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**Abstract:** China's development finance is sizable but reliable information is scarce. To address critical information gaps, we introduce a new open source methodology for collecting project-level development finance information and create a database of Chinese official finance to Africa from 2000-2011. Our initial data collection efforts found that China's official finance commitments amount to approximately US$ 73 billion over the 2000-2011 period. We provide details on 1,511 non-investment projects to 50 African countries. We use this database to extend previous research on the aid-conflict nexus. Our results show that sudden withdrawals of "traditional" aid are only more likely to induce conflict in the absence of sufficient alternative funding from China. More broadly, these findings highlight the importance of gathering better data on the development activities of China and other non-traditional donors to better understand the link between foreign aid and conflict.

**Keywords:** Development Finance; Foreign Aid; Non-DAC Donors; South-South Cooperation; China; Aid Shocks; Violent Armed Conflict

* This article is accompanied by the release of AidData's Chinese Official Finance to Africa Dataset, Version 1.1, available for download at http://china.aiddata.org/datasets/1.1 and an interactive database platform (at http://china.aiddata.org). AidData's Tracking Underreported Financial Flows (TUFF) methodology is also available for download at http://china.aiddata.org/TUFF_codebook. An earlier version of this article – entitled "China's Development Finance to Africa: A Media-Based Approach to Data Collection," co-authored with Vijaya Ramachandran – is available as working paper of the Center for Global Development (CGD Working Paper 323). We thank Owen Barder, Deborah Bräutigam, Bruce Bueno de Mesquita, Chuan Chen, Vivien Foster, Fang He, Cullen Hendrix, Nataliya Pushak, Mona Sehgal, Arvind Subramanian, Bann Seng Tan, Yan Wang, Eric Werker, and Franck Wiebe for comments on earlier drafts of this paper. We also thank Julie Walz for her contributions to the paper while a Policy Analyst at the Center for Global Development. We owe a debt of gratitude to Brian O'Donnell, who managed the team of research assistants at the College of William and Mary responsible for the creation of AidData's China's Official Finance to Africa Dataset, Version 1.0, and Robert Mosolgo, who created the online coding interface for our research assistants and the interactive database platform at http://china.aiddata.org. Wen Chen, Sarah Christophe, Alexandria Foster, Jaclyn Goldschmidt, Dylan Kolhoff, Patrick Leisure, Kevin McCrory, Alex Miller, Henrique Passos Neto, Grace Perkins, Charles Perla, Kyle Titlow, Wendy Wen, and Amber Will provided outstanding research assistance during the project. The authors are solely responsible for any errors or shortcomings in this article.

## 1. INTRODUCTION

Over the last decade, foreign assistance from non-Western governments has increased sharply—both in absolute terms and as a share of global development finance (Manning 2006; Woods 2008; Walz and Ramachandran 2011; Dreher et al. 2011, 2013; Fuchs and Vadlamannati 2013). The emerging "Aid 2.0" architecture (The Economist 2011) poses a challenge to the existing aid regime that is organized around the Development Assistance Committee (DAC) of the Organization for Economic Cooperation and Development (OECD). Increasing donor competition grants developing countries the opportunity to "shop around" for the types of development finance that best suit their interests (Dreher et al. 2013). The rapid increase in development finance from governments that do not report to the DAC also raises a set of vexing questions for scholars and policymakers. How much funding do these non-DAC donors provide, to whom and on what terms? What impact do non-DAC sources of finance have on economic development, democratization, debt sustainability, environmental outcomes, conflict and violence in developing countries? China, Russia, Venezuela, and India are thought to provide billions of dollars in assistance every year (Walz and Ramachandran 2011), but most of these "new" suppliers of development finance have chosen not to participate in existing reporting systems, such as the OECD's Creditor Reporting System (CRS) or the International Aid Transparency Initiative (IATI).[1]

China is of particular interest to researchers and policymakers because of the perceived scale and opaqueness of its activities in developing countries. Western policymakers have accused China of expanding its presence in Africa for largely self-interested reasons: securing access to natural resources, subsidizing Chinese firms and exports, cementing and expanding political alliances, and pursuing global economic hegemony.[2] China counters that its investment in Africa "[…] is based on respecting the will of Africa, listening to the voice of Africa and caring about the concerns of Africa, thus earning the trust of most African countries."[3] With increasing development activities all over the African continent, China's development finance has come under intense scrutiny over the last decade. To analyze recipient perceptions, Milner et al. (2013) have conducted a field experiment that included 3,600 participants

[1] There are widely varying levels of commitment to transparency among non-DAC suppliers of development finance. For example, Brazil, India, South Africa, and many of the new Eastern and Central European donors have demonstrated a higher level of interest in data disclosure and compliance with international reporting standards (Aufricht et al. 2012; Sinha and Hubbard 2012). Russia has recently started to provide aggregate bilateral aid data to the CRS.

[2] See Dreher and Fuchs (2012) for a summary of the relevant literature.

[3] "Is China an irresponsible friend of Africa?" *People's Daily Online*, 16 August 2006, available at http://english.peopledaily.com.cn/90883/7899133.html.

suggesting that in Uganda public opinion about Chinese "aid" projects is worse than opinions about US or World Bank aid projects. African policymakers are divided on the issue of whether, to what degree, and how Chinese development finance impacts social, economic, environmental, and government outcomes.[4] While some leaders perceive Chinese financing as better suited to Africa's needs, others feel threatened by China's growing presence in their countries.[5] Adjudicating between these competing claims has proven difficult because Beijing discloses very little official information about its development finance activities. In the absence of reliable and comprehensive data about Chinese development finance, much of the conventional wisdom about Chinese development finance rests on untested assumptions, individual case studies, and incomplete data sources.[6]

As a result of this lack of data, scholars cannot account for China's development activities in quantitative studies of the allocation, effectiveness and (unwelcome) side-effects of aid. Since China is said to have emerged as the most important non-Western source of development finance, this omission may considerably bias research results. To understand the allocation pattern and consequences of development aid and similar activities, scholarship needs to get the whole picture to give reliable answers to research questions involving aid and conflict, geopolitical competition, and connections between aid shocks and violence. To address these critical information gaps, we (a) systematize a web-based, open source methodology for collecting project-level development finance information; and (b) create a comprehensive database of Chinese development finance flows to Africa from 2000-2011. We then use this database to replicate the findings by Nielsen et al. (2011), who show that aid shocks significantly increase the likelihood of conflict onset. Building upon these findings, our new empirical results suggest

[4] We discuss this in more detail in a previous version of this paper (Strange et al. 2013).

[5] See, for example, evidence reported in media reports: Wade, Abdoulaye, "Time for the West to Practice What It Preaches," *Financial Times*, 23 January 2008, available at http://www.ft.com/intl/cms/s/0/5d347f88-c897-11dc-94a6-0000779fd2ac.html#axzz295bvXrn1; Kagame, Paul, "Why Africa Welcomes the Chinese," *The Guardian*, 2 November 2009, available at http://www.guardian.co.uk/commentisfree/2009/nov/02/aid-trade-rwanda-china-west; Conway-Smith, Erin, "Zambian Election Results Check Chinese Influence in Africa," *Global Post*, 25 September 2011, available at http://www.globalpost.com/dispatch/news/regions/africa/110924/zambian-election-results-check-chinese-influence-africa.

[6] The Chinese authorities have taken some modest steps to make their development finance activities more transparent in recent years. The State Council's release of the inaugural "White Paper on China's Foreign Aid" in April 2011 is one of several encouraging developments in this regard (State Council 2011). However, official sources do not cover most of Chinese development finance activities; nor do they consistently specify financial amounts or forms of support at the project level.

that sudden withdrawals of "traditional" aid are only more likely to induce conflict in the absence of sufficient alternative funding from China.

This paper is structured as follows. Section 2 provides an overview of previous attempts to measure Chinese development finance and identifies some of the key factors that have impeded the creation of accurate, detailed, and comprehensive data. In Section 3, we introduce our new data collection methodology and present the resultant database of Chinese overseas development finance activities. We find that China's financial commitments exceed US$ 73 billion over the 2000-2011 period. Section 4 provides an overview of Chinese development finance to Africa as tracked by this new database. In Section 5, we extend the findings of Nielsen et al. (2011) and show that the collection of Chinese aid data is crucial to fully understand the aid-conflict nexus. However, we are cognizant of the limitations imposed by this data collection approach and we discuss these weaknesses and conclude in Section 6.

## 2. QUANTIFYING CHINESE DEVELOPMENT FINANCE

The Chinese government does not release detailed, project-level financial information about its overseas aid activities.[7] The establishment of a comprehensive aid reporting infrastructure is challenging as flows come from various ministries. Chinese officials have argued that publishing country-level data will draw attention to which countries are the largest recipients and result in pressure from other governments for more aid (Lancaster 2007).[8] Moreover, publishing total volumes of Chinese aid may also provoke domestic criticism about spending abroad when there are so many Chinese still living in poverty (Lancaster 2007). Beijing's resistance to aid transparency may also reflect a broader disinterest in complying with Western (OECD-DAC) standards (Grimm et al. 2011). As a result of this lack of transparency, China's aid to Africa is the subject of much speculation, confusion, and misinformation.

[7] The yearbooks of the Ministry of Commerce (MOFCOM) reported a list of "comprehensive projects completed" by recipient country between 1990 and 2005, but do not identify the financial value of these projects (available at http://aiddata.org/content/index/Research/research-datasets). Moreover, the World Food Program's Food Aid Information System (FAIS; available at http://www.wfp.org/fais/) and the UN OCHA's Financial Tracking Service (FTS; available at http://fts.unocha.org/) report information on China's food aid and humanitarian aid flows, respectively. However, these flows constitute only a small fraction of China's development finance.

[8] While the Ministry of Commerce, the Ministry of Foreign Affairs and the Ministry of Finance are the primary actors, Chinese development finance is administered through a multi-tiered system that includes participation from 23 government ministries and commissions as well as local, provincial and regional ministries of commerce (Huang 2007). For example, the Ministry of Social Welfare oversees the implementation of humanitarian aid programs (Christensen 2010) and military aid is handled by the Ministry of National Defense (Pehnelt 2007).

Scholars, policy analysts, and journalists routinely use inflated estimates to demonstrate the threat that China poses to Western donors on the continent.

Conceptual differences confound efforts to catalogue and measure "Chinese aid." Chinese development finance flows do not easily align with the well-defined OECD-DAC definitions of Official Development Assistance (ODA) and Other Official Flows (OOF). The DAC defines ODA as "[g]rants or loans to [developing] countries and territories […] and to multilateral agencies which are: (a) undertaken by the official sector; (b) with promotion of economic development and welfare as the main objective; (c) at concessional financial terms (if a loan, having a grant element of at least 25 per cent). In addition to financial flows, technical co-operation is included in aid" (OECD DAC glossary).[9] Members of the DAC have agreed that assistance to refugees, scholarships for developing country students, and funding relevant research are eligible to be included in ODA. Military aid and peacekeeping enforcement are examples for flows that are excluded (OECD 2008). OOF is categorized as "[t]ransactions by the official sector with [developing] countries […] which do not meet the conditions for eligibility as Official Development Assistance, either because they are not primarily aimed at development, or because they have a grant element of less than 25 per cent" (OECD DAC glossary).

China states that its foreign aid "[f]alls into the category of South-South cooperation" (State Council 2011); however, it does not provide precise definitions in the 2011 White Paper or other official publications. The White Paper provides five "basic features" of Chinese foreign aid, but these are more about principles for how to give aid. The White Paper does not explicitly address how China classifies different development finance flow types and classes (State Council 2011). It also states that Chinese financial aid flows include grants, interest-free loans and concessional loans, and also lists eight forms of aid: "complete projects, goods and materials, technical cooperation, human resource development cooperation, medical teams sent abroad, emergency humanitarian aid, volunteer programs in foreign countries, and debt relief" (State Council 2011). What is more, there is no consensus as to how to classify many Chinese financial instruments that lack OECD-DAC counterparts such as natural resource-backed loans. So-called Chinese "package financing" means that development finance often consists of agreements that mix aid and investment, and/or concessional and non-concessional financing (Grimm et al. 2011). Chinese state-owned enterprises also blur the line between official government finance and private flows; FDI or joint ventures can come from firms that are either private or state-owned. Finally, there may be substantial discrepancies between Western and Chinese considerations of the cost of aid for the donor country. Western aid budgets include administrative costs which might inflate statistics on aid

[9] The OECD DAC Glossary of Key Terms and Concepts is available online at http://www.oecd.org/dac/dac-glossary.htm.

flows since substantial chunks of aid budgets might be used on donor administrative costs rather than directly on recipient development.[10]

Analysts still disagree about the nature of Chinese development finance and what can be counted as ODA versus OOF. The difficulties to align Chinese development finance with DAC categories are further complicated by the fact that many transactions with African countries are in fact bundles of several financing mechanisms. Bräutigam (2011) argues that a relatively small amount of finance is given as ODA to Africa—only around US$ 1.4 billion in 2007—but the majority comes as OOF. A study by the Congressional Research Service and NYU Wagner School took a broader approach, characterizing many more types of flows, including state-owned companies investing abroad, as "aid and related activities." They arrived at an estimate of US$ 18 billion in annual aid and related activities to Africa (Lum et al. 2009). Table 1 displays Chinese development finance estimates provided by these and other previous studies.

These wide-ranging estimates—US$ 0.58 to US$ 18 billion in annual aid to Africa—have significant implications for how China should be considered as a donor on the continent in comparison to DAC donors. If the upper estimate is to be believed, China gave three times more assistance to Africa in 2007 than the United States provided in ODA to the continent (US$ 5.3 billion). All DAC donors disbursed only US$ 27 billion in ODA to Africa in 2007 (DAC CRS database). Yet high estimates of Chinese aid are likely inflated for several reasons discussed below.

There is a compelling need for a common vocabulary and categorization scheme for Chinese development finance. Bräutigam (2009, 2011) demonstrates that many forms of Chinese development finance do not fit cleanly into OECD-DAC categorizations. However, neither the research community nor the policy community has coalesced around a single taxonomy for classifying and categorizing Chinese development finance flows that enables some degree of comparison with development finance flows from OECD-DAC donors. Figure 1 introduces the general framework that we employed to categorize different types of Chinese development finance.

Instead of combining aid and investment projects into one omnibus category, we have attempted to create more precise classifications and definitions that capture the diversity of Chinese development finance modalities. We classify all projects according to one of eleven flow class categories: ODA-like, OOF-like, Official Investment, Military Aid without development intent, Joint Ventures with Chinese state involvement, Joint Ventures without Chinese state involvement, Foreign Direct Investment (FDI) with Chinese state involvement, Foreign Direct Investment (FDI) without Chinese state involvement,

[10] The authors thank Li Xiaoyun of China Agricultural University (CAU) for this insight.

NGO aid, Corporate Aid from state-owned enterprises, and Corporate Aid from private enterprises. Our database also has a category called "Vague (Official Finance)," for flows of official financing that are either ODA-like or OOF-like, but for which there is insufficient information to assign the flows to either the ODA-like or OOF-like category (as well as a further residual category "Vague Residual Commercial Activities" for unofficial flows). We define China's Official Finance as the sum of ODA-like, OOF-like, Vague (Official Finance), Official Investment, and Military Aid. The remaining categories capture a range of aid and investment activities that involve varying levels of state involvement. While others may want to use our dataset for different purposes, the focus of this paper is on non-military and non-investment *official financing* from China to Africa, regardless of its developmental, commercial, or representational intent.[11] We use the term "Official Finance" as shorthand for these official financing flows in the remainder of the paper.

Our categorization scheme has several benefits. It explicitly accounts for the types of Chinese overseas financial activities that do not easily fit within existing categorization schemes (e.g., joint ventures and investments that involve Chinese state-owned enterprises), while at the same time using some categories that can be mapped back onto OECD-DAC definitions with a reasonable degree of confidence. In particular, the introduction of "ODA-like," "OOF-like," and "Vague Official Finance" categories provide a basis for analysts to make more accurate comparisons of official finance provided by China and Western donors. Additionally, by introducing the "Vague Official Finance" and "Vague Residual Commercial Activities," we have made the imprecision of our data and the uncertainty of our flow-type designations explicit. We consider this last point to be particularly important. At present, many scholars who study Chinese aid and investment have refused to be transparent about their data and methods. We believe that transparency is a necessary condition for scientific progress because it invites and permits scrutiny, which will uncover weaknesses in our methods and errors in their application.

[11] The data contained in the "unofficial" categories are less complete than the data on official finance. The incomplete nature of these data is a by-product of our methodology, which includes search criteria that are geared more towards capturing official financing flows (see Strange et al. 2014 for details). Users should therefore proceed with caution when using these data.

## 3. TRACKING UNDER-REPORTED FINANCIAL FLOWS: AN OPEN-SOURCE APPROACH TO DEVELOPMENT FINANCE DATA COLLECTION

Political scientists, economists, sociologists, geographers, and computer scientists have used open-source and media-based data collection methodologies to track violent and non-violent conflict incidents; document the scale, scope, and impact of natural and man-made disasters; and study patterns of political interaction and sentiment (Schrodt and Gerner 1994; King and Lowe 2003; Shellman 2008; Leetaru 2010; Raleigh et al. 2010; Yonamine and Schrodt 2011; EM-DAT 2012; Salehyan et al. 2012). The nature of media-based data collection, in particular, presents several unique challenges for data completeness, accuracy, quality, and credibility (Woolley 2000; Reeves et al. 2006). First, as with any social scientific inquiry, there is potential for human error by the coder. To reduce the risk of human error, each project received multiple rounds of arbitration, ensuring that each project entry was reviewed by at least two researchers. Second, information extracted from public media outlets cannot substitute for complete and accurate statistical data from official sources. Media-based data collection is only as good as the imperfect data sources upon which it relies. In the absence of official project-level data, there is no foolproof method for adjudicating between conflicting media reports.[12] However, because our methodology pulls from a diverse set of information repositories, researchers were often able to reconcile competing media reports by finding information in government documents, NGO reports, or journal articles. Third, relying on media reports poses a risk of "detection bias," or the risk that countries with lower levels of press freedom are less likely to permit journalists to report on official finance activities from various donors. Similarly, if the motives of media reporting are economic or political in nature, the objectivity and utility of the data are questionable. Among sociologists and scholars who study conflict and terrorism, there is an appreciation for the fact that the use of media reports to identify inherently political "events" (e.g., political protests, terrorist attacks) introduces a risk of selection bias (McCarthy et al. 1996; Drakos and Gofas 2006; Drakos 2007).

AidData's methodology for tracking under-reported financial flows (TUFF) is designed to mitigate many of the risks associated with using media reports to collect data. During the first stage, projects undertaken in a particular country and supported by a specific supplier of development finance—

[12] However, it is also not the case that official sources are always more credible (and valuable) than media-based information. First, media-based data collection that relies on information regarding the implementation and/or the completion of projects can provide more useful and accurate project-level information than official reports, depending on how official project information is collected, updated and presented. Second, aid data are politically sensitive and might thus be more susceptible to manipulation. In this regard, empirical evidence in Wallace (2011) suggests caution in the usage of politically sensitive data provided by authoritarian regimes.

be it a sovereign government, multilateral institution, non-governmental organization, or private foundation—are identified through Factiva, a Dow Jones-owned media database. Factiva draws on approximately 28,000 media sources worldwide in 23 languages. Most of these sources are newspapers, radio and television transcripts. In the second stage, researchers perform targeted searches on each potential project identified in the first stage to corroborate project information and populate missing data fields. In this way, the media reports gathered in the first stage serve as a departure point for a set of follow-on data collection procedures that draw information from case studies and field reports completed by academics and non-governmental organizations, project inventories supplied through Chinese embassy websites, and grant and loan data published by recipient governments.[13]

Our methodological approach is informed by previous attempts to use media reports to track Chinese official development financing and expands on these previous methods by supplementing media reports with additional information sources. Bartke (1989) was the first scholar to track Chinese aid – from the first donations in the 1950s until 1987. In 2008, New York University's Wagner School and the U.S. Congressional Research Service produced a report on Chinese assistance to Africa, Southeast Asia, and Latin America over the 2002-2007 period (Lum et al. 2009). However, the dataset used to generate this report is not publicly available and the authors did not provide details about their methodology. In 2008, researchers from the World Bank's Public-Private Infrastructure Advisory Facility (PPIAF) also published a media-based methodology to identify Chinese infrastructure and natural resource extraction projects in Sub-Saharan Africa (Foster et al. 2008). The PPIAF team provided far more methodological detail than the NYU Wagner School team, but did not document its data collection procedures in a way that could be easily replicated by other researchers.[14] Also, subsequent efforts to collect data about China's development and investment activities from media sources (Gallagher et al. 2012; Scissors 2012; US EX-IM Bank 2012; Wolf et al. 2013) did not document their data collection procedures in a systematic, transparent, or replicable way. In spite of the scientific benefits of transparency and replicability, researchers who generate novel Chinese aid and investment data have a strong disincentive to disclose their sources or methods in order to preserve reputational benefits and/or the commercial value of their data.

Previous efforts to classify or collect Chinese development finance data have encountered six primary challenges. First, although many Chinese projects are cancelled, mothballed, or scaled back after

[13] In our background paper (Strange et al. 2014), we describe this methodology in great detail, providing a step-by-step guide that documents how we conduct these searches and record results during both stages.

[14] AidData's TUFF methodology is based in part on the methodology developed by the Public-Private Infrastructure Advisory Facility (PPIAF) (Foster et al. 2008; see also Strange et al. 2014).

the original announcement is made, previous data collection initiatives did not carefully "follow the money" from initial announcement to implementation, thus increasing the risk of over-counting (Bräutigam 2011). Therefore, we conducted follow-up audits on all announced projects in order to mitigate the risk of mistaking project announcements for initiated or completed projects. Second, researchers have paid insufficient attention to double-counting of individual projects and activities reported by multiple media reports over multiple years (Grimm et al. 2011). To address this challenge, we employ a web-based data platform with filtering and keyword search functions that facilitate the identification and elimination of duplicate projects. Third, most scholars and analysts elide the issue of how to classify different forms of Chinese development finance. Rather than rolling all aid and investment projects into one category, we classified all projects according to one of twelve flow-type categories introduced in Section 2 (see again Figure 1).

Fourth, a lack of transparency in research methods has impeded efforts to improve knowledge about the distribution and impact of Chinese development finance. Documenting and disclosing research methods allows database users to identify potential errors and procedural flaws and thus facilitates the improvement of methods and data quality. Fifth, unlike previous efforts that rely only on English-language sources to track Chinese aid, trained Chinese-language experts conducted Chinese-language search queries to fill data gaps and enhance data accuracy. Finally, wherever possible, we avoided a "sole-sourcing" data collection process, or relying on data from a single source to track Chinese development finance projects. We instead employed a triangulation system wherein multiple sources for the same project provided data about different project attributes. More broadly, source triangulation helped minimize data deficiencies resulting from uncertainty over whether certain projects were actually undertaken and completed following their announcement. Because this triangulation process pulled from multiple information repositories, it reduces a project record's reliance on media reports.

The TUFF methodology has drawn criticism for its integration of data culled from news reports, which may be biased and incomplete (e.g., Provost and Harris 2013). However, until recently, few critiques have brought to bear independent sources of information that shed light on the accuracy and the comprehensiveness of the TUFF methodology. Muchapondwa et al. (2013) is an exception, employing "ground-truthing" techniques – that is, have local enumerators follow a standardized set of site visit and interview to verify and update existing project records and uncover previously unidentified projects – to test the robustness of the methodology for tracking Chinese development finance activities in Uganda and South Africa. Their results suggest that, while data collected through local informants with official roles in the Chinese-financed projects reveal new and additional information not available through open source materials, TUFF provides a credible data collection methodology for scholars seeking to learn about

development finance from governments that do not disclose comprehensive official information about their outgoing financial flows.

## 4. NEW EVIDENCE ON CHINESE OFFICIAL FINANCE TO AFRICA

Our database on Chinese official finance includes 1,751 non-investment projects to 50 recipient countries over the 2000-2011 period.[15] These values (and the subsequent analysis) do not include data for two types of official finance: Official Investments and Military Aid without development intent. This is because the objective of AidData's data collection initiative was to track Chinese official development finance; as a result, project reporting for these two flow classes is likely not as comprehensive.[16] Focusing thus on non-investment official finance to Africa, 13.6% of the projects remain non-binding pledges.[17] Figure 2 shows the composition of projects over time, separating pledges from committed projects, those currently being implemented, and completed projects. This does not necessarily mean that a project has not reached the next stage of completion; it only means that we did not find any information in open source materials that one of the subsequent stages has been reached. Since we cannot be sure that these projects do indeed get formally committed, we exclude pledges from the analysis below (239 projects amounting to US$ 24.6 billion; this value and all following values are in constant 2009 US dollars).[18] By doing so, we intend to achieve comparability with aid commitments as defined by the OECD-DAC.

In what follows, we analyze the remaining 1,511 projects to 50 recipient countries that have reached at least commitment stage. 63% of the projects provide information on the amount of official finance committed, totaling US$ 73 billion. Note that this covers all financial flows that can be classified as either ODA-like or OOF-like (including "vague" projects that are identified as one of the two). Figure

[15] We also collected data for 2012. However, we decided to exclude these data from our analysis as the numbers for 2012 may be lower as a result of limited accumulated media information compared to previous years. The number of projects from more recent years is likely to increase in future updates of this database as more information becomes available.

[16] The initial dataset contains 27 Official Investment projects, as well as dozens of projects coded as either FDI or Joint Ventures with or without state involvement. We leave the systematic collection of China's investment flows through media sources for future research.

[17] Pledges are informal agreements while commitments are defined as formal written, binding, contracts. Determinations are based on a set of key words discussed in our methodology document (Strange et al. 2014).

[18] As noted by Bräutigam (2009: 49), many "plump promises" reported in the media never materialize. By excluding pledges and focusing on flows that have at least reached the commitment stage, we follow a common practice in aid statistics and in empirical analyses on aid.

3 shows the yearly number of projects and dollar amounts over the study period. As shown in the figure, these two measures of China's official finance to Africa are highly correlated (0.82) and show an increasing trend over time. In 2000, we were able to identify 47 projects (US$ 2.4 billion), and by 2010 we found more than three times these numbers and amounts: 160 projects (US$ 10 billion).[19]

The plurality of the projects included in our data are in-kind contributions (25%), although these projects typically have smaller monetary values and amount to only 3% of the total dollar amount tracked. The second-largest category covers monetary grants (excluding debt forgiveness, 23% of projects), followed by loans (excluding debt rescheduling, 21%), free-standing technical assistance (8%), scholarships and other training (4%), vague grants (4%), and debt forgiveness (4%).[20] Within these flow types the likelihood that the monetary value of a project is reported varies substantially. For example, 92% of loan projects have a reported monetary value, while only 9% of the (supposedly cheaper) projects of the category "Scholarships/training in the donor country" have a dollar amount.

Figure 4 shows the allocation of these projects according to the nature of the financial flow. We distinguish between ODA-like projects, OOF-like projects, and Vague Official Finance. Vague Official Finance refers to projects that are clearly either ODA or OOF, but for which the available information is insufficient to assign projects to one category or another. A good example of a project classified as Vague Official Finance is a concessional loan to Sierra Leone's telecommunication company, Sierratel, for US$ 16.8 million (project identification number 53), where the degree of concessionality is unknown.[21] As can be seen from Figure 4, the largest category in terms of project numbers is ODA-like grants (688 projects, amounting to US$ 5,100 million). This category includes, among many other things, donations of agricultural machinery and food aid. We count 41 OOF-like grants and 55 grants coded to be vague due to insufficient information. Loans are also of quantitative importance. We classify 108 loans as ODA-like (amounting to US$ 5,539 million), 31 as OOF-like (US$ 18,361 million), and 182 as Vague Official Finance (US$ 29,672 million). There are thus a significant number of loans for which we have no detailed financial information that prevents us from coding them as either ODA-like or OOF-like. 58 projects—57 of them coded as ODA-like—are classified as debt relief (debt rescheduling agreements and debt forgiveness). An additional 185 projects are classified as technical assistance and scholarships (151 of

[19] Note, however, that the amount of detail available for flows to particular countries varies considerably. Appendix A-1 shows the share of projects per country where we lack information on the monetary value of the projects.

[20] The corresponding shares in US dollars are 7% (monetary grants), 73% (loans), 0.24% (free-standing technical assistance), 0.004% (scholarships), 0.35% (vague grants), and 5.5% (debt forgiveness). Grants are coded as "grants (vague)" if the corresponding media reports lack information on whether the grant was provided in kind or in cash.

[21] We apply the same coding procedure when donor intent is unclear.

which receive the ODA-like designation). Although small in terms of project numbers, export credits are important in terms of their monetary value (US$ 4,385 million).

Given the interest in China's role in Africa vis-à-vis Western donors, we also compare annual official financing flows from China with those from the United States and the entire OECD-DAC. Figure 5 demonstrates that in the early-2000s China was already providing almost the amount of official financing to Africa as the United States. At the peak in 2007, China was providing almost twice the amount of total U.S.-ODA and -OOF, and almost half the amount of ODA and OOF to Africa from the entire OECD-DAC combined. All three trend upward over time. Chinese financing flows to Africa can vary dramatically from year to year, often due to megadeals: multi-million dollar financing packages for large infrastructure projects or other loans. The spike in 2007 is due to two large Chinese megadeals; including large loans to the Democratic Republic of Congo and Sudan.[22] Over the entire 2000-2011 period, China committed US$ 73 billion in official flows to Africa, which is more than a fifth of the total OECD-DAC flows (US$ 361 billion) and almost as much as committed by the United States (US$ 83 billion).

Figure 6 restricts the analysis to Chinese and Western flows of official development assistance (or what we call ODA-like flows). Chinese flows to Africa identified as ODA have been lower than those of Western donors. Over the entire decade China committed US$ 15 billion in ODA to Africa, which is 4% of the total OECD-DAC ODA flows (US$ 347 billion) and 19% of those of the United States (US$ 81 billion). However, an important caveat here is that our estimates of Chinese ODA are likely significantly devalued since a substantial chunk of Chinese official finance is labeled as "Vague Official Finance." These projects are cases that we are able to classify as official Chinese finance but do not have enough information to discern whether a project should be considered as OOF or ODA. Figure 6 includes these flows as a separate item for comparison. Only in 2010, these combined flows exceed ODA by the United States.[23]

Which sectors receive the most projects? Figures 7 and 8 turn to the sectoral allocation of China's official projects in Africa. While we lack sufficient information on 214 projects, the most important sector

[22] Appendix A-2 shows the 20 largest projects in our sample by commitment size. Very large projects with project size of US$ 1 billion are often called "megadeals." 13 projects in our sample would fall under this definition. Consistent with conventional perceptions in the literature, we observe a large number of loans as well as many projects in the infrastructure and energy sectors in this sample.

[23] It should also be noted that as the dataset is missing financial values for 37% of Chinese projects, these project amounts are not captured in the comparative analysis. Thus, dollar amounts of Chinese Official Finance and ODA are both likely to be undercounted in comparison to OECD-DAC and US figures.

according to DAC purpose codes is Government and Civil Society (Figure 7), with an overall number of 209 projects, amounting to US$ 1,718 million. While it might seem surprising at first that China is so active in this sector, some of Beijing's activities differ much from Western donors. Whereas DAC activities in this sector include strengthening public financial management systems, supporting anti-corruption institutions, and a wide variety of "good governance" initiatives, Chinese support to the sector includes, among other things, the construction of presidential estates and executive office suites.[24] Health (182 projects), Education (149), and Transport and Storage (107) are on the following places. Examples of projects in these sectors include support for the creation of a China-Liberia malaria prevention center (Health); scholarships for Zimbabweans to undertake undergraduate and postgraduate studies in China (Education); and the rehabilitation of the Kigali road network in Rwanda (Transport and Storage).

In terms of monetary amounts (Figure 8), Transport and Storage projects dominate (US$ 17,230 million), followed by Other Multisector (US$ 16,937 million) and Energy Generation and Supply (US$ 13,301 million). These sectors are also outstanding in terms of project size. The largest average size in monetary values have projects in Other Multisector (US$ 529 million), followed by Energy Generation and Supply (US$ 261 million) and Transport and Storage (US$ 215 million). At the bottom of the list, only four projects each are classified under Women in Development, two under Support to NGOs and GOs, and only one each under Non-food Commodity Assistance and General Budget Support.[25] We could not track a single project in the sector "General Environmental Protection." Appendix A-3 shows the number of projects allocated to sectors over time.

Appendices A-4 and A-5 report the sectoral distribution of Chinese projects identified as ODA-like for comparison. As can be seen, the largest number of Chinese aid projects is in the health sector (154 projects accounting for US$ 696 million), followed by Government and Civil Society (148, US$ 1,025 million), Education (115, US$ 108 million), and Agriculture, Forestry, and Fishing (73, US$ 1,090 million). In terms of volume, Actions Related to Debt (US$ 4,085 million) and Transport and Storage (US$ 2,881 million) account for the largest numbers. The sectoral distribution of Chinese aid to Africa stands in contrast to the pattern of behavior observed among DAC donors and most multilateral donors controlled by DAC governments. Over the last decade, Western donors have channeled the lion's share of

[24] Projects carried out by China include judicial training in Angola, the renovation of the Ministry of Foreign Affairs in Liberia, the construction of the National Assembly building in the Seychelles or a financial contribution to facilitate the last phase of the Somali National Reconciliation Conference.

[25] Specifically, the Chinese Embassy in Harare donated in 2006 teaching equipment to the Women's University in Africa of Zimbabwe to promote gender equality and empowerment and also supported the Malawian Ministry of Women and Child Development in 2009.

their funding (nearly 50%) into social and humanitarian sectors (Lyne et al. 2009; OECD 2012). This lends some degree of support to the notion that Chinese aid is complementary to assistance from Western donors (Moss and Rose 2006).

Table 2 outlines the ten largest recipients of official finance from China, the United States, and the OECD-DAC as a whole, aggregating flows from 2000-2011. Four of the top ten recipient countries are consistent across all three donors: the Democratic Republic of Congo, Ethiopia, Nigeria, and Sudan.[26] A number of countries may not make the top ten lists for all three donors, but still receive a significant amount of finance from China and the DAC. For instance, Ghana is first on the list for China, and although it is not in the top ten for the US or DAC it is a very large recipient of Western funding as well (Ghana takes the 11th spot on the DAC recipient list and the 12th spot for the US). Zimbabwe, for example, is a notable exception as the country is a top recipient of Chinese official finance but not of DAC flows. An aggregate comparison across all three donors suggests that a large percentage of both Chinese and Western official financial flows go to many of the same governments and regions in Africa. However, it does mask differences in the modalities and sectors of funding. Although Sudan is a top recipient from all three donors, the types of funding are vastly different; China has had a large focus on the oil pipeline and infrastructure in the eastern corridor, whereas DAC donors have largely concentrated funding in social sectors and conflict regions such as Darfur.

Figure 9 plots each country's share in the total number of China's official projects in Africa. Nine African states individually received at least 3% of all Chinese official finance projects to Africa from 2000-2011. Only two of these countries (Ghana and Liberia) are situated in West Africa, while the rest are all either in Eastern or Southern Africa. Over the entire 2000-2011 period, Zimbabwe received the largest number of projects (101), followed by Ghana (67), Ethiopia (63), Kenya (61), Liberia (59), and Sudan (53). The fewest number went to Libya (2), South Sudan (5), Chad (6), Benin, and Cape Verde (7 each). Since South Sudan was not an independent country until 2011, it is not surprising that the young country has received such a small number of projects over our study period. Also, it is not surprising that we did not track any Chinese official project in Burkina Faso, Swaziland, the Gambia, and São Tomé and Príncipe between 2000 and 2011. During the 2000-2011 period, none of these countries maintain diplomatic relations with the PRC and recognize the Republic of China (Taiwan) instead. Appendix A-6 shows China's allocation of projects by country over time.

Finally, Figure 10 shows China's official finance by recipient country as a share of the recipient's gross national income (GNI). This measure is a commonly used indicator for aid dependency. In general,

[26] South Sudan is counted as a separate country in the dataset after its independence in 2011.

Chinese official finance does not tend to be particularly high compared to African countries' economic size. There are a few exceptions such as Equatorial Guinea (4.8%), Ghana (4.1%), the Democratic Republic of Congo (2.9%) and Zimbabwe (2.8%). Given the increasing trend of Chinese activities in Africa, this is likely to change in the foreseeable future.

## 5. REVISITING THE AID-CONFLICT NEXUS

The impact of development finance on the incidence, duration, and severity of conflict in recipient countries has been extensively studied (e.g., Grossman 1992; Collier and Hoeffler 2002; Esman and Herring 2003; De Ree and Nillesen 2009; Nunn and Qian 2013; Crost et al. forthcoming). This literature is, however, largely limited to Western sources of development finance; all of it ignores Chinese aid. This is an important omission, potentially so important that its inclusion might challenge the results of previous papers. To the extent that China gives aid where Western donors are absent and increases aid where Western donors retreat, ignoring Chinese aid severely biases the results of the existing studies.

As one example, consider Nielsen et al. (2011). Nielsen et al. combine data on bilateral and multilateral aid (excluding China and other important non-DAC donors) with data provided by the Peace Research Institute Oslo (PRIO). They run a rare-event logit analysis of time-series, cross-sectional data on 2,627 conflict events across 139 states over the 1981-2005 period. They find (among other results) that aid shocks significantly increase the probability of armed conflict onsets.[27] We replicate this study, adding our data on Chinese aid to their database.

Our data allow us to test an important hypothesis: If "traditional" donors suddenly cut aid, recipient governments with close ties to other important donors, such as China, reduce the probability of violent conflict by offsetting aid shocks with such alternative funding sources. Following Nielsen et al. (2011), we hypothesize that aid shocks do not translate into armed conflict onset if countries have access to sufficient funding from China following shocks in aid from Western donors. The availability of Chinese funds could enable governments to provide side-payments or military investments to prevent potential rebels from challenging them. The conclusion of aid deals with Beijing might also serve as a signal to potential rebels that the government can credibly commit to side-payments and thus prevent significant shifts in the distribution of power. In this section, we test whether Chinese commitments to

[27] Nielsen et al. (2011) define foreign aid "shocks" as severe decreases in aid revenue. They measure it using a binary indicator that takes the value of one if the change in the aid-over-GDP ratio (averaged over the last two years) is below the 15$^{th}$ percentile of that variable's level. While the aid data employed in Nielson et al. also cover ODA flows from some non-DAC donors, the bulk of the financial flows covered in this study are provided by the group of "traditional" donors. Their data does not include Chinese aid.

provide development finance in the aftermath of a shock in aid by other donors can mitigate the effect of drastic changes in "traditional" aid flows on intrastate conflict.

We replicate the original study as follows. We reproduce Model (1) of Table 1 in Nielsen et al. (2011: 226) using 2000-2005 conflict data for Africa rather than the original 1981-2005 worldwide sample, given that our database exclusively covers information on Chinese development finance projects committed since 2000 to African recipient countries. As conflicts are not rare in Africa (5.3%of all post-2000 observations are conflicts), we run our models using logit regressions rather than rare-events logit. In order to analyze the impact of Chinese development activities on conflict onset, we add one of three measures of the intensity of Chinese development activities in a particular country at a time to the main regression in Nielsen et al. (2011). The first measure is the total number of China's official finance projects, the second is the total number of ODA-like projects and the third is the US$ amount of China's official finance directed to a particular country as a share of the recipient's GNI. The two measures based on project numbers have the advantage that they account for the entire universe of projects unveiled by the TUFF methodology. While the third measure based on monetary amounts has the drawback that it excludes those projects for which we could not identify the monetary value of the project, it has the advantage that it accounts for the size of the project and that of the recipient's economy.[28]

We present the results of our empirical analysis in Table 3. The first column replicates Model 1 from Table 1 of Nielsen et al. (2011). The second column repeats the same regression, but employs logit rather than rare-event logit for the reason explained above. Our third and fourth columns demonstrate that the main results of Nielsen et al. (2011) hold if we first restrict the period of analysis to the 2000-2005 period and then further reduce the sample to cover African countries only.

As a next step, we introduce our three measures of Chinese development activities and their interactions terms with the aid shock dummy in columns 5-7 of Table 3. Since the coefficients in a non-linear model with interaction terms cannot be directly interpreted (Ai and Norton 2003), Table 4 computes the average marginal effects of aid shocks on conflict onset at different levels of Chinese development finance. We find that aid shocks significantly increase the probability of armed conflict onset if no sufficient alternative funding from China is available. As can be seen in the table, the effect of aid shocks on conflict remains statistically significant at conventional levels only at low levels of Chinese development activities. More precisely, we find that aid shocks do not significantly increase the likelihood of conflict onset if the number of Chinese projects exceeds three (columns 1 and 2).

[28] Note that we do not lag our measures of Chinese development activities even though Nielsen et al. (2011) lag the "aid shock" dummy in their estimations. This is crucial, as China and the recipient need time to react to a sudden drop in aid from other donors. By taking this approach, we assume the availability of Chinese funding to matter at the time of the (potential) outbreak of a conflict.

Accounting for the monetary value of the development projects and the size of the economy, column 3 shows that aid shocks do not translate into conflict if the amount of Chinese official finance as a share of recipient GNI amounts to 1% or more. These findings suggest that the availability of funding from China mitigates the impact of aid shocks from "traditional" donors on conflict onset.

As Nielsen et al. (2011) argue, incoming aid flows are often unstable despite the fact that many developing countries rely on them for a substantial portion of national expenditures. Instability resulting from sudden aid withdrawals are thus a major concern for developing states, making alternative sources of funding beyond "traditional" donors even more critical. Our results suggest that Chinese development finance may have a stabilizing effect in weak governments. More broadly, the findings highlight the importance of gathering better data on the development activities of China and other non-traditional donors to better understand the link between foreign aid and conflict.

## 6. CONCLUSIONS

As some Western governments scale back their development finance commitments, non-Western donors are rapidly expanding their overseas aid activities. The most important provider of official finance to Africa among these non-DAC donor countries is China. Yet many non-DAC donors, including China, lack either the capacity or the political will to provide detailed information about their aid activities. Scholars are increasingly handicapped in their ability to study aid allocation and the impact of non-Western development finance on development, political and conflict outcomes.

Based on insights from previous projects tracking conflicts, disasters, aid, investment and other political and economic phenomena through open source data collection techniques, we have crafted a systematic, transparent and replicable methodology that triangulates and curates information from a wide range of sources that are largely independent from each other. Apart from contributing to the literature on development finance, we pursued this project as a proof of concept exercise to test the viability of a web-based, open source data collection approach. Its application has uncovered more than US$ 73 billion in commitments of official Chinese financing flows to Africa that were previously unrecorded—in a single location and with a single, consistent methodology—at the project level. We hope that this database will be used and continuously improved by scholars, practitioners, policymakers and other interested stakeholders. Ideally, Chinese government agencies would disclose detailed and comprehensive official data at the project level, thus obviating the need for researchers to devote time and effort to construct sub-optimal data sets through media sources. However, at this time, Beijing has not announced any intention of joining the international aid transparency movement.

Several important observations can be made about 21st century Chinese official finance to Africa. First, with respect to the geographic distribution of China's official finance, we find that China's activities are spread all over the African continent. Only countries recognizing Taiwan do not show up among China's recipients of official finance flows. According to the dollar amounts tracked, the largest recipient appears to be Ghana followed by the Democratic Republic of Congo and Ethiopia. Second, with respect to the sectoral distribution, we find that China is active in almost all sectors, with "General environmental protection" being a notable exception. While conventional wisdom that infrastructure plays an important role has been confirmed by the TUFF approach, the sector "Government and Civil Society" plays the most important role in terms of project numbers. Unsurprisingly in the Chinese case, projects in this sector are about "Government" and not "Civil Society." Third, with respect to the trend over time, Chinese activities as a financier of development activities are increasing and are by today roughly comparable to the size of activities provided by the United States. When looking at ODA-like flows exclusively, however, China still is clearly behind the United States.

Moreover, the results presented in this paper suggest that Chinese development finance merits greater attention within the conflict studies literature. Extending the work of Nielsen et al. (2011), the empirical application of our dataset has shown that aid shocks from "traditional" sources are more likely to induce conflict onset only if insufficient alternative funding is available from China. This underscores the necessity of creating, improving and utilizing new sources of information to understand the development activities of China and other non-DAC donors.

Finally, going forward, we hope to continue improving the accuracy, precision, and comprehensiveness of the TUFF methodology used to produce our project-level dataset of Chinese development finance to Africa. We have identified seven possible steps for future research. First, we plan to collect and integrate more data from development practitioners, journalists, researchers and other local stakeholders in Africa. Second, future iterations of the dataset should include more diverse language searching throughout both stages of the data collection process. Third, we will prioritize supplementary data collection for the project records in our database that lack financial values. Fourth, we intend to geocode the precise latitude and longitude coordinates of all projects and analyze the spatial distribution of Chinese development finance. Sub-nationally georeferenced data will help address a range of questions focused on the nature, scope and aims of Chinese development finance in Africa. Fifth, efforts should be made to more systematically track unofficial and quasi-official activities to provide a more complete picture of how China supports African development. Sixth, the application of TUFF data collection methods to one or more DAC donors (for whom we have official project-level data) could help reveal the biases and shortcomings of the methodology. Seventh, one could adapt the TUFF methodology to more

effectively track development finance flows from other non-transparent donor governments, such as Saudi Arabia and Venezuela.

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Table 1. *Estimates of Chinese development finance to Africa*

| Source | Year | Amount per year | Flow type |
|---|---|---|---|
| Bräutigam (2011a) | 2007 | US$ 1.4B | ODA |
| Wang (2007) | 2004-2005 | US$ 1-1.5B | ODA |
| The Economist (2004) | 2002 | US$ 1.8B | ODA |
| Lum et al. (2009) | 2007 | US$ 17.96B | Aid and related activities |
| Christensen (2010) | 2009 | US$ 2.1B | Aid |
| Lancaster (2007) | 2007 | US$ 582-875M* | Aid |
| He (2006) | 1956-2006 | US$ 5.7B** | Aid |
| Kurlantzick (2006) | 2004 | US$ 2.7B | Aid |
| Fitch Ratings (2011) | 2001-2010 | US$ 67.2B | EXIM Bank loans |
| Alden and Alves (2009) | 2006 | US$ 12-15B | EXIM Bank loans |
| Harman (2007) | 2006 | US$ 12.5B | EXIM Bank loans |
| Christensen (2010) | 2009 | US$ 375M | Debt relief |

* Authors' calculations based on mid-point of the estimated range of total Chinese aid ($1.5-2B), and the estimated range of Africa financing (33%-50%).

** Author's estimation for the entire 50-year time period.

Table 2. *Ten largest recipients of Official Finance to Africa (ODA and OOF), 2000-2011*

| | China | United States | DAC |
|---|---|---|---|
| **1.** | **Ghana (US$ 11.6B)** | 1. Egypt (US$ 7.6B) | 1. Nigeria (US$ 28.8B) |
| **2.** | **DRC (US$ 7.8B)** | 2. Ethiopia (US$ 6.9B) | 2. DRC (US$ 21.9B) |
| **3.** | **Ethiopia (US$ 6.6B)** | 3. Sudan (US$ 6.8B) | 3. Tanzania (US$ 19.6B) |
| **4.** | **Sudan (US$ 5.3B)** | 4. DRC (US$ 5.8B) | 4. Mozambique (US$ 17.9B) |
| **5.** | **Angola (US$ 4.2B)** | 5. Kenya (US$ 5.5B) | 5. Egypt (US$ 16.5B) |
| **6.** | **Equatorial Guinea (US$ 3.7B)** | 6. Nigeria (US$ 4.2B) | 6. Ethiopia (US$ 16.1B) |
| **7.** | **Zimbabwe (US$ 3.5B)** | 7. South Africa (US$ 3.6B) | 7. Kenya (US$ 14.6B) |
| **8.** | **Nigeria (US$ 3.1B)** | 8. Uganda (US$ 3.5B) | 8. Sudan (US$ 14.0B) |
| **9.** | **Cameroon (US$ 3.0B)** | 9. Tanzania (US$ 3.4B) | 9. Morocco (US$ 12.6B) |
| **10.** | **South Africa (US$ 2.3B)** | 10. Mozambique (US$ 3B) | 10. Uganda (US$ 12B) |

Source: AidData's Chinese Official Finance to Africa Dataset, Version 1.1 and OECD DAC Creditor Reporting System.

Table 3. *Aid shocks, Chinese development finance and conflict onset (regression results)*

| | (1) Baseline RE Logit Full sample Full sample | (2) Baseline Logit Full sample All countries | (3) Baseline Logit 2000-2005 All countries | (4) Baseline Logit 2000-2005 Africa only | (5) Interaction 1 Logit 2000-2005 Africa only | (6) Interaction 2 Logit 2000-2005 Africa only | (7) Interaction 3 Logit 2000-2005 Africa only |
|---|---|---|---|---|---|---|---|
| **Aid shock** | 0.911*** | 0.937*** | 1.681*** | 4.063** | 3.980* | 4.109* | 5.209** |
| | (0.001) | (0.001) | (0.006) | (0.017) | (0.057) | (0.057) | (0.048) |
| **Number of OF projects** | | | | | -2.761** | | |
| | | | | | (0.039) | | |
| **Aid shock * Number OF** | | | | | 2.446 | | |
| | | | | | (0.139) | | |
| **Number of ODA projects** | | | | | | -6.637** | |
| | | | | | | (0.040) | |
| **Aid shock * Number ODA** | | | | | | 6.384* | |
| | | | | | | (0.055) | |
| **OF amount/GNI** | | | | | | | 0.235 |
| | | | | | | | (0.507) |
| **Aid shock * OF amount/GNI** | | | | | | | -2.233* |
| | | | | | | | (0.081) |
| **Positive aid shock** | 0.154 | 0.150 | 0.406 | -1.070 | 1.136 | 0.393 | -1.252 |
| | (0.672) | (0.683) | (0.585) | (0.349) | (0.551) | (0.797) | (0.405) |
| **Human rights violations** | 0.607*** | 0.625*** | 0.557* | 0.497 | 0.618 | 0.154 | 0.280 |
| | (0.000) | (0.000) | (0.081) | (0.565) | (0.480) | (0.850) | (0.741) |
| **Assassinations** | 0.136 | 0.123 | 0.428 | -1.376 | -1.851 | -1.612 | -2.034 |
| | (0.168) | (0.216) | (0.183) | (0.312) | (0.105) | (0.229) | (0.169) |
| **Riots** | 0.014 | -0.009 | -0.213 | | | | |
| | (0.917) | (0.944) | (0.717) | | | | |
| **General strikes** | 0.015 | -0.019 | -0.154 | | | | |
| | (0.944) | (0.927) | (0.819) | | | | |
| **Antigov. demonstrations** | -0.053 | -0.066 | -0.510 | -2.902 | -1.882 | -2.149 | -3.062 |
| | (0.672) | (0.598) | (0.175) | (0.151) | (0.292) | (0.283) | (0.217) |
| **Infant mortality** | 0.003 | 0.004 | -0.002 | -0.002 | -0.009 | -0.003 | -0.002 |
| | (0.473) | (0.462) | (0.840) | (0.949) | (0.742) | (0.931) | (0.965) |
| **Bad neighborhood** | -0.038 | -0.048 | -0.095 | 0.725* | 1.074** | 0.860* | 0.703 |
| | (0.747) | (0.690) | (0.714) | (0.092) | (0.034) | (0.079) | (0.174) |
| **Partial autocracy** | 0.230 | 0.231 | -0.294 | 17.091*** | 24.386*** | 25.346*** | 17.519*** |
| | (0.490) | (0.492) | (0.762) | (0.000) | (0.000) | (0.000) | (0.000) |
| **Partial democracy** | -0.669 | -0.741 | -1.212 | 15.878*** | 23.361*** | 24.271*** | 16.264*** |
| | (0.157) | (0.120) | (0.244) | (0.000) | (0.000) | (0.000) | (0.000) |
| **Factional democracy** | 0.681* | 0.698* | 0.061 | 16.127*** | 23.048*** | 23.948*** | 16.743*** |
| | (0.077) | (0.073) | (0.959) | (0.000) | (0.000) | (0.000) | (0.000) |
| **Full democracy** | 0.176 | 0.164 | -2.653** | | | | |
| | (0.747) | (0.766) | (0.032) | | | | |
| **ln(GDP per capita)** | -0.200 | -0.198 | -0.182 | 0.182 | 0.384 | 0.243 | 0.112 |
| | (0.401) | (0.410) | (0.654) | (0.786) | (0.655) | (0.780) | (0.912) |
| **ln(Population)** | 0.090 | 0.100 | 0.212 | -0.044 | -0.234 | -0.262 | -0.013 |
| | (0.283) | (0.238) | (0.359) | (0.904) | (0.639) | (0.524) | (0.978) |
| **Oil** | 0.010*** | 0.009*** | 0.051*** | 0.679*** | 1.209*** | 1.376*** | 0.791*** |
| | (0.001) | (0.002) | (0.000) | (0.000) | (0.001) | (0.001) | (0.000) |
| **Instability** | 0.225 | 0.224 | -0.196 | 0.963 | 1.642** | 1.620* | 1.053 |
| | (0.407) | (0.414) | (0.755) | (0.239) | (0.048) | (0.052) | (0.246) |
| **Ethnic frac.** | 1.341** | 1.405** | 2.404 | 4.073* | 5.129* | 5.275* | 2.789 |
| | (0.022) | (0.017) | (0.166) | (0.062) | (0.073) | (0.091) | (0.283) |
| **Religious frac.** | -0.738 | -0.771 | -1.002 | 2.182 | 4.517 | 4.134 | 3.728 |
| | (0.273) | (0.257) | (0.477) | (0.454) | (0.205) | (0.341) | (0.291) |
| **Noncontiguous** | 0.985*** | 0.981*** | 1.137 | 0.907 | 4.593** | 5.018** | 0.629 |
| | (0.002) | (0.002) | (0.117) | (0.662) | (0.020) | (0.045) | (0.780) |
| **Mountains** | 0.086 | 0.091 | 0.076 | -0.337 | -0.351 | -0.103 | -0.315 |
| | (0.359) | (0.338) | (0.672) | (0.352) | (0.425) | (0.811) | (0.488) |
| **Cold War** | 0.163 | 0.176 | | | | | |
| | (0.567) | (0.540) | | | | | |
| **Spline 1** | -0.003 | -0.002 | 0.214 | -0.831 | -0.733 | -0.701 | -1.378 |
| | (0.501) | (0.516) | (0.623) | (0.568) | (0.622) | (0.652) | (0.456) |
| **Spline 2** | 0.004 | 0.004 | -0.337 | 0.656 | 0.200 | 0.170 | 1.433 |
| | (0.331) | (0.348) | (0.514) | (0.762) | (0.937) | (0.942) | (0.533) |
| **Spline 3** | -0.003 | -0.002 | 0.397 | 0.181 | 1.104 | 1.143 | -0.594 |
| | (0.294) | (0.321) | (0.407) | (0.947) | (0.752) | (0.700) | (0.789) |
| **Constant** | -5.797** | -6.148** | -7.655 | -28.753*** | -36.406*** | -35.372*** | -29.250* |
| | (0.046) | (0.036) | (0.133) | (0.007) | (0.008) | (0.006) | (0.065) |
| **Number of observations** | 2627 | 2627 | 719 | 188 | 188 | 188 | 185 |
| **Number of countries** | 139 | 139 | 128 | 39 | 39 | 39 | 39 |
| **AIC** | . | 723.003 | 203.893 | 83.386 | 83.222 | 82.125 | 83.939 |
| **BIC** | . | 875.717 | 318.339 | 151.351 | 157.660 | 156.564 | 158.007 |

Table 4. *Aid shocks, Chinese development finance and conflict onset (marginal effects)*

| | (1)<br>**Numbers OF** | (2)<br>**Numbers ODA** | (3)<br>**OF amount/GNI** |
|---|---|---|---|
| *Effect of Aid shock at different levels of Chinese development finance* | | | |
| 0 | 0.202* | 0.190** | 0.206*** |
| | (0.064) | (0.040) | (0.009) |
| 1 | 0.215*** | 0.198*** | 0.069 |
| | (0.005) | (0.004) | (0.253) |
| 2 | 0.200** | 0.190** | 0.009 |
| | (0.017) | (0.018) | (0.804) |
| 3 | 0.184* | 0.178* | -0.010 |
| | (0.080) | (0.084) | (0.520) |
| 4 | 0.169 | 0.162 | -0.018 |
| | (0.192) | (0.203) | (0.192) |
| 5 | 0.154 | 0.146 | -0.024 |
| | (0.310) | (0.326) | (0.149) |
| 6 | 0.139 | 0.132 | -0.028 |
| | (0.404) | (0.431) | (0.235) |
| 7 | 0.124 | 0.119 | -0.033 |
| | (0.485) | (0.515) | (0.331) |
| 8 | 0.110 | 0.107 | -0.038 |
| | (0.548) | (0.581) | (0.414) |
| 9 | 0.097 | 0.096 | -0.044 |
| | (0.596) | (0.736) | (0.481) |
| Number of observations | 188 | 188 | 185 |

Figure 1. *A classification scheme of Chinese Official and Unofficial Finance*

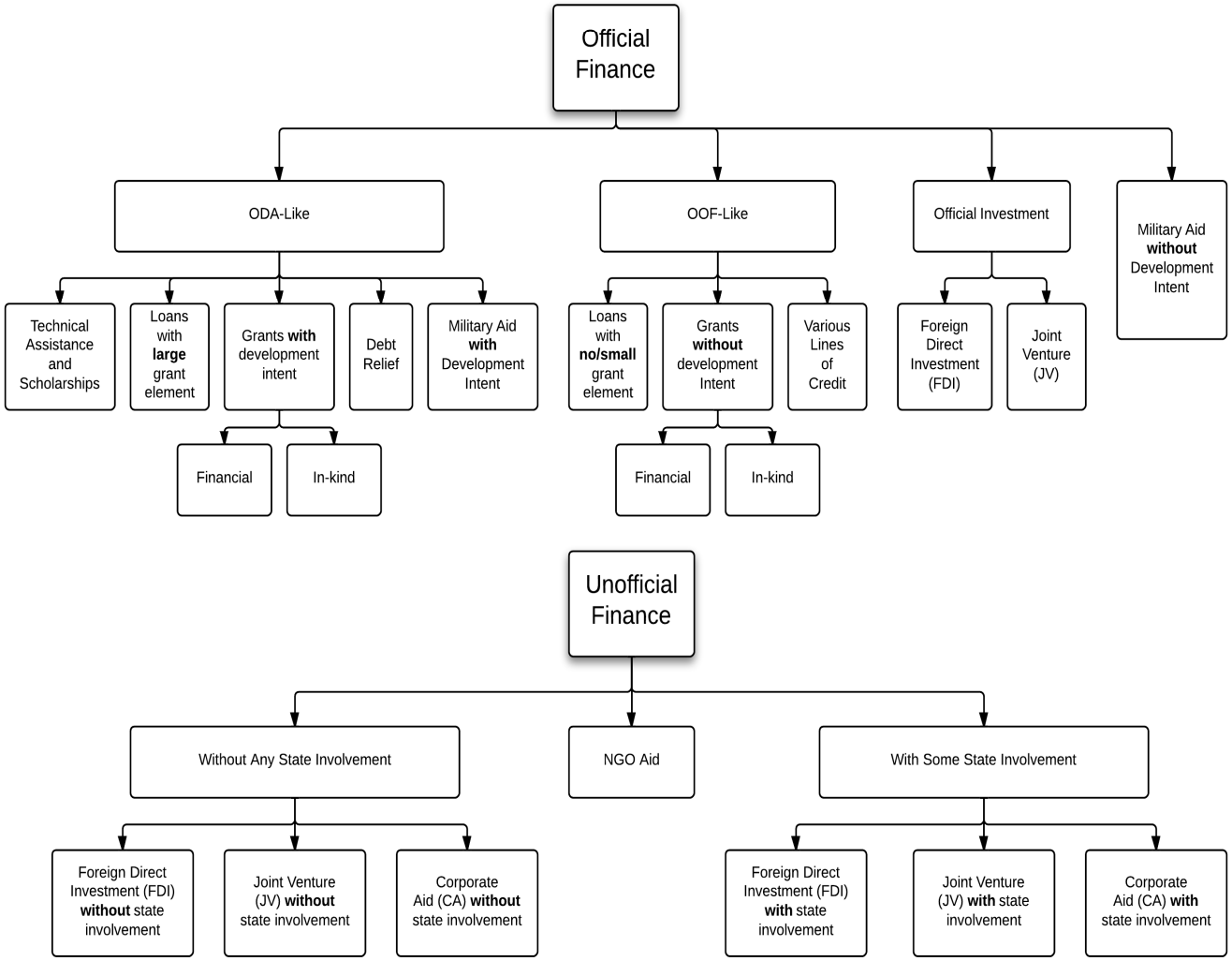


Figure 2. *Share of each reported status of all projects over time, 2000-2011*

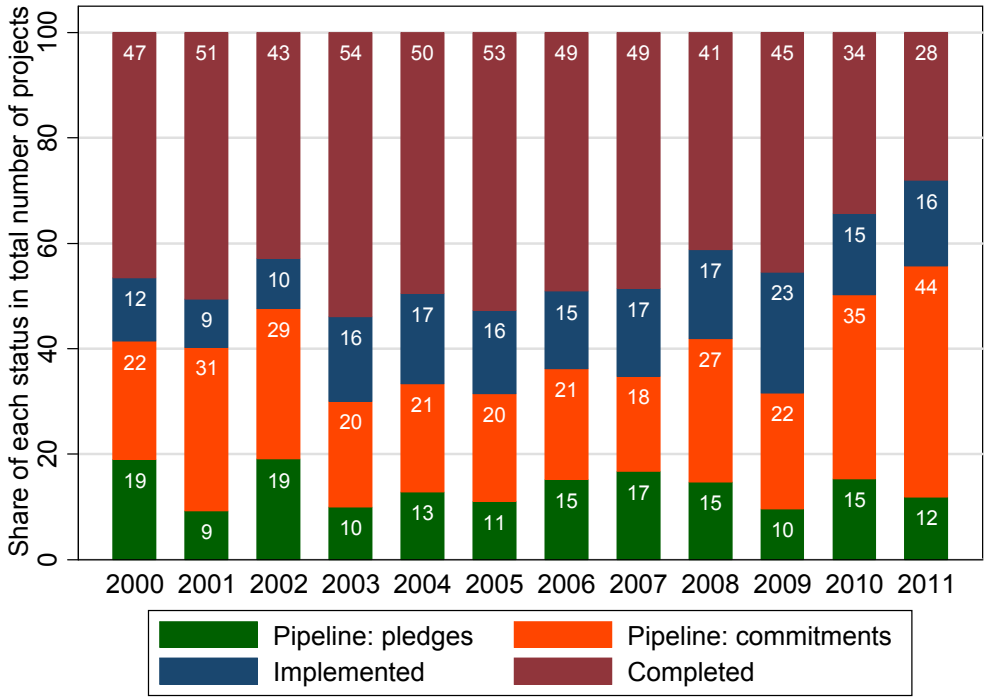



Figure 3. *Chinese official finance reported over time, 2000-2011*

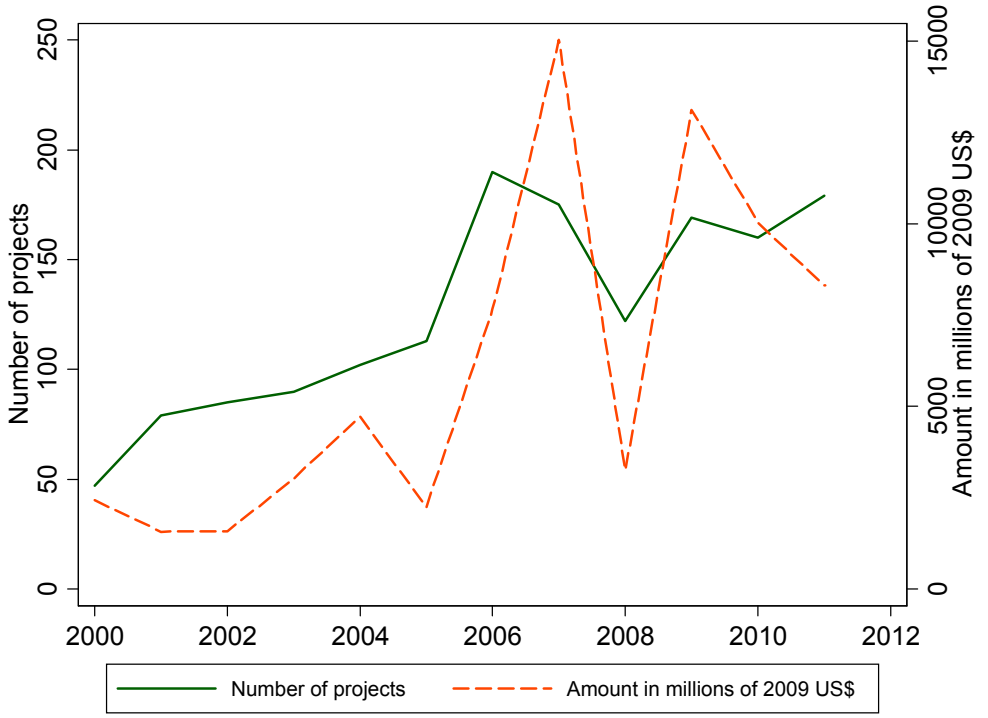


Figure 4. *Number of Chinese projects by type of flow, 2000-2011*

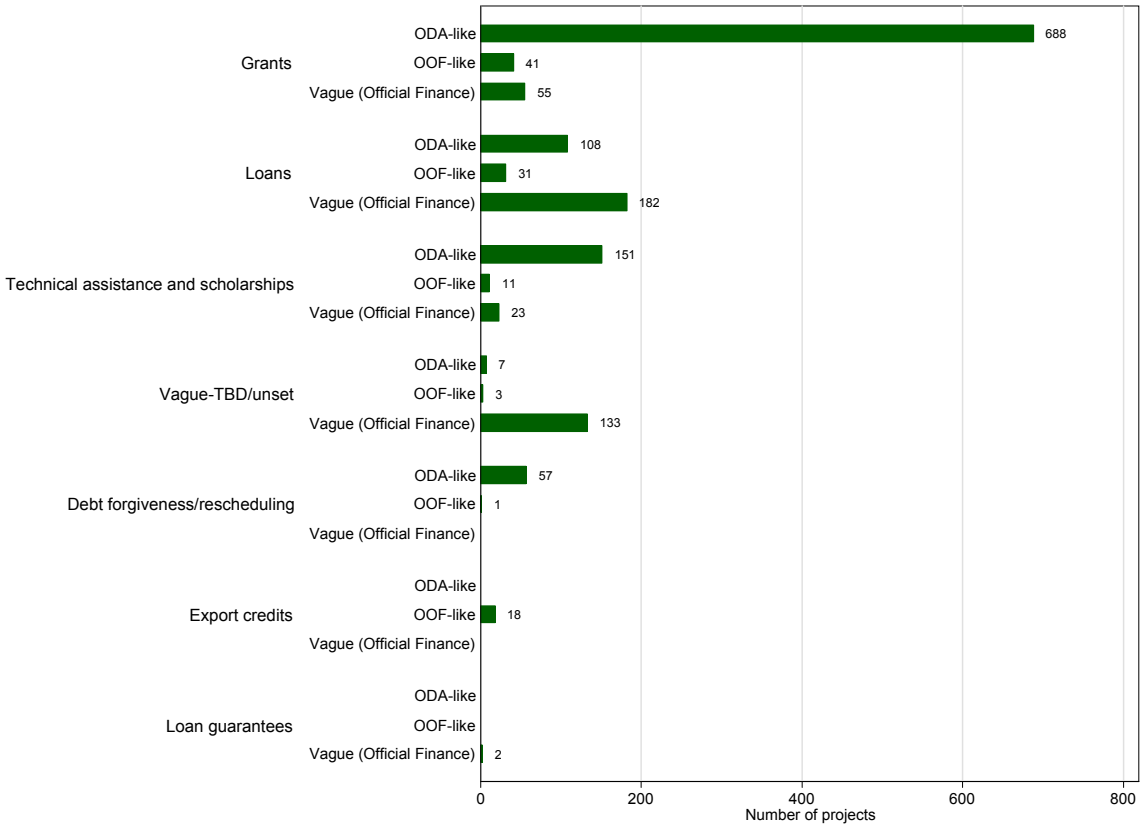


Figure 5. *Chinese, OECD-DAC, and US Official flows over time, 2000-2011*

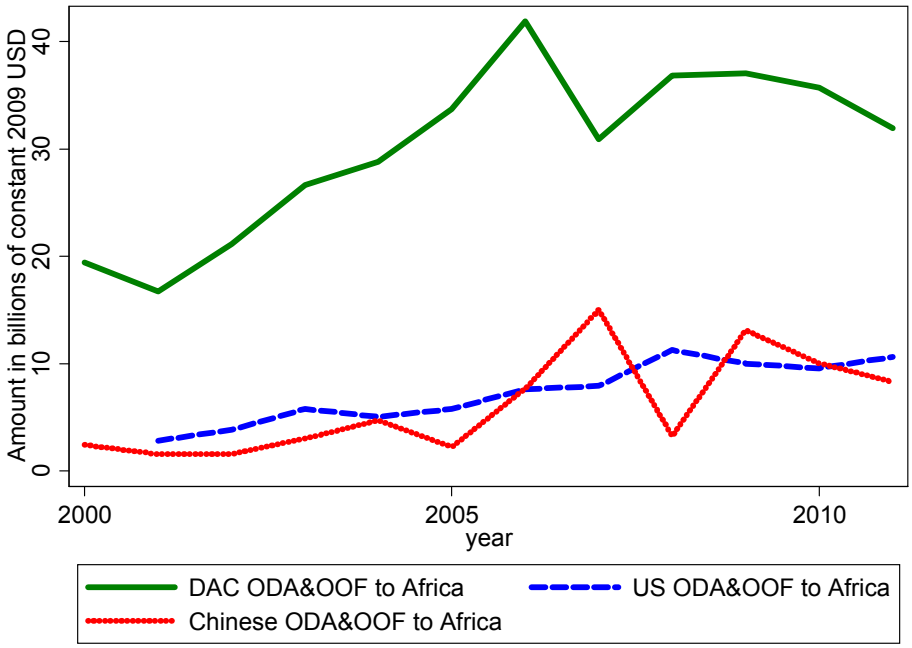
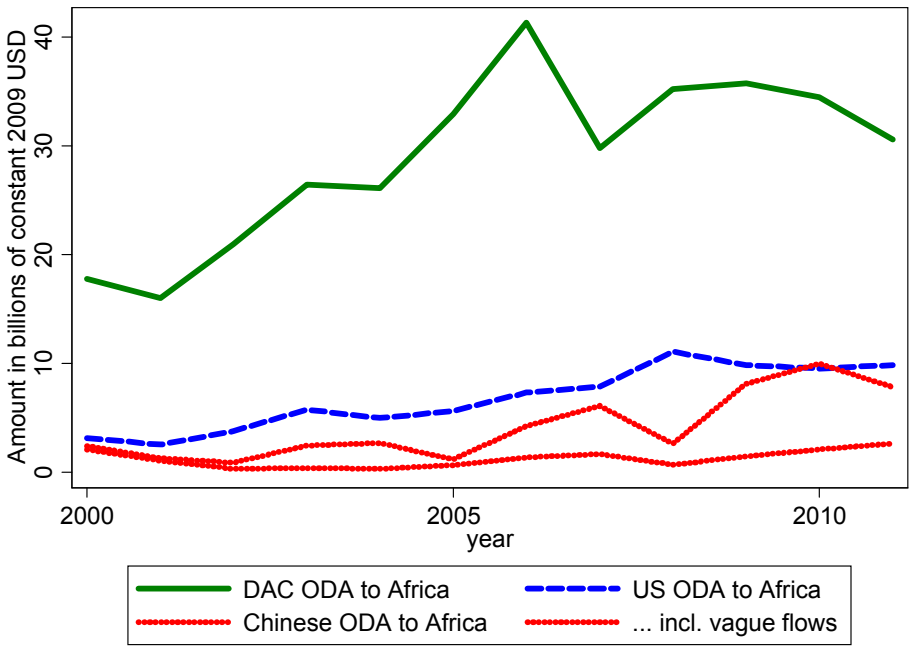



Figure 6. *Chinese, OECD-DAC and US ODA over time, 2000-2011*




Note: The figure displays Chinese ODA both including vague flows (upper dotted line) and excluding these flows that cannot be identified as either ODA or OOF (lower dotted line)

Figure 7. *Number of Chinese projects by sector, 2000-2011*

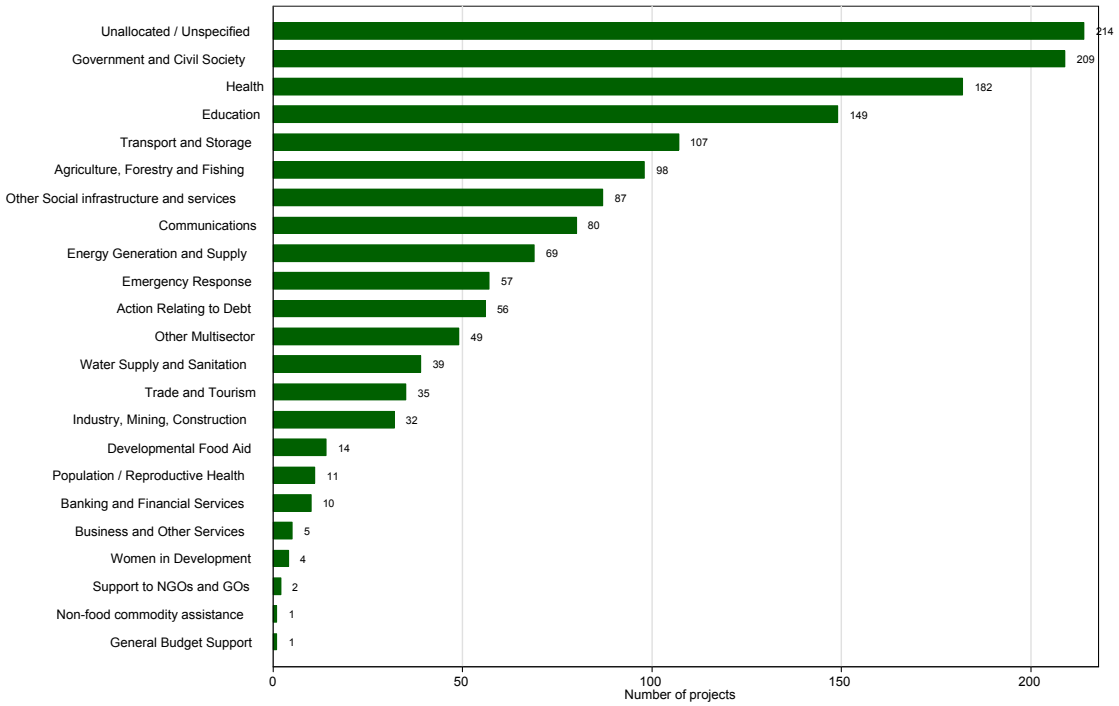



Figure 8. *Monetary amount of Chinese official finance by sector, 2000-2011*

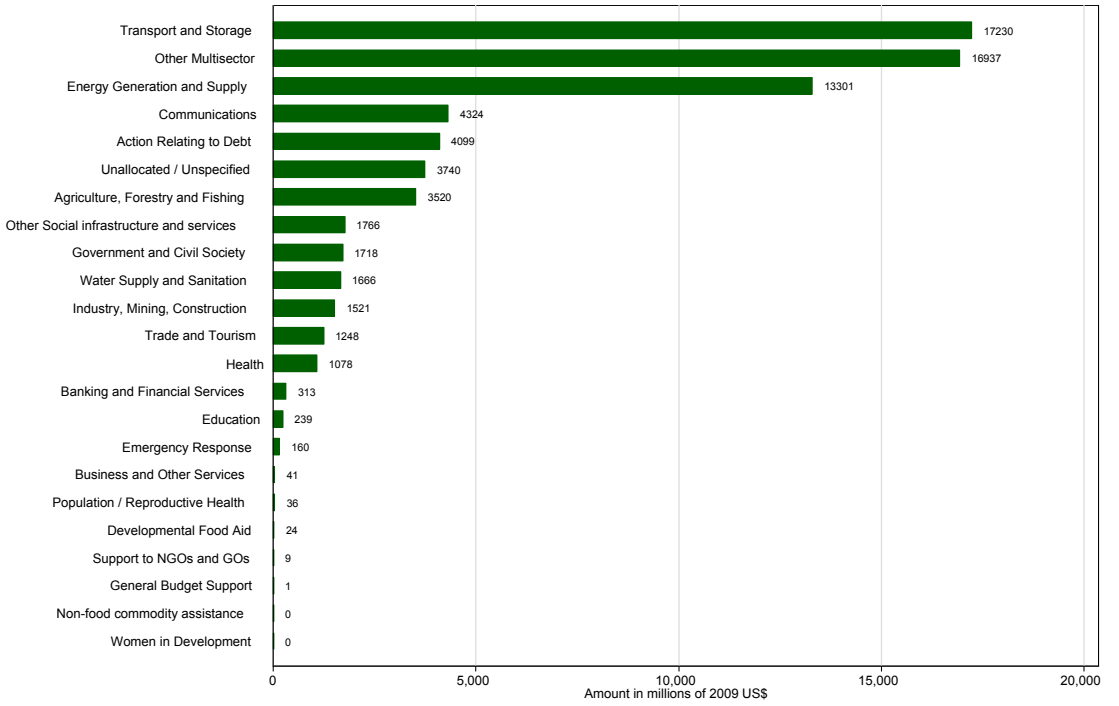


Figure 9. *Percentage of China's official projects to Africa by recipient country, 2000-2011*

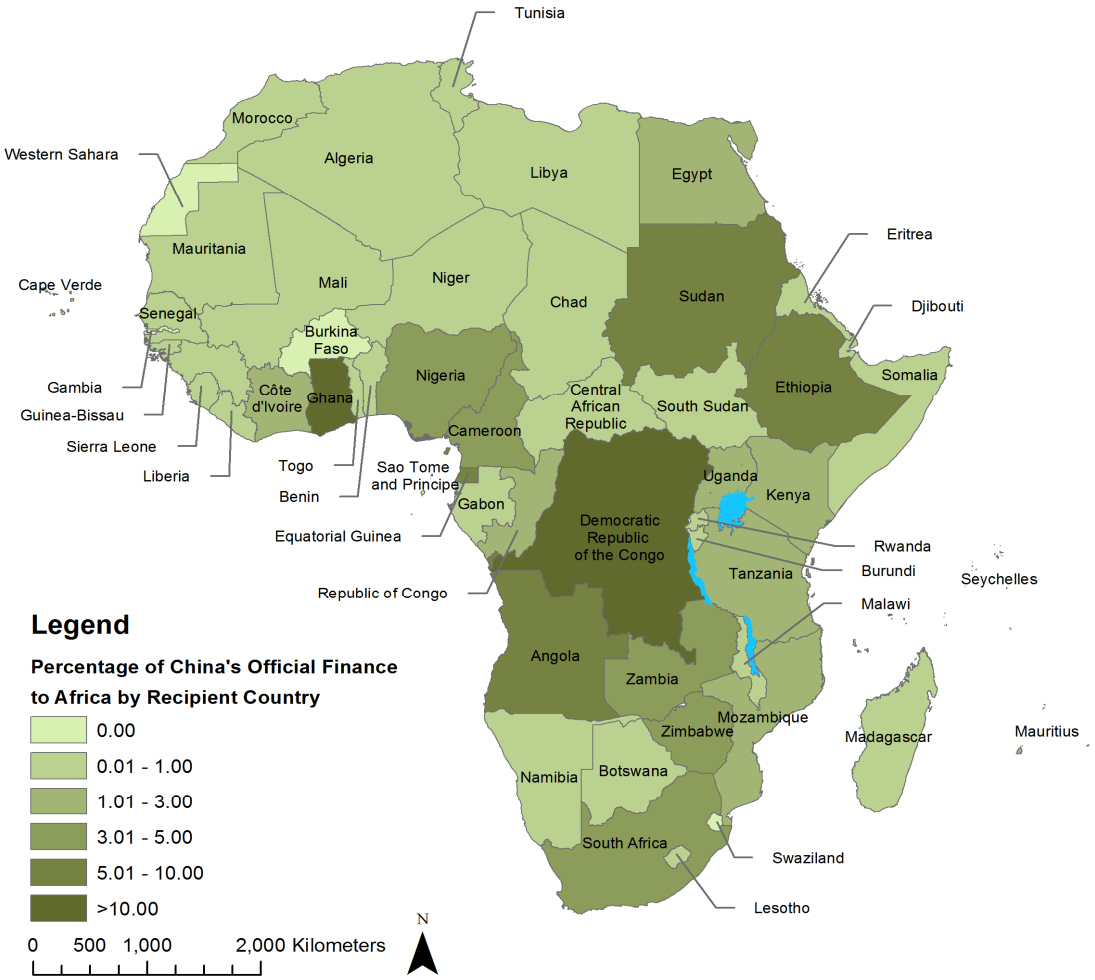
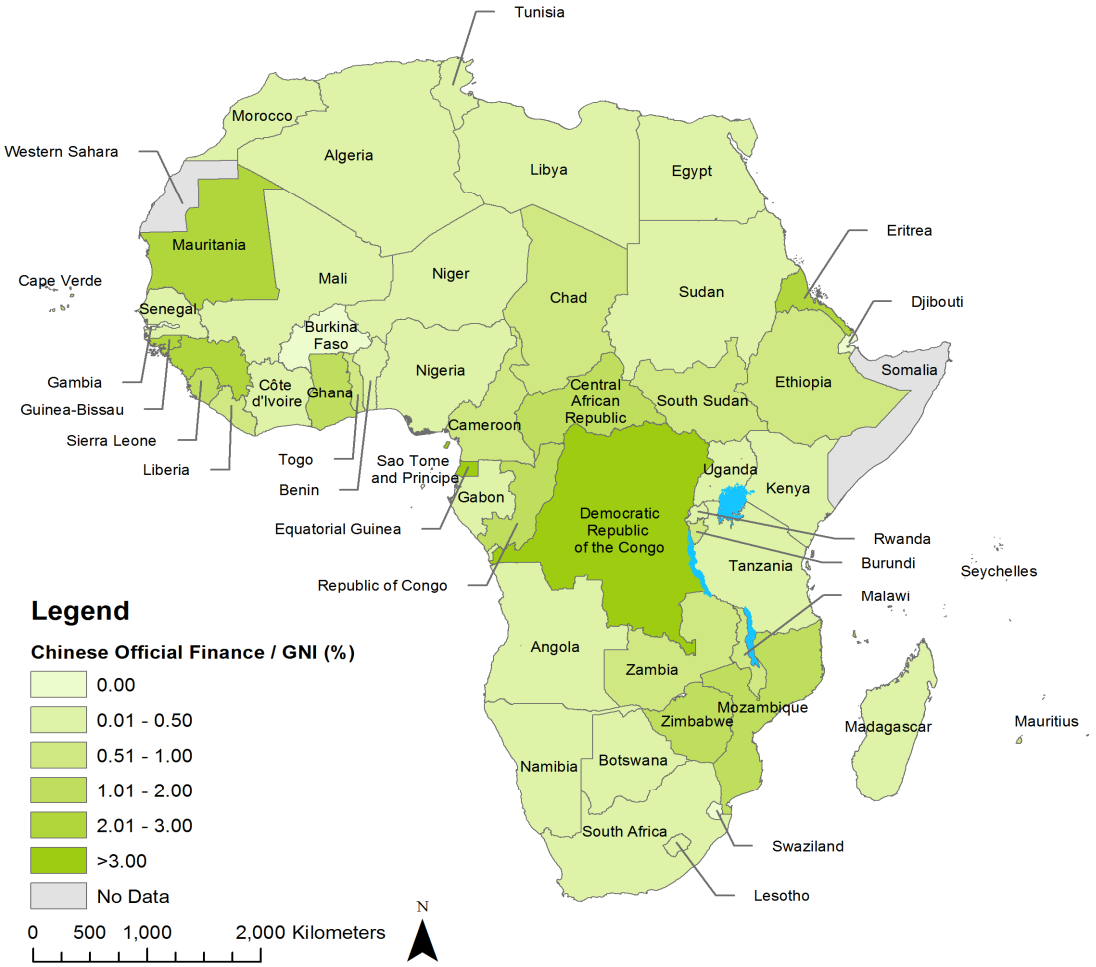
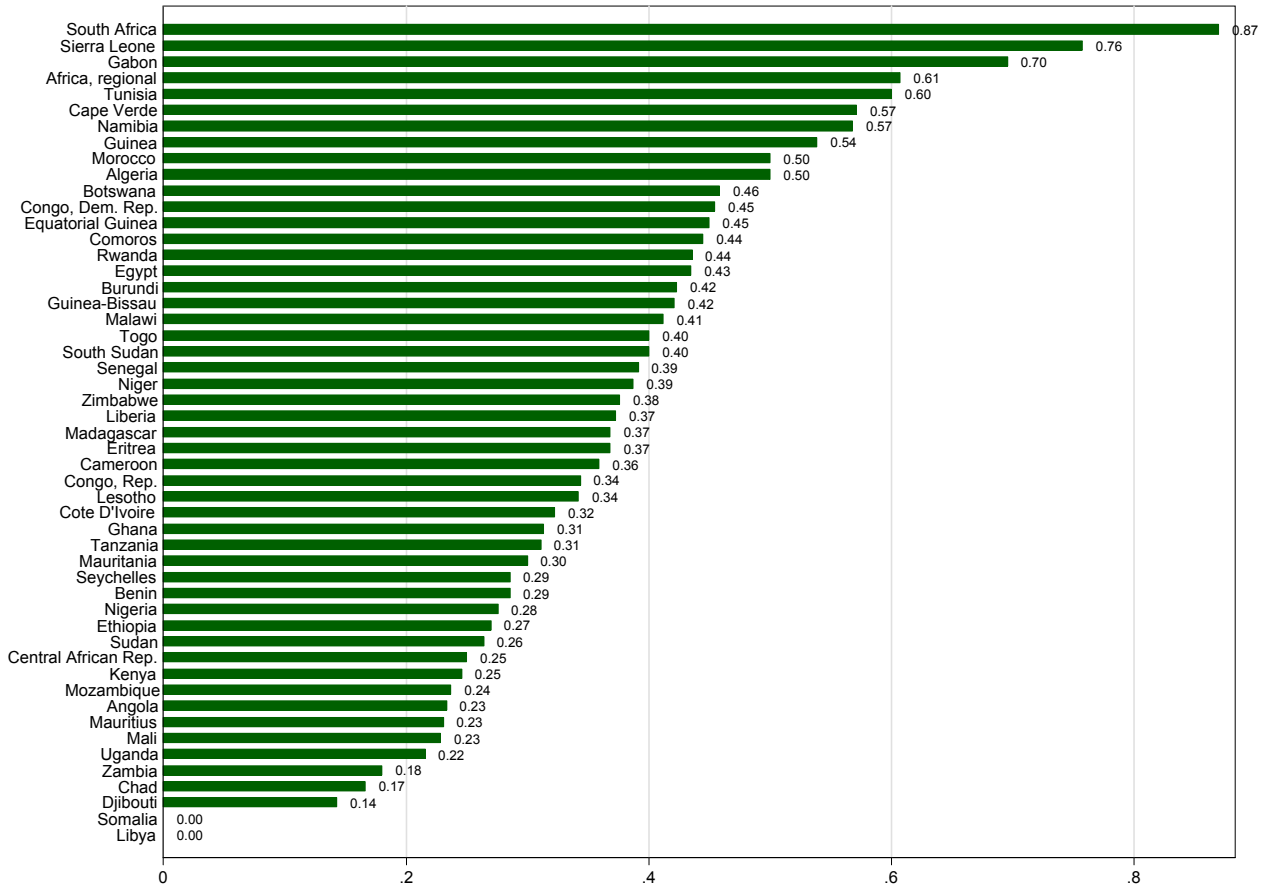


Figure 10. *China's official finance to Africa by recipient country as percentage of GNI, 2000-2011 average*



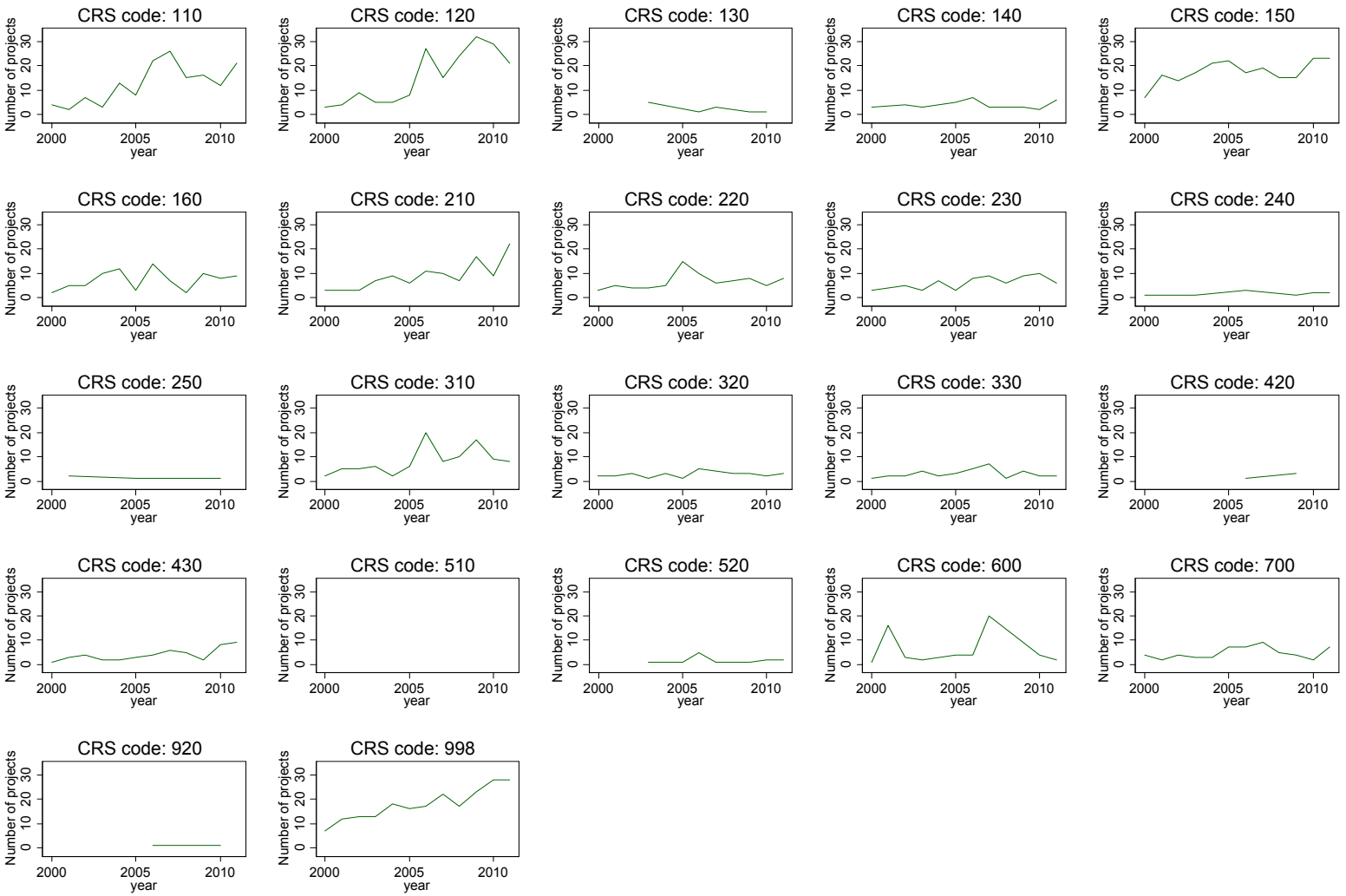
Appendix A-1. *Share of projects without information on their monetary value*



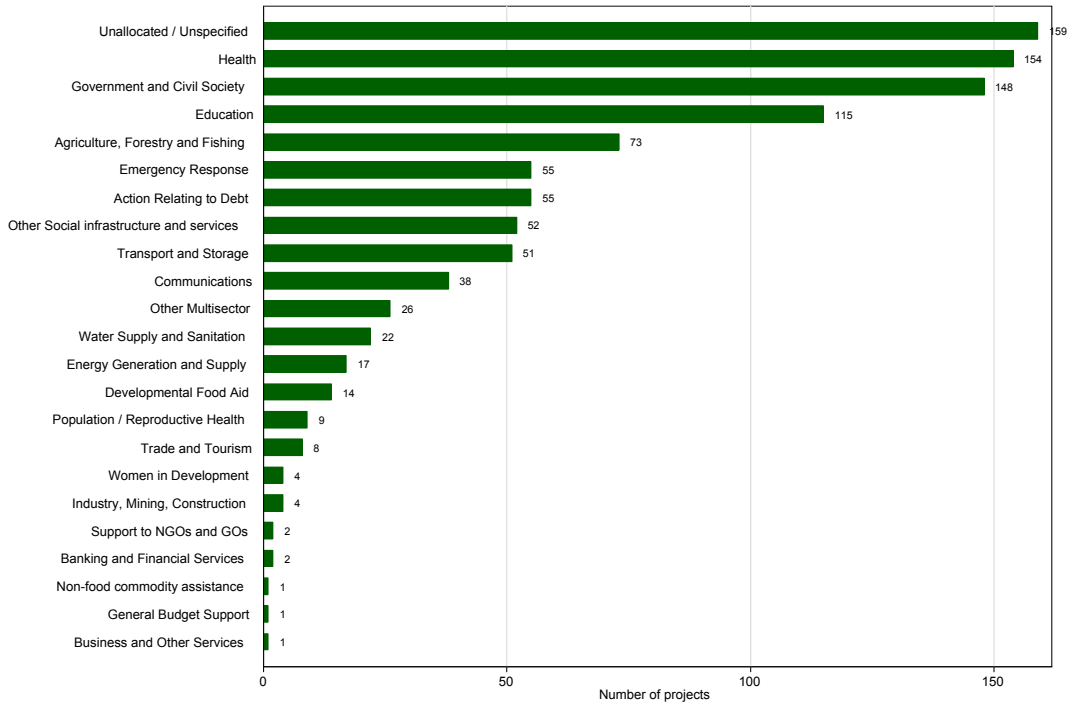
Appendix A-2. *List of the 20 largest projects (in millions of US$), 2000-2011*

| Recipient | Year | Project | Flow Class | Flow | Status | Value |
|---|---|---|---|---|---|---|
| Congo, Dem. Rep. | 2007 | Infrastructure for mines barter deal (Sicomines) | OOF-like | Loan | Implementation | 7160 |
| Ghana | 2010 | China offers 6 billion USD concessionary loan | Vague (OF) | Loan | Implementation | 5485 |
| Ghana | 2009 | 3 billion USD loan from China Development Bank for oil project, road project, others | OOF-like | Loan | Implementation | 3000 |
| Equatorial Guinea | 2006 | $2b oil-backed loan | OOF-like | Loan | Completion | 2692 |
| Ethiopia | 2009 | Concessional Ex-Im Bank Loan for Dam Construction | Vague (OF) | Loan | Pipeline: Commitment | 2249 |
| South Africa | 2011 | Financial Cooperation Agreement | Vague (OF) | Vague | Pipeline: Commitment | 2072 |
| Africa, regional | 2000 | $1 billion of African debt cancelled; may not be bilateral | ODA-like | Debt forgiveness | Completion | 1697 |
| Angola | 2004 | Phase 1 of National Rehabilitation Project | OOF-like | Loan | Implementation | 1507 |
| Sudan | 2007 | Construction of railway from Khartoum to Port Sudan | OOF-like | Export credits | Completion | 1377 |
| Angola | 2009 | 1.2 billion USD loan for agricultural development | OOF-like | Loan | Implementation | 1200 |
| Zimbabwe | 2004 | ZESA Secures Funding for Lake Kariba Power Plant | Vague (OF) | Loan | Pipeline: Commitment | 1010 |
| Zambia | 2010 | Chinese firm to build Kafue Gorge power plant | Vague (OF) | Loan | Implementation | 930 |
| Sudan | 2003 | Loan for Hydro-Mechanic Components of the Merowe hydroelectric power station | Vague (OF) | Loan | Completion | 836 |
| Mauritius | 2009 | East-West Corridor, Ring Road, Bus Way, and Harbour Bridge | Vague (OF) | Loan | Implementation | 782 |
| Cameroon | 2009 | Loan for water distribution project | Vague (OF) | Loan | Implementation | 775 |
| Mozambique | 2009 | China builds Agricultural Research Center/Agriculture Station | ODA-like | In-kind Grant | Completion | 700 |
| Cameroon | 2003 | Memve'ele Dam | Vague (OF) | Loan | Implementation | 674 |
| Nigeria | 2006 | Light Rail Network | Vague (OF) | Loan | Implementation | 673 |
| Ethiopia | 2006 | Master Loan Program for Development Projects Phase I | Vague (OF) | Loan | Implementation | 673 |
| Egypt | 2006 | Cairo International Convention Center Loan | Vague (OF) | Loan | Pipeline: Commitment | 673 |

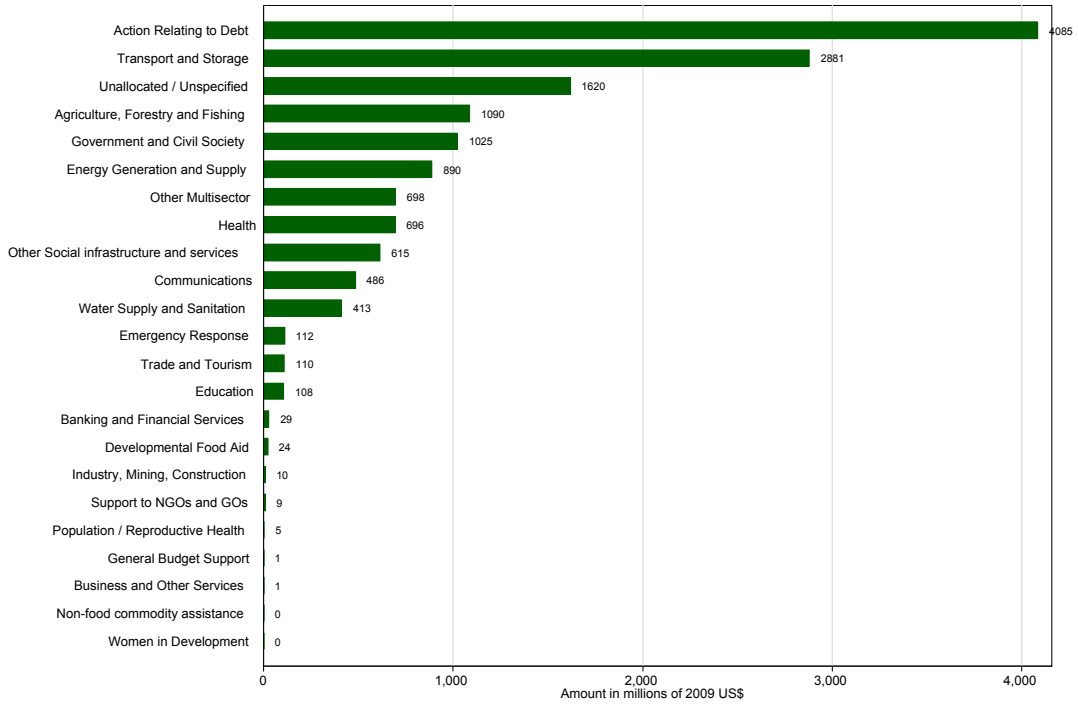
Appendix A-3. *Chinese official finance over time by sector, 2000-2011*
Note: See Appendix B for list of aid sectors



Appendix A-4. *Number of Chinese ODA projects by sector, 2000-2011*

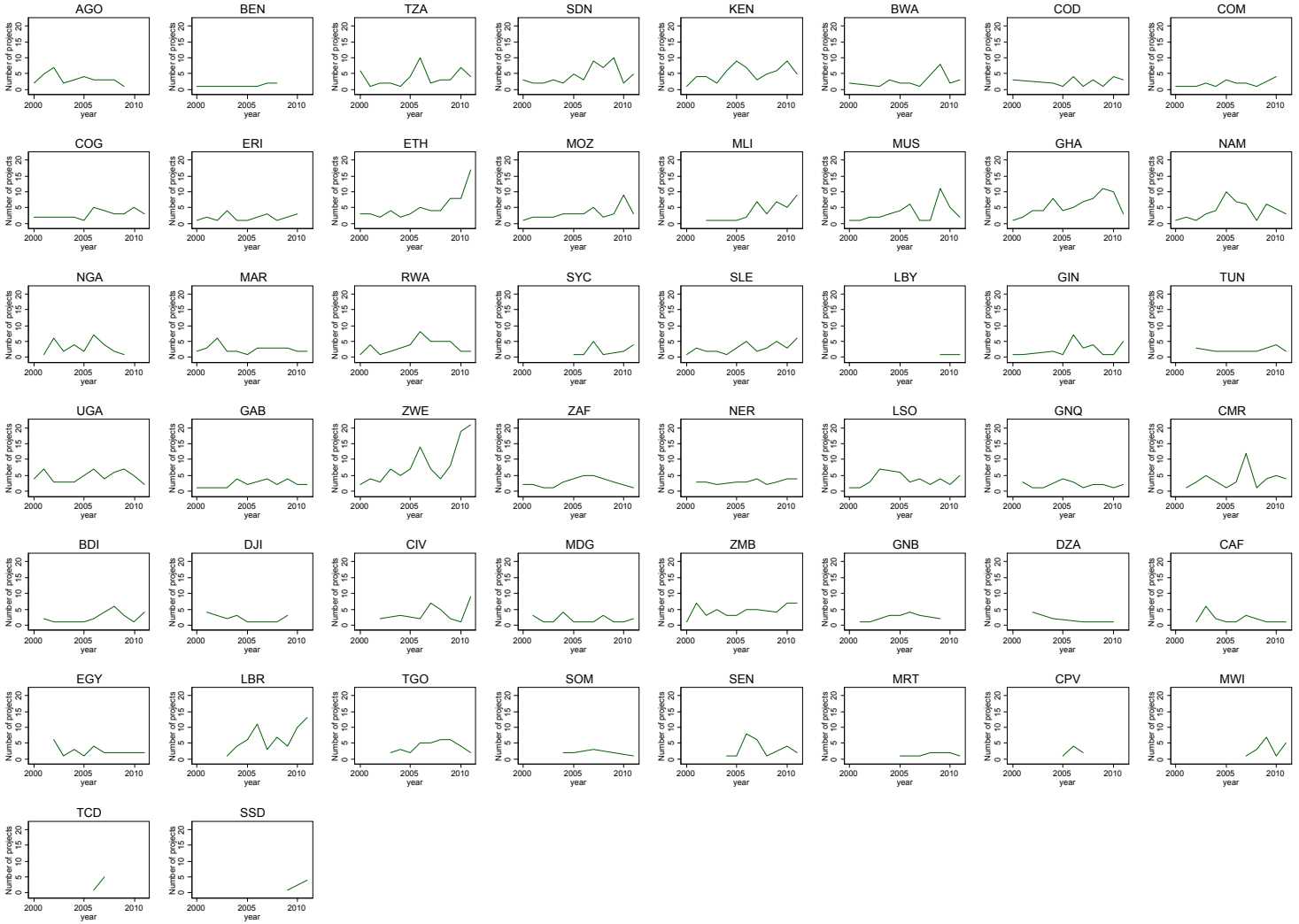



Appendix A-5. *Monetary amount of Chinese ODA by sector, 2000-2011*



Appendix A-6. *Chinese official finance over time by recipient country, 2000-2011*

Note: See Appendix C for list of countries. AidData did not track any project in Burkina Faso, the Gambia, São Tomé and Príncipe, and Swaziland over the 2000-2011 period.



Appendix B. *List of aid sectors*

| **Code** | **Sector** |
|---|---|
| 110 | Education |
| 120 | Health |
| 130 | Population policies/Programmes and reproductive health |
| 140 | Water supply and sanitation |
| 150 | Government and civil society |
| 160 | Other social infrastructure and services |
| 210 | Transport and storage |
| 220 | Communications |
| 230 | Energy generation and supply |
| 240 | Banking and financial services |
| 250 | Business and other services |
| 310 | Agriculture, forestry and fishing |
| 320 | Industry, mining and construction |
| 330 | Trade and tourism |
| 410 | General environmental protection |
| 420 | Women |
| 430 | Other multisector |
| 510 | General budget support |
| 520 | Developmental food aid/Food security assistance |
| 530 | Non-food commodity assistance |
| 600 | Action relating to debt |
| 700 | Emergency response |
| 920 | Support to (non-)governmental organisations |
| 998 | Unallocated/Unspecified |
| 110 | Education |
| 120 | Health |
| 130 | Population policies/Programmes and reproductive health |
| 140 | Water supply and sanitation |

Appendix C. *List of countries*

| **Code** | **Country** | **Code** | **Country** |
|---|---|---|---|
| AGO | Angola | MDG | Madagascar |
| BDI | Burundi | MLI | Mali |
| BEN | Benin | MOZ | Mozambique |
| BFA | Burkina Faso | MRT | Mauritania |
| BWA | Botswana | MUS | Mauritius |
| CAF | Central African Rep. | MWI | Malawi |
| CIV | Cote D'Ivoire | MYT | Mayotte |
| CMR | Cameroon | NAM | Namibia |
| COD | Congo, Dem. Rep. | NER | Niger |
| COG | Congo, Rep. | NGA | Nigeria |
| COM | Comoros | RWA | Rwanda |
| CPV | Cape Verde | SDN | Sudan |
| DJI | Djibouti | SEN | Senegal |
| DZA | Algeria | SHN | Saint Helena |
| EGY | Egypt | SLE | Sierra Leone |
| ERI | Eritrea | SOM | Somalia |
| ETH | Ethiopia | SSD | South Sudan |
| GAB | Gabon | STP | Sao Tome and Principe |
| GHA | Ghana | SWZ | Swaziland |
| GIN | Guinea | SYC | Seychelles |
| GMB | Gambia | TCD | Chad |
| GNB | Guinea-Bissau | TGO | Togo |
| GNQ | Equatorial Guinea | TUN | Tunisia |
| KEN | Kenya | TZA | Tanzania |
| LBR | Liberia | UGA | Uganda |
| LBY | Libya | ZAF | South Africa |
| LSO | Lesotho | ZMB | Zambia |
| MAR | Morocco | ZWE | Zimbabwe |

APPENDIX D. *Comparing TUFF with existing data sources.*

In order to preliminarily gauge the comprehensiveness of our data, we compared the records contained in *AidData's Chinese Official Finance to Africa Dataset, Version 1.0* with four existing data sources of Chinese official finance. First, to determine the extent to which our data match the (admittedly limited) data on Chinese aid from official sources, we cross-checked our project records with the project records reported in China's MOFCOM Yearbooks from 2000-2005 (with the exception of 2002 when no data were reported). Matching our data to MOFCOM Yearbooks proved difficult, as the Yearbooks report project completion years while our database records project commitment years and then follows up on whether projects have been implemented and/or completed. That said, the results from the matching exercise suggest that our database contains more projects listed in MOFCOM Yearbooks for more recent years. This makes sense because commitment years for earlier projects have a higher probability of occurring before 2000—our data collection cut-off date. We matched 6% of MOFCOM projects completed in 2000, 27% in 2001, 50% in 2003, 62% in 2004, and 50% in 2005.

Second, we cross-checked our database with humanitarian aid data recorded in the Financial Tracking Service (FTS) of the UN Office for Coordination of Humanitarian Affairs (OCHA). While our dataset contains 86 official finance projects coded as "Developmental Food Aid/Food Security Assistance" and "Emergency response" in the 2000-2011 period, FTS contains only 26 humanitarian assistance project records that would plausibly meet our database inclusion criteria. Of the 19 FTS records that contain sufficient information for our comparison, 13 (68%) can be matched to a specific project in our dataset. This suggests that we are collecting more comprehensive and detailed Chinese humanitarian assistance data than FTS.

Third, we have compared our dataset with the Food Aid Information System (FAIS), an online database provided by the UN World Food Programme (WFP) that tracks international food aid flows. Results were mixed. On one hand, we found that FAIS reported over 40 recipient-year pairings with food aid from China that did not exist in our database. But we also found 10 pairings in our dataset that were

not in the FAIS database. There were over 10 pairings that showed up in both databases. However, FAIS does not provide data for 2010 and also only reports Chinese food aid to 30 African states, excluding a substantial number of recipients for which AidData has food aid records. The AidData-FAIS matching results suggest that our methodology may not be as effective for collecting food aid data as it is for tracking Chinese foreign aid in other sectors. But FAIS also seems to suffer from substantial data gaps in reporting Chinese food aid to African countries. Taken together, these comparisons with MOFCOM Yearbooks, FTS and FAIS suggest that open source data are no substitute for official data but a viable second-best solution, particularly when official data are largely incomplete.

Fourth, we cross-checked a database of incoming aid flows managed by Malawi's Ministry of Finance. Malawi's Aid Management Platform contains data from 30 donor agencies and US$ 5.3 billion in commitments (current US$), representing approximately 80% of all external funding reported to the Ministry of Finance since 2000. Out of 2,584 projects in the AMP Malawi database, only two records (2008 and 2009 project) list the People's Republic of China as the donor entity, totaling US$ 163 million (current US$). Both of these projects are included in our dataset. However, our dataset includes 14 additional Chinese official finance projects in Malawi, totaling US$ 164.8 million in commitments. Collectively, these projects double the amount of recorded commitments of Chinese official finance in Malawi. This comparison illustrates the added value of using TUFF as another method to track aid flows in the absence of official project records.

In addition to comparisons with these four official databases, we compare the annual amount of total Chinese aid to Africa, as represented by our new dataset, and estimates from previous studies (see again Table 1). Our dataset contains 937 "ODA-like" project IDs with an aggregate value of US$ 13.0 billion (in constant 2009 US$). The 937 figure includes projects identified as being in the "Commitment," "Implementation," or "Completion" stages, and excludes projects with a status of "Pledge." This is an average of less than US$ 1.1 billion of Chinese ODA to Africa per annum during the twelve year study range. This is roughly comparable to previous studies such as Bräutigam (2011), Wang (2007) and The

Economist (2004) that estimated Chinese ODA to Africa to be somewhere between US$ 1 and US$ 2 billion for a particular year in our study's time range. More broadly, our database contains 1,422 projects that have been classified as "Chinese Official Finance," which includes projects labeled as "ODA-like," "OOF-like" and "Vague Official Finance," for a total of US$ 75.4 billion between 2000-2011, or US$ 6.3 billion per year. This estimate falls in between previous wide-ranging estimates such as the CRS/NYU Wagner School study that placed 2007 Chinese "aid and related activities" at US$ 18.0 billion (Lum et al. 2009), and Christensen (2010), who estimated 2009 Chinese "aid" to Africa at US$ 2.1 billion.

AidData's aggregate estimates must be considered in light of two important caveats. First, our estimates not only include data for completed Chinese aid projects, but also for projects in the commitment stage that have been announced or remain in the preparation/design phase but have not necessarily broken ground, as well as for projects for which implementation is underway but that have not been reported as completed. The total values for Chinese official finance are considerably smaller when we exclude projects that lack information that they have been finalized (US$ 19.4 billion over the 2000-2011 period) or have at least been started (US$ 48.6 billion). Second, 38% of the official finance records in our database lack financial values. It therefore stands to reason that we may have under-estimated Chinese official development flows to Africa in this paper as a result. We hope to fill in as many of these missing financial values as possible in future updates to the dataset.[29] To obtain more accurate estimations of the total monetary value of China's development finance, future research should elaborate ways to impute missing monetary values of individual projects based on their observed characteristics.

[29] To this end, we have created a web-based platform available online at china.aiddata.org to solicit better information about Chinese aid and investment projects and programs.