach that Hanban refers to as Confucius Classrooms (which is distinct from the more substantial CI). We do not include Confucius Classrooms (CCs) because there are few of them (10 African CCs links listed on Hanban's website) and they likely function as a satellite program with overlapping management. African countries' numbers of CCs (and CIs) include: Comoros 1 CC (0 CIs); Tunisia 1 CC (0 CIs); Tanzania 1 CC (2 CIs); Kenya 1 CC (4 CIs), South Africa 3 CCs (5 CIs), Ethiopia 2 CCs (2 CIs); and Mali 1 CC (0 CIs).

article undertakes to measure the explanatory effects of the joint spatial and temporal distribution of CIs with Chinese FDI outflows across African country-years.

The first African CIs opened in Kenya and South Africa in 2004. Since 2004, the rapidly increasing number of CIs worldwide has been lauded for numerous achievements while also attracting criticism. According to Xinhua (2006),<sup>9</sup> Hanban aims to have opened 1000 CIs by 2020. Among its stated goals is to supply credentialed teachers of Mandarin to foreigners wanting to learn to speak and write Chinese.

Lien et al. (2012) investigate empirical effects of the presence of a CI on Chinese FDI flows and trade. They find a positive effect of the presence of CIs on Chinese exports to developing countries although these effects are, perhaps due to small sample sizes, not always robust to alternative techniques and model specifications. The effect of a CI on direct investment is stronger than its effect on trade flows and stronger in developing countries than in developed countries (Lien et al., 2012). Xu et al. (2015) report a significant positive association between the presence of CIs and Chinese FDI outflows using panel data covering the years 2004–2012. Their analysis reveals that this positive association varies substantially, depending on both cultural similarity and differences in institutional quality between China and the host countries receiving Chinese FDI. Chinese FDI tends to flow to countries with greater cultural similarity and lower measures of institutional quality. Lien and Co (2013) show that CIs helped promote US exports to China at the US-state level. Lien et al. (2014) demonstrate that CIs have the effect of increasing tourism to China from the host country. Relationships between culture and trade flows are analyzed in Oh, Selmier and Lien (2011) and Lien and Oh (2014).

The extant literature and gaps therein suggest several hypotheses that motivate further empirical investigation. The literature, as yet, appears mixed, with conflicting results and methodological sensitivities preventing students of Chinese FDI outflows from coalescing on a well-established set of empirical regularities. Our focus in this paper is Chinese FDI outflows to Africa. We report new descriptive evidence regarding the joint explanatory power of CIs, Chinese aid flows, and destination countries' natural resources (while controlling for other destination country characteristics) on Chinese FDI outflows to Africa.

The literature provides considerable evidence of relationships between Chinese aid and FDI although these relationships are sometimes fragile, or they disappear in particular time periods or with different estimation techniques. Chinese investment projects may result from a joint decision-making process in which the Chinese state has some influence, which could generate links between aid and trade. Intuition would suggest that these potential links would be especially relevant concerning FDI decisions by Chinese state-owned enterprises (SOEs). Our empirical models allow the count variable measuring the number of CIs in African country-years to influence Chinese FDI outflows jointly with Chinese aid flows and destination countries' characteristics. Our evidence reveals a data-generating process that cannot be neatly separated into isolated decision-making channels of government and private FDI investors.

Kaplinsky and Morris (2009) describe how the Chinese Export-Import Bank (China EXIM Bank) provides aid to Angola tied to quid-pro-quo decisions: the Angolan government purchases Chinese inputs, and Chinese SOEs make large investments installing new physical capital in Angola. Kaplinsky and Morris (2009) argue that, at least in the case of Angola, Chinese SOEs have won large infrastructure projects for everything from mineral extraction to construction of highways and railways in this manner. China's stated policies are to provide overseas aid to projects that are both politically sensitive and economically strategic.

### 3. Data

#### 3.1. Data Sources

Table 1 shows data sources for variables used in the subsequent empirical analysis. The years for which all data sources are available provide nine years of data coverage in the estimation sample, from 2004 (the first year CIs appeared in Africa) through 2012.

#### 3.2. Confucius Institute count data for African country-years

CI count data are provided by Hanban, available as country-specific links on its website. There are some gaps between the year in which CIs were opened (correctly coded in our count variable, CI) and what is frequently mis-reported as the “first CI” in Seoul, South Korea, in December 2004. In fact, there were already CIs in Kenya and South Africa in 2004, which is therefore the first year of our sample. There are nine years of observations and 41 countries.<sup>10</sup> That gives a maximum possible number of observations of 9 years  $\times$  41 countries = 369 country-years. Missing observations of FDI and Chinese aid significantly reduce the number of observations, however, leaving us with an unbalanced panel for econometric analysis.

#### 3.3. Three dependent variables used to extract evidence about CIs and China FDI Outflow

We first estimate the effect of CIs on Log China FDI Outflow (and, as a robustness check of the transformation used to construct the dependent variable,  $\sinh^{-1}(\text{China FDI Outflow})$ ), while controlling for Chinese aid to African country-years and mineral

<sup>9</sup> [http://news.xinhuanet.com/english/2006-10/02/content\\_5521722.htm](http://news.xinhuanet.com/english/2006-10/02/content_5521722.htm).

<sup>10</sup> The 41 African countries for which data are available are: Angola, Burundi, Benin, Burkina Faso, Botswana, Cote d'Ivoire, Cameroon, Congo Republic, Algeria, Egypt, Ethiopia, Gabon, Ghana, Guinea, Guinea-Bissau, Gambia, Kenya, Liberia, Libya, Morocco, Madagascar, Mali, Mozambique, Mauritania, Mauritius, Malawi, Namibia, Nigeria, Niger, Rwanda, Sudan, Senegal, Sierra Leone, Togo, Tunisia, Tanzania, Uganda, South Africa, Congo Democratic, Zambia, Zimbabwe.



**Table 1**  
Variables and data sources.

Variable	Description	Data source
Log China FDI Outflow	$\ln(\text{Bi-lateral FDI outflows from China to an African country-year} + 1)$	UNCTAD
$\sin^{-1}(\text{China FDI Outflow})$	$\sin^{-1}(\text{Bi-lateral FDI outflows from China to an African country-year})$	
Log GDP per capita	GDP per capita, PPP (current international dollars), transformed by natural logarithm $\ln(\text{GDP per capita})$	WDI
Institutional quality	Sum of 12 ICRG political risk variables (coded such that larger values capture higher-quality political institutions) for an African country-year	PRS Group, Political Risk Indexes
Log China Aid	Total aid, official and unofficial, from China to an African country-year (in current US\$), transformed by natural logarithm $\ln(\text{China Aid})$ [Note: Source 1 <a href="http://China.AidData.org">China.AidData.org</a> is default Aid Data source unless explicitly labeled as Rand Aid data.]	source 1: <a href="http://China.AidData.org">China.AidData.org</a> source 2: Rand Aid Data
Log Mineral Exports to China	Mineral Exports from African country-year to China	UN Comtrade
Log Mineral Exports to RoW	Mineral Exports from African country-year to Rest of World (RoW)	UN Comtrade
Confucius Institutes	Count variable measuring the number of Confucius Institutes in an African country-year	Hanban
Log GDP	GDP (current US\$), transformed by natural logarithm $\ln(\text{GDP})$	WDI
Log Trade	Total export and imports (% of GDP), transformed by natural logarithm	WDI
Log Inflation	Consumer Price Index (annual % change), transformed by natural logarithm	WDI
Log Distance	Geographic distance (in kilometers) from Shanghai to African Country's city with largest population, transformed by natural logarithm	CEPII

exports to China and to the rest of the world, used as a proxy for marketable endowments of natural resources. Table 2 presents OLS estimates of two dependent variables that transform the raw level of FDI outflows in different ways. The natural log of China FDI Outflow + 1 is our primary dependent variable although we also estimated models using the asymptotically equivalent inverse hyperbolic sine transformation (denoted  $\sinh^{-1}(\cdot)$ ) as discussed below.

A second empirical effect we measure is the effect of CIs and natural resources on Chinese aid outflows to Africa, analyzed as the second main dependent variable in our analysis. Aid outflow (the variable referred to as Log China Aid) is a control variable (lagged one year) in the Log China FDI Outflow equation described in the previous paragraph. But then Log China Aid becomes the dependent variable, providing an empirical test of whether CIs statistically influence aid flows. A third dependent variable is the CI count variable itself. To examine the possibility of reverse causality, we estimate effects of lagged Log China FDI Outflow and lagged Log China Aid (together with natural resources and other control variables) on the expected number of CIs.

When estimating empirical models of each of the three primary dependent variables—Log China FDI Outflow, Log China Aid, and the number of Confucius Institutes—our main empirical models are specified with all right-hand-side variables lagged by one year to deal with likely endogeneity. In the supplementary appendices described below, we also report versions of these same lagged specifications with country and year fixed effects included; we re-estimate the models using contemporaneous rather than lagged-right-hand-side specifications; and finally we report simultaneous equations models estimated by three-stage least squares (3SLS). The empirical results point to CIs as an expression of Chinese soft power that has effects on China's FDI outflows to Africa independent of Chinese aid outflow (in the sense of not being fully subsumed by controls for Chinese aid).

The primary dependent variable is the natural logarithm of China FDI Outflow. There are country-years in which China FDI Outflow is negative, however, because of depreciation and/or divestment (e.g., when a private Chinese owner sells a company it owns domiciled in Africa). Appendix 1 shows the empirical distribution of  $\ln(\text{China FDI Outflow} + 1)$  as being relatively symmetric and statistically well-behaved (with an upper tail that includes Sudan in 2011 and South Africa in 2007). To include negative observations of China FDI Outflow (without discarding them as we do when using the natural logarithm transformation), we use the so-called Inverse Hyperbolic Sine (IHS) transformation  $\sinh^{-1}(\text{China FDI Outflow})$ , which can handle negative values of its argument and behaves asymptotically like the natural logarithm as the argument becomes large.<sup>11</sup> Empirical models are estimated for both these dependent variables capturing Chinese FDI outflows.

### 3.4. Two sets of Chinese Aid data: [ChinaAid.org](http://ChinaAid.org) and Rand Aid data

There are two sets of data used to measure flows of Chinese aid into each African country-year (although not all country-years are available). The first data source is [ChinaAidData.org](http://ChinaAidData.org) (Tierney et al., 2011), which uses a methodology for combining official aid

<sup>11</sup> The inverse hyperbolic sine (IHS) transformation is  $\sinh^{-1}(x) = \ln(x + (x^2 + 1)^{0.5})$ . Its domain is the entire real line. IHS can therefore accept negative FDI outflow values as inputs. For example, if a Chinese-owned enterprise operating overseas were sold to non-Chinese buyers, then China FDI Outflow could be negative. Notice that for sufficiently large  $x$ , IHS approaches the natural logarithm function,  $\ln(x)$ , shifted up by the constant  $\ln(2)$ . To see this, note that the difference,  $\sinh^{-1}(x) - \ln(x) = \ln(x + (x^2 + 1)^{0.5}) - \ln(x) = \ln(1 + (1 + 1/x^2)^{0.5})$ , approaches  $\ln(2)$  as  $x$  becomes large. Therefore, empirical studies of FDI sometimes apply IHS to handle data with occasional negative values of FDI. Marginal effects estimated in a model of IHS(FDI) with mostly positive values of FDI can be interpreted as slight underestimates of analogous effects on expected  $\ln(\text{FDI})$  (e.g., Burbidge, Magee and Robb, 1988; Busse and Hefeker, 2007).

data released by the Chinese government and unofficial aid projects from worldwide media coverage referred to as Tracking Underreported Financial Flows (TUFF, Strange et al., forthcoming). The second set of measures of Chinese aid is published by Rand, referred to in this paper as the Rand Aid data. Proponents of the Rand Aid data view it as more objectively accurate than those relying on data released by the Chinese government. The disadvantage of the Rand Aid data, however, is that a substantially larger number of country-year observations are missing due to lack of reliable information. We estimate all empirical results using both sources of aid data.

### 3.5. Other control variables in Table 1

Mineral resource exports are published in the UN Comtrade Database.<sup>12</sup> The empirical models also control for income, geographic distance from China, inflation, trade, and institutional quality. We use natural logarithm transformations of income per capita,  $\ln(\text{GDP per capita})$ , to measure income and  $\ln(\text{GDP})$  to measure absolute market size.

## 4. Results

### 4.1. Effects of Confucius Institute (CIs) on China FDI Outflow to African country-years?

The empirical results in this section focus on three sets of estimated conditional expectations. The first and primary conditional expectation is Log China FDI Outflow. The regressions below describe how expected Log China FDI Outflow is affected by (i.e., percentage changes in China FDI Outflow associated with one-unit changes in) the number of CIs, Log China Aid, and Log of Mineral Exports to China (while controlling for other standard macroeconomic variables that appear in most empirical models of trade flows).

Table 2 reports 12 empirical models of China FDI Outflow based on two versions of the dependent variable, two sources of aid data, and three specifications of the empirical model (starting with a basic specification, adding variable measuring the number of CIs, and finally additional macro controls). All right-hand-side variables in Table 1 are lagged one year so that coefficients measure changes in log-approximated percentage points (on a 0–1 scale representing 0 to 100%) in expected next-year China FDI Outflow to an African country. CIs have large and statistically significant effects in seven of the eight models in Table 2 in which the variable appears. The presence of a CI raises expected Chinese FDI in the subsequent year by 50 to 94%. Mineral exports and Chinese aid are significantly associated with next-year FDI outflows when the dependent variable is Log China FDI Outflow but rarely so for  $\sinh^{-1}(\text{China FDI Outflow})$ .

If the information content in the count of CIs in each African country-year were completely accounted for by Chinese soft power as expressed through aid and natural resource flows (as proxied by mineral exports to China), then one would expect those two variables (Log China Aid and Log Mineral Exports to China) to absorb the entire statistical association between CIs and Log China FDI Outflow. But the data show otherwise. Notwithstanding those other controls, Table 2 reveals an independent and economically significant effect of CIs on subsequent FDI outflows. The coefficient on CI in Table 2 ranges from 0.501 to 0.939. The presence of an extra CI can therefore be associated with an increase in expected FDI of roughly 50 to 94%. To put this in context, we calculate how large a value ( $x_1$  relative to the sample average  $x_0$ ) in another right-hand-side variable, say Log Chinese Aid ( $x$ ), is required to produce a similar-sized increase in expected FDI using that other variable's effect size from the same empirical model. We suppose that the CI-elasticity of FDI is 0.501 (using the smallest effect size of CI from the third column of Table 2). From the same empirical model in Table 2, the Chinese-Aid-elasticity of FDI is 0.137. To generate an equal-sized effect on expected FDI, a country-year in our sample would have to have Chinese Aid flows 265% above the sample average:  $(x_1/x_0) = 0.501/0.137 = 3.65$ , a 265% increase in expected China FDI Outflow.<sup>13</sup>

Recent econometric research points to potential problems with the log-linear specification so commonly used in applied econometrics, which, according to Silva and Tenreiro (2006), can lead to overstatement of effect sizes. Silva and Tenreiro propose a Poisson Pseudo-Maximum-Likelihood (PPML) estimator that succeeds at improving accuracy, despite maximizing what is, strictly speaking, an incorrect likelihood objective (using a discrete Poisson probability density function for a continuously valued dependent variable with non-negative support). As confirmed in simulation studies, PPML typically produces more conservative (i.e., smaller-magnitude) coefficient estimates. Based on these benefits of PPML estimation in Silva and Tenreiro (2006), we re-estimate the Log China FDI Outflow model and all subsequent models using PPML. Statistical significance and effect size closely match those of analogous models estimated by OLS.<sup>14</sup>

Table 3 reports empirical models of Log China FDI Outflow estimated by PPML, with two sources of aid data and three model specifications as before. The more conservative estimates in Table 3 can be interpreted as lower bounds on the true effect of CIs on FDI, indicating an economically significant 11 to 19% increase in FDI outflows associated with an additional CI (while controlling for aid flows, natural resources, and other standard macroeconomic controls). Aid and natural resources, together with CIs,

<sup>12</sup> The UN Comtrade Database includes petroleum products under the heading "minerals." From UN Comtrade's online data description, we have that "Mineral fuels, lubricants and related materials" includes the following: "32 - Coal, coke and briquettes; 33 - Petroleum, petroleum products and related materials; 34 - Gas, natural and manufactured; 35 - Electric current." <http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=14>.

<sup>13</sup> See Akhtaruzzaman, Berg and Hajzler (2017) and Berg and Gabel (2015, 2017) for further detail on simulating counterfactuals with unbalanced panel data.

<sup>14</sup> There are occasional discrepancies in numbers of observations due to PPML's requirement of all non-negative values. The dependent variables in Table 1 take on some negative values as shown in the summary statistics in Appendix 2.

**Table 2**

Empirical models of Log China FDI Outflow estimated by OLS, with two sources of Chinese aid data, three model specifications (1, 2, 3), and two versions of the dependent variable, Log China FDI Outflow and sinh-1(China FDI Outflow).

Variables	ChinaAid.org Aid data						Rand Aid data					
	Log China FDI Outflow			sinh-1(China FDI Outflow) sinh-1(China FDI Outflow)			Log China FDI Outflow			sinh-1(China FDI Outflow) sinh-1(China FDI Outflow)		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Log GDP per capita (1-year lag)	−0.068 (0.250)	−0.206 (0.225)	−0.048 (0.253)	−0.411 (0.381)	−0.497 (0.364)	−0.117 (0.378)	−0.347 (0.446)	−0.820* (0.425)	−0.875* (0.513)	−1.346 (0.901)	−1.519 (0.910)	−1.984* (1.179)
Institutional quality (1-year lag)	−0.002 (0.014)	0.001 (0.013)	−0.004 (0.013)	0.011 (0.021)	0.011 (0.021)	0.000 (0.019)	−0.025 (0.020)	0.000 (0.022)	0.006 (0.022)	−0.018 (0.046)	−0.004 (0.056)	0.023 (0.048)
Log China Aid (1-year lag)	0.212*** (0.059)	0.159*** (0.051)	0.137** (0.060)	0.176* (0.098)	0.118 (0.080)	0.083 (0.088)	0.106 (0.064)	0.107* (0.062)	0.108 (0.065)	0.125 (0.148)	0.108 (0.143)	0.053 (0.134)
Log Mineral Exports to China (1-year lag)	0.098*** (0.033)	0.087*** (0.032)	0.081** (0.035)	0.141** (0.065)	0.126** (0.064)	0.135** (0.066)	0.111** (0.048)	0.095** (0.047)	0.097* (0.055)	0.185 (0.125)	0.155 (0.120)	0.169 (0.113)
Log Mineral Exports to RoW (1-year lag)	0.100 (0.076)	0.062 (0.073)	0.066 (0.086)	−0.028 (0.125)	−0.067 (0.119)	0.042 (0.142)	0.149 (0.104)	0.150 (0.104)	0.195 (0.116)	0.067 (0.238)	0.027 (0.232)	0.265 (0.218)
Confucius Institutes (1-year lag)		0.708*** (0.169)	0.501** (0.209)		0.635* (0.382)	0.634* (0.361)		0.604*** (0.197)	0.687** (0.290)		0.581 (0.572)	0.939* (0.525)
Log GDP (1-year lag)			0.078 (0.236)		−0.433 (0.371)			−0.145 (0.368)			−0.474 (0.743)	
Log Inflation (1-year lag)			0.257 (0.250)		0.715** (0.325)			0.178 (0.335)			1.067 (0.647)	
Log Distance			0.276 (1.145)		0.261 (2.514)			−0.591 (1.446)			−2.572 (3.507)	
Log Trade (1-year lag)			−0.559 (0.751)		−1.118 (1.011)			0.065 (0.898)			0.705 (2.492)	
Observations	122	122	113	135	135	125	50	50	46	58	58	53
R-squared	0.256	0.377	0.412	0.087	0.123	0.170	0.342	0.449	0.482	0.146	0.171	0.241
BIC	475.26	460.34	439.70	660.21	659.63	628.10	187.59	183.13	181.35	313.26	315.58	302.37
AIC	458.44	440.71	409.70	642.78	639.29	596.99	176.12	169.74	161.24	300.90	301.16	280.70

Robust standard errors appear in parentheses with statistical significance indicated by: \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.10$ .



**Table 3**  
Empirical models of Log China FDI Outflow estimated by Poisson Pseudo-Maximum-Likelihood.

VARIABLES	ChinaAid.org Aid data			Rand Aid data		
	Log China FDI Outflow			Log China FDI Outflow		
	(1)	(2)	(3)	(1)	(2)	(3)
Log GDP per capita (1-year lag)	0.028 (0.050)	−0.073 (0.078)	−0.016 (0.091)	−0.110 (0.116)	−0.247** (0.125)	−0.261* (0.144)
Institutional quality (1-year lag)	−0.003 (0.003)	−0.001 (0.004)	−0.001 (0.004)	−0.006 (0.005)	−0.000 (0.006)	0.002 (0.006)
Log China Aid (1-year lag)	0.069*** (0.019)	0.047*** (0.017)	0.045** (0.019)	0.028 (0.017)	0.026 (0.017)	0.030* (0.017)
Log Mineral Exports to China (1-year lag)	0.037*** (0.012)	0.031*** (0.012)	0.028** (0.013)	0.033** (0.015)	0.029** (0.014)	0.030* (0.017)
Log Mineral Exports to RoW (1-year lag)		0.015 (0.023)	0.020 (0.026)	0.036 (0.027)	0.038 (0.028)	0.059* (0.031)
Confucius Institutes (1-year lag)		0.164*** (0.040)	0.112** (0.053)		0.156*** (0.045)	0.193*** (0.072)
Log GDP (1-year lag)			0.009 (0.076)			−0.069 (0.115)
Log Inflation (1-year lag)			0.082 (0.084)			0.055 (0.098)
Log Distance			−0.094 (0.320)			−0.300 (0.383)
Log Trade (1-year lag)			−0.164 (0.229)			−0.010 (0.235)
Observations	122	122	113	50	50	46
R-squared	0.275	0.361	0.403	0.344	0.432	0.463
BIC	478.97	480.49	462.82	199.13	200.15	207.76
AIC	464.94	460.86	432.82	187.78	186.91	187.64

Robust standard errors appear in parentheses with statistical significance indicated by: \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.10$ .

are statistically and economically significant in the most fully parameterized model using either source of aid data. We interpret this as evidence that CIs exert an independent and economically important effect on FDI in addition to the effects of aid (an alternative mechanism of Chinese soft power) and the natural resources motive that critics of Chinese typically emphasize.

**Table 4**  
Empirical models of Log China Aid estimated by Poisson Pseudo-Maximum-Likelihood.

Variables	ChinaAid.org Aid data			Rand Aid data		
	Log China Aid			Log China Aid		
	(1)	(2)	(3)	(1)	(2)	(3)
Log GDP per capita (1-year lag)	−0.067*** (0.023)	−0.068*** (0.023)	−0.059** (0.025)	−0.026 (0.037)	−0.025 (0.037)	−0.003 (0.046)
Institutional quality (1-year lag)	−0.000 (0.001)	−0.000 (0.001)	−0.000 (0.001)	−0.003 (0.002)	−0.003 (0.002)	−0.005** (0.002)
Log Mineral Exports to China (1-year lag)	0.014*** (0.004)	0.013*** (0.004)	0.011*** (0.004)	0.004 (0.005)	0.002 (0.005)	−0.002 (0.004)
Log Mineral Exports to RoW (1-year lag)	0.007 (0.007)	0.005 (0.007)	−0.005 (0.007)	0.006 (0.009)	0.002 (0.009)	−0.017* (0.010)
Confucius Institutes (1-year lag)		0.033*** (0.011)	−0.013 (0.015)		0.022* (0.012)	−0.042** (0.019)
Log GDP (1-year lag)			0.054*** (0.018)			0.082*** (0.027)
Log Inflation (1-year lag)			0.004 (0.018)			−0.010 (0.014)
Log Distance			0.273*** (0.097)			0.500*** (0.118)
Log Trade (1-year lag)			−0.079 (0.049)			−0.011 (0.082)
Observations	140	140	130	58	58	53
R-squared	0.175	0.216	0.340	0.151	0.179	0.451
BIC	734.28	737.32	699.67	314.50	318.09	303.60
AIC	719.57	719.67	670.99	304.20	305.73	283.90

Robust standard errors appear in parentheses with statistical significance indicated by: \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.10$ .

#### 4.2. Do CIs and natural resources predict Chinese aid flows?

Having confirmed in Tables 2 and 3 that CIs predict Chinese FDI outflows, the next empirical model in Table 4 investigates whether CIs and natural resources predict Log China Aid as the dependent variable. Table 4 reports PPML estimates of Log China Aid. Table 4 shows that once the full set of controls are included, then CIs do not positively predict aid flows the subsequent year. We interpret these results as demonstrating that while aid flows are no doubt one means of expressing soft power, CIs should be viewed an independent and novel dimension of China's soft power. The overly simple view espoused by critics of the Chinese government as narrowly pursuing a single resource-driven objective would be hard-pressed to explain the multiple, independent dimensions implicit in the irreducibly vector-valued column space of variables in Tables 3 and 4 predicting trade and aid.

#### 4.3. Do aid flows and natural resources predict CIs?

Table 5 presents a final set of empirical results in which the dependent variable is the CI count variable. If aid and CIs were proxies for a single dimension of soft power, then one would expect CIs to predict aid (Table 4) and aid to predict CIs (Table 5), neither of which is observed in our data. If China's soft power amounted to nothing more than resource seeking, then one would expect mineral resource exports to be strongly associated with, and absorb, a large share of the variation in both Log China Aid (Table 4) and CIs (Table 5). Although there are one or two effects whose signs are consistent with that hypothesis, the evidence as revealed in Tables 4 and 5 overall rejects such narrow interpretations. The statistical associations between aid and CIs seen in the smaller models in Tables 4 and 5 all shrink toward zero or become negative once all controls are included. This attenuation (or disappearance) of any strong associations between aid and CIs contradicts the hypothesis that both are proxies for a unidimensional Chinese soft power primarily serving the objective of natural resources.

#### 4.4. Robustness checks

The PPML models estimated in Tables 3, 4 and 5, in general, track well with OLS results. Interaction terms between institutional quality and aid or CIs overturn none of the qualitative interpretations of the results in Tables 3, 4 and 5. We investigated different statistical filters of the time series data to deal with possible statistical problems arising from time trends, all of them fraught with the challenge of relatively few observations in the time dimension (i.e., a maximum of 9 years in our data). In the opposite direction, some authors in the FDI literature report regression models with no time dimension based on time-averaged data. Appendices 3 through 5 therefore present re-estimated versions of Tables 3 through 5 but this time using time-averaged data (with tiny sample sizes consisting of the number of African countries with valid observations of FDI and aid for all nine years of the sample). There are no negative values of FDI after time averaging and the effect size of CIs on FDI is far larger than in Table 3. In Appendix 3, an extra CI is associated with a 20 to 40 percentage-point increase in China FDI Outflow in the

**Table 5**  
Empirical models of the number of CIs estimated by Poisson Pseudo-Maximum-Likelihood.

Variables	ChinaAid.org aid data		Rand Aid data	
	Confucius Institutes		Confucius Institutes	
	(1)	(2)	(1)	(2)
Log GDP per capita (1-year lag)	0.187 (0.190)	−0.088 (0.261)	0.110 (0.295)	−0.455 (0.776)
Institutional quality (1-year lag)	0.006 (0.010)	0.006 (0.011)	−0.019 (0.015)	0.009 (0.028)
Log China Aid (1-year lag)	0.162*** (0.053)	0.006 (0.043)	0.015 (0.038)	−0.069 (0.049)
Log Mineral Exports to China (1-year lag)	0.031 (0.032)	−0.018 (0.033)	0.108** (0.051)	−0.019 (0.048)
Log Mineral Exports to RoW (1-year lag)	0.097 (0.068)	−0.087 (0.065)	0.055 (0.072)	−0.104 (0.119)
Log GDP (1-year lag)		0.848** (0.168)		( )
Log Inflation (1-year lag)		0.220 (0.155)		( )
Log Distance		0.675 (0.654)		( )
Log Trade (1-year lag)		0.308 (0.597)		( )
Observations	143	133	59	54
R-squared	0.336	0.617	0.320	0.706
BIC	303.12	269.63	153.36	134.33
AIC	285.35	240.73	140.90	114.44

Robust standard errors appear in parentheses with statistical significance indicated by: \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.10$ .

subsequent year in Appendix 3. Similarly as in Table 4, Appendix 4 reveals no consistent evidence of CIs being positively associated with Chinese aid flows to Africa. And no consistent evidence emerges from Appendix 5 that aid flows are positively associated with CIs. There are even some statistically significant negative associations in Appendix 5.

There are potential problems of endogeneity among Chinese FDI outflows, Chinese foreign aid flows and the number of CIs. In Appendix 6, we re-estimate our main results including year and country fixed effects in the three main empirical models of Tables 3 through 5. The main qualitative findings (in terms of sign, approximate effect size, and statistical significance) remain largely the same with the following modification. The significant effects of Log Mineral Exports to China on Log China FDI in Tables 2 and 3 disappear once year and country fixed effects are included.

In Appendix 7, we re-estimate models of Log China Aid and Confucius Institutes from Tables 4 and 5, this time including Log China FDI Outflow as an additional right-hand-side variable, which overturned none of the main qualitative findings from those two tables. In Appendix 8, we once again re-estimate the Log China Aid and Confucius Institutes models from Tables 4 and 5, this time, with contemporaneous rather than lagged right-hand-side variables. The absence of contemporaneous effects of CIs on Log China Aid or vice versa in Appendix 8 provides support for the lagged right-hand-side specifications in Tables 2 through 5. In Appendix 9, we estimate two simultaneous equations models using different identifying restrictions (while allowing for endogeneity among Log China FDI Outflow, Log China Aid, and Confucius Institutes), estimated by three-stage least squares (3SLS). In all cases, the simultaneous equations results in Appendix 9 demonstrate that Log China Aid and CIs have large, independent and statistically significant effects on Log China FDI Outflow. The simultaneous equations models support the view that CIs are a form of soft power which facilitates FDI projects while having independent importance not entirely subsumed by the resource seeking motive.

Multicollinearity is another potential problem in our data especially among variables measuring the number of CIs, Chinese foreign aid flows, and minerals exports. Appendix 10 shows variance inflation factor (VIF) calculations commonly used to measure the severity of multicollinearity for variables used in the empirical models. Commonly used rules of thumb for diagnosing severe multicollinearity are thresholds such as  $VIF > 5$  or  $VIF > 10$ , which would indicate severe problems. Fortunately these problems are not indicated by the VIF calculations in Appendix 10, which are all below 5 and mostly below 2.

## 5. Conclusion

We estimate conditional expectations of Log China FDI Outflow, Log China Aid, and the number of Confucius Institutes (CIs), which vary by African country and year from 2004 to 2012. We find that CIs and aid, together with natural resources, have joint predictive power on the subsequent year's Chinese FDI outflows. CIs are not positively associated with a subsequent year's aid flows. And aid flows are not positively associated with a subsequent year's expected number of CIs. We interpret the evidence revealed by these three sets of empirical models as suggesting that CIs are indeed an expression of Chinese soft power; that the objectives underlying this expression of soft power are not entirely subsumed by natural resource seeking; and those objectives cannot therefore be unidimensional. The data show clearly that CIs and aid flows are not positive predictors of each other and not subsumed (i.e., made to disappear) by the inclusion of controls for mineral resources. Thus, the presence of a CI reveals independent, novel, and economically significant information about future trade flows that cannot be explained away easily by differences in natural resources or other control variables commonly found in empirical models of trade flows.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.chieco.2017.02.004>.

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