

'Ground-Truthing' Chinese Development Finance in Africa: Field Evidence from South Africa and Uganda

Edwin Muchapondwa, Daniel Nielson, Bradley Parks, Austin M. Strange, and Michael J. Tierney

Abstract:

A new methodology, Tracking Underreported Financial Flows (TUFF), leverages open-source information on development finance by non-transparent, non-Western donors. If such open-source methods prove to be valid and reliable, they can enhance our understanding of the causes and consequences of development finance from non-transparent donors including, but not limited to, China. But open-source methods face charges of inaccuracy. In this study we create and field-test a replicable 'ground-truthing' methodology to verify, update, and improve open-source data with in-person interviews and site visits in Uganda and South Africa. Ground-truthing generally reveals close agreement between open-source data and answers to protocol questions from informants with official roles in the Chinese-funded projects. Our findings suggest that open-source data collection, while limited in knowable ways, can provide a stronger empirical foundation for research on development finance.

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AidData – a joint venture of the College of William and Mary, Development Gateway and Brigham Young University – is a research and innovation lab that seeks to make development finance more transparent, accountable, and effective. Users can track over \$40 trillion in funding for development including remittances, foreign direct investment, aid, and most recently US private foundation flows all on a publicly accessible data portal on AidData.org. AidData's work is made possible through funding from and partnerships with USAID, the World Bank, the Asian Development Bank, the African Development Bank, the Islamic Development Bank, the Open Aid Partnership, DFATD, the Hewlett Foundation, the Gates Foundation, Humanity United, and 20+ finance and planning ministries in Asia, Africa, and Latin America.

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1. The Challenge of Studying Non-Western Donors for Quantitative Research

A key constraint on our ability to better understand the nature, distribution, and impact of global development finance is the absence of sufficiently detailed and comprehensive information (Tierney et al. 2011). This problem is particularly acute in poor countries that lack strong statistical agencies and data collection capacities (Devarajan, 2013; Jerven 2014). However, major changes in the global development finance architecture have created a new type of information scarcity problem. Virtually none of the major non-Western suppliers of global development finance participate in reporting regimes such as the OECD's Creditor Reporting System (CRS) or the International Aid Transparency Initiative (IATI), and many of these governments have signaled that they are not interested in complying with such norms in the near future.

Therefore, scholars and policymakers interested in the causes and consequences of non-Western development finance face a dilemma. The development finance activities of countries such as China, Russia and Iran may have far-reaching implications, but existing reporting systems do not effectively track the contributions or activities of these new players, making it difficult to understand either their motives or impact.

Beijing's foreign aid program is the best illustration of this problem. International media, research institutions, and donor agencies closely scrutinise the grants, loans and other forms of assistance that China provides to other countries because of the perceived economic, developmental, diplomatic, and geostrategic implications of Beijing's largesse. Yet much of the conventional wisdom about Chinese development finance relies on anecdotes, untested assumptions, individual case studies, and incomplete data sources (Strange et al. 2013). The fact that a large body of research on China's overseas development finance exists and that much of this scholarship rests on fragile empirical foundations makes systematic data collection on the topic especially important.

Western policymakers and commentators often accuse China of using development finance as a mechanism for securing access to natural resources, subsidizing Chinese firms and exports, cementing and expanding political alliances, and pursuing global economic hegemony (Manson 2012). Beijing 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.'¹

¹ 'Is China an irresponsible friend of Africa?' *People's Daily Online*, 6 August 2012, available at <http://english.peopledaily.com.cn/90883/7899133.html>.

In an attempt to provide an improved evidence base to help address the debates over the causes and consequences of Chinese development finance, AidData (which publishes the world's largest project-level database on international development finance at aiddata.org) has produced a new methodology, Tracking Underreported Financial Flows (TUFF), which draws from open-source information produced by the media, scholarly research, and government reports and databases. The application of the TUFF methodology resulted in the publication of a database (available at china.aiddata.org) that captures 1,955 Chinese-sponsored projects worth approximately \$83.3 billion in financial commitments from 2000 to 2012.

AidData's TUFF methodology has drawn criticism for integrating information culled from news reports, which may be biased or incomplete (e.g., Xu and Carey 2014; Provost and Harris 2013). However, few critiques have gathered and analyzed alternative sources of information that would allow an empirical assessment of the accuracy, comprehensiveness, and biases that result from open-source data collection. We address all three of these issues below.

This study directly investigates the accuracy of the open-source data on Chinese aid and thereby contributes to the broader debate on whether, to what extent, and how open-source data collection methods can help scholars and policymakers who seek to understand unreported or underreported sources of development finance. We have witnessed a dramatic increase in the number of new suppliers entering the "international development finance market" over the last fifteen years, and these new sources of funding are diverse in terms of their values, objectives, and tactics (Brainard and Chollet 2007; Bräutigam 2011; Halper 2010; Schadlow 2013). Venezuela, Saudi Arabia, Russia, Iran, Cuba, and China now spend billions of dollars each year to construct and rehabilitate roads, dams, bridges, airports, schools, hospitals, soccer stadiums, and presidential palaces; provide generous scholarships to elites and their family members for study in Moscow, Beijing, Havana, Caracas, Tehran, and Riyadh; and establish universities, mosques, and cultural centers that promote the values and ideas of their state sponsors (LaFraniere 2009; Girod and Walters 2012; Romero 2012). We also know from recent studies that these non-Western donors affect social, political, and economic outcomes in ways that are both substantively important and poorly understood (e.g. Ahmed 2012; Strange et al. 2014; Bader forthcoming).

Yet, these new entrants into the international development finance market are actively resisting efforts by Western governments to induce, coerce, or otherwise encourage compliance with the set of norms and principles enshrined in the prevailing international development finance regime (Tierney 2014).²

² In response to growing frustration with the policies and practices of international financial institutions established after World War II (the World Bank, IMF, and the regional development banks), emerging powers are also engaging in efforts to reshape the international economic and political order (Tierney 2014). They are seeking to build international financial institutions of their own, including a \$100 billion reserve fund alternative to the IMF, a "New Development Bank" with \$100 billion of operating capital to finance infrastructure worldwide, and an Asian Infrastructure Investment Bank with operating capital of \$50 billion (Romero 2014; Sanderson and Zhou 2014).

At the 2011 High Level Forum on Aid Effectiveness in Busan, South Korea, negotiations quickly split along DAC and non-DAC lines. Member states of the OECD's Development Assistance Committee (DAC) argued that new players should adopt measurable, time-bound aid transparency commitments. Non-DAC suppliers of development finance bristled at this suggestion, arguing that "South-South cooperation" activities are qualitatively different from Western aid and should not be governed by traditional aid principles (Fraeters 2011; Tran 2012). China, now a leading provider of global development finance, argued that the "principle of transparency should apply to north-south cooperation, but ... it should not be seen as a standard for south-south cooperation" (Tran 2011). Ultimately, Busan resulted in a rather tenuous agreement: the majority of DAC members reaffirmed the importance of complying with IATI standards as well as the aid effectiveness standards established at Paris (2005) and Accra (2008); many non-members agreed to a set of voluntary standards, but reiterated the claim that South-South cooperation should not be subject to the same set of expectations as Western aid (Barder 2011).

As such, there is a clear and compelling need for timely, detailed, and accurate data on the financial activities of non-Western states. But the absence of an international reporting regime that enjoys the support of both traditional and non-traditional donors remains a key constraint. Open-source methodology provides an opportunity to ease this constraint; therefore, a second objective of this article is to determine whether open-source data collection methods provide a credible way of studying the nature, distribution, and impact of unreported or underreported sources of development finance.

We report the results of an extensive effort in two countries – Uganda and South Africa – to “ground-truth” AidData’s project-level information on Chinese development finance by conducting site visits and in-person interviews with recipient government officials and other individuals possessing knowledge of Chinese projects. To preview the findings, the ground-truthing exercise uncovered some new information that corrected and amended the open-source data in several instances, but overwhelmingly the ground-truthed findings corroborated the open sources from which the AidData information base on Chinese development finance was compiled. The attempts to complete in-person interviews succeeded in uncovering mostly minor, additional information on 46 percent of the projects tracked through the open-source data collection exercise. However, despite extensive contacting and snowball sampling, our research team could not obtain information on more than one third of the projects, suggesting that on-the-ground fieldwork is neither a reliable substitute for nor a fool-proof complement to more comprehensive data-collection methods; field methods may therefore be subject to significant selection bias.

In the remainder of this paper, we provide some contextual information about Chinese development finance in Africa, review attempts to collect data on the topic, and introduce readers to the open-

source methodology, ground-truthing methods, and the resulting datasets. We then present our findings and draw general lessons from the exercise.

1.1 Background and Literature

Assistance from non-western donors represents a growing share of global development finance (Manning, 2006; Woods, 2008; Dreher et al. 2011; Walz and Ramachandran, 2011; Dreher et al. 2011; Coppard et al. 2013; Fuchs and Vadlamannati, 2013; Tierney 2014). Many non-DAC donors—China, Korea, Poland, India, and Saudi Arabia, for example—arguably share more differences than similarities (Kragelund, 2008). Regardless, members of the DAC are no longer the only significant actors in the aid business. Western and non-Western donors increasingly operate in the same countries and sectors, creating uncertainty over how these different actors will compete and cooperate.

Developing countries also face new challenges and opportunities. For instance, higher levels of donor competition have made it possible for governments in low income and lower-middle-income countries to “shop around” for the funding partners who will most effectively support their interests (Brainard and Chollet, 2007; Whitfield, 2009; Hernandez 2014). On the other hand, the net effect of non-DAC donors in Africa does not necessarily increase recipient well-being to levels commensurate with aid flows. Overall development may sometimes take a backseat as donors and local leaders reap the benefits of increased non-DAC flows (Kragelund, 2008; Dreher et al 2015). Still, while often criticized for neglecting areas of greatest need, using aid for selfish motives and not coordinating with Western donors, non-DAC donors may be only marginally guiltier than their OECD counterparts (Dreher et al. 2011).

The rise of non-Western development finance also poses a methodological challenge to scholars and practitioners. While it is widely believed that non-Western governments are providing significant amounts of development finance, many of these governments do not participate in international disclosure regimes such as the OECD's Creditor Reporting System (CRS) or IATI.³ In the absence of new methods and data sources, it is difficult to gauge the nature, scale, scope, and impact of these new forms of development finance. In particular, it is hard to assess where non-DAC development finance goes and how it affects economic, social, political, and environmental outcomes in the developing world. A dearth of reliable and detailed data on non-Western donor activities also makes it far more difficult for governments to coordinate their aid with others to achieve better development

³ 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/or compliance with international reporting standards (Basu et al. 2013; Aufrecht et al. 2012; Sinha and Hubbard 2012). Russia has recently started to provide aggregate bilateral aid data to the OECD's CRS database.

outcomes. For example, annual estimates of Overseas Development Aid (ODA)-equivalent aid flows from non-DAC states range from \$11-\$41.7 billion, or between 8 and 31 percent of aggregate ODA flows worldwide (Walz and Ramachandran, 2011). This enormous range illustrates how a paucity of reliable information hinders our ability to understand the macro impact of non-DAC aid flows. And, as we suggested above, the results of the High Level Forum at Busan indicate that these data challenges are likely to persist as official project-level data will not be forthcoming.

More broadly, Western and non-Western donors diverge in the way that they design and deliver development finance (Strange et al. 2013a).⁴ While occasional cooperation occurs, most researchers characterise the present aid landscape as more emblematic of a contest than a partnership. In particular, U.S. and Chinese development finance in Africa is often perceived in the media as part of a larger strategic rivalry (Ching, 2012; Joselow, 2013). The reality is likely much more nuanced. It is true that the U.S. and China do not coordinate on much of their development finance activities in Africa. Moreover, they provide different forms of development finance: a disproportionate amount of U.S. official finance is in the form of ODA, while China has delivered considerably more Other Official Flow (OOF)-like financing, which contains lower proportions of grants and a higher proportions of loans (Parks and Strange, 2014). Nonetheless, project-level data suggests that both donors finance a wide range of projects in many countries and sectors (Strange et al. 2013). Even if not intentional, in many cases aid from China and the U.S. (as well as other Western donors) may be complementary by nature.

In any case, the perceived volume and opacity of its development finance make China a uniquely important case among non-DAC donors. China has a rich history of 20th century development finance that continues to influence contemporary Chinese aid policy and practice. While Beijing's official statistics on foreign aid are gradually becoming more detailed, the domestic authorities release comparatively little information at the project level.⁵ China's Ministry of Commerce (MOFCOM) ranked dead last in Publish What You Fund's 2014 Aid Transparency Index (Basu et al. 2014).

To analyze citizens' perceptions of aid and government projects in a developing country, Milner et al. (2013) conducted an experiment that included 3,600 participants in Uganda. Their results suggest that citizens' views about Chinese aid projects are less positive than their views on U.S. or World Bank aid projects. Indeed, Ugandans in the randomised experiment were significantly less willing to tell their

⁴ In a leaked State Department cable, the former U.S. Ambassador to China Jon Huntsman noted that 'China's fast, efficient, "no strings attached" bilateral approach is popular in [Africa], as is the PRC preference for infrastructure over governance projects. ... In addition, African officials believe that competition between donors has had positive consequences for African development, giving the African countries options after several decades of a largely Western development model' (Huntsman 2010).

⁵ 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 People's Republic of China (PRC) (2011). China's government is currently in the process of establishing its own foreign aid statistical system, an effort spearheaded by the Ministry of Commerce (MOFCOM) (Kitano and Harada 2014).

local leaders of their support for Chinese aid projects compared to identical projects from the U.S. and the World Bank, and they actually sent supportive text messages significantly less frequently for Chinese than U.S. projects.

Meanwhile, African policy makers are divided on the issue of whether, to what degree, and how Chinese development finance impacts social, economic, environmental, and government outcomes. While some leaders perceive Chinese financing as better suited to Africa's needs, others feel threatened by China's growing presence in their countries (Wallis, 2007; Kagame, 2009; Wade, 2008; BBC, 2011). Access to reliable, project-level information on Beijing's aid activities might help explain some of the factors influencing these apparent discrepancies.

Notwithstanding the polarised nature of debate on the scale and impact of China's development finance in Africa, a rare point of consensus among scholars is the need for better information in order to assess the causes and consequences of China's development finance (Bräutigam 2009; Grimm 2011; Strange et al. 2013).⁶ However, as the next section illustrates, there is equally contentious debate on how such data should be obtained.

2. Efforts to Quantify Chinese Development Finance

Immediately following AidData's April 2013 release of the first publicly available dataset on Chinese development finance projects in Africa (and the methodology used to generate that dataset), scholars and policy analysts advanced public reactions ranging from enthusiastic support to intense skepticism.⁷ Shortly thereafter, a debate ensued about how social scientific knowledge is generated, refined, and improved.⁸ The divergent initial responses to the dataset and the polarized nature of the subsequent debate indicate a lack of consensus in the development research community over how to cope with and adapt to a changing information landscape.

Prior to this data release, there had been several attempts to organise information on China's overseas development finance activities (Lancaster, 2009; Bräutigam, 1998, 2011). Given the scarcity of systematic, project-level official data, media-based methods have been the modus operandi for scholars attempting to quantify China's development finance to Africa (Foster et al. 2008; Lum et al. 2009; US EX-IM Bank, 2012; Wolf et al. 2013; Strange et al. 2013a, Kitano and Harada, 2014). The

⁶ The group of advocates for better information includes some of China's most authoritative voices on the subject. During conversations in 2013, one of the authors spoke with over a dozen of China's leading Africa scholars, all of whom expressed their desire for better data.

⁷ For some of the more notable contributions to the discussion, see <https://storify.com/witschinafrica/the-aiddata-database-debate-heats-up.html>.

⁸ For a summary of this debate, see <http://www.chinaafricarealstory.com/2013/04/rubbery-numbers-on-chinese-aid.html> and <http://aiddata.org/blog/a-rejoinder-to-rubbery-numbers-on-chinese-aid>.

degree of transparency, level of detail, and general quality of the methods used in these studies varies considerably. Other scholars, citing the shortcoming of media-based methods,⁹ insist on qualitative, field-based approaches to understanding China's role in African development. Some of these scholars have also offered estimates of China's "aid," though they typically reveal few systematic details on the methods used for data collection and analysis (Bräutigam, 2011). Not surprisingly, different approaches have generated vastly different results: estimates generated by scholars on Chinese annual aid to Africa range from roughly \$500 million to more than \$17 billion (Strange et al. 2013a). While scholars are clearly paying more attention to the development finance activities of China and other non-DAC donors, there is no consensus on how these flows should be tracked and understood. A general lack of methodological progress to date reflects the academy's inability to keep pace with the rapidly changing global development finance architecture.

The absence of a strong empirical foundation presents a major obstacle for those who seek to draw systematic conclusions about China's impact on African development at the community-, country-, region-, and continent-levels. The absence of a shared development finance data tracking system also does a great disservice to the intended beneficiaries of Beijing's support across the continent. Without better information about what the Chinese are doing, where they are doing it, and to what effect, local African communities have a limited ability to agitate for changes that might benefit their communities.

Yet information about non-DAC project-level development finance does exist, including China's development activities in Africa. One way to think about the state of existing data is as an archipelago of 'data islands.' These islands take many forms, including official data published by the Chinese government; data posted on Chinese embassy websites; media reports published in Chinese, English, French, Portuguese, Spanish, and Arabic; case study research performed by academic researchers and journalists; African and Chinese company reports; and aid information management systems managed by developing country governments across the continent. Scholars face the difficult task of triangulating and adjudicating between these sources, which vary in their level of detail and quality.

To help address this informational gap, AidData recently created a new database tracking 21st-century Chinese official finance to Africa. The data were collected using a new methodology called 'Tracking Under-Reported Financial Flows' (TUFF).¹⁰ The TUFF approach builds upon previous efforts to track

⁹ Strange et al. (2013b) outline several potential shortcomings of open-source data collection methods in tracking non-DAC development finance. They include: failing to track the status of projects temporally; double-counting projects; misclassifying development finance flows; not making research methods transparent; relying disproportionately on English-language resources; and providing a single media source as evidence for a project.

¹⁰ AidData's pilot methodology for tracking under-reported financial flows was initially termed 'Media-Based Data Collection' (MBDC). However, upon publication of the initial dataset and methodology it quickly became clear that this name was confusing because it implied that AidData's methodological approach relied exclusively on media reports. While analysis of media reports

Chinese development assistance in several ways. First, rather than grouping all projects into an omnibus “aid” category, it attempts to classify projects reportedly funded by official Chinese agencies as either ‘Official Development Assistance’ (ODA) and ‘Other Official Flows’ (OOF). A detailed categorization scheme facilitates comparisons of different Chinese official finance flows with OECD-DAC finance.¹¹

Second, the database is maintained on china.aiddata.org, an interactive platform that centralises different types of data and allows researchers to pool their knowledge about specific Chinese development projects. Since the launch of the first iteration of the dataset (version 1.0) in April 2013, AidData has revised 384 existing project records and created 143 additional project records for the 2000-12 period. AidData has also generated 249 new records for projects that were pledged, committed, and implemented in 2012. As of 28 June 2014, the database tracked \$123 billion in official finance commitments for 1,955 projects from 2000-12.

Third, Chinese-financed projects are classified according to their reported “status,” including ‘pledged,’ ‘committed,’ ‘implemented,’ ‘completed,’ ‘cancelled,’ and ‘suspended,’ rather than lumping them into a single category. Additionally, in order to avoid potential double counting, all project records were compared for each African recipient country and duplicate projects were eliminated. Upon publication of the initial dataset, AidData also released its detailed methodology that other researchers might use to scrutinise and replicate the TUFF data collection process. The database also limits overdependence upon individual media reports to track Chinese-funded official finance projects.¹² In the latest 1.1 version of the dataset, the average official finance project relied on 2.6 unique sources of information.¹³ A full account of the advantages and limitations of the TUFF approach is available at china.aiddata.org.

Notwithstanding the care taken by the TUFF team at AidData, data collection efforts that utilise media and other publicly available sources face several obstacles. For instance, the nature of data collection processes utilizing media sources confront limits with regard to data completeness, accuracy, quality, and credibility (Woolley, 2000; Reeves et al. 2006). First, as in any scientific enterprise, human errors

is an important step in the TUFF process, the methodology is a comprehensive approach designed to incorporate diverse sources of information that collectively corroborate Chinese-financed official finance projects.

¹¹ For instance, the 1.0 pilot database included \$75.4 billion in official finance commitments from 2000-11. However, using the OECD’s definition of ODA, the pilot uncovered \$13.0 billion in ‘ODA-like’ official finance commitments. The latter category includes projects that appear to fit into the definition of ODA based on all available information. Interestingly, AidData’s initial estimate of Chinese development finance resembling ODA averages approximately \$1.1 billion per year from 2000-11, 21 per cent lower than Deborah Bräutigam’s estimate of Chinese ODA flows to Africa of \$1.4 billion in 2009. In her widely read blog, *China in Africa: The Real Story*, Bräutigam (2013) wrote that she believes AidData’s figures are ‘way too high.’

¹² AidData employed a team of native Chinese speakers to analyze Chinese-language media reports, business publications, and official documents to complement English-language data collection.

¹³ However, given the often-limited availability of project-specific news sources, 35 per cent of AidData’s project records still rely on a single source. With greater access to supplementary project documentation, sole-sourced project records should be corroborated and improved.

can occur, particularly during online searches and when entering data. Second, information from media outlets cannot replace complete and accurate statistical data from authoritative official sources. Data that relies upon media reports is only as valid as the imperfect sources on which journalists rely. Nor is there a fail-safe way to adjudicate between media that provide conflicting information about a single project.¹⁴ This problem may be more acute in countries that have relatively low levels of press freedom and contain only small cadres of independent and well-trained journalists (Musakwa, 2013).¹⁵ Finally, using media reports risks ‘detection bias,’ the possibility that states with lower levels of press freedom are less likely to permit journalists to report on development finance from certain donors. Sociologists and scholars of conflict and terrorism have found 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).¹⁶

However, it is likely that the validity of open-source collection of aid information is testable and can be gauged through fieldwork by researchers on the ground. In the next section of this paper, we introduce and describe a ground-truthing exercise carried out to cross-check open-source information on Chinese aid in South Africa and Uganda from August-November 2013.

3. Ground-truthing: An Alternative Approach to Data Collection

To gauge the efficacy and accuracy of the open-source approach to track Chinese aid, we created and field-tested a ‘ground-truthing’ protocol (Authors 2013). It establishes detailed procedures for verifying, updating, and enhancing existing project-level data with in-person interviews with donor and recipient personnel at Chinese development finance project sites in Uganda and South Africa. In other words, it consists of systematic fieldwork procedures designed to extract information that might otherwise not be accessible through media-based data collection, academic publications, government records, or other web-based sources. This section summarises the methods employed to collect evidence in the field used to test the rigor of the TUFF approach. It also discusses the potential advantages and shortcomings of the ground-truthing approach.

¹⁴ However, it is also not the case that official sources are always more credible (and valuable) than media-based information. See Strange et al. (2013a) for a discussion of this point.

¹⁵ Additionally, if the motives of media reporting are economic or political in nature, the objectivity and utility of the data are questionable.

¹⁶ However, given that research on aid allocation and aid effectiveness has not benefited significantly from the use of media-based data collection methods, the existing literature does not offer much insight regarding whether, to what degree, and how detection bias might influence media-based aid and development finance data and the inferences we draw based on such data.

For the purposes of this paper, ‘ground-truthing’ refers to systematic fieldwork, primarily in the form of interviews and visits to project sites.¹⁷ Conceptually, ground-truthing offers a methodological alternative to research approaches in which the majority of data collection depends on electronic, open source documents. Ground-truthing follows a step-by-step procedure that is systematic, transparent, and replicable. This approach ensures that other researchers can trace the precise origin of all data collected. We employ ground-truthing in order to test how effectively, or ineffectively, AidData’s TUFF approach—based as it is on electronic and open sources—is able to track Chinese development finance in Africa at the project level.

Our ground-truthing methodology is codified in a 15-page methodology document that guided our team of researchers (Authors 2013). It covers the training that enumerators must complete before engaging in ground-truthing. Training primarily involved reading background literature and obtaining relevant government authorizations required to conduct fieldwork. Projects were then randomly assigned to enumerators in given blocking strata based on enumerators’ mastery of languages for visits to sites where the main language used was not English. After project assignment, enumerators assessed the feasibility of ground-truthing by listing known physical locations, project personnel, required travel, possible legal or administrative restrictions, and the extent of the open-source information. This assessment exercise enabled enumerators to pre-assess or triage the difficulty of obtaining information from the field for each project. Some projects, especially agreements on cooperation principles between countries, provided little that was tangible and few people—other than heads of state—to contact, so in this triage process these projects were relegated to lower priority, especially because money did not typically change hands.

After the project pre-assessment, enumerators read thoroughly all of the known publicly available information on the project, conducted additional Google searches to supplement the open-source information, and identified any additional project contacts beyond those supplied in the open-source project record. After project managers coordinated the contact generation and consolidated lists to avoid duplicate contacting, enumerators began correspondence with contacts through email and phone calls, especially employing snowball methods to accumulate additional contacts who potentially held information. All emails were based on a template supplied by the project manager. Where possible, enumerators secured in-person appointments to meet with contacts and other informants. If appointments could not be obtained, enumerators were still instructed to make field visits to take photographs and gather as much on-site information as possible. They also made on-site inquiries about obtaining interviews.

During the actual interviews, enumerators made clear that the research was apolitical and fully transparent and asked for additional contacts that could help deepen the data collection. During site visits, enumerators photographed the project, tagged the geo-location of the project, and engaged

¹⁷ See Strange et al. (2013b) for the full methodology.

local personnel as much as possible. Enumerators were given a set of scripted questions that enquired about background information on the informant, descriptive information on the project (start date, status, revision of project timetable, financing details, and disbursement schedule).¹⁸ They also asked about implementers, government agencies involved, project personnel, and donors. If China was not mentioned in the early stage of the interviews, enumerators explicitly asked, 'Did the Chinese government provide assistance for this project?' See appendix below for the list of site-visit questions.

Our team was large: 19 professional enumerators undertook the ground-truthing efforts in Uganda, spending roughly 8 hours per day on data-gathering efforts for two weeks each (roughly 1,500 researcher hours total). This does not include time spent on travel outside of immediately accessible metropolitan areas. All of the Ugandan enumerators were college graduates and on average they had four years of experience performing social science research, mostly through in-person interviews. In a different project, the same team succeeded in interviewing 354 current and former members of the Ugandan parliament (capturing 71 per cent of the sitting members) (see Milner et al. 2013). So they had significant recent experience contacting and meeting with government officials, suggesting meaningful task-relevant skill. In South Africa, four professional researchers with similar education backgrounds as the Ugandan enumerators pursued the ground-truthing for a corresponding interval.

Ground-truthing provides an imperfect but useful way for measuring how well open-source data captures Chinese development finance. In principle, data collected through open-source and ground-truthing methods can be compared to examine the extent to which different approaches yield the same results, as well as to identify areas where they uncover different and potentially contradictory information. This is especially valuable given the challenges researchers face in choosing data collection methods to track the activities of non-Western donors. A common criticism of methods that employ media-based approaches is that this kind of research relies on speculative information found in the news reports. Ground-truthing is different from media- and web-based approaches in that it involves direct observation of project sites and interaction with actual project stakeholders and infrastructure, providing a useful contrast to approaches relying on intermediary data sources.

Apart from helping to identify potential weaknesses and biases in the open-source methodology, ground-truthing arguably has several stand-alone advantages over web-based approaches to data collection. Valuable data can be gathered by directly corresponding with African and Chinese professionals and officials affiliated with specific development finance activities, interviewing subjects on site, photographing project sites, and recording the geographic coordinates of Chinese-financed projects. This method of data collection poses a lower risk that information will be 'contaminated' since it flows, in theory, directly from the project site to the researcher. Web-based data collection, by

¹⁸ While each site visit followed the same interview protocol, certain visits required enumerators to ask additional questions. For instance, during visits to projects reportedly financed by a loan, enumerators prompted interviewed subjects to answer additional questions regarding specific loan terms.

contrast, involves a multi-step process in which information is passed from one source to another before being collected by the researcher.

Ground-truthing may in some cases expose researchers to official and/or quasi-official data, such as an interview with a local government official. Information obtained from these types of sources is not typically published through established channels by state agencies responsible for aid information dissemination, but nonetheless comes from the government. In general, it is possible that ground-truthing may be less likely to force the researcher to make judgment calls compared to web-based research. During the open-source data collection, it is often difficult to make decisions on how to code development finance when two or more media reports present conflicting data.

Additionally, as discussed in section two, electronically accessible data may fail to adequately uncover development finance projects in regions or communities that have low levels of press freedom, and it also might fail to uncover smaller or less observable projects on which media outlets do not bother to report. Ground-truthing can in theory avoid these pitfalls since researchers are not limited to studying only projects picked up by media reports. This is potentially why our pilot data collection exercise, the results of which are outlined in the proceeding section, was able to uncover additional Chinese official finance projects in South Africa and Uganda not included in AidData's TUFF database.

Finally, ground-truthing should not face major biases resulting from conflicts of interest among researchers. The enumerators employed to undertake ground-truthing activities are well-trained freelance researchers who had no prior affiliation with AidData and no stake in the TUFF approach. Ground-truthing should therefore be able to potentially uncover information previously not captured by open-source methods, including entire projects on which media outlets did not report.

At the same time, the field-based data collection approach that we undertook in the summer and fall of 2013 faces several weaknesses that could limit its ability to produce alternative data that might prove comprehensive. First, and perhaps most importantly, ground-truthing methods are subject to significant problems of selection bias. Despite repeated attempts to contact South African, Ugandan, or Chinese officials with knowledge of individual projects, we were unable to collect information for approximately 31 per cent of the projects (or 19 of 61 projects) in Uganda and 45 per cent of the projects (15 of 33 projects) in South Africa. Local officials either could not be located or were not comfortable sharing project details. The latter problem proved to be far more challenging than the former.¹⁹

¹⁹ Besides selection biases, all interview-based approaches may suffer from the fact that their subjects may have incentives to hide or mis-represent information. The possibility of enumerator error can also negatively impact the accuracy of ground-truthing when enumerators collect, record, or categorise information.

It is unlikely that the projects we failed to verify are missing at random. The TUFF 1.1 data on Chinese official finance to Uganda and South Africa contains 94 total projects. Many of the South Africa projects are diplomatic agreements and principled commitments to share resources and engage in mutual investment. This made the South Africa projects less tangible and therefore less amenable to ground-truthing. In the end, we successfully ground-truthed only 18 of the 33 South-Africa projects. In Uganda, many more projects were tangible, so we successfully ground-truthed 42 of 61 projects. Table 1 summarises our ground-truthing fieldwork in both countries.

Table 1. Ground-truthing Chinese Official Finance in South Africa and Uganda

Location	# Projects in TUFF Database	# Successfully Ground-truthed	# 'New' projects
South Africa	33	18	3 ²⁰
Uganda	61	42	0
Total	94	60	3

We tested the sources of selection bias systematically by performing logistic regression analysis with the dependent variable capturing whether or not the projects were successfully ground-truthed and various features of the projects as independent variables including financial size, observability, the amount of time that had elapsed since project announcement, specificity of physical location, existence of specified contacts in the TUFF record, and distance from the national capital. Our results (presented in Table 2) suggest that projects for which ground-truthing succeeded in generating new information were, not surprisingly, in the more observable sectors, were local rather than national in character, had individual contacts listed in the TUFF-generated records, and had occurred more recently. In other words, it was generally and obviously easier to ground-truth newer, observable projects for which researchers already had information on subnational location and relevant personnel. The results for 'Contact Specified' and 'Years Elapsed' are significant at the 0.1 level in Model 2, in which the variables not approaching statistical significance in the more-inclusive Model 1 were dropped, but both 'Observable Sector' and 'Local' are significant at the 0.05 and 0.01 levels in both models, respectively.

Table 2. Logistic regression analysis of selection effects in Ground-truthing success

VARIABLE	Model 1	Model 2
Observable Sector	1.286** (0.616)	1.097** (0.553)
Local	2.457***	2.186***

²⁰ While we only found 3 additional projects using the strict ground-truthing methodology, enumerators did find 51 MOUs, Letters of Intent, or Technical Co-operation Agreements within which potential projects might be found. These documents, which also included many activities outside the scope of development finance, contained seven projects that were already in the TUFF database, and 10 potential projects that still need to be researched.

	(0.615)	(0.548)
Contact Listed	1.451*	1.300*
	(0.808)	(0.716)
Years Elapsed	-0.131	-0.144*
	(0.0862)	(0.0795)
Near Capital	0.347	
	(0.629)	
Project Amount	3.03e-10	
	(1.36e-09)	
Constant	-3.018**	-2.447***
	(1.211)	(0.930)
Observations	92	94

Standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The marginal effects suggest that whether or not a project is in an observable sector – as the binary variable shifts from 0 to 1 – is associated with an increase in the probability of successful ground-truthing of .21. Given that the baseline probability of successful ground-truthing is .64, this suggests some substantive as well as statistical significance. Even more notably, a project being local (located at the village, municipality, or district level) rather than national is associated with a jump in the probability of successful ground-truthing of .42. Having contacts listed in the TUFF record was associated with an increase in the probability of ground-truthing success of .20, and each additional year of distance from the project’s inception was associated with a decrease in the probability of successful ground-truthing of .027.

This is prima facie evidence that ground-truthing methods are quite vulnerable to selection bias. Of course, we have no additional source of information to provide a template of all Chinese assistance projects with which to compare the open-source and ground-truthed data. But clearly there are very large differences between the projects that were successfully ground-truthed when compared against the universe of TUFF projects. The fact that we could ground-truth only 64 per cent of the project total suggests that the open-source methodology produced a more comprehensive picture of Chinese assistance to the two countries than was recoverable solely through our field research.

In addition to these methodological limitations, the ground-truthing method is time-consuming and costly, as it requires hiring, training, and fielding many local enumerators. While attempts could be made to gather information on the 1,900+ projects currently in the TUFF-generated database of Chinese development finance activities at china.aiddata.org, we estimate that the data collection for all existing Chinese development finance activities in Africa from 2000-12 would cost nearly \$700,000 (based on the direct costs we incurred to complete the Uganda and South Africa pilot data collection exercises). This does not include projects reportedly committed by China from 2012 onward, nor does it capture the recurring costs of maintaining such a database over time. Additionally, the results from our ground-truthing pilot exercise reveal that taking this methodology ‘to scale’ would yield data for

only a subset of the Chinese projects – and it is likely that the subset would be plagued by significant selection bias. As previously mentioned, we were able to ground-truth 69 per cent of the projects in Uganda and 54 per cent of the projects in South Africa. Perhaps most importantly, our ground-truthing exercise was supported by pre-existing data on Chinese official finance projects in South Africa and Uganda. Without baseline information provided by the TUFF database, one can imagine the significant costs that might arise from having to locate and classify Chinese official finance projects throughout both countries before ground-truthing could occur.

The relatively high cost of ground-truthing poses a significant challenge to researchers who seek to draw generalizable conclusions about Chinese development finance and must decide how to allocate scarce resources, including time, money, and intellectual energy. Data collected through ground-truthing often add precision and detail to the project records identified through open-source methods; however, there is a clear trade-off between the informational richness acquired through field-based data collection and the comprehensiveness of data collected through media-based and other open-source methods.

In summary, ground-truthing provides field evidence that can complement media- and internet-based data on Chinese development finance by collecting local information from sources on the ground. It also, conveniently, provides a valuable way to test the rigor of other methods that track non-Western development finance, such as AidData's TUFF methodology. The following section discusses the results of our ground-truthing pilot exercises in South Africa and Uganda over a period of four months in 2013.

4. Comparison of Open-source Data and Field-based Data

Our South African sample included 33 official finance project records found in AidData's *Chinese Official Finance to Africa Dataset, Version 1.1*. The scope of our ground-truthing research in Uganda covered 61 official finance projects.

Our results for South Africa and Uganda demonstrate the limits of ground-truthing as a method for tracking development finance flows from China. First, shortly after initiating in-country field research, it became clear that many of the official finance project records in AidData's dataset were too 'intangible' for ground-truthing. That is to say, many records in the china.aiddata.org database pertained to bilateral agreements and/or transactions between China and the recipient country and were not likely to have a physical project site that researchers could visit, photograph, and enquire about in interviews. This is reflected in the logit analysis above with the strong selection effects recovered for the 'Observable Sector' variable. Common examples of less observable projects

included debt-relief agreements, memoranda of understanding, and other project records for which the open-source information was not detailed enough to provide researchers with an idea of where and how to undertake ground-truthing activities. This is a major limitation of ground-truthing.

Second, we found the ground-truthing methodology to be limited in its ability to uncover financial values in cases where pre-existing financial information did not already exist. In South Africa, ground-truthing methods only resulted in the identification of a previously unreported financial value for a single project. There were two such cases in Uganda. Our results therefore suggest that ground-truthing methods may be more effective for confirming or challenging existing financial details rather than uncovering financial details in the first place.

Despite its limitations as a primary form of data collection, our findings suggest that ground-truthing is a helpful, though not foolproof, complement to other types of data collection methods. For example, through ground-truthing methods we managed to identify substantial amounts of information not captured by the open-source method. Specifically, we identified new information for 18 out of 33 total projects in South Africa (including the broader MOUs and agreements) and we identified new information on 3 of 7 Chinese official finance projects that were visited by researchers in South Africa.²¹ We were also able to collect new information for 25 of 61 projects in Uganda. When we include the less tangible projects in the count, ground-truthing methods resulted in new information for 46 per cent (43 of the 94) official finance records included in our sample.

Further, our results suggest that despite its limitations, the open-source approach is a fairly robust method of independent data collection. In only 1 of the ground-truthed projects in South Africa did the information collected conflict with the information uncovered through AidData's TUFF methodology. This figure increased to 17 projects in Uganda. However, most of the corrections involved minor amendments of dates, status, or contact information—the major items of sector, scale, scope, and size remained substantially unchanged.²² In the combined sample of projects in both countries, we found a statistically significant positive bivariate correlation of .311 between (a) whether the ground-truthing uncovered new information, resulting in the recoding of one or more variables in the open-source dataset, and (b) the number of web-based sources for that project. This result suggests that

²¹ The 'tangible' projects were those with physical locations, while the intangible projects were often promises to share information or simple transfers of capital from Chinese entities to South African organizations.

²² When comparing the results of the ground-truthing pilot to our findings from the TUFF data collection exercise, we considered a single discrepancy in any one of the 36 database fields to mean that the ground-truthing survey had uncovered 'contradictory' information. For example, in project ID 2517, the project entry lists 2006 as the commitment year for the project. During the onsite interview, however, researchers determined that the Chinese government had committed to the project in 2001. Similarly, when onsite visits revealed that an announced project had entered the implementation stage or been completed (project IDs 2517, 11357, 11391), that information was treated as contradicting existing data. In this context, it follows that a large portion of ground-truthed projects containing 'contradictory' information improves the accuracy of our existing data and shows the limits of remote monitoring. However, this does not constitute evidence that TUFF methods are unreliable since the new information has predominately resulted in minor adjustments to existing project entries.

ground-truthing methods may not help fill many data gaps for projects that lack good open-source information. Rather, ground-truthing may be more helpful as a methodological tool for expanding and refining project-level information uncovered through open-source data collection. Perhaps more importantly, users may now have stronger grounds for confidence in the accuracy of the original open-source data and the prospects for using web-based methods to track the development finance activities of other non-DAC donors.

Apart from its impact on project numbers, ground-truthing affects aggregate financial estimates of Chinese official finance at the recipient country level. Ground-truthing methods differed from the open-source method's aggregate estimate of Chinese official finance to South Africa by adding only \$150,000 (and this change was limited to the education sector); however, in Uganda, the absolute value of the change in official finance was \$26,787,303. This number represented a 2.7 per cent change in the overall estimate of Chinese official finance to Uganda. This change in reported financial commitments was spread across a number of sectors: Government and Civil Society (\$16,457,564); Water Supply and Sanitation (\$8,851,613); Other Social Services (\$1,007,400); Education (\$294,266); Population Policies (\$266,000); and Health (\$60,460). For the Government and Civil Society sector, we were unable to definitively conclude whether the open-source data has systematically over- or underestimated financial commitments. In some cases, such as the construction of a new office building for the Ugandan Ministry of Foreign Affairs (project ID# 2498), our ground-truthing report found that the cost of the project was \$14.2 million, almost \$10 million more than the TUFF findings. However, for the construction of Uganda's new Presidential offices (project ID# 12127), TUFF apparently overestimated the project's cost by \$7 million. Without a sufficiently large sample, it is not possible to draw any strong inferences for whether TUFF commitment estimates are too high or too low.

In addition to its impact on information related to reported financial commitments, we also examined the extent to which ground-truthing methods affect the reported status of Chinese official finance projects. In South Africa and Uganda, ground-truthing methods uncovered a previously unreported value for the status of 9 projects. In two cases we updated project status from 'Pipeline Commitment' to 'Implementation' or 'Completion.' Three projects were changed from 'Pipeline: Pledge' to either 'Implementation' or 'Completion.' No projects were shifted from 'Implementation' or 'Completion' status to a 'Pipeline Commitment' or 'Pipeline Pledge' status. While the sample size is admittedly small, this suggests that the open-source methodology may systematically underestimate the number and financial value of completed projects and projects in implementation. These findings have potentially important implications for researchers who choose to aggregate Chinese development finance based on the reported status of Chinese-financed projects. Excluding all projects but those in the completed or implementation category could result in undercounting.

Our pilot exercise also revealed that ground-truthing is undoubtedly superior to open-source methods in its ability to uncover visual evidence of the current status of Chinese development projects. We visually confirmed the existence of 4 projects in South Africa, while in Uganda we compiled visual evidence for 14 official finance projects through site visits.²³

Another important strength of ground-truthing is its ability to construct a more nuanced narrative about a development finance project, uncovering information that typically goes unreported in other information sources. During interviews with members of the Kampala City Council, we learned that some road equipment supplies by China First Automobile Workers as part of an Exim Bank loan had since malfunctioned (project ID# 11579). Enumerators in South Africa were also able to uncover loan conditions for a \$650 million joint venture in a platinum mining operation (project ID# 2479). In another interview, enumerators were able to determine the completion date for the construction of Uganda's new Ministry of Foreign Affairs building (project ID#2498).

Ground-truthing also adds significant informational value in that it helps to identify official finance projects that are not uncovered through the web-based data collection. For instance, in South Africa, our ground-truthing efforts resulted in the identification of three Chinese-financed project sites and fifty-one bilateral agreements between the governments of China and South Africa that were not previously captured by AidData's TUFF methodology. While many of these agreements likely involve activities that fall outside the definition of official finance (see Strange et al. 2013b), it is possible that others are linked to Chinese development finance contributions. For example, enumerators discovered a fish hatchery and demonstration centre in South Africa's Free State that was not in the TUFF database. This project appears to be a clear example of Chinese official financing.

Additionally, we must acknowledge that while ground-truthing yielded some key corrections to open-source project records, it also left many projects unverified and demonstrated that many others may be effectively unverifiable. More broadly, we believe these findings contribute to an ongoing dialogue about whether our collective understanding of development finance activities of China and other non-Western governments can be improved through the application of novel methods such as open-source and field-based data collection approaches. Our experience with ground-truthing Chinese development finance in South Africa and Uganda suggests that the answer is yes.

²³ One of these ground-truthed projects (an Aquaculture Demonstration Centre) was not uncovered through TUFF-generated data, but rather through the ground-truthing process itself. The enumerators quickly learned that the South African Treasury's Department of International Development Cooperation maintains a database with a list of all Chinese projects and this database included a Project Status Report for the Aquaculture Demonstration Centre project, which was not part of the original sample of TUFF-generated projects that the principal investigators supplied. A member of the enumeration team subsequently identified (through a media report) a local politician and a broader network of contacts, who were knowledgeable about the Aquaculture Demonstration Centre project.

5. Conclusion

The present debate about the causes and consequences of non-Western sources of development finance rests on fragile empirical foundations, and many of the tools that researchers have at their disposal to pursue these critical questions are not fit for purpose. Our results suggest that, while data collected through local enumeration can reveal new and additional information not available through open source materials, the open-source methodology provides a credible data collection approach for scholars seeking to learn about development finance from governments that do not disclose comprehensive official information about their outgoing financial flows. Ground-truthing is certainly a valuable method of collecting some types of project-level data on development finance, and it could potentially be extended to donors and regions outside of China and Africa. However, given its various limitations and relatively high cost, ground-truthing may add the most value as a supplementary rather than primary approach to data collection. We also find that it is a valuable tool for identifying sources of bias in open source development finance data collection. While ground-truthing revealed multiple imperfections in the TUFF-generated data for Chinese official finance in South Africa and Uganda, the vast majority of our ground-truthing findings reinforce information found in the open-source data.

These findings are particularly significant when one considers the fundamental shifts that are taking place in the international development finance landscape. Non-Western governments are contesting voluntary disclosure norms created decades ago by and for western governments. Therefore, scholars and policy makers who are interested in understanding these new sources of global development finance must confront a difficult challenge. New sources of development cooperation may have vast implications for economic growth, debt sustainability, state capacity, poverty reduction, human rights, and environmental sustainability in Africa. But existing reporting systems are not up to the task of tracking the activities of non-Western development financiers, which makes it nearly impossible to objectively understand the nature, distribution, or effects of these activities without new methods of data collection. Given this reality and the fact the global reporting regime for development finance is entering a period of tumult (Manning 2013; Barder and Klasen 2014; Xu and Carey 2014), development researchers may benefit from relying on open-source methods of studying the nature, distribution, and impact of contemporary development finance from non-Western donors.

Appendix

Ground-truthing Interview Questions:

Project Name:

Project ID Number:

Project Location (Province, City, GPS Location):

Enumerator Name:

Person Interviewed:

Interview Contact Information (Phone, Email, Address):

1. Introduce yourself.
2. Learn about respondent.
3. What is your position?
4. How long have you been working in the post?
5. What has been your involvement in the project?
6. How is this project benefitting the community?
7. What is the closest trading centre/local council (LC1)?
8. In what year was this project announced?
9. When did this project begin?
10. Is this project complete? If not, has work officially begun?
11. And when was the project originally planned to commence?
12. When was the project completely finished?
13. And when was the project originally planned to be finished?
14. Was this project financed by a grant or a loan?
15. What was the total project amount?
16. How much has already been disbursed?
17. Which donors or government agencies provided funding for this project?
 - a. List them all
 - b. For each funding source, ask:
 - c. Which activities did funding source A finance?
 - d. Which activities did funding source B finance?
 - e. Etc.
18. What company or agency implemented this project?
19. What government agencies were also involved with this project?
20. How much money did each donor or funding agency provide for this project?
21. If China was not mentioned, ask: Did the Chinese government provide assistance for this project?
22. [IF LOAN] was this loan a line of credit?
23. [IF LOAN] Was this loan made at or below market rates?
24. [IF LOAN] What was the interest rate of the loan?
25. [IF LOAN] Are you familiar with any other details of the loan?
26. What individuals managed parts of the project during planning, funding, or implementing stages?
27. [End of interview, open-ended] What else can you say about this project?

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