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# Complementary or adverse? Comparing development results of official funding from China and traditional donors in Africa

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| **Abstract:** | While China has become an important source of aid and other official funding for Africa, its coordination with other development partners remains limited, and its contribution to development has been questioned. Recent studies demonstrated that funding from China and traditional donors have similar determinants, but little was done to systematically compare their role for development. The paper compares impacts on infrastructure, governance, external debt sustainability and dependence on natural resources. Furthermore, we explore whether there are (dis)advantages from the presence of both donors. Overall, we find that China has similar, beneficial, impact when compared with traditional donors on all the development dimensions but debt. The presence of both donors, in turn, has a positive effect on debt sustainability, but negative impacts on the other dimensions. We interpret these results based on effective development cooperation principles of ownership, alignment, harmonisation, accountability. |
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Dear Editor

We are glad to submit our work to Structural Change and Economic Dynamics. The work is about the impacts of Chinese funding compared to those of traditional donors on the development of African countries. The manuscript is titled “Complementary or adverse? Comparing development results of official funding from China and traditional donors in Africa”. We would also be glad to share our data upon expressed interest by your reviewers and to make data fully available for publication. This dataset is an original one, combining sources both from open access databases and the ones we contacted specifically. We are looking forward to learning your opinion and reviewers’ suggestions about this manuscript.

Best regards, yours sincerely

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**Highlights**

- We compare role of China and traditional donors on development in Africa
- We consider infrastructure, governance, debt and dependence on natural resources
- We find similar results for both donors on all dimensions but debt
- Presence of both donors benefits debt sustainability
- But it is also associated with worse performance on other dimensions of development

# Complementary or adverse? Comparing development results of official funding from China and traditional donors in Africa

Marta Marson[†,‡] and Ivan Savin[§,**]

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## Abstract

While China has become an important source of aid and other official funding for Africa, its coordination with other development partners remains limited, and its contribution to development has been questioned. Recent studies demonstrated that funding from China and traditional donors have similar determinants, but little was done to systematically compare their role for development. The paper compares impacts on infrastructure, governance, external debt sustainability and dependence on natural resources. Furthermore, we explore whether there are (dis)advantages from the presence of both donors. Overall, we find that China has similar, beneficial, impact when compared with traditional donors on all the development dimensions but debt. The presence of both donors, in turn, has a positive effect on debt sustainability, but negative impacts on the other dimensions. We interpret these results based on effective development cooperation principles of ownership, alignment, harmonisation, accountability.

**Keywords:** foreign aid, official funding, Africa, China, development

# 1 Introduction

Ever since China started playing a considerable role on the African continent, its real objectives and impacts were questioned. One of the most popular and widely cited studies summarizing this criticism is by Naim (2007) who frames the financial flows coming from China as "rogue aid". Recent studies testing the "rogue aid" hypothesis by comparing the motives driving the allocation of funding to African countries of China and of traditional donors indicate that these concerns do not find an empirical support (Dreher and Fuchs 2015; Broich 2017). However, still little has been done, to our knowledge, to systematically compare the impact of official funding (OF) from the two donors on development of the African continent and the (dis)advantages from their simultaneous presence. We focus our analysis on the African continent because i) it is the poorest and most aid-dependent region in the world since, compared to other regions (e.g. Latin Americ, Asia), less private finance is available here; and ii) here China has recently gained a lot of importance and influence.

Our analysis aims to provide a more comprehensive picture in the following development dimensions: infrastructure development, quality of governance, countries' dependence on natural resources, and debt sustainability. Furthermore, we consider that the ascent of China influences the dynamics of Western aid to the continent and alters the landscape of development assistance (Zafar 2007). In particular, we assume that the presence of alternative funding from China, by interacting with funding from traditional donors, alters development effectiveness in two ways. First, it creates a new and broader structure of opportunities for African countries, e.g., to bargain better financing terms and orient the allocation of funds towards national priorities. This can be described by ownership and alignment principles of development cooperation effectiveness (OECD 2005; Fourth High Level Forum on Aid Effectiveness 2011). [1] Second, it complicates coordination and exchange of information among donors, and between them and

[1] These principles were first stated in the Paris declaration on aid effectiveness (OECD 2005) signed by 137 countries and by many multilateral and civil society organisations. Original principles are (i) ownership: recipient countries set their own strategies for poverty reduction, improve their institutions and tackle corruption; (ii) alignment: donor countries align behind these objectives and use local systems; (iii) harmonisation: donor countries coordinate, simplify procedures and share information to avoid duplication; (iv) results: recipient countries and donors shift focus to development results and results get measured; (v) mutual accountability: donors and recipient countries are accountable for development results. A series of High-Level Meetings and the Fourth High Level Forum on Aid Effectiveness in Busan confirmed these principles, which are now supposed to be implemented within the framework of Global Partnerships for development (SDG 17). Effective cooperation principles are now: (i) ownership of development priorities by developing countries; (ii) focus on results; (iii) inclusive development partnerships; (iv)

the recipient countries[2], challenging harmonization and accountability of local institutions, which are also part of development effectiveness. We capture these new opportunities and risks through an interaction term between Chinese and traditional funding, and formally test this effect on development results. Furthermore, by means of a quantile estimator we differentiate the effect of funding conditional on the performance of countries on the respective development dimensions, thus allowing for a differential effect of OF conditional on their level of development. Another important advantage of quantile regression is that it imposes no assumptions on the distribution of our dependent variables, and thus, provides robust estimates for the asymmetrically distributed (across countries and years) development indicators like external debt, natural resources rents or infrastructure.

Our findings support the idea that China and traditional donors have similar impacts on development of African countries. More particularly, funding from each of the two donors[3] beneficially affects the quality of governance, the development of infrastructure, and the dependence on natural resources. An exception is external debt: funding from China increases the normalized debt stock, while traditional donors reduce it, arguably due to the smaller share of concessional flows in Chinese official funding. The presence of alternative donors, as captured by the interaction term, results in a positive effect on debt sustainability, but also in negative impacts on other development dimensions (increased dependence on natural resources, lower access to infrastructure and lower quality for some dimensions of governance). This confirms the intuition that accountability and harmonization challenges limit development effectiveness of African countries, but also questions the expectation that more control by the recipient country (i.e. ownership and alignment) directly translate into better development results (Greenhill et al. 2016, Kilama 2016).

transparency and accountability to each other (http://effectivecooperation.org/about/principles). Now, ownership largely includes aligment, while harmonization is likely perceived as top-down. Busan Partnership Agreement, welcoming the 'diversity of development cooperation actors' under paragraph 25, calls on developing countries to 'lead consultation and co-ordination", so that coordination is now sometimes a preferred word than harmonisation (Fourth High Level Forum on Aid Effectiveness 2012). Hencefoth, we refer to coordination and harmonization indifferently.

[2] Henceforth, we use 'African country' and 'recipient country' interchangeably.

[3] In the following, we refer to traditional donors and China as two (distinct) donors, while not differentiating between particular countries or institutions (listed in footnote 13) within the group of traditional donors. Since China is by far the biggest non-DAC donor on the African continent and has attracted a lot of attention in the literature, we concentrate on it alone as an alternative type of donor.

The paper is organized as follows. Section 2 contains a literature review and presents the hypotheses to be tested. In Section 3 we describe the methodology and the dataset used. Section 4 provides empirical results, while Section 5 contains some concluding remarks, including those pertaining to policy implications.

## 2 Literature review and hypotheses

The literature review is organized into three parts. Fistly, we shortly review the (vast) literature on effects of official funding on development. Second, we address literature on funding from China, and comparing China with traditional donors with particular attention to their respect of effective cooperation principles. Finally, we discuss findings from (scant) literature on the interaction between the two.

### 2.1 Aid-development nexus

Concerning the impact of aid on development, the widely discussed issue in the literature is the aid-growth nexus. It is hard to measure empirically, and the findings are often contradictory (Burnside and Dollar 2000; Hansen and Tarp 2000; Hansen and Tarp 2001; Easterly 2003; Werker 2012; Arndt et al. 2015; Doucouliagos 2016). Instead of measuring the direct impact of aid on GDP, we concentrate on the "intermediate" development indicators which are expected to lead to sustainable development in the long term (infrastructure and economic diversification are Goal 9 targets 1 and B respectively, debt is Goal 17 target 4 and Governance is Goal 16 of the Sustainable Development Goals).

The literature considers the impact of aid on key dimensions of development, such as infrastructure, governance, dependence on natural resources and public debt. While some authors argue that aid undermines good institutions (Bräutigam 2004, Easterly and Pfutze 2008; Easterly and Williamson 2011; Moyo 2009; Busse and Gröning 2009), Okada and Samreth (2012) and Mohamed et al. (2015), both employing quantile regression but using different data samples, demonstrate that aid reduces corruption. They nonetheless disagree whether the effect is stronger in less or more corrupt countries. Donno and Neureieter (2018) find that human right conditionalities associated with aid from the EU are effective in countries that are heavily dependent on the EU aid. Donaubauer et al. (2016) show that aid targeted at infrastructure[4] not only increases the recipient's endowment of infrastructure but also helps them to attract

[4] In contrast, considering total aid, Donaubauer et al. (2016) find no impact of aid on infrastructure.

higher FDI inflows. Arndt et al. (2015) empirically identify a positive impact of aid on growth, through human and physical capital accumulation demonstrating the positive impact of aid on the industrial sector in the recipient economies, and hence, promoting economy's structural change and diversification in the long run. When it comes to indebtedness, Powell and Bird (2010) demonstrate that traditional donors have been using aid and debt relief as complementary instruments to assist African countries. Easterly (2002) argues that debt relief is futile for governments that are not committed to serious reform programs and that continue to be dominated by rent-seeking elites, therefore advocating stronger conditionality. Bjørnskov and Schröder (2013) demonstrate that aid negatively affects debt service and, consequently, the level of indebtedness of recipient countries by undermining their repayment incentives.

**2.2 The rising role of China and its comparison to DAC donors**

Over the last decades the role of non-DAC donors[5] has dramatically risen (Dreher et al. 2011; Tierney 2014). The steep rise in aid flows from China (see Figure 1) attracted a lot of attention and some concern, but most studies focus on the objectives of funding from China rather than on its effects. Framing aid from China as "rogue aid", Naim (2007) questioned the real purpose of those financial flows, conjecturing that they are driven not by the needs of the recipient countries, but by national interests of China (such as access to natural resources and support in UN voting system). Similar claims have been also expressed by Tull (2006), Taylor (2007) and Halper (2010). China is also blamed for undermining efforts by Western countries to rein in conflict and corruption (Kaplinsky 2013). These claims, however, are based on selective case studies only (Dreher and Fuchs 2015), ignoring the fact that the allocation of aid by traditional donors themselves does not match the extent of poverty and deprivation of recipient countries (Baulch 2006). And even then, the comparison was often incorrect since ODA funding from traditional donors has in most cases been compared with all OF flows from China, including more commercially oriented initiatives (Bräutigam 2011; Dreher et al. 2018).[6] While China has been blamed, among others, for "free riding" on debt relief provided to African

[5] DAC stands for Development Assistance Committee. In Section 3.1 we provide definitions of the commonly used acronyms in the aid literature (such as DAC, ODA, OOF and OF). Non-DAC donors can be divided into DAC reporting countries, seeking coordination and standardisation with the DAC itself, and other countries including China.

[6] For a detailed discussion on the relationship between DAC and non-DAC donors, and the adherence of the latter to the ODA norms, see Kim and Lightfoot (2011).

countries by DAC donors, Reisen and Ndoye (2008) found no evidence for imprudent lending from China to debt relief beneficiaries. Habiyaremye (2015) considers loans for infrastructure provided by China and paid back in natural resources. Addressing the concerns that they may reinforce Africa's resource dependence, he finds that, by helping African countries reduce existing infrastructure bottlenecks, these loans increase their diversification capacity. Kilama instead (2016) finds that funding by China and emerging donors improves aid absorption capacity by developing countries, but also leads to significant increase of the indebtedness level of governments.

More recently, thanks to the growing availability of data on the OF flows from non-DAC donors, a number of studies testing for a systematic difference in funding allocation between DAC and non-DAC donors has been produced. Dreher et al. (2011) compared 16 new donors (China excluded) with 22 DAC donors over the period 2001-2008 demonstrating that both groups of donors have no preference for less corrupt or more democratic regimes, and that, for both groups, commercial self-interest (e.g., by promoting its biggest trade partners) is not a main determinant. Dreher and Fuchs (2015) confirmed these results by comparing China with DAC and other non-DAC donors over 1996-2005. More recently, Broich (2017) compared OF from China with OF from DAC donors finding no evidence that China prefers countries with less democratic regimes or lower institutional quality, or countries exhibiting other strategic advantages (like oil resources) for the donor country.

As for comparison between China and traditional donors in their impact on African countries, the studies so far have been concentrated on GDP growth, with limited attention to other development indicators. Thus, financing from China has been found to exhibit a positive effect on economic performance, while financing from the World Bank has not (Dreher and Lohmann 2015; Dreher et al. 2019). Dreher et al. (2021) compared China and traditional donors in their effect on GDP growth in African countries, finding ODA from both sources having a significant impact on economic development, while the same does not apply to Other Official Flows (OOF). Likewise, Wako (2018), analysing ODA and ODA-like flows only, finds similar results for China and traditional donors with an overall positive effect of aid on GDP but a negative impact on the institutional quality. Local corruption (i.e. perception of corruption in the surroundings of projects'

sites) is considered by Isaksson and Kotsadam (2018). They find that Chinese aid projects fuel local corruption but have no observable impact on short term local economic activity, while World Bank aid projects stimulate local economic activity without any consistent evidence of it fuelling local corruption. Finally, Liu and Tang (2018) investigated the impact of aid from the US and China on trade flows between the donors and African countries. While the export from both donors is strengthened by aid to African partners, for imports the role of aid is strong only for China. The authors interpret this as evidence that China's aid to the African continent is consistent with the approach mutual benefit. Savin et al. (2020) find that official finance from China, US and EU countries stimulates export of goods to Africa, while trade flows in the opposite direction are fostered only in the case of China and Europe. Despite claims in the literature that funding from China aims at securing import of natural resources, the authors find evidence that countries receiving Chinese funding raise their bilateral export of manufactured goods and not of primary commodities. Finally, while for Europe and the US official flows other than development assistance play a bigger role in shaping trade flows, China primarily uses highly concessional and development-oriented flows.

There is no analysis explicitly comparing China and traditional donors in their respect of effective development cooperation principles, but some differences are well documented. China is usually praised for the speed of operations (Strange et al. 2015), non intereference and non-conditionality (Bräutigam 2011; Asmus et al. 2017; Prizzon at al. 2017, Kilama 2016), and for overcoming Western-style paternalism (Bräutigam 2009).[7] Compared to the EU and the US, China has largely deployed economic aid and investments with no strings attached. This policy results from its principle of non-interference and its desire to provide an alternative to the Western-style, conditional giving and investments under the Washington Consensus (Aidoo and Hess 2015). This is in line with ownership principle and receipient countries identify ownership and alignment with national priorities as strengths of China (Prizzon at al 2017).[8] Harmonisation and accountability, instead, are China's weaknesses, since China does not participate in coordination efforts

[7] Conditionality means that aid is only given following the acceptance of conditions which have to be met by the recipient country, i.e. good governance and democracy, but also privatisation and other politically controversial reforms. See Shah (2018) for more details on the types of conditionalities.

[8] The ownership principle postulates that recipient countries set their own development strategies, while donor countries align behind their objectives.

of traditional donors (Prizzon et al. 2017; Bräutigam 2011). Last, China is largely resorting to tied aid, which is now blamed by traditional donors, while export credits are still common for both. [9]

**2.3 Synergy from the presence of two types of donors**

Little has been done to study the interplay of the two donors present on the African continent. An exception is represented by Strange et al. (2015) demonstrating that the presence of alternative funding from China reduces the probability of an armed conflict in case of a sudden withdrawal of aid from traditional donors. In the field of governace, Brazys et al. (2017) find that World Bank projects in Tanzania are associated with lower level of corruption in the absence of Chinese projects explaining this by difficulty to monitor an increasing number of projects (hence, accountability challenges).

The effects of interaction between traditional and Chinese funding encompass issues related with coordination and competition. The lack of coordination challenges development effectiveness and it increases transaction costs, preventing optimal allocation of aid across countries (Bigsten and Tengstam 2015; Mascarenhas and Sandler 2006). Moreover, coordination is necessary to discipline the governments of the host countries, but it can also force coordinating donors to give up some political power over the recipient country itself (Bourguignon and Platteau 2015). In fact, the presence of multiple non-coordinating donors competing for African countries[10] can increase the bargaining power of recipient countries (Reisen 2007; Kilama 2016; Greenhill et al. 2016; Prizzon et al. 2017) for better financing terms and for allocation towards national priorities, fostering the ownership principle. Hernandez (2017) found empirical evidence that the World Bank in Africa delivers loans with significantly fewer conditions to recipient countries which are assisted by China, while Swedlund (2017) does not find the bargaining power of traditional donors to be eroded. In contrast, the World Bank's conditionality is rarely affected by aid inflows from DAC donors.[11] Acconding to Kilama (2016) developing countries could use the increasing influence of emerging donors in development

[9] Tied aid is aid offered under the condition that it must be used to procure goods or services from the country providing aid. Untying aid is encouraged by OECD and DAC, but still common for funding from China. Export credits, instead, are common for both sources of funding. Please note that our sources of data do not allow to distinguish between tied and untied aid.

[10] According to Dreher and Fuchs (2015), donors support African countries in exchange of political support (for example, by voting at the United Nations General Assembly).

[11] This also supports the option for aggregating DAC countries and main multilateral donors in our analysis.

cooperation as strategic policy to improve their control over the development agenda, even when partnering with traditional donors. Competition might also orient traditional donors towards more funding or more infrastructural funding to countries where China is present. Humphrey and Michaelowa (2019) demonstrate this is only the case for funding to non-concessional (mostly middle-income) countries, where multilateral banks tend to increase loans in order to avoid losing clients. In contrast to Zeit (2020), they also find that multilateral banks neither increase their orientation towards infrastructure (still preferring capacity building and institutional reforms), nor relax their environment and social safeguard policies.

The presence of both donors shifts responsibilities from the donors to the recipient country itself, so that African countries have a main role in coordinating interventions and ensuring consistency of development strategies. As a consequence, the joint presence of traditional donors and China can increase ownership, regardless the extent to which individual donors support these principles or are, instead, more oriented towards conditionalities. Greater ownership, however, does not necessarily lead to better results (Greenhill et al. 2016) and one has to test the sign of the synergy effect from the presence of both types of donors, to recognize the importance of African agency, not relegating African actors to passive recipients, in line with Kaplinsky (2013).

To summarize, the literature analysis demonstrates that i) while there is a growing interest in the impact of ODA and official funding on different development indicators (governance, infrastructure, dependence on natural resources, indebtedness), they have been investigated separately with different data sets and different methodologies providing limited comparability of results, sometimes leading to mutually inconsistent conclusions; ii) the role of China as global donor in Africa has increased dramatically over the last 15 years, little work has been done to systematically compare their impacts over the range of development indicators mentioned above; iii) there is a lack of studies on the interplay of the two donors present on the African continent.

The hypotheses we pose are as follows:

***Hypothesis 1:*** Official funding from China and traditional donors has similar impact on governance, infrastructure, dependence on natural resources and debt sustainability in African countries.

***Hypothesis 2:*** The joint presence of traditional donors and China in African countries produces a synergy effect on the four development dimensions under scrutiny. The sign of this effect depends upon the prevalence of harmonisation/accountability challenges over ownership/alignment benefits.

***Hypothesis 2a:*** if harmonisation/accountability challenges prevail, the synergy effects are expected to be negative.

***Hypothesis 2b:*** if ownership/alignment benefits prevail, the synergy effects are expected to be positive.

The first hypothesis is motivated by the similarity of the determinants of Chinese aid allocation to those from traditional donors, as well as of the effects of aid flows from those two types of donors on GDP of the recipient countries. The second hypothesis in turn reflects earlier mixed findings on synergy effects for recipient countries receiving aid from both types of donors and the role of effective cooperation principles in shaping these effects.

# 3 Estimation strategy and data

### 3.1 Data

Before proceeding with the data, some clarification with respect to the definitions employed has to be made. As traditional donors we consider members of the Development Assistance Committee (DAC) and main multilateral donors, as defined by OECD.[12] In 1972 DAC defined Official Development Assistance (ODA) as:

> *„Flows of official financing administered with the promotion of the economic development and welfare of developing countries … with a grant element of at least 25 per cent … the pure purpose of export promotion is excluded."*

[12] DAC members are Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States. Main multilateral donors, which we also include among traditional donors, are EU Institutions, International Monetary Fund, Regional Development Banks, United Nations, World Bank Group. The similarities between DAC countries and multilateral donors are particularly evident when compared to China: 1) they are mostly old donors which shaped the cooperation system in the post war period; 2) they coordinate in the DAC; 3) they are signatories of the Busan Partnership for Effective Development Cooperation.

Other official flows (OOF) include grants or loans from public sector violating the two main conditions, namely i) they are not for development or welfare and/or ii) they are not sufficiently concessional. However, it must be stressed that these definitions are problematic for several reasons. First, the concessionality criterion is a questionable reference in times of low interest rates (Bräutigam 2011). Second, data about flows from China are incomplete (particularly with respect to the degree of concessionality, see bottom right chart in Figure 1, where a considerable share of OF from China cannot be strictly attributed to ODA or OOF). To avoid strong assumptions with respect to which part of OF from China shall be considered as ODA, in the following we take OF (ODA and OOF combined) as the primary measure of financial flows from donors to African countries. That is, in the following we compare official financing flows from the DAC countries and China to Africa that do not necessarily have a sufficient grant element or pure developing purpose to be classified as ODA. Therefore, the term donor in this paper is used more broadly than just provider of concessional and development-oriented ODA-like finance, but also of non-concessional or non development-oriented (OOF) flows.

The data, at the project level, is available at http://www.aiddata.org and is based on an open-source methodology [13] named Tracking Underreported Financial Flows (TUFF). This methodology provides a systematic, transparent and replicable way of tracking aid and other forms of state financing from governments that do not publish comprehensive or detailed information about their overseas activities. A quality assurance procedure includes the elimination of duplicated records and a consistency check for the projects' classification.[14] Our study is based on the version of the dataset 1.0 accessed on 05.12.2017. However, this dataset has few important limitations. First, as introduced above, it does not allow to distinguish with certainty between the funding complying with the DAC's definition of ODA and OOF. The second limitation is that the dataset on China, in contrast to the data available for traditional donors, does not specify the year when the amounts of money are actually disbursed, but only the year when they are committed. Nonetheless, in line with Savin et al. (2020) and based on the available data on the starting and

[13] As an open source database, users are also allowed to "suggest a project", "confirm", "challenge", or "comment" on projects.

[14] For the purposes of our empirical analysis, only project records marked as fully reliable were included.

ending period of the projects we estimate the average length of the projects funded by China (distinguishing between projects devoted to infrastructure, which usually last longer, and all other projects)[15] and extrapolate the OF amounts in equal shares over the respective periods, thus ensuring comparability between traditional donors and China.[16] Finally, given lack of transparency from the side of China to report their official flows and being able to transfer those through offshore financial centes and foreign affiliates of Chinese banks (Cerutti et al. 2018, Horn et al. 2019), our estimates of Chinese flows should be considered as a conservative, lower bound.

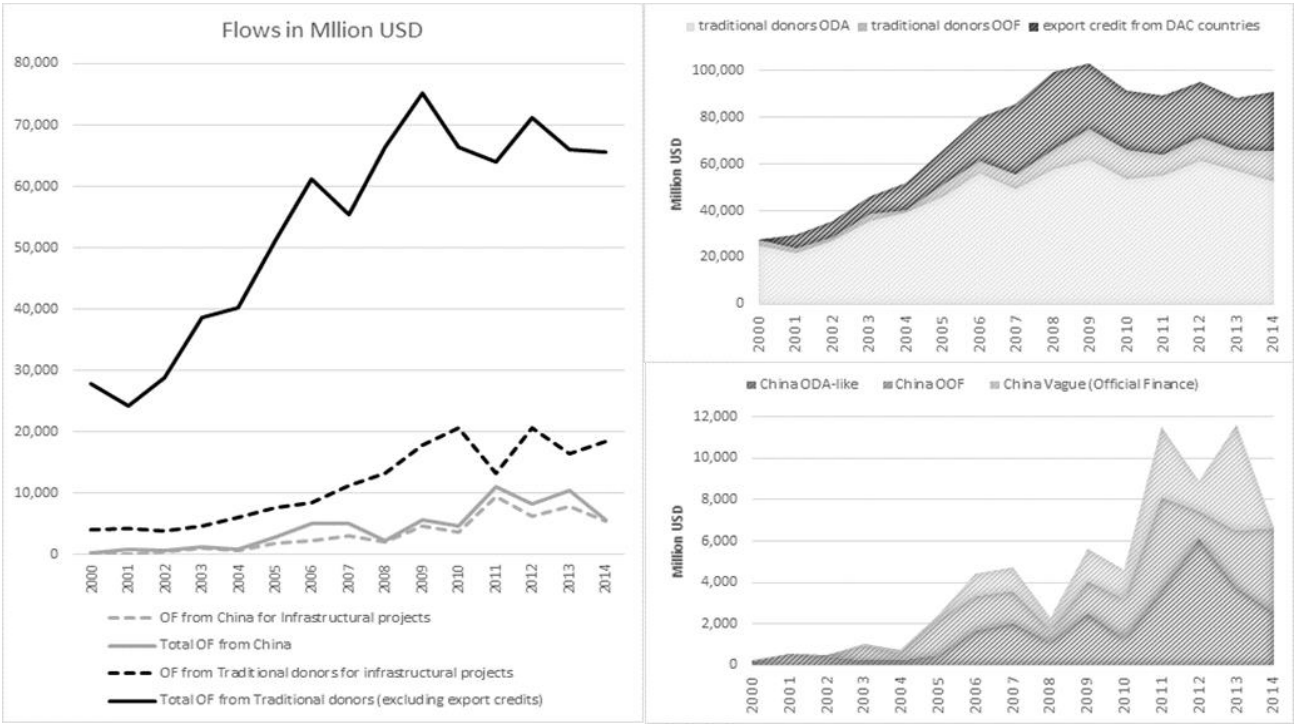


Figure 1. OF flows from traditional donors and China to Africa between 2000 and 2014. The left panel distinguishes infrastructural projects, while the right panel – between ODA, OOF and vague official finance.

We use data coming from the following sources:

- OF from China is from aiddata.org and OF from traditional donors is from the OECD Creditor Reporting System (CRS) database on development finance. Both are deflated to constant prices and normalized by recipient country's GDP in order to make funding to different countries comparable.

[15] As a result, infrastructure projects funded by China last on average 3 years while all other projects last only 2 years.
[16] Note that the delay between commitment and actual disbursement of OF from China and traditional donors is very different and is much smaller in the former case (Strange at al. 2015). Transforming the data into disbursement has the advantages of reflecting the actual availability of funds for African countries and of unifying all the OF from one of the funding sources in one variable, which is convenient for our interaction effect.

Considering that Chinese OF includes export credits, while OECD CRS does not, we merged it with data on export credits from DAC countries provided by Berne Union.[17] Figure 2 illustrates the distribution of OF funding from both donors to African countries over the period 2000-2014, showing that it is highly skewed, particularly that from traditional donors.

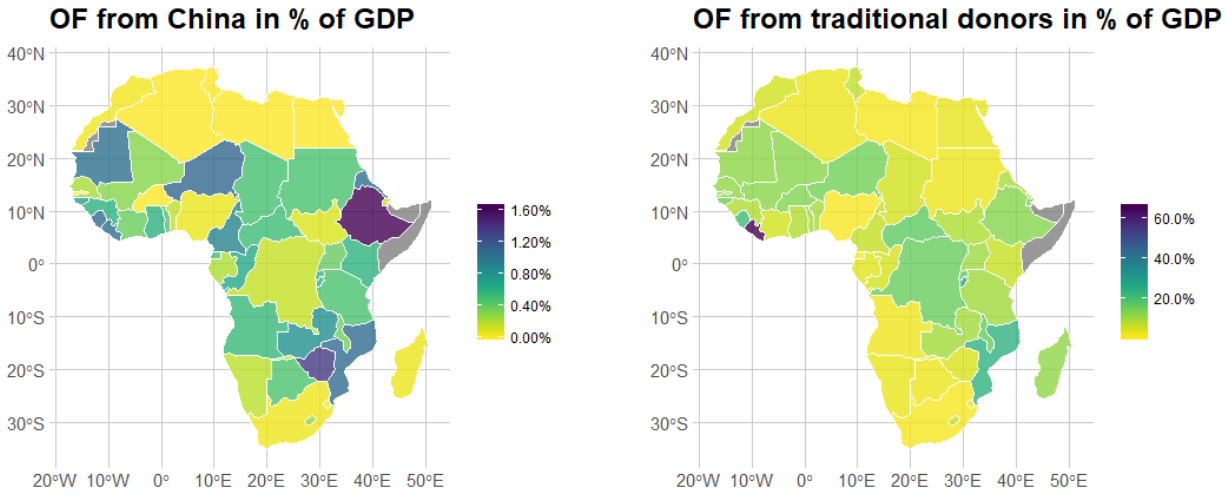


Figure 2. Distribution of OF flows from China (left plot) and traditional donors (right plot) to Africa between 2000 and 2014. The results are taken in % of GDP and averaged over the fifteen years.

- The quality of governance is from World Bank Worldwide Governance Indicators, covering 6 dimensions namely: Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, Control of Corruption (see Table A1 in Appendix A for description of each dimension). A simple average of the six dimensions for each country and each year is also used in the analysis as a single proxy for the quality of governance (see Kaufmann et al. 2010).
- The level of infrastructure development is measured by the African Infrastructure Development Index (AIDI) from the African Development Bank. The major components of this index are: (i) Transport; (ii) Electricity; (iii) Information and Communication Technologies; and (iv) Water and Sanitation (Ncube et al.

[17] Berne Union is an international trade association that, among others, provides insurance on transactions with export credits. As a robustness test, we also tried unpublished export credit data provided by OECD itself (with more conservative estimates on export credits as these do not account for credits for a period shorter than 2 years), finding that all our results hold. The results are available on request.

2013). Since the index is nonstationary containing a positive trend,[18] we take a three-year difference (improvement in infrastructure) as our dependent variable.

- Primary commodities export on country GDP is from UNCTAD, and it is taken as an indicator of diversification of the economic structure of countries.

- Natural resources rents on country GDP are also used to capture structural change and sustainability. The data is from World Development Indicators, where rents are defined as revenues above the cost of extracting the resources, so that they reflect both the lack of value addition, and the deterioration of natural capital stocks.

- External debt sustainability (external debt stock on country GNI) is from World Development Indicators.

More details on dependent, explanatory and control variables can be found in Appendix A.

**3.2 Empirical strategy**

We formulate the following regression equation:

$$Y_{i,t} = \alpha + \gamma_1 \sum_{p=1}^{3} OF_{i,t-p}^{CHINA} + \gamma_2 \sum_{p=1}^{3} OF_{i,t-p}^{TRAD} + \gamma_3 \sum_{p=1}^{3} OF_{i,t-p}^{CHINA} \times \sum_{p=1}^{3} OF_{i,t-p}^{TRAD} + \gamma_4 Y_{i,t-3} + \beta X + \mu_i + \varepsilon_{i,t} \,. \quad (1)$$

On the left-hand side is the development indicator of interest $Y_{i,t}$ (be it one of the dimensions of the quality of governance, infrastructure index, dependence on natural resources or external debt of the recipient country *i* in period *t*). On the right-hand side we put:

- the cumulated amount of OF (ODA + OOF) either from China $\sum_{p=1}^{3} OF_{i,t-p}^{CHINA}$ and traditional donors $\sum_{p=1}^{3} OF_{i,t-p}^{TRAD}$ normalized by GDP of the recipient country over the preceding three years. Doing this, we account for a delayed impact of funding on development (Moreira 2005) and reduce the problem of reverse causality. Another advantage of this approach is that we aggregate the foreign funding from each donor in one term, thus facilitating the analysis of the potential synergy effects experienced by recipient countries due to the presence of both China and traditional donors;

- their interaction term to capture possible synergy effects;

[18] The Fisher-type unit-root test for panel data, did not reject the null hypothesis that all panels (countries) contain a unit root in both specifications (Dickey Fuller and Phillips Perron).

- the lagged dependant variable $Y_{t-3}$ to limit the omitted variable bias;[19]
- a set of controls $X$ that is subject to variation depending on the specific development indicator under consideration;
- country fixed effects (FE) $\mu_i$.

To further mitigate the concerns of potential reverse causality, in line with Dosi et al. (2015), we test if our development indicators ($Y_{i,t}$) Granger-cause aid flows from China and traditional donors regressing these aid flows against their own lag and lagged $Y_{i,t}$ and adding all the controls ($\beta X + \mu_i$) we use in Eq. (1) . Our results reject the hypothesis of reverse causality in all cases but funding from traditional donors including debt relief which positively depends on the level of debt sustainability (see Tables B3 in Appendix B). However, once we separate between OF flows and debt relief, the past level of indebtedness does not anymore explain OF flows from traditional donors indicating that it is debt relief granted by traditional donors to highly indebted countries, not the official finance flows, causing the problem. For this reason, in our main model (see Table 1) we include as regressor the official flows from traditional donors net of debt relief, while the model with overall flows is available in Appendix B. Overall, these results show that causality in Eq. (1) goes from OF flows to development indicators and not the other way around.

FE estimation of equation (1) takes unobserved heterogeneity among recipient countries explicitly into account[20] and is considered as a benchmark estimator in our study. As main estimator, however, we apply the quantile regression (QR, Koenker and Bassett 1978) since

i) QR is robust to fat-tails in the distribution of $Y$ (as we show in Figure A2 in Appendix A, the distribution of most of our dependent variables such as improvement in infrastructure, natural resources rents but also political stability is skewed with fat tails);
ii) QR allows to differentiate the effect of funding conditional on the performance of countries with reference to the development indicator of interest, thus capturing a non-linear relationship between

[19] We take a three-year lag to capture the state of the development indicator before receiving the (cumulated) foreign public funding.
[20] In Section 4 we report results of the Hausman specification test (Hausman 1978), which supports our choice to not use the random effects alternative in all specified models. This is not surprising, given the large heterogeneity among African countries in terms of income, governance, infrastructure and other key development indicators.

aid and development. This is important also because African countries show little persistence in their development performance (i.e. stability of countries in occupying certain percentiles over the period of interest). Therefore, QR captures countries' heterogeneity that FE would miss. [21]

We use the QR estimator extended to include fixed effects, developed by Canay (2011). This allows us to keep control over unobserved idiosyncratic effects that remain persistent for African countries over the period of analysis.

## 4 Regression results

Regression results of the main models are presented in Table 1, while Table 2 reports marginal effects calculated across different percentiles. Additional models, like certain dimensions of governance as well as models serving as robustness tests (e.g., debt with overall funding from traditionl donors, including debt relief), are presented in Appendix B. Since OF flows to African countries from both donors have very skewed distributions, we report in Table 2 the marginal effects by considering the presence of the other donor at its median, rather than mean, level. As a result, the cumulated median level of OF from China is 0.5% of the recipient's GDP (below the mean of 1.5%), while the cumulated median level of OF from traditional donors is 23% of GDP (mean 32%). Robust standard errors for the OLS and QR estimates are reported to obtain heteroskedasticity-robust estimates.[22]

To better understand the conditional impact of OF from one donor given different level of presence of the other donor, we use twoway contour plots. These are constructed by estimating from our models marginal effects of OF from one of the donors over a range of possible values of OF from the other donor, and plotting the corresponding predictions of the dependent variable on a two-dimensional graph. The two axes capture the presence of the two donors in African countries. Moreover, since the marginal effects in the QR estimation differ depending on the percentile of the dependent variable, we report the median quantile

[21] Some basic analysis demonstrates that African countries tend to occupy different percentiles in terms of performance on all our dependent variables over the period of consideration. For example, in terms of external debt stock on GNI the Republic of the Congo occupied the bottom 20% of African countries between 2000-2005, but in few years, around 2010-2012, it managed to move to the upper quantiles. Similarly, Mauritius originally occupied the top 20% in terms of external debt stock, but moved to the bottom quantiles in the most recent years (2012-2015).

[22] In the literature, heteroscedastic-robust estimates are frequently called cluster-robust estimates (Cameron and Miller, 2015). In our case, the standard errors are clustered on the country level.

together with the first and ninth deciles (i.e. 10%, 50% and 90%). The twoway contour plots with marginal effects are particularly suitable to study the interaction between two continuous covariates, as the curvature of the lines in those plots is caused by the interaction term. In particular, without the interaction the lines would be straight and diagonal, while their nonlinear shape captures the presence of synergy effects.

To summarize, we explore possible (dis)advantages from the presence of both donors by first testing the significance of the interaction term. Then we look on the marginal effects in Table 2 reported at the median level of other's donor presence. Finally, we assess whether these results hold at alternative levels of OF from the two donors by studying the contour plots.

Table 1. Regression results for main models tested.

| | Infrastructure index change | | Governance (average) | | Control of corruption | | Rule of Law | | External debt sustainability | | Natural resources rents | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OLS | Median QR | OLS | Median QR | OLS | Median QR | OLS | Median QR | OLS | Median QR | OLS | Median QR |
| Chinese infrastructural funding | 9.24 | 8.70** | | | | | | | | | | |
| Traditional donors infastructural funding | 10.28* | 9.47*** | | | | | | | | | | |
| Chinese funding | | | 1.26*** | 0.40 | 1.31* | 0.52 | 2.02*** | 0.82* | 584.71*** | 332.89*** | -8.69 | -35.06*** |
| Traditional donors funding | | | 0.12*** | 0.11*** | 0.13** | 0.10** | 0.10* | 0.03 | | | -4.71* | -3.45*** |
| Traditional donors funding (excluding debt relief) | | | | | | | | | -90.37 | -38.33*** | | |
| Interaction term | -102.35 | -90.70 | -2.63*** | -1.07 | -1.97* | -0.45 | -3.22*** | -0.10 | -2301.76*** | -1205.45*** | 174.53*** | 205.95*** |
| Lagged dependent variable | -0.20 | 0.16 | 0.37*** | 0.70*** | 0.24** | 0.42*** | 0.31*** | 0.57*** | 0.46*** | 0.47*** | 0.12 | 0.22*** |
| Governance | -2.54 | -2.21*** | | | | | | | -8.62 | -4.30** | -3.13 | -3.07*** |
| Rural Population | -40.97*** | -33.73*** | | | | | | | | | | |
| GDP growth | | | 0.30*** | 0.44*** | 0.17* | 0.27*** | 0.30*** | 0.50*** | -57.90** | -43.72*** | | |
| Trade balance | | | | | | | | | -0.65*** | -0.34*** | | |
| GDP per capita | | | 24.53*** | 17.88*** | 23.38 | 20.94*** | 23.16** | 21.67*** | | | | |
| Natural resources rents | | | -0.003*** | -0.004*** | -0.000 | -0.004*** | -0.005*** | -0.006*** | | | | |
| Population | | | | | | | | | | | -0.39 | -0.30*** |
| Gross fixed capital | | | | | | | | | | | -0.19** | -0.11*** |
| Debt relief from traditional donors | | | | | | | | | -102.54*** | -81.75*** | | |
| Constant | 24.88*** | 20.25*** | -0.80*** | -0.71*** | 0.77*** | -0.72*** | -0.84*** | -0.85*** | 98.43** | 71.63*** | 21.37*** | 16.41*** |
| N of observations | 407 | 407 | 566 | 566 | 566 | 566 | 565 | 565 | 490 | 490 | 412 | 412 |
| N of countries | 52 | 52 | 53 | 53 | 53 | 53 | 53 | 53 | 46 | 46 | 46 | 46 |
| Fixed effects included | Yes | Yes | yes | Yes | yes | yes | yes | yes | yes | yes | yes | yes |
| within R2 / Pseudo R2 | 0.10 | 0.82 | 0.29 | 0.60 | 0.12 | 0.32 | 0.22 | 0.53 | 0.82 | 0.58 | 0.11 | 0.53 |
| Hausman test | 207.35*** | | 158.53*** | | 199.33*** | | 165.90*** | | 1128.62*** | | 106.84*** | |

Notes: The asterisks ***, **, and * are 1%, 5%, and 10% of significance levels, respectively. Hetoroscedasticity robust estimates are reported. Quantile regression results are based on 10,000 bootstrapping repetitions.

Table 2. Marginal effects for main models tested.

| | Infrastructure index change | | Governance (average) | | Control of Corruption | | Rule of Law | | External debt sustainability | | Natural resources rents | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Chinese Funding for Infrastructure | Traditional Donors' Funding for Infrastructure | Chinese Funding | Traditional Donors' Funding | Chinese Funding | Traditional Donors' Funding | Chinese Funding | Traditional Donors' Funding | Chinese Funding | Traditional Donors' Funding (excluding debt relief) | Chinese Funding | Traditional Donors' Funding |
| OLS | 9.24 | 10.28* | 0.63** | 0.11*** | 0.83* | 0.12** | 1.24*** | 0.08* | 7.49 | -132.25** | 33.63 | -3.88* |
| QR | | | | | | | | | | | | |
| 0.1 | 21.34*** | 14.96*** | 0.67** | 0.1*** | 0.95** | 0.11* | 0.69 | 0.06* | 43.93 | -85.67*** | 27.96** | -2.05 |
| 0.25 | 9.52** | 10.31*** | 0.18 | 0.06*** | 0.75*** | 0.15*** | 0.72 | 0.02 | 14.55 | -57.38*** | 17.03** | -3.58*** |
| 0.5 | 8.7** | 9.47*** | 0.14 | 0.11*** | 0.42 | 0.1** | 0.79*** | 0.03 | 40.62 | -44.07*** | 14.87** | -2.47*** |
| 0.75 | 9.32* | 10.19*** | 0.61** | 0.13*** | 0.95** | 0.16*** | 0.59** | 0.01 | 107.22 | -26.27*** | 28.83* | -4.58*** |
| 0.9 | 12.48** | 11.2*** | 0.17 | 0.13*** | 0.53 | 0.1 | 0.75* | 0.04 | 259.65*** | -26.29** | 8.38 | -6.87*** |

Notes: The asterisks ***, **, and * are 1%, 5%, and 10% of significance levels, respectively. Hetoroscedasticity robust estimates are reported. Quantile regression results are based on 10,000 bootstrapping repetitions. Due to the highly skewed distribution of funding of both donors (Figure 2), marginal effects of each donor's funding are generated taking the median and not the mean level of the other donor's funding.

### 4.1 Infrastructure

As we can see from Table 1, the improvement in the infrastructure index is positively and significantly affected by both Chinese and traditional donors' infrastructural funding (supporting Hypothesis 1). It is important to note here that this model captures the efficiency in the use of funding (i.e. funding divided by GDP translated into improvement in infrastructure index) rather than a broader and more sophisticated evaluation of impacts of the infrastructure on growth and inequality, like, for example, Calderón and Servén (2004). Control variables are the percentage of rural population, which, as expected, challenges infrastructural improvements by making users more difficult to serve, and governance, which is negative and significant in all percentiles. The latter is surprising at first, but can be explained by the neglect of negative environmental and social impacts of infrastructural projects by countries with poor governance. Such neglect can speed up and ensure the approval of many infrastructural projects despite those impacts (World Bank 2017).

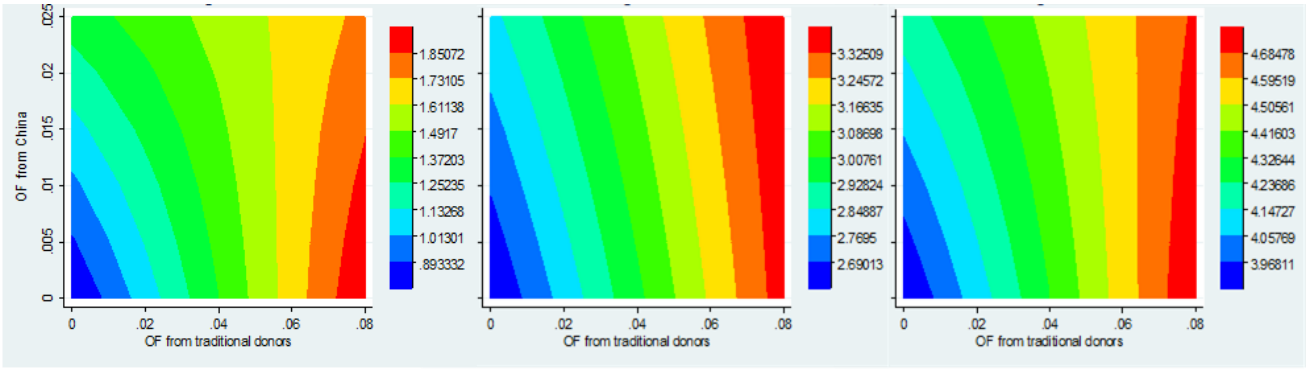


Figure 3. Twoway contour plot of predicted change in the infrastructure index for different combinations of OF funding from China and traditional donors (left chart is QR estimation for 10th percentile of the dependent variable, the mid chart – for 50th percentile, and the right one – for 90th percentile)

Notes: X and Y axis capture 0-90 percentiles of the respective OF distributions. Please note that colours are associated to different values in the three pictures, as clearly shown by the palette legend on the right side of each chart.

The interaction term is only significant in the extreme percentiles (10th and 90th), and it is negative. Also, the contour plots in Figure 3 demonstrate the negative synergy effect (the left and the right charts). This can be due to harmonization challenges (in line with Hypothesis 2a) well documented in the literature, as different infrastructural projects are developed without a comprehensive plan, based on the availability of funding from uncoordinated donors (Bourgignon and Plateau, 2015). An example of inefficiency resulting from coordination challenges is that of the new standard gauge railway financed by China in Kenya, whose

track runs along that of the old colonial rail line targeted by World Bank funding for rehabilitation (Wang and Wissenbach 2019). Similar to Donaubauer (2016), we also find overall OF funding (not limited to infrastructure) of less significance in its impact on infrastructure (Appendix B).

**4.2 Governance**

The effect of OF on governance, for both the average index and the six constituent dimensions, is positive, though not always significant, across particular dimensions of governance and different percentiles of development of governance across African countries both for China and traditional donors (in agreement with Hypothesis 1). Traditional donors tend to have a stronger impact on voice and accountability, thanks to their human rights conditionalities (Donno and Neureiter 2017), and on the control of corruption. OF from China has a larger impact on government effectiveness, likely due to their non-interference policy (Bräutigam 2011; Asmus et al. 2017; Prizzon at al. 2017) which allows government to be more credible in formulation, implementation, commitment to policies and on the rule of law. Our findings are in line with the literature on the positive impacts of aid (from traditional donors) on governance (Okada and Samreth 2012; Mohamed et al. 2015), and allow the extension of similar conclusions to OF funding from China. The control variables included in the models are natural resources rents, per capita income and income growth over the last three years. As expected, while the first control variable is associated with worse governance, the latter two are associated with better governance.

For the average governance index, the interaction effect is negative, but only significant for upper percentiles (75th and 90th), which can be also seen from the contour plot chart in Figure 4 (right chart). That is, African countries receiving OF from both donors are worse off in terms of quality of governance than receiving funding only from DAC donors. Furthermore, we find a negative interaction effect for upper percentiles of political stability and absence of violence, but only marginally significant. The same is true for other dimensions of governance, like the control of corruption. In those cases, in line with Brazys et al. (2017), the negative coefficient of the interaction term points to harmonisation and accountability challenges: the presence of multiple, uncoordinated funding from donors with different reporting standards creates opportunities for mismanagement by local officers and politicians making accountability to any donor and to

the citizens themselves less strict and straightforward (in line with Hypothesis 2a). Negative interaction effects can also be explained by weakened conditionality when dependence on traditional donor decreases, as found by Donno and Neureiter (2018) for human rights. Other dimensions of governance are presented in Appendix B and are in line with the discussion above.

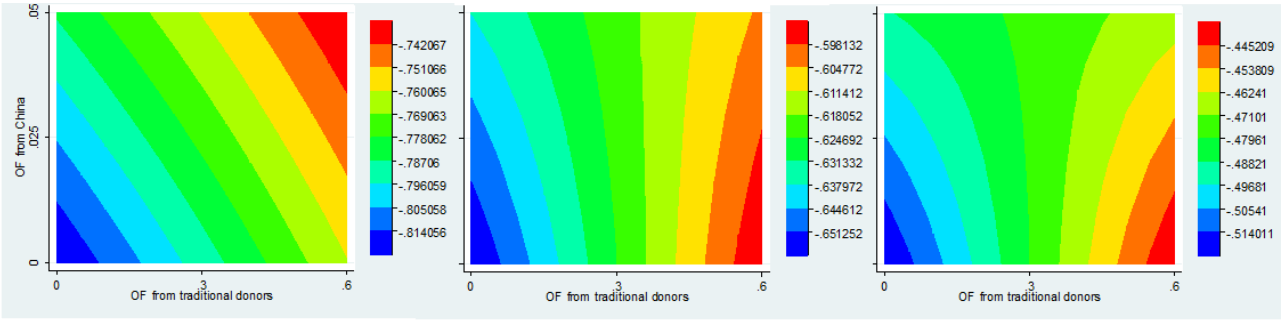


Figure 4. Twoway contour plot of predicted average governance for different combinations of OF funding from China and traditional donors (left chart is QR estimation for 10th percentile of the dependent variable, the mid chart – for 50th percentile, and the right one – for 90th percentile)

Notes: X and Y axis capture 0-90 quantiles of the respective OF distributions. Please note that colours are associated to different values in the three pictures, as clearly shown by the palette legend on the right side of each chart.

### 4.3 External debt sustainability

While so far the presented models support the Hypothesis 1 of similar impact of the two donors, the level of external debt is affected in opposite directions by funding from Chinese and traditional donors. OF from China increases the debt to GNI ratio, while traditional donors reduce it with both coefficients being highly significant (see Table 1). The findings of Bjørnskov and Schröder (2013) on the negative role of aid on indebtedness are thus confirmed only for China. However, while Bjørnskov and Schröder (2013) explain their findings based on incentives to repayment, our explanation is more trivial. OF from China includes a large portion of funding without concessional terms (compare the OOF components in the right charts of Figure 1), which by its very nature creates debt. Controls included are GDP growth over the three years period, trade balance, and governance, with the former two being negative (i.e. improving debt sustainability) and significant.

Interestingly enough, the impact from OF from China and traditional donors clearly changes over quantiles (Table 2). While traditional donors have strongest positive (i.e. reducing debt) impact on countries with relatively low debt, China affects significantly only those countries with relatively high indebtedness increasing their debt to GNI ratio. Taken together, this shows an alarming picture where countries with high

debt to income ratio do not experience much beneficial effects from traditional donors, while becoming increasing indebted to China. On the positive side, we find the interaction term to be significant and negative (i.e. good in reducing the external debt stock as a percentage of GNI), but even this beneficial effect is weaker for highly indebted countries (see Figure 5).

Our study, thus, generalizes the finding by Hernandez (2017) on better terms and conditions for loans provided by traditional donors in Africa to countries funded also by China - to official funding coming from any of the two donors. This is in line with Reisen (2007), Kilama (2016), Greenhill et al. (2016) and Prizzon et al. (2017), since competition between donors gives African countries more ownership and the power to bargain better financing terms (in line with Hypothesis 2b). Logically enough, the countries having relatively low debt have stronger bargaining position. Note that we observe the beneficial role of ownership here dominating the potential detrimental effect from the reduced accountability, that opens up opportunities to borrow from donors whose information on the indebtedness of the country is not complete. In Appendix B we also present a model including debt relief in OF flows from traditional donors, like for other models but being potentially endogenous in this case.

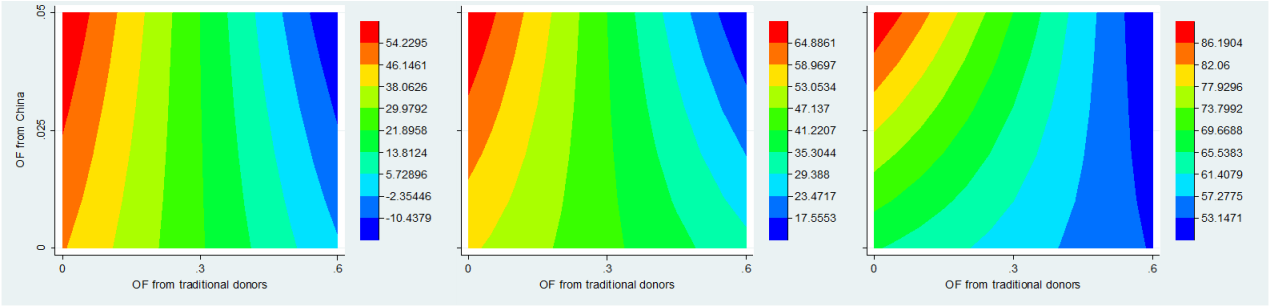


Figure 5: Twoway contour plot of predicted external debt stock as % in GNI for different combinations of OF funding from China and traditional donors (left chart is QR estimation for 10th percentile of the dependent variable, the mid chart – for 50th percentile, and the right one – for 90th percentile)
Notes: X and Y axis capture 0-90 percentiles of the respective OF distributions. Please note that colours are associated to different values in the three pictures, as clearly shown by the palette legend on the right side of each chart.

### 4.4 Dependence on natural resources

When natural resources rents are considered, the individual coefficients of the two donors from Table 1 are negative, showing that, when the other donor is not present, OF from both donors support countries in

reducing the dependence on natural resources. This, however is very unlikely as we know from the data (see Figure 2). Taking the positive and highly significant interaction effect into account and looking at the marginal effects (Table 2) changes the conclusion dramatically. In particular, while the marginal effect of OF from traditional donors remains negative and significant in all percentiles, the marginal effect of China turns positive and significant in all but the upper percentiles. One should remember, though, that these marginal effects are calculated taking the presence of the other donor at its median level. Figure 6, which shows twoway contour plots over the whole range of possible presences of the two donors, tells the complete story. While the marginal effect of OF from China for countries with little presence of traditional donors (i.e. below their median level of approx. 20% in GDP) is negative (i.e. stimulating economy diversification), it turns positive for those countries where traditional donors are strongly present (i.e. above the median level). In the same way, for recipient countries where China's presence is stronger (with cumulated OF flows above 2-3% of GDP), also the marginal effect of funding from traditional donors becomes detrimental (positive), which is in line with our Hypothesis 1.

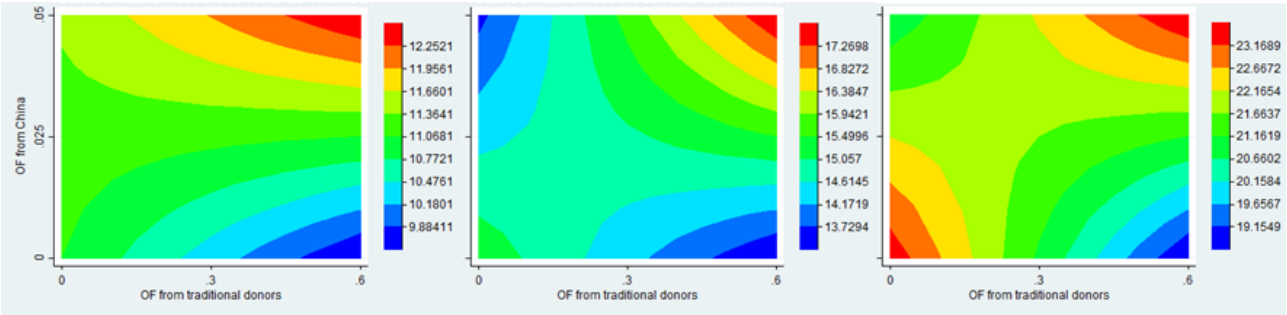


Figure 6: Twoway contour plot of predicted natural resources dependence for different combinations of OF funding from China and traditional donors (left chart is QR estimation for 10th percentile of the dependent variable, the mid chart – for 50th percentile, and the right one – for 90th percentile)
Notes: X and Y axis capture 0-90 percentiles of the respective OF distributions. Please note that colours are associated to different values in the pictures, as clearly shown by the palette legend on the right side of each of them.

This demonstrates a complex relationship between external official funding and dependence on natural resources for African economies. Those countries in which only one of the two donors is relatively strongly present tend to diversify more than other countries. This finding may have two explanations. First, donors invest in projects that lead to economic diversification only in recipient countries where they are relatively strongly present. In these cases, the donor and the recipient have a stronger trust and strategic

cooperation fostering donors to share technologies and experience necessary for development and economy diversification. Conversely, in countries where there is stronger competition with alternative donors, each donor prioritizes its direct interest by e.g. securing access to local natural resources with resource-backed loans (Bräutigam 2009, Habiyaremye 2015). Export credits and tied aid, used to promote donors' trade interest, can also limit the development of local firms and strengthen dependence on imports from donor countries. Second, the negative synergy effect can also be explained by greater ownership (in contradiction with Hypithesis 2b). Presence of both donors gives recipient countries stronger bargaining power to direct foreign public funding towards projects allowing the exploitation of natural resources which ensure revenues in the short run. So, even though one of the donors may have some reservation against the investments because of negative environmental or social impacts, the competition from the alternative donor allows the recipient countries to carry out those projects anyway,in line with Zeits (2020). This orientation by African countries might be viewed as an evidence that African agency is weak, captured by rent seeking elites, and the presence of both donors, with more rent seeking opportunities, disincentivizes countries to commit seriously to development and undertake investments towards structural change (Easterly and Williamson, 2011; Moyo, 2009).

The robustness check with export of primary commodities as percentage of GDP as an alternative proxy for dependence on natural resources supports our findings (see Appendix B). In particular, the model demonstrates the detrimental impact of both donors captured by significant and positive marginal effects in the lowest percentiles (Table B2). Furthermore, the corresponding twoway contour plots (Figure B1) demonstrate the presence of the synergy effect indicating that African countries with funding from both donors tend to increase their export of primary commodities.

## 5 Conclusion

Over the last two decades China has become an important source of aid and other official funding for Africa, but its coordination with traditional donors remains very limited, and its contribution to Africa's development has been widely criticized. While the literature has recently demonstrated that funding from China and traditional donors are driven by similar determinants, less was done to compare the impact of funding from

the two donors on African development and the (dis)advantages from their simultaneous presence. This study systematically compares the impact of the two donors over a range of development indicators which are expected to lead to sustainable development in the long term: quality of governance, infrastructure development, countries' dependence on natural resources and external debt sustainability. In doing so, we combine data from a range of sources and consider aid and other official flows together to avoid classification inconsistencies. Furthermore, assuming that the presence of alternative funding from China, next to the funding from traditional donors, challenges harmonization/accountability and strengthens ownership/alignment, we formally test the role of their simultaneous presence on development effectiveness by including an interaction term between Chinese and traditional donors' funding. We use a quantile regression that allows us to distinguish the impacts of funding on countries with different levels of the development indicator under consideration, to obtain robust results in the presence of fat tails in the distribution of our dependent variables, and to explore the differentiated marginal effects of each of the two donors given different levels of presence of the alternative donor.

Our results support Hypothesis 1 about similar impacts of funding from China and traditional donors for infrastructure development, quality of governance and natural resources dependence. While for the former two indicators the role of foreign funding is positive (i.e. improving governance and infrastructure), for the natural resources dependence the relationship is more nuanced. In particular, African countries with a relatively strong presence of only one of the two donors tend to diversify their economy, while in cases where all donors are strongly present, OF from the two donors increases their dependence on natural resources. For the external debt sustainability the impacts of the two donors are opposite in direction: China increases the debt, while traditional donors reduce it. This finding is robust to inclusion of the debt relief component and can be explained by the lower portion of concessional funding from China. Regarding Hypothesis 2 we find that presence of the two donors has detrimental effects for all development results, but indebtedness. We interpret the negative effects as due to challenges in harmonization and mutual accountability (for infrastructure and governance confirming Hypothesis 2a), while for natural resources it can be the perverse result of increased ownership (contradicting Hypothesis 2b). Positive effect of increased

ownership was only found for indebtedness (in line with Hypothesis 2b). While this does not imply that negative synergy effects offset the benefits from OF coming from traditional donors and China, it confirms that there is scope for improving donors coordination, to ensure better harmonization and accountability, but also for strengthening African agency, i.e. making it more consistent with African development interests, to ensure that more ownership and alignment lead to better development results.

Further research would benefit from a transparent and full overview of Chinese official flows and their reliable and consistent classification into aid and other official funding. This would allow to differentiate the impacts of different forms of aid, further clarifying the dynamics determining the results of the models discussed in this paper.

## References


Aidoo R., Hess S. (2015) Non-interference 2.0: China's evolving foreign policy towards a changing Africa. *Journal of Current Chinese Affairs*, 44(1): 107-139.

AfDB, OECD, UNDP, UNECA (2013) African Economic Outlook 2013 Structural Transformation and Natural Resources. OECD Publishing, Paris. https://www.oecd-ilibrary.org/development/african-economic-outlook-2013_aeo-2013-en

Arndt T. C., Jones E. S., Tarp F. (2015) Assessing Foreign Aid's Long Run Contribution to Growth and Development, *World Development* 69(C): 6-18

Asmus G., A. Fuchs, Müller A. (2017) BRICS and Foreign Aid. In: The World Scientific Reference on the Economies of the BRIC Countries, E. Mansfield and N. Rudra (Eds.), World Scientific

Baulch B. (2006) Aid distribution and the MDGs, *World Development* 34 (6): 933–950

Bigsten A., Tengstam S. (2015) International coordination and the effectiveness of aid. *World Development* 69(4): 75–85

Bjørnskov C., Schröder P.J.H. (2013) Are debt repayment incentives undermined by foreign aid? *Journal of Comparative Economics* 41(4): 1073-1091

Bourguignon F., Platteau J.-P. (2015) The hard challenge of aid coordination. *World Development* 69: 86–97

Bräutigam D.A., Knack S., 2004. Foreign aid, institutions, and governance in sub-Saharan Africa. *Economic Development and Cultural Change*, 52(2): 255-285.

Bräutigam D. (2009) *The dragon's gift: the real story of China in Africa*. Oxford University Press.

Bräutigam D. (2011) Aid with Chinese characteristics: Chinese Foreign Aid and Development Finance Meet the OECD-DAC Aid Regime. *Journal of International Development* 23(5): 752-764

Brazys S., Elkink J.A., Kelly G. (2017) Bad neighbors? How co-located Chinese and World Bank development projects impact local corruption in Tanzania. *The Review of International Organizations* 12(2): 227-253.

Broich T. (2017) Do authoritarian regimes receive more Chinese development finance than democratic ones? Empirical evidence for Africa. *China Economic Review* 46:180-207

Burnside C., D. B Dollar (2000) Aid, Policies and Growth. *American Economic Review* 90(4): 847-68

Busse M., Gröning, S. (2009). Does foreign aid improve governance? *Economics Letters* 104(2): 76-78.

Calderón, C., Servén, L. (2004). The effects of infrastructure development on growth and income distribution. The World Bank. https://elibrary.worldbank.org/doi/abs/10.1596/1813-9450-3400

Cameron C. A., D. L. Miller (2015). A practitioner's guide to cluster-robust inference. *Journal of Human Resources* 50: 317– 372

Canay I. A. (2011) A simple approach to quantile regression for panel data. *The Econometrics Journal* 14: 368-386

Cerutti E., Koch C., Pradhan S.-K. (2018) The growing footprint of EME banks in the international banking system. *BIS Quarterly Review*, December 2018.

Donaubauer J., Meyer B., Nunnenkamp, P. (2016) Aid, Infrastructure, and FDI: Assessing the Transmission Channel with a New Index of Infrastructure. *World Development* 78(C): 230-245

Donno D., Neureiter M. (2018) Can human rights conditionality reduce repression? Examining the European Union's economic agreements. *The Review of International Organizations* 13(3):335-357.

Dosi, G., Moschella, D., Pugliese, E. and Tamagni, F., 2015. Productivity, market selection, and corporate growth: comparative evidence across US and Europe. *Small Business Economics*, *45*(3), pp.643-672.

Doucouliagos, H. The politics of international aid. *The Oxford Handbook of Public Choice*, Volume 2. 2016.

Dreher A., Fuchs A. (2015) Rogue Aid? An Empirical Analysis of China's Aid Allocation. *Canadian Journal of Economics* 48(3): 988–1023

Dreher, A., Fuchs, A., Hodler, R., Parks, B. C., Raschky, P. A., & Tierney, M. J. (2019). African leaders and the geography of China's foreign assistance. *Journal of Development Economics*, 140, 44-71.

Dreher, A., Fuchs, A., Parks, B., Strange, A., & Tierney, M. J. (2021) Aid, China, and Growth: Evidence from a New Global Development Finance Dataset. *American Economic Journal: Economic Policy*: forthcoming

Dreher A., Fuchs A., Parks B., Strange A.M., Tierney M.J. (2018) Apples and Dragon Fruits: The Determinants of Aid and Other Forms of State Financing from China to Africa. *International Studies Quarterly* 62(1): 182–194

Dreher A., Lohmann S. (2015) Aid and Growth at the Regional Level. *Oxford Review of Economic Policy* 31(3-4): 420-446

Dreher A., Nunnenkamp P., Thiele R. (2011) Are 'New' Donors Different? Comparing the Allocation of Bilateral Aid Between nonDAC and DAC Donor Countries. *World Development* 39(11): 1950–1968

Easterly W. (2002). How did heavily indebted poor countries become heavily indebted? Reviewing two decades of debt relief. *World Development* 30(10): 1677-1696
Easterly, W., 2003. Can foreign aid buy growth?. *Journal of Economic Perspectives*, *17*(3), pp.23-48.

Easterly W., Pfutze T. (2008). Where does the money go? Best and worst practices in foreign aid. *The Journal of Economic* Perspectives 22(2): 29–52

Easterly W., Williamson C.R. (2011). Rhetoric versus reality: the best and worst of aid agency practices. *World Development* 39(11): 1930-1949

Fourth High Level Forum on Aid Effectiveness (2012) The Busan Partnership for Effective Development Co-operation. The Busan Partnership for Effective Development Cooperation http://www.oecd.org/dac/effectiveness/Busan%20partnership.pdf

Greenhill R., Prizzon A., Rogerson A., (2016) The Age of Choice: Developing Countries in the New Aid Landscape, In: *The Fragmentation of Aid: Concepts, Measurements and Implications for Development Cooperatio*n, A. Klingebiel, S.; Mahn, T. & Negre, M. (Eds.), Palgrave Macmillan UK

Habiyaremye A. (2016). Is Sino-African trade exacerbating resource dependence in Africa? *Structural Change and Economic Dynamics* 37: 1-12.

Halper S. (2010) Beijing's Coalition of the Willing. *Foreign Policy* 180: 100-102

Hausman J. A. (1978) Specification Tests in Econometrics. *Econometrica* 46: 1251-1271

Hernandez D. (2017) Are "New" Donors Challenging World Bank Conditionality? *World Development* 96: 529-549

Horn S., Reinhart, C. M., Trebesch, C. (2019) China's Overseas Lending (Working Paper No. 26050), National Bureau of Economic Research. https://doi.org/10.3386/w26050

Humphrey, C. and Michaelowa, K. (2019) China in Africa: Competition for traditional development finance institutions?. *World Development 120*: 15-28.

Isaksson A. S., Kotsadam A. (2018). Chinese aid and local corruption. *Journal of Public Economics* 159: 146-159.

Kaplinsky R. (2013) What contribution can China make to inclusive growth in sub-Saharan Africa? *Development and Change* 44(6): 1295-1316

Kaufmann D., Kraay, A. and Mastruzzi, M. (2010) The Worldwide Governance Indicators: Methodology and Analytical Issues. World Bank Policy Research Working Paper No. 5430. Available at SSRN: https://ssrn.com/abstract=1682130

Kilama E.G. (2016) The influence of China and emerging donors aid allocation: a recipient perspective. *China Economic Review* 38: 76-91

Kim S., Lightfoot S. (2011) Does "DAC-Ability" Really Matter? The Emergence of Non-DAC Donors: Introduction to Policy Arena. *Journal of International Development* 23: 711–721

Koenker R., G. Bassett (1978) Regression Quantiles. *Econometrica* 46: 33-50

Liu A., Tang B. (2018) US and China aid to Africa: Impact on the donor-recipient trade relations. *China Economic* Review 48: 46-65.

Mascarenhas R., Sandler T. (2006) Do donors cooperatively fund foreign aid? *The Review of International Organizations* 1(4): 337-357

Mohamed M.R., S.R. Kaliappan, N.W. Ismail and W.N.W Azman-Saini (2015) Effect of foreign aid on corruption: evidence from Sub-Saharan African countries. *International Journal of Social Economics* 42(1): 47-63

Moreira S.B. (2005) Evaluating the Impact of Foreign Aid on Economic Growth: A Cross-Country Study. *Journal of Economic Development* 30(2): 25-49

Moyo D. (2009) *Dead Aid: Why Aid is not Working and How There Is Another Way for Africa*. Penguin: London.

Naim M. (2007) Rogue aid. *Foreign Policy* 159: 95–96

Ncube M., Leyeka Lufumpa C., Murinde V., Kayizzi-Mugerwa S. (2013). The Africa Infrastructure Development Index (Aidi), African Development Bank

OECD (2005) 2005 Paris declaration on aid effectiveness. Paris: OECD.

OECD (2008) The Paris Declaration on Aid Effectiveness and the Accra Agenda for Action, http://www.oecd.org/dac/effectiveness/34428351.pdf

Okada K., Samreth S. (2012) The effect of foreign aid on corruption: a quantile regression approach. *Economics Letters* 115(2): 240-243

Powell R., Bird G. (2010) Aid and debt relief in Africa: have they been substitutes or complements? *World Development* 38 (3): 219–227

Prizzon A., Greenhill R., Mustapha S. (2017) An 'age of choice' for external development finance? Evidence from country case studies. *Development Policy Review* 35(S1): O29–O45

Reisen H., (2007) Is China actually helping improve debt sustainability in Africa. *G24 policy brief* (9): 1-14

Reisen H., S. Ndoye (2008) Prudent versus Imprudent Lending to Africa: From debt relief to emerging lenders, OECD Development Centre Working Papers, No. 268, OECD Publishing, Paris.

Savin, I., Marson, M. and Sutormina, M. (2020) How different aid flows affect different trade flows: Evidence from Africa and its largest donors. *Structural Change and Economic Dynamics* 55: 119-136.

Shah A. (2018) Development assistance and conditionality: Challenges in design and options for more effective assistance, EC-OECD Seminar Series on Designing better economic development policies for regions and cities, OECD

Strange A. M., Dreher A., Fuchs A., Parks B., Tierney M.J. (2015) Tracking Underreported Financial Flows: China's Development Finance and the Aid-Conflict Nexus Revisited. *Journal of Conflict Resolution* 61(5): 935-963

Swedlund, H.J., 2017. Is China eroding the bargaining power of traditional donors in Africa?. *International Affairs*, *93*(2), pp.389-408.

Taylor I. (2007) Sino-African relations and the problem of human rights. *African Affairs* 107(426): 63–87

Tierney M.J. (2014) Rising Powers and the Regime for Development Finance. *International Studies Review* 16(3): 452–455

Tull D.M. (2006) China's engagement in Africa: Scope, significance and consequences. *The Journal of Modern African Studies* 44(3): 459–479

Wako H.A. (2018) Aid, institutions and economic growth in sub-Saharan Africa: Heterogeneous donors and heterogeneous responses. *Review of Development Economics* 22(1): 23-44

Wang, Y. and Wissenbach, U., 2019. Clientelism at work? A case study of Kenyan Standard Gauge Railway project. *Economic History of Developing Regions*, *34*(3), pp.280-299.

Werker, E., 2012. The political economy of bilateral foreign aid. The Political Economy of Bilateral Foreign Aid, In: Gerard Caprio (Ed.): *Handbook of Safeguarding Global Financial Stability: Political, Social, Cultural, and Economic Theories and Models*, U.K., Academic Press: 47-58.
World Bank (2017) The World Bank Environmental and Social Framework, The World Bank http://pubdocs.worldbank.org/en/837721522762050108/Environmental-and-Social-Framework.pdf

Zafar, A. (2007). The growing relationship between China and Sub-Saharan Africa: Macroeconomic, trade, investment, and aid links. *The World Bank Research Observer*, 22(1), 103-130.

Zeitz, A.O., 2020. Emulate or differentiate?. *The Review of International Organizations*, pp.1-28.

# Appendix A: Further data description

Table A1. Variables description

| | Short name | Description | Source |
|---|---|---|---|
| Dependent variables | Natural resources rents | Total natural resources rents (% of GDP). Total natural resources rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents. | World Development Indicators (World Bank) |
| | External debt sustainability | External debt stocks (in % of GNI). Total external debt is debt owed to non-residents repayable in currency, goods, or services. Total external debt is the sum of public, publicly guaranteed, and private nonguaranteed long-term debt, use of IMF credit, and short-term debt. | |
| | Infrastructure | African Infrastructure Development Index (the index is calculated to capture actual accessibility and coverage of infrastructure. Sectors covered are: Roads, Electricity, Telephone, Internet, Water and Sanitation (Ncube et al. 2013) | African Development Bank |
| | Change in infrastructure | Difference between the current level in the value of the African Infrastructure Development Index and its level three years before | |
| | Primary commodities export | Export of primary commodities to China divided by GDP (data deflated to 2010 USD) | United Nations Conference on Trade and Development (UNCTAD) |
| | Voice and accountability | Voice and Accountability Indicator (from -2.5 to +2.5) captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. | World Bank Worldwide Governance Indicators |
| | Political stability | Political Stability and Absence of Violence Indicator (from -2.5 to +2.5) measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism. | |
| | Government effectiveness | Government Effectiveness Indicator (from -2.5 to +2.5) captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. | |
| | Regulatory quality | Regulatory Quality Indicator (from -2.5 to +2.5) captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. | |
| | Rule of law | Rule of Law Indicator (from -2.5 to +2.5) captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. | |
| | Control of corruption | Control of Corruption (from -2.5 to +2.5) captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. | |
| | Governance | Average of the 6 indicators above (from -2.5 to +2.5) | |
| Official funding | Funding from China for infrastructure | Funding from China (ODA+OOF) for infrastructure sectors: transport, energy, communication and water. From commitment data, moving averages are calculated over the last three years and normalized by GDP of recipient country. Results are cumulated over the preceding three years. Data deflated to 2010 USD (million). | AidData |
| | Funding from China | Funding from China (ODA+ OOF) for any sector. From commitment data, moving averages are calculated over the last three years and normalized by GDP of recipient country. For other sectors instead moving averages of two years are calculated. The two are then cumulated over the preceding three years. Data deflated to 2010 USD (million). | |
| | Funding from traditional donors | Funding from DAC and main multilateral organisations (ODA+OOF) and export credit for any sector divided by GDP of recipient country. Disbursement data are cumulated over the last 3 years. Data deflated to 2010 USD (million). | OECD and Berne Union |

| | | | |
|---|---|---|---|
| | Funding from traditional donors for infrastructure | Funding from DAC and main multilateral organisations (ODA+OOF) for infrastructure sectors (transport, energy communication and water) normalized by GDP of recipient country. Disbursement data are cumulated over the preceding three years. Data deflated to 2010 USD (million). Export credits are not considered here due to the lack of sector detail (infrastructure vs. other sectors) in Berne Union data. | OECD |
| | Funding from traditional donors excluding debt relief | Funding from Traditional Donors by GDP minus debt relief from DAC and main multilateral organisations normalized by GDP of recipient country. Disbursement data are cumulated over the preceding three years. Data deflated to 2010 USD (million). | OECD |
| | Debt relief from traditional donors | Debt Relief from Traditional Donors by GDP from DAC and main multilateral organisations normalized by GDP. Disbursement data are cumulated over the preceding three years. Data deflated to 2010 USD (million). | OECD |
| Controls | Population | National population (million) | World Development Indicators (World Bank) |
| | GDP per capita | GDP per capita in constant 2010 USD | |
| | GDP growth | Three years growth rate of GDP in constant 2010 USD | |
| | Rural population | Percentage of rural population over total population | |
| | Trade balance | External balance on goods and services (% of GDP) cumulated over the last years | |
| | Gross fixed capital | Gross fixed capital formation, private sector (% of GDP) | |

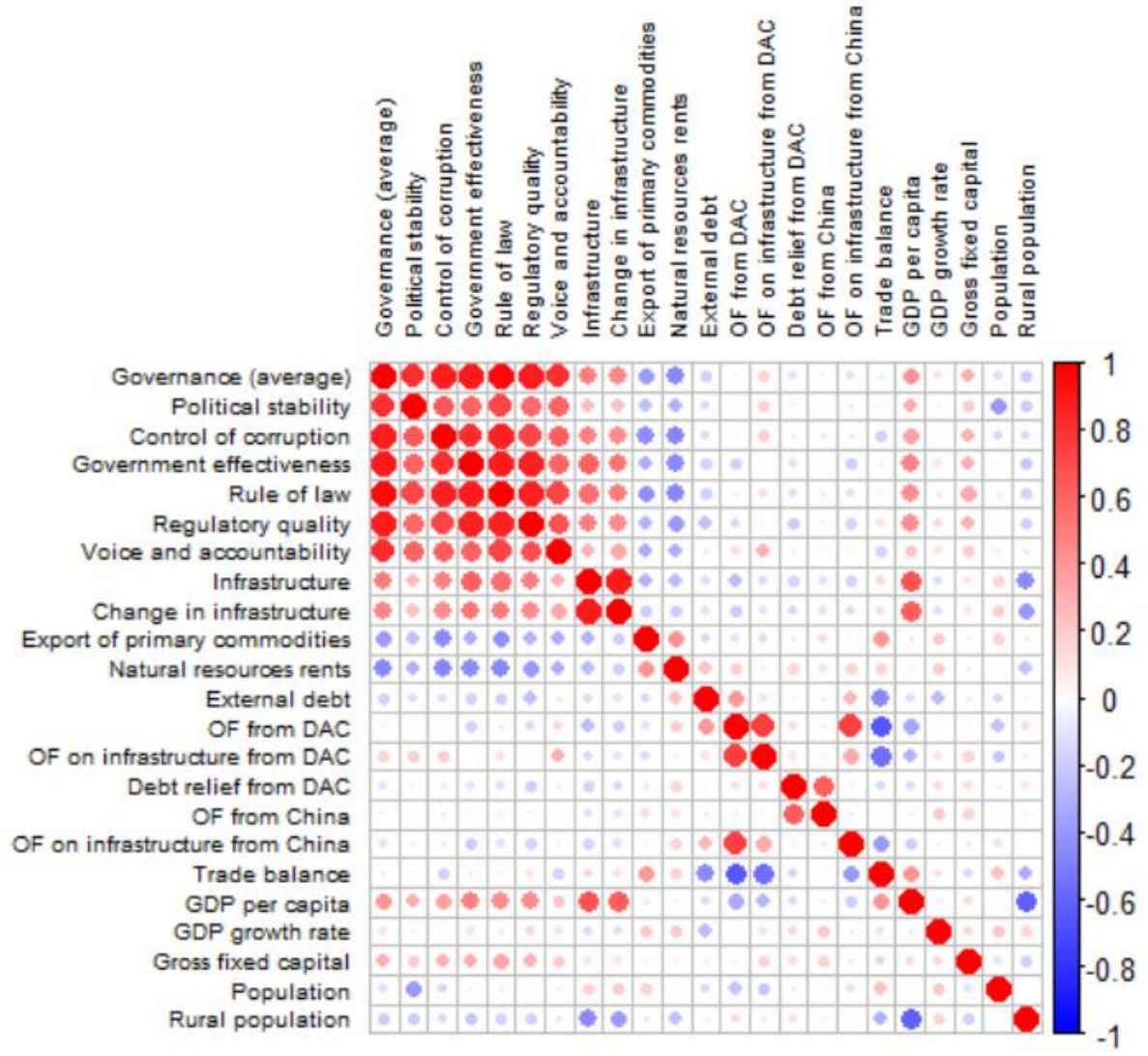


Figure A1. Correlation matrix plotted a circle diagram with the colour and the size of circles illustrating the sign and the absolute size of the correlations.

Notes: "DAC" is used as a shorter form for "traditional donors" to reduce the size of the legend.

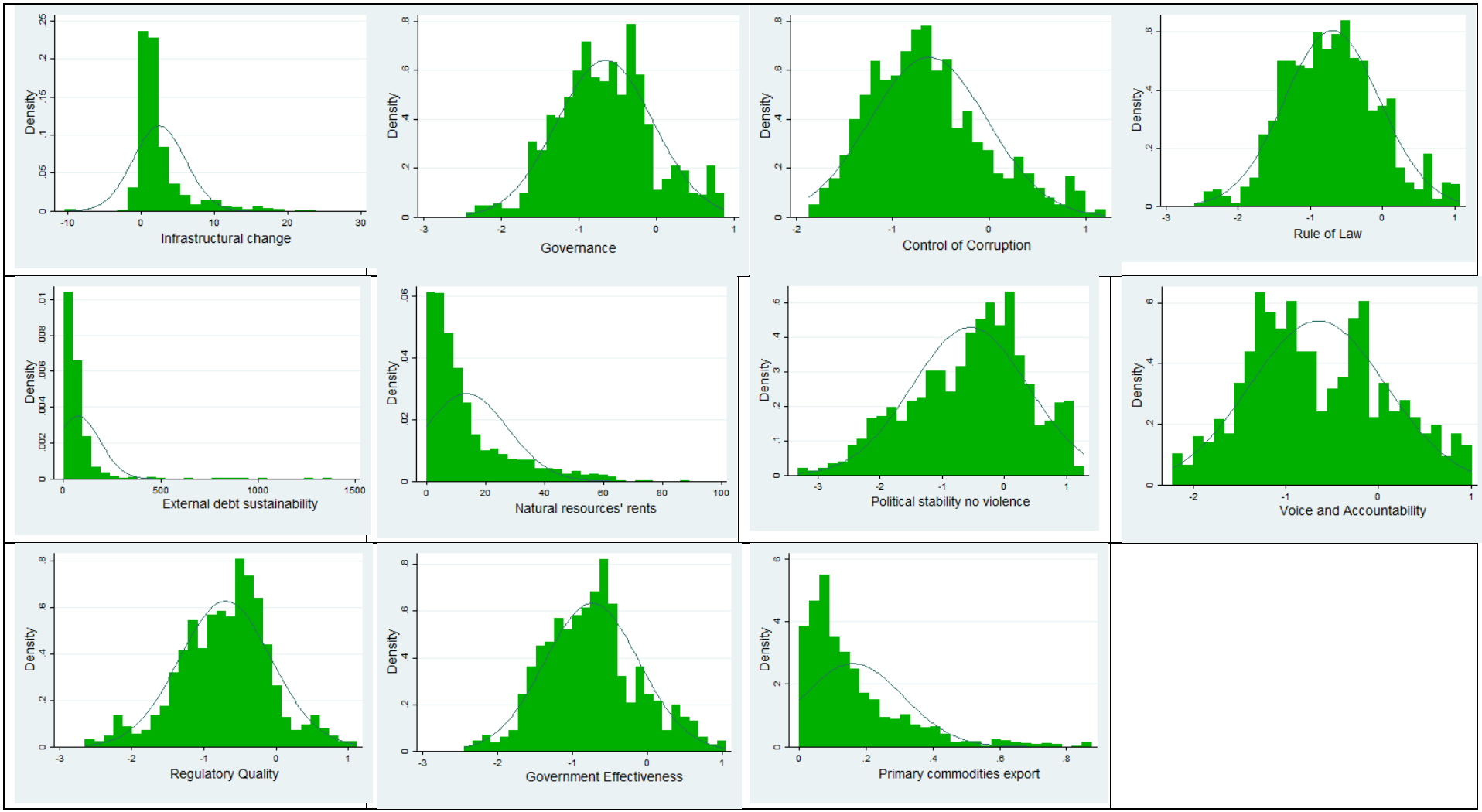


Figure A2. Distribution histograms of dependent variables used in our analysis together with fitted normal density plots.

## Appendix B. Results from robustness tests

Table B1. Regression results for additional models tested.

| | Infrastructure change (funding not limited to infrastructure) | | Political stability no violence | | Voice and accountability | | Regulatory quality | | Governemnt effectiveness | | Primary commodities export | | External debt sustainability | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OLS | Median QR | OLS | Median QR | OLS | Median QR | OLS | Median QR | OLS | Median QR | OLS | Median QR | OLS | Median QR |
| Chinese funding | 1.75 | 1.64 | 0.27 | 0.80 | 1.57*** | 0.47 | 0.21 | -1.08** | 1.67*** | 1.20*** | 0.27 | 0.04 | 457.75*** | 354.38*** |
| Traditional donors funding | 0.53 | 0.50*** | 0.24** | 0.29*** | 0.04 | 0.08* | 0.13** | 0.05 | 0.15** | 0.10** | 0.02 | 0.01 | -90.61*** | -47.34*** |
| Interaction term | 3.76 | 2.39 | -2.30 | -2.38 | -3.03** | -1.81* | -0.44 | 1.01 | -2.44** | -1.27 | 0.45 | 0.54 | -1500.69*** | -1065.37*** |
| Lagged dependent variable | -0.20 | 0.13 | 0.27*** | 0.46*** | 0.23*** | 0.63*** | 0.36*** | 0.63*** | 0.28*** | 0.50*** | 0.32 | 0.08* | 0.39*** | 0.43*** |
| Governance | -2.28 | -2.07*** | | | | | | | | | -0.05 | -0.05*** | -4.66 | -2.79* |
| GDP growth | | | 0.69*** | 0.52*** | 0.16 | 0.14 | 0.18** | 0.44*** | 0.32*** | 0.42*** | | | -58.12** | -41.31*** |
| GDP per capita | | | 65.45 | 53.85*** | -8.07 | -0.95 | 46.09*** | 22.85*** | -2.00 | 15.10*** | | | | |
| Natural resources rents | | | -0.06* | -0.01*** | -0.002 | -0.003*** | -0.001 | -0.004*** | -0.01*** | -0.01*** | | | | |
| Population | | | | | | | | | | | 0.01 | 0.01*** | | |
| Gross fixed capital | | | | | | | | | | | 0.0002 | 0.0001 | | |
| Trade balance | | | | | | | | | | | | | -0.57*** | -0.32*** |
| Rural population | -45.26*** | -38.64*** | | | | | | | | | | | | |
| Constant | -27.76*** | 23.47*** | -1.32*** | -0.98*** | -0.63*** | -0.36*** | -0.78*** | -0.76*** | -0.89*** | -0.83*** | 0.18*** | 0.18*** | 109.38** | 75.86*** |
| N. of observations | 407 | 407 | 565 | 565 | 565 | 565 | 565 | 565 | 565 | 565 | 407 | 407 | 490 | 490 |
| N of countries | 25 | 25 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 53 | 45 | 45 | 46 | 46 |
| Fixed effects included | Yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| R2 within / Pseudo R2 | 0.09 | 0.84 | 0.18 | 0.42 | 0.08 | 0.30 | 0.22 | 0.50 | 0.21 | 0.43 | 0.04 | 0.29 | 0.81 | 0.55 |
| Hausman test | 205.93*** | | 108.24*** | | 197.85*** | | 153.68*** | | 188.00*** | | 149.34*** | | 135.59*** | |

Notes: The asterisks ***, **, and * are 1%, 5%, and 10% of significance levels, respectively. Hetoroscedasticity robust estimates are reported. Quantile regression results are based on 10,000 bootstrapping repetitions.

Table B2. Marginal effects for additional models tested.

| | Infrastructure index change | | Political stability no violence | | Voice and accountability | | Regulatory Quality | | Government effectiveness | | Primary Commodities Export | | External debt sustainability | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Chinese Funding | Traditional Donors' Funding | Chinese Funding | Traditional Donors' Funding | Chinese Funding | Traditional Donors' Funding | Chinese Funding | Traditional Donors' Funding | Chinese Funding | Traditional Donors' Funding | Chinese Funding | Traditional Donors' Funding | Chinese Funding | Traditional Donors' Funding |
| OLS | 1.75 | 0.53 | -0.28 | 0.23** | 0.83** | 0.02 | 0.1 | 0.12** | 1.07** | 0.14** | 0.39 | 0.02 | 45.85 | -117.91*** |
| QR | | | | | | | | | | | | | | |
| 0.1 | 9.16 | 1.28** | 1.49 | 0.37*** | 1.18*** | 0.02 | -0.22 | 0.08** | 1.15** | 0.13*** | 0.37*** | 0.07*** | 75.21* | -87.76*** |
| 0.25 | 5.27* | 0.86*** | 0.65 | 0.29*** | 0.58* | 0.05 | -0.51 | 0.08** | 0.65 | 0.07** | 0.39*** | 0.03* | 73.77** | -65.23*** |
| 0.5 | 1.64 | 0.5*** | 0.22 | 0.28*** | 0.03 | 0.07 | -0.84** | 0.05* | 0.9*** | 0.09** | 0.17*** | 0.01 | 96.08** | -52.941*** |
| 0.75 | -1.19 | 0.29 | -0.53 | 0.26*** | 0.21 | 0.06 | -0.15 | 0.09* | 0.56 | 0.06 | 0.2 | -0.02 | 143.42* | -33.07*** |
| 0.9 | 0.97 | 0.19 | -0.97 | 0.25*** | 0.06 | 0.06 | -0.46 | 0.1 | 0.76 | 0.12*** | 0.5 | -0.03 | 208.03* | -23.53*** |

Notes: The asterisks ***, **, and * are 1%, 5%, and 10% of significance levels, respectively. Hetoroscedasticity robust estimates are reported. Quantile regression results are based on 10,000 bootstrapping repetitions. Due to the highly skewed distribution of funding of both donors (Figure 2), marginal effects of each donor's funding are generated taking the median and not the mean level of the other donor's funding.

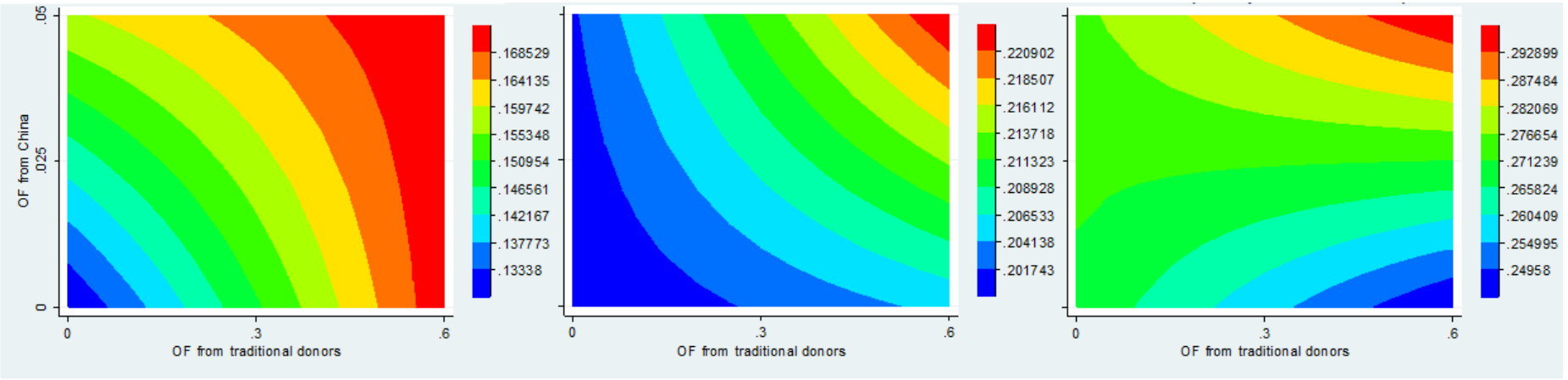


Figure B1: Twoway contour plot of predicted primary commodities export (in % of GDP) for different combinations of OF funding from China and traditional donors (left chart is QR estimation for 10th percentile of the dependent variable, the mid chart – for 50th percentile, and the right one – for 90th percentile)

Notes: X and Y axis capture 0-90 quantiles of the respective OF distributions. Please note that colours are associated to different values in the pictures, as clearly shown by the palette legend on the right side of each of them.

Table B3. Regression results testing the role development indicators in explaining official funding from the two types of donors. For brevity reasons, we report only the coefficients of the development indicators. Full results can be obtained from the authors on request.

| | Traditional donors' funding | Chinese funding | Traditional donors' funding | Chinese funding | Traditional donors' funding | Chinese funding | Traditional donors' funding | Chinese funding | Traditional donors' funding (excluding debt relief) | Chinese funding | Traditional donors' funding |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Infrastructure index change | 0.0004 | | | | | | | | | | |
| Governance (average) | | -0.01 | 0.03 | | | | | | | | |
| Control of Corruption | | | | 0.001 | -0.04 | | | | | | |
| Rule of Law | | | | | | 0.004 | 0.07 | | | | |
| External debt sustainability | | | | | | | | 1.17E-06 | 0.0003 | | |
| Natural resources rents | | | | | | | | | | -0.00002 | -0.0008 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N. of observations | 301 | 510 | 510 | 510 | 510 | 509 | 509 | 447 | 447 | 372 | 372 |
| N of countries | 52 | 53 | 53 | 53 | 53 | 52 | 52 | 46 | 46 | 46 | 46 |
| Fixed effects included | yes | yes | yes | yes | yes | yes | Yes | yes | yes | yes | yes |
| within R2 | 0.07 | 0.03 | 0.07 | 0.03 | 0.07 | 0.03 | 0.07 | 0.08 | 0.27 | 0.12 | 0.17 |

| | Chinese funding (funding not limited to infrastructure) | Traditional donors' funding (funding not limited to infrastructure) | Chinese funding | Traditional donors' funding | Chinese funding | Traditional donors' funding | Chinese funding | Traditional donors' funding | Chinese funding | Traditional donors' funding | Chinese funding | Traditional donors' funding | Chinese funding | Traditional donors' funding (including debt relief) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Infrastructure index change | -0.0003 | -0.0013 | | | | | | | | | | | | |
| Primary Commodities Export | | | -0.0055 | -0.0936 | | | | | | | | | | |
| Political stability and no violence | | | | | -0.0103 | 0.0083 | | | | | | | | |
| Voice and accountability | | | | | | | -0.0094 | 0.0881 | | | | | | |
| Regulatory quality | | | | | | | | | 0.0061 | -0.0222 | | | | |
| Government effectiveness | | | | | | | | | | | -0.0023 | -0.0097 | | |
| External debt sustainability | | | | | | | | | | | | | 7.11E-06 | 0.0009*** |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N. of observations | 301 | 301 | 372 | 372 | 509 | 509 | 509 | 509 | 509 | 509 | 509 | 509 | 447 | 447 |
| N of countries | 52 | 52 | 45 | 45 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 46 | 46 |
| Fixed effects included | yes | yes | yes | yes | yes | yes | yes | yes | yes | Yes | yes | yes | yes | yes |
| within R2 | 0.21 | 0.26 | 0.11 | 0.18 | 0.05 | 0.07 | 0.03 | 0.07 | 0.03 | 0.07 | 0.03 | 0.07 | 0.09 | 0.23 |

Notes: The asterisks ***, **, and * are 1%, 5%, and 10% of significance levels, respectively. Hetoroscedasticity robust estimates are reported.