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Abstract

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JEL Classification: F35, F59, H73, H77, O19, P33

Keywords: Development finance, foreign aid, aid events, Public Opinion, Government approval, soft power, China, Gallup World Poll

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Can Aid Buy Foreign Public Support? Evidence from Chinese Development Finance

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March 18, 2022

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1 Introduction

A large literature examines the effects of foreign aid.[1] Most of this research focuses on whether or not aid affects tangible outcomes in recipient countries, such as economic growth, health, education, and corruption.[2] These outcomes are certainly important to those living in developing countries and to development finance institutions. However, recipient country welfare is only one of many objectives that motivates bilateral donors to provide foreign aid (Thiele et al. 2007).[3] Donor countries also use bilateral aid to pursue their own geostrategic goals, such as buying votes in international organizations, supporting friendly governments before elections, securing market access for exporters, deterring asylum seekers, and fighting terrorism (e.g., Kuziemko and Werker 2006, Fleck and Kilby 2010, Faye and Niehaus 2012, Dippel 2015, Rommel and Schaudt 2020). Another key motivation for bilateral aid is the acquisition of soft power—e.g., to influence international public opinion about the donor government.[4]

To this end, donor governments spend a considerable amount of time and money disseminating positive messages about their generosity to members of the public in developing countries. They attach their logos to aid shipments. They place signage at project sites to inform the public of their activities. They organize public ceremonies to mark the start of new projects and the completion of existing ones. Some broadcast their own messages through social media channels and cultivate journalists to encourage media coverage of their accomplishments. Others are more aggressive, forging content-sharing partnerships with radio stations, television channels, and newspapers or building telecommunication systems that make it easier to transmit information to the general public. In short, aid is used to shape perceptions on the ground in developing countries, and 'brand management' is one of the most important reasons why donor governments extend foreign aid bilaterally rather than multilaterally.[5]

Economists and political scientists have estimated the impacts of development finance on vote buying, migrant deterrence, the fight against terror, and public opinion in recipient provinces or countries (e.g., Bandyopadhyay et al. 2014, Dreher et al. 2019,

[1] For ease of exposition, we will use the term "aid" in this paper to refer broadly to any types of official sector financial flows from a donor (or lender) to a recipient (or borrower). In cases when we wish to reference the narrower (OECD-DAC) definition of aid, we use the term Official Development Assistance (ODA). In cases when we wish to reference concessional and non-concessional official financing that does not qualify as ODA, we use the term Other Official Flows (OOF). Finally, when we wish to reference the sum of ODA and OOF, we use the term Official Finance (OF).

[2] See Werker et al. (2009), Dreher et al. (2018), and Doucouliagos (2019) for literature surveys.

[3] Also, this objective is probably better addressed via multilateral institutions (Milner and Tingley 2010).

[4] Soft power is "the ability to achieve goals through attraction rather than coercion" (Nye 2004: p. x). Public opinion is a commonly used proxy for soft power (e.g., Nye 2004, Goldsmith and Horiuchi 2012, Rose 2016).

[5] They do so in spite of well-documented concerns related to aid proliferation and fragmentation (Knack and Rahman 2007).

Lanati and Thiele 2018, Eichenauer et al. 2021). Yet, no study has comprehensively tested whether and to what extent development finance affects overall levels of approval for donor governments in recipient countries and the entire Global South. This is a surprising omission since soft power is an important first-order outcome for a number of other strategic goals: Goldsmith and Horiuchi (2012) suggest that foreign public opinion affects military support by foreign countries. Rose (2016, 2019) and Guiso et al. (2009) show that soft power and higher levels of trust between countries also bring material economic gains, such as higher exports for countries with greater global influence. Disdier and Mayer (2007) find stronger trade ties between countries whose populations have higher levels of affinity for each other. Moreover, to the extent that soft power affects economic outcomes in the donor country (via increased trade, for example), it may increase support for aid giving in the donor country and as such also lead to higher volumes of future foreign aid flows to recipient countries.

Whether and how aid improves foreign public perceptions of governments is of growing importance for many of the largest bilateral donors. As Goldsmith et al. (2014: 88) point out, "[c]ompetition between major powers such as the United States (U.S.) and China for favorable perceptions in global public opinion is increasingly evident today and likely to be a pivotal feature of the emerging international order." However, whether aid increases or erodes support for donor governments abroad remains an open question. Instead of bolstering support for donor governments, development projects could easily become reputational liabilities if they are not carefully designed and implemented. Projects that involve large-scale construction activities often create noise, traffic, and pollution. They can lead to labor strikes, public protests, lawsuits, and allegations of political favoritism and corruption.[6] Additionally, development projects can backfire—from a 'brand management' perspective—if they fail to reach completion or experience major cost overruns that are borne by local and national governments.[7]

Public opinion effects are not limited to the localities where projects occur. Aid branding and publicity can affect attitudes in farther-flung places, too, and attitudinal

[6]For example, during the middle of winter in 2018, a China Eximbank-financed thermal power plant in the Kyrgyz Republic failed, and local residents were left with no heating. When civil society organizations followed the paper trail, evidence of embezzlement emerged. This resulted in the dismissal of Prime Minister Sapar Isakov. 30 government officials were charged with corruption and using their positions to lobby for the selection of a Chinese company (TBEA) as the contractor for the project. Prosecutors estimate that bid-rigging and the inflated cost of the sole-source contract issued to TBEA cost the Government of the Kyrgyz Republic as much as US$ 111 million (Malik et al. 2021).

[7]The Astana Light Rail Construction Project is a case in point. China Development Bank issued a US$ 1.5 billion loan to Astana LRT LLP—a project company that is owned by the City of Astana—for this project and the Government of Kazakhstan provided a sovereign guarantee in support of the loan. However, in October 2019, the President of Kazakhstan ordered an investigation into the officials who initiated the project. The chief executive of Astana LRT LLP was accused of embezzling project funds and fled the country. The local authorities suspended the construction of the railway and the half-finished project became a source of public discontent (Malik et al. 2021). The four-meter-high concrete trestles upon which the railway was supposed to run are now referred to by local residents of Astana as "monuments of corruption."

effects in some places might offset effects in others. Gauging the effects of foreign aid projects on a donor's soft power therefore requires an estimate of aggregate effects in addition to partial, localized estimates that are specific to project sites.

We investigate the effects of development projects on a donor government's popular support across three different target audiences: (i) people living in the province(s) where a project takes place, (ii) people living in other areas of the country with less direct exposure to the project, and, most importantly, (iii) international audiences without direct exposure to projects. These three levels of analysis allow us to distinguish between direct and indirect public opinion effects. Provinces that host development projects have the highest levels of 'treatment exposure,' and the people living within these jurisdictions are most directly affected by positive and negative project outcomes. We therefore consider any changes in public sentiment toward the donor government that accrue in these provinces to be direct effects. Those who live in close proximity to development projects will be more likely to make judgments about the donor government based on their own firsthand experiences and observations—or those of the people whom they know. However, indirect public opinion effects can also occur when people outside the province where the project is located learn about it via television, radio, print media, online media, word of mouth, or travel. Such effects are, of course, not restricted to residents of the host country, and different audiences around the world can react differently to information about development projects. The construction of Hambantota Port in Sri Lanka is a case in point. This project, which was financed by China Eximbank, has been cited in thousands of media reports in virtually every corner of the globe as evidence that the Chinese government is engaging in 'debt-trap diplomacy' (Brautigam 2020).[8] Nor do development projects necessarily produce consistent public opinion effects across these different audiences. For example, a development project that is considered to be useful and appropriate by residents of the recipient country might elicit a very different response from observers in a rival country to the donor or recipient, who may view the donor's or recipient's gains as coming at their expense.

We focus our empirical analysis on Chinese government-financed development projects. Beijing's overseas development program is a useful application for several reasons: China has become the world's largest bilateral source of international

[8]Another prominent example is the China Eximbank-financed Entebbe Airport Upgrading and Expansion Project in Uganda, which became a major source of international controversy when various media outlets reported (incorrectly) that the airport was a source of collateral the lender could seize in the event of default. Beijing tried to put the issue to rest by issuing the following public statement: "Not a single project in Africa has ever been confiscated by China because of failing to pay Chinese loans." But Beijing was lampooned by Trevor Noah—the host of a satirical television news program called *The Daily Show*—for the careful wording of its statement. In a video clip that has now been viewed nearly 4 million times on YouTube, Noah said: "I don't know, maybe it's just me, but that statement was not the most reassuring thing I've ever heard because 'We've never confiscated an airport' is very different from 'We're never going to confiscate an airport'" (Parks et al. 2022).

development finance. It now outspends the United States on a more than 2-to-1 basis.[9] Like other major powers, China is increasingly seeking to expand its economic and political influence around the world. Development finance is an important tool that the Chinese government uses to burnish its popular image in the "Global South" (Kurlantzick 2007, Hanauer and Morris 2014a,b, Fuchs and Rudyak 2019). In 2014, Chinese President Xi Jinping acknowledged that the Belt and Road Initiative (BRI) is part of a broader effort to "increase China's soft power, give a good Chinese narrative, and better communicate China's message to the world" (People's Daily 2014). Echoing this point, a senior Chinese government official announced that "the work of foreign aid relates to China's image. We cannot tolerate any negligence or projects of poor quality" (MOFCOM 2014). The Chinese government is also attractive from an inferential leverage perspective because it is the only bilateral donor for which all development projects have been subnationally geocoded for a substantial number of years across all major world regions. These data—in conjunction with public opinion data that have broad spatio-temporal coverage—provide a strong empirical foundation for the identification of causal effects.

We measure the causal effects of Chinese development projects in the short and long run. First, we use time-stamped, respondent-level data for more than 1.5 million people interviewed by the Gallup World Poll across 126 countries between 2006–2017 in an event study to analyze the short-term effects. This approach exploits the staggered roll-out of the poll and the availability of precise interview dates. The precise dates allow us to compare respondents who were interviewed within 30 days before versus 30 days after the occurrence of a Chinese project event. We create a new database coding such events that includes 3,998 commitment, start, and end dates of 2,214 Chinese development projects in 126 countries and 2,025 first-order subnational administrative (ADM1) regions around the world.[10] Controlling for province-year fixed effects, as well as a range of individual and survey characteristics, the timing of an interview can be considered random relative to a Chinese project event. This research design enables us to rigorously analyze the immediate effects of development projects on public attitudes.

While the event study enables estimation of public opinion effects at the discontinuity and thus facilitates the identification of causal effects, it comes at the cost of neglecting a large share of available data. This is because it relies only on projects with event dates that occur during Gallup survey windows. What is more, these estimates relate to the specific timing of project events and are thus short-term in nature. This approach does not capture the potential longer-term attitudinal effects of Chinese government-financed

[9] Whereas average annual development finance commitments from China amounted to US$ 85.4 billion between 2013 and 2017, average annual development finance commitments from the U.S. amounted to US$ 37 billion during the same five-year period (Malik et al. 2021, Dreher et al. 2022).

[10] ADM1 regions are one layer below the national level and correspond, for example, to provinces, states, oblasts, governorates, and emirates, depending on the administrative divisions in place in a given country. Note that we drop China and high-income countries from the analysis.

projects.

The second component of our empirical strategy uses an instrumental-variables approach to test longer-term effects and to more comprehensively assess the public opinion effects of China's overseas development projects. We again make use of georeferenced and temporally disaggregated Chinese development project data and subnational public opinion data from the Gallup World Poll. We not only estimate the effects of Chinese development projects on public approval of Beijing within recipient provinces and countries, but also across the Global South as a whole.

Our instrumental-variables strategy follows Bluhm et al. (2020) and Dreher et al. (2021b) and makes use of a supply shock—the yearly production volumes of physical construction materials produced in China—to proxy the over-time availability of Chinese projects. China overproduces materials, such as steel, relative to its domestic demand (Dreher et al. 2021a). Chinese government-financed development projects are often tied to goods and services provided by Chinese companies, and as such they also heavily rely on input materials produced in China. Therefore, larger production volumes of construction materials in China should increase the supply of overseas development projects. Bluhm et al. (2020) and Dreher et al. (2021b) use the share of years over the sample period in which a region received a development project from China to proxy which regions are likely to receive larger or smaller shares of additional projects that results from these supply shocks. The instrumental variable is the interaction of the supply-shock measure with this probability of receiving aid.

This identification strategy is based on an intuition similar to that of a difference-in-differences design. We investigate a differential effect of Chinese project input surpluses on public opinion in provinces with different exposure levels to Chinese development projects. The identifying assumption is that, apart from the direct effect of Chinese development projects on public opinion, public opinion in provinces with differing probabilities of receiving development finance from the Chinese government will not be differentially affected by changes in China's production of physical project inputs, after controlling for province- and country-year-fixed effects and the other variables in the model. Below we provide tests of several underlying assumptions needed to ensure the validity of this approach.

Our results show that the completion of Chinese development projects increases popular support for the Chinese government in recipient countries. This finding is consistent across the event study that captures effects of exposure to Chinese development projects within narrow, 30-day windows at the discontinuity, as well as the annual, macro-level analysis that includes a larger sample of projects. On average, we estimate that the completion of one additional Chinese development project increases public approval for the Chinese government at recipient country level by more than 3 percentage points in the short run and 0.2 percentage points in the longer run.

We test the mechanisms behind the longer-term findings by looking at the potentially positive and negative (side) effects of Chinese development projects. The results suggest that Chinese development projects tend to foster development in recipient countries through higher reported and perceived incomes, improvements in living standards, and higher levels of satisfaction with public goods provision.[11]

Beyond these country-level impacts, a donor country's ability to amass soft power depends on *global* perceptions of its development projects. Analyzing reactions across all developing countries included in our sample, we find that China's provision of development projects raises approval of the Chinese government public opinion among countries in Africa, potential "swing states" in the United Nations General Assembly, and countries with higher baseline (ex ante) levels of public support for the Chinese government. All of these countries are arguably "high-value" targets for Beijing. We also find that Chinese development finance increases support for the Chinese government in relevant third countries that are politically aligned with the respective recipient countries. These indirect gains make development finance an especially attractive instrument for the accumulation of soft power. On the African continent, for example, we estimate that Beijing's global project portfolio increases public approval of the Chinese government by more than 2.2 percentage points per year, on average. Finally, our results show that Chinese development finance boosts public approval ratings for the governing authorities in recipient countries, which is consistent with the "win-win cooperation" principle that is commonly used by the Chinese government to describe its foreign aid program.

Our findings contribute to the aid effectiveness literature in general and the literature on aid and public opinion in particular (Milner and Tingley 2013, Dietrich et al. 2018). They also add to a growing strand of research that measures the intended and unintended effects of Chinese development finance. Recent work has shown that Chinese development projects increase economic growth and reduce the spatial concentration of economic activity, but they also fuel local corruption, stoke ethnic tensions, weaken trade union participation, instigate public protests, and degrade the natural environment (Isaksson and Kotsadam 2018a,b, Gehring et al. 2019, Bluhm et al. 2020, Isaksson 2020, Dreher et al. 2021a, Dreher et al. 2021b, Iacoella et al. 2021, Baehr et al. 2022).[12] Likewise, recipient governments seem to benefit from these projects as they can steer funds to politically consequentially jurisdictions in order to advance their electoral interests (Dreher et al. 2019, Anaxagorou et al. 2020).

Our work is most directly related to a growing set of studies that investigate the effects

[11] China's public opinion gains are less rather than more pronounced among people who live in close proximity to completed Chinese development projects. Relative to the country level, more citizens in project provinces report a deterioration of their living standards and a drop in their perceived incomes after the completion of Chinese development projects. This may be the result of lower-than-expected project quality, which is likely experienced to a greater degree among the residents of project provinces.

[12] Dreher et al. (2022) provide an overview of this literature.

of aid on China's image within recipient countries. These studies typically analyze local public opinion effects around project sites—with mixed results. Using geocoded data on Chinese development projects and Afrobarometer survey data, Blair et al. (2021) leverage a spatial difference-in-differences strategy to estimate the public opinion impacts of local exposure to Chinese development finance in 38 African countries. They find that Chinese development projects are disproportionately announced in places that hold positive views of China, but individuals who live near *completed* projects report less favorable views of China and more favorable views of the United States and other Western powers. In contrast, a recent study finds that the general public in Africa generally provides positive evaluations of China's foreign aid, particularly within host countries which are more developed and democratic (Han et al. 2016). Similarly, a separate study using Afrobarometer data decomposes African perceptions toward Chinese trade, investment, and aid, and finds that the latter two are often viewed more positively by African citizens (Morgan 2019). Finally, Chen and Han (2022) find that individuals more supportive of incumbent political parties are most supportive of aid from China as well.

This paper is unique in several ways. We study public opinion gains and losses that accrue locally as well as in other areas of recipient countries and in other countries. As such, we offer a comprehensive assessment of the effects of aid on foreign perceptions of donors. In addition, previous work also focuses almost exclusively on attitudes toward Chinese projects in African countries. One study finds no evidence at national and subnational scales that China's trade, aid, and investment in 18 Latin American countries affect public attitudes toward Beijing, on average (Eichenauer et al. 2021).[13] But China's development finance is a global phenomenon, and Asia is the largest recipient of Chinese development finance (Dreher et al. 2022). Our study analyzes a substantially larger sample of development projects that covers all developing regions, with an identification strategy that enables estimation of causal effects in regressions at the level of individuals, provinces, and countries.[14] As such, we can analyze the effect of development finance on soft power at various levels. We use individual-level data to estimate short-term effects of aid events on donor approval. Then, we use province- and country-level aggregates to examine the longer-term effect of aid on Chinese government approval in project

[13] They do, however, find evidence of a polarization effect, with 'treated' individuals being more likely than 'untreated' individuals to express very positive or very negative views of China—consistent with the view that Chinese development projects create winners and losers.

[14] Jones (2018), Xu and Zhang (2020), and Blair et al. (2021) leverage variation in the timing of project implementation, comparing individuals interviewed in locations before the project implementation phase to those interviewed in locations where projects started the implementation phase. To the extent that pledges and commitments create expectations about outcomes that implemented projects do not meet, this approach biases the estimated coefficients downwards because it cannot disentangle the effects of announcement and delivery. What is more, the assumption that the timing when projects are committed relative to when they start being implemented is random relies on the absence of time-varying effects on projects and opinion, which might or might not hold true. Eichenauer et al. (2021) use a plausibly exogenous instrument at the country level, but do not report causal estimates at finer scales.

provinces, recipient countries, and at the global level. Relying on the staggered roll-out of the Gallup World Poll at the micro level and an instrumental variable for aggregate-level analyses allows us to report causal effects rather than just conditional correlations. In addition, the analysis on the global level also takes into account that China might value popular support in some developing countries more than in others. Ultimately, this nuanced view of the overall level of soft power gains is needed when it comes to evaluating the effectiveness of aid as a tool to enhance global soft power. This makes our study the first comprehensive analysis of the soft-power effects of foreign aid via public opinion.

We proceed as follows. Section 2 introduces our new data on Chinese project events and presents the survey data on the approval of China's government. In Section 3, we analyze short-run effects with the individual-level event study. In Section 4, we proceed with the analysis of longer-run effects at the province and country level that relies on the instrumental-variables strategy. Section 5 studies effects at the global level. Section 6 analyzes whether Chinese development finance is "win-win" cooperation in the sense that it also raises citizens' approval of the national government of recipient countries. The final Section 7 concludes.

2 Data

2.1 New Data on the Timing of Chinese Development Projects

Analyzing the effects of China's development projects on public approval of the Chinese government requires comprehensive project-level information with high spatial and temporal precision. Such data are unavailable via official channels as the Chinese government does not release project-level information of this nature. The Ministry of Commerce—China's lead institution responsible for foreign aid during the past several decades—ranks last among the 47 international donors evaluated in the 2020 Aid Transparency Index (Publish What You Fund 2020). China's State Council publishes official white papers on foreign aid, but the information in these publications is largely limited to aggregate statistics by world regions and decades (State Council 2011, 2014, 2021). In response to this lack of official data, several open-source research initiatives have created project-level datasets that combine and refine information contained across government documents, media reports, and registrars maintained by recipient governments and international organizations (e.g., Strange et al. 2017a, Ray et al. 2021). AidData's Global Chinese Official Finance Dataset, created using the Tracking Underreported Financial Flows (TUFF) methodology, is to date the most comprehensive data-gathering effort as it covers the 'known universe' of China's development projects

in developing countries (Dreher et al. 2021b, Dreher et al. 2022).[15] In addition to dozens of other variables, it provides detailed project descriptions, classifications according to sectors and flow types, and—in 56% of the project cases—information on monetary commitment amounts.

We draw on the 1.1.1 version of this dataset, in which Bluhm et al. (2020) geocoded all implemented and completed projects included in AidData's Global Chinese Official Finance Dataset, in order to estimate localized effects using precise geographic information on development projects.[16] Bluhm et al. assigned longitude and latitude to each project site. In sum, the data contain 3,485 Chinese development projects worth US$ 273.6 billion (in terms of committed finance) implemented in 6,190 project locations across 134 countries. These locational data allow us to attribute 2,183 projects to the level of first subnational administrative (ADM1) regions, which typically correspond to provinces or states, and are the most fine-grained level of analysis that we require for our study design.[17] 1,519 of these projects can be classified as Official Development Assistance (ODA) according to OECD definitions.[18] The remaining 664 projects are categorized as Other Official Flows (OOF), meaning they lack concessionality or development intent and are thus more commercially oriented.[19] The world map in Figure 1 visualizes the number of projects completed over the sample period at the province level.

These data enable researchers to analyze Chinese government-financed development projects with a level of spatial precision that is not possible for projects financed by any other bilateral donor over such a long period of time.[20] However, AidData's Geocoded Global Chinese Official Finance Dataset lacks the precise temporal data needed

[15]This dataset is a widely used data source in analyses that examine the nature, allocation, and effects of Chinese development finance. Contributions in economics and political science include Hsiang and Sekar (2016), Hernandez (2017), Isaksson and Kotsadam (2018a,b), Gehring et al. (2019), Anaxagorou et al. (2020), Isaksson (2020), Martorano et al. (2020), Eichenauer et al. (2021), Horn et al. (2021), Iacoella et al. (2021), Zeitz (2021), and Cervellati et al. (2022), among others.

[16]In September 2021, AidData presented an updated version of this dataset, which also covers the years 2015–2017 (Custer et al. 2021, Dreher et al. 2022). However, the lack of precise geographic information prevents us from including these data in our analysis.

[17]We thus use project locations with precision codes 1–4. Precision code 1 corresponds to an exact location; precision code 2 corresponds to locations within 25 kilometers of the exact project site; precision code 3 corresponds to a second-order administrative (ADM2) region; and precision code 4 corresponds to an ADM1 region.

[18]The dataset codes all Chinese government-financed projects as ODA if they are financed by Chinese government institutions, have development intent, and a minimum level of concessionality with a 25-percent grant element or larger.

[19]We include projects that are classified as "Vague Official Finance" in this category. These project records contain insufficient information about concessionality and/or development intent to classify whether they are ODA or OOF.

[20]Other global, geocoded project-level databases for bilateral donors we are aware of cover Indian development finance for a period of eight years (Asmus et al. 2021) and French development cooperation for seven years (AFD 2021). Coverage of the variable capturing attitudes towards these donor governments is with 126,927 and 273,601 observations substantially lower than for the Chinese government (580,484, excluding "don't know" and "refused" answers). For the United States and Japan geocoded data are also available for the subset of humanitarian aid, but not for overall flows (Bommer et al. 2022).

to carefully analyze whether Chinese projects affect public opinion. While all of the project records include information on the commitment year, information on the exact implementation start and end dates are missing for about three quarters of the projects, and no calendar day-level information is available on commitment dates. As such, existing studies have relied on annual-level tests of project allocation and effects. This is a particularly consequential limitation for studies focused on the effects of development projects on outcomes such as public opinion, since such outcomes can be confounded by a host of factors. Causal inference is easier when it is possible to identify narrow windows of time during which other factors should not vary much if at all. What is more, in order to study the effects of completed projects, previous studies had assumed average duration times from commitment to completion (e.g., Bluhm et al. 2020, Dreher et al. 2021b) or only used a small fraction (approximately 25%) of the projects with known commencement and completion dates (Isaksson and Kotsadam 2018a,b, Isaksson 2020). While the former approach assumes no systematic variation in the speed of implementation across different types of projects, the latter assumes that those projects with known commencement and completion dates are representative of the larger sample of Chinese government-financed development projects. Neither of these assumptions are likely to hold true.

To address this limitation, we revisited the initial data collection process implemented by AidData (Dreher et al. 2021b, Dreher et al. 2022). Our objective was to identify precise commitment, commencement, and completion dates. Commitment dates represent grant and loan agreement signings or official project announcements. Commencement dates are typically memorialized via foundation stone-laying and groundbreaking ceremonies. Completion dates typically mark the end of construction, the point at which new infrastructure can be used, and/or the date on which a project passed final inspection. The TUFF methodology that was implemented to create the original dataset is based on systematic screening of various official and unofficial sources that are publicly accessible and contain information on individual Chinese development projects (Strange et al. 2017b). For each project record, we reviewed these underlying sources to double-check existing dates and fill in missing information. In addition, a team of research assistants performed additional English- and Chinese-language internet searches that targeted individual projects with missing information on commitment, commencement, and completion dates. This was done using Chinese project titles and the China-based search engine Baidu. To do so, we first translated existing project names into the Chinese language, and then searched for the recipient country in combination with a basic project description, name, and year. If the results of this searching were insufficient to find exact project events, we used a more fine-grained approach based on project-specific keywords or the names of the actors potentially involved in the project, such as the respective Chinese ambassador or the relevant construction contractor. Appendix A provides the

full codebook that we used to create these data.

This data-gathering effort significantly improved the coverage and quality of project event dates: We uncovered a total of 3,998 dates. Our study is the first to provide exact commitment dates for Chinese development projects and substantially increased the coverage of start and end dates compared to previous work (see Figure B1 in Appendix B for a comparison). Of the 3,485 projects included in Dreher et al. (2021b) and Dreher et al. (2022), 429 now contain a commitment date (12%), 1,771 a start date (51%), and 1,798 an end date (52%).[21]

These project event dates allow us to estimate short-term effects of Chinese development projects on public approval of the Chinese government. They also enable us to improve temporal precision in estimates of the more longer-term effects as we can rely on exact project end dates rather than rough estimates based on their commitment year. These data can also benefit future research by enabling researchers to carry out subannual analyses of Chinese development finance.

Our event study utilizes these newly collected data by focusing on individuals interviewed just before and after a project-related event. We rely on binary variables indicating these events. In our study of longer-term effects, we rely on the completion date variable exclusively and use the number of Chinese development projects completed in a year as our main variable of interest. We prefer this variable over the (logged) monetary amount of development funding (in US$) to a particular subnational region as 44% of the projects lack information on the monetary values (see Dreher et al. 2021b). The use of project counts circumvents this problem; however, we repeat the analysis using monetary amounts for comparison. In addition, we make use of monetary amounts to investigate the effects of large projects (which we define as those of US$ 1 million or above) in separate regressions.

2.2 Public Approval of the Chinese Government

We pair our fine-grained Chinese project information with respondent-level data on public opinion from the Gallup World Poll (GWP, Gallup 2018). To the best of our knowledge, the GWP is the most systematic collection of worldwide public opinion data. It covers worldwide annual data since 2006 and includes repeated cross-sectional data for more than 1.5 million individuals—on average 115,000 individuals per interview-year.[22] Each

[21] Of the 2,183 geocoded projects, 286 projects now contain information on commitment dates (13%), 1,123 projects on start dates (51%), and 1,136 projects on end dates (52%). Commitment dates were considerably more difficult to identify using our open-source search method. This was in part because online sources appeared less likely to explicitly publish such dates, whereas start and end dates were more common. Similarly, sources did not refer to commitment dates in uniform ways or language (relative to start and end dates, which were more clearly identifiable in these sources).

[22] Figure B2 in Appendix B shows the number of individuals included per year, as well as the months and days of interview.

country-wave of the GWP is tethered to a specific period of time when the survey was completed. Individuals are tagged with location variables, which we matched to ADM1 regions.[23] This allows us to examine respondent-level data for a maximum of 126 countries and 2,025 ADM1 regions.

GWP data are probability-based and nationally representative of the resident population of 15 years and older—with only a few exceptions due to staff safety concerns and scarcely populated or poorly accessible areas. Questions are standardized around the world for all respondents and asked in the respective national language. GWP interviewers conduct surveys by telephone where telephone coverage exceeds 80 percent using random digit dialing or nationally representative telephone number lists. In all other regions, they conduct face-to-face interviews based on random routes procedures at different times of the day.[25] A typical survey collects data from 1,000 individuals, varying with country population size.[26] GWP data are widely used in economic research (Deaton 2008, Bjørnskov 2010, Kahneman and Deaton 2010, Stevenson and Wolfers 2013, Bertoli and Ruyssen 2018, Deaton 2018, Guriev et al. 2022).

We focus on the following question: "Do you approve or disapprove of the job performance of the leadership of China?"[27] For our empirical analysis below, we recode this variable as a binary indicator that takes the value of one if the respondent approves of China's leadership.[28] 63% of the respondents approve of China's leadership. For comparison, the fraction of respondents who approve of their national government is 54%. The world map in Figure 2 visualizes the mean approval rates for the Chinese government over the sample period by ADM1 region. The country with the highest average approval rate is Mali (91%), followed by the Central African Republic (91%) and Guinea (87%). Kosovo (12%), Puerto Rico (16%), and Croatia (25%) have the lowest average approval rates. As can be seen in Figure 3, approval rates peaked in 2006 and hit rock bottom in 2013 and show considerable differences across world regions. Overall,

[23]GWP provides within-country geographic variables indicating the subnational region the respondent lives in (named *REGION_xxx*). We matched this variable with ADM1 shapefile names from the Database of Global Administrative Area (GADM). We use GADM version 2.8 to map the administrative areas of all countries. We successfully mapped provinces from 126 out of the total 140 developing countries in the GWP.[24] From these countries, we mapped 2,025 out of a total of 2,280 provinces. If countries or provinces could not be mapped, this was either because the GWP used a spatial identifier that was above the unit of ADM1 regions (but below the country level), or because names of GADM28 units and the spatial identifier did not match. See Table B1 in the Appendix for the full list of countries included in our analysis.

[25]Face-to-face interviews usually take about one hour; telephone interviews take 30 minutes.

[26]For more information on the GWP Survey Method, see `https://news.gallup.com/poll/105226/world-poll-methodology.aspx`.

[27]GWP also asks for the opinion on China as a whole: "In general, what opinion do you have of the following nations? China." However, the coverage of this question is poor, with less than 54,000 observations compared to 890,000 observations for the question on the Chinese government that we use in this paper. The correlation between those individuals expressing a positive opinion on the job performance of the Chinese government and those expressing a positive opinion on China as a nation is 0.36.

[28]We code responses indicating "Don't know" as missing.

average approval rates across countries show a decreasing trend over time.[29]

3 The Short Run: Individual-level Event Study

Our goal is to estimate the effects of Chinese development projects on public support for the Chinese government. However, isolating these potential effects is difficult since individuals are exposed to many potentially confounding factors. For example, any other interactions with Chinese state- or non-state actors—whether direct or indirect—could affect individuals' opinion toward the Chinese government. Many individuals in developing countries regularly observe and interact with Chinese markets, shops, goods and services, Chinese state-owned and private businesses and investors, managers and workers of Chinese companies, and news coverage provided by local outlets, international media agencies, and Chinese state-run media (Han et al. 2021).

Given that public opinion towards China and the Chinese government is likely based on composite assessments of these diverse observations and experiences, isolating the effects of Chinese government-financed development projects is key for our empirical strategy. We address this challenge in two ways. In this section, we use narrow time windows around project commitment, commencement, and completion dates to isolate potential short-term effects of Chinese development projects on approval of the Chinese government. In the next section, we use an instrumental-variables approach that relies on exogenous variation in the supply of Chinese development projects to estimate longer-term effects.

3.1 Empirical Strategy

We carry out an individual-level analysis of short-term effects of Chinese project events. This approach exploits the staggered roll-out of the GWP, which specifies the exact calendar days on which respondents are interviewed. All individuals within a country wave are interviewed on days within a time window of about four weeks.[30] Our new data on project-level event dates allow us to identify GWP country survey waves that fall in windows around these events. Project events include the three types introduced in the previous section: (1) the commitment of new projects, which are typically announced at bilateral meetings that attract public attention; (2) the start of project implementation, which is visible on the ground and often accompanied by a groundbreaking or foundation stone-laying ceremony; and (3) project completion, which is often covered by the media and accompanied with a ribbon-cutting ceremony, particularly for larger infrastructure projects. In total, 29,331 individuals in 35 countries and 420 provinces were exposed to

[29] We give all countries equal weight when calculating the average.

[30] The mean number is 26 days with a standard deviation of 19 days.

41 projects totalling 43 project events that fall into the respective survey windows over the 2008–2017 period.

These 43 project events are covered at random, based on whether or not they fall within the windows around GWP interview dates. Both project events and GWP interviews occur throughout the year and cover all weeks of the month and all days of the week (see again Figures B1 and B2). Table B2 in the Appendix tests whether these 41 projects differ in their main characteristics from (i) other projects where information on event dates is also available, and (ii) the entire sample of projects (independent of whether information on dates is available). It demonstrates that the 41 projects are by and large representative of all projects in the dataset with information on commitment, commencement, and completion dates, respectively (columns 1–3), as well as the entire sample of projects (columns 4–6). These projects do not substantially differ from those without dates across a wide range of project characteristics.[31] The subsample of projects covers a wide range of activities, including the construction and expansion of airports, roads, and railways, the dispatching of peacekeeping missions and medical teams, and the construction of primary schools, Confucius Institutes, and government buildings (see Tables B3–B5).

Using this subset of projects and project events, we compare individuals interviewed just before a given project event to those interviewed just after it. Our identifying assumption is that the timing of Chinese project events—i.e., commitment, implementation, and completion dates—is independent of the timing of the GWP interviews. This is plausibly the case. There is no obvious reason why the interview dates of a U.S.-based survey enumeration firm would systematically be related to the timing of Chinese project events. Nevertheless, we take several measures to ensure that our control group (individuals interviewed just before a project event) is comparable to our treatment group (individuals interviewed just after a project event). First, we only compare individuals interviewed in the same province and year, as we control for province-year level confounding factors through province-year fixed effects. Second, we limit the sample to include only individuals interviewed 30 days before and after the event to further mitigate the probability that individual opinion is driven by other events.[32] Third, we add survey-level control variables to ensure that the effect is not driven by any underlying implementation of the GWP survey in a specific wave. Based on these measures, it is arguably random if an individual is interviewed before or after a project event, which allows us to interpret our results in a causal manner.

[31] It only appears that commitment and start dates are significantly more available for more recent years, which is unsurprising since it should be easier to gather information on more recent events where online media coverage should be better. We capture this by the inclusion of fixed effects in the analyses below. There is also some evidence that commitment dates are more (less) often available for projects in the production sector (ODA projects), and start dates for economic infrastructure projects.

[32] We choose 30 days as it roughly corresponds to one month, but also test robustness to other event windows.

Specifically, we estimate the following equation:

$$Support_{ipcdy} = \beta post_{icdy} + \gamma X_{ipcdy} + \delta S_d + \zeta_{pcy} + \epsilon_{icpdy}, \quad (1)$$

where $Support_{ipcdy}$ is a binary variable that takes a value of one if individual i living in province p of country c interviewed on day d in year y approves of China's government (as introduced in the previous section). $post_{icdy}$ indicates whether or not an individual has been interviewed within 30 days after a project event in the country—either commitment, start of the implementation period, or completion.[33] X_{ipcdy} are individual-level control variables, which include a binary variable if the respondent is female, the respondent's age in years and its square, an education indicator, and an urban area indicator.[34]

S_d represents survey-level control variables, including binary variables for the day of the week and an indicator counting the days of the GWP survey windows. ζ_{pcy} denotes province-year-fixed effects. Finally, ϵ_{ipcdy} is the error term. We cluster standard errors at the level of the treatment, which is country×interview date. β is the coefficient of interest that shows the average effect of Chinese projects on support.[35]

Estimating the effects of development projects on Chinese government approval for all individuals in a given country is suitable to the extent that (country-wide) reporting about projects drives attitudes rather than local news or personal experiences on the ground. For China and other donor governments, country-level attitudes are likely more important than local attitudes in the pursuit of soft power. However, by additionally estimating provincial effects, we can also account for local experiences. While our main analysis focuses on project events anywhere in a country, we also estimate a variant of eq. (1) in which we interact $post_{icdy}$ with a binary indicator for projects that are placed in the province of the person interviewed, testing whether opinions of individuals who have been interviewed within 30 days after a project event in the province differ from those interviewed elsewhere in the recipient country. We thus also present results that compare individuals of the same province interviewed before a project date to those interviewed thereafter.

[33] To be conservative, we include the treatment day in the control group. By doing so, we assume that events take some time to unfold. Results are robust to instead excluding the event day from the analysis. Note that it is likely that public opinion in the pre-project period is affected by other, earlier, projects, which also biases our coefficients towards zero. Results are robust when leaving out those projects where another project was committed, started, or completed in the six months prior to the project event.

[34] The education variable takes a value of one if the respondent has 1–8 years of schooling, a value of two for 8–15 years, and a value of three for 15 years or more. The urban area indicator is one if the respondent lives in a rural area or village, two for a small town, three for the suburb of a large city, and four for a large city. Panel A of Table B6 provides descriptive statistics of all variables employed in the individual-level analysis.

[35] Our results are robust against a variety of different levels of clustering standard errors, including two-way clustering for country and interview date, country and interview wave, province and interview date, province and interview wave, country, province, wave, and date. When we cluster for country×interview wave or wave, our results remain similar, but are slightly weaker in terms of statistical significance.

3.2 Micro-level Results

Table 1 shows our main results for the short-run impact of Chinese development projects on public opinion towards China's government, based on the event-study approach of eq. (1). Column 1 of panel A investigates the effect of project events for all projects in our sample—small and large ones alike and independent of whether or not they are concessional. The coefficient on *post* shows that there is no significant difference in opinion about the Chinese government across individuals interviewed after as compared to before a project event. In columns 2–4 of panel A, we investigate these events separately by event type. This reduces the number of projects included in the analysis substantially. Column 2 shows the average effect of 9 committed projects, column 3 that of 19 projects that start the implementation phase, and column 4 that of 20 completed projects. The results show that only project completion significantly affects public opinion, at the ten-percent level of significance. Being interviewed after the project end date increases Chinese government approval by 3.0 percentage points.[36] This effects is sizable in light of the sample mean of 70 percent.

We offer three potential explanations for this strong result: First, completed projects are often touted by recipient and donor governments as visible achievements. Project completion dates erase any uncertainty about whether a project will actually reach completion. Second, the completion of a project ends negative spillovers or externalities directly stemming from the construction or other elements of project implementation. By contrast, when individuals initially hear of a project commitment, they might not expect positive effects from the project and only realize such effects after project completion. Finally, individuals might only learn about where and what types of projects China's government has provided after a project's completion.

To win the approval of the general public, donors often emphasize that their projects represent acts of generosity (Dietrich et al. 2019). Individual projects vary significantly in their financial terms and degree of generosity, and most donors provide a combination of highly concessional ODA and less concessional (or non-concessional) OOF. Panel B reports the effects of highly concessional projects only. At the five-percent level of significance, we again find that public opinion of the Chinese government improves when such projects are completed (column 4). Individuals interviewed within 30 days of the completion of a Chinese ODA project approve of the Chinese government by 4.1 percentage points more than individuals interviewed in the prior 30-day period.[37] It is

[36] We have tested heterogeneity on a number of dimensions: We find no evidence that individuals with better education or access to information evaluate projects differently. Nor do we find lagged approval of China's government, one's own government, or the U.S. government to affect how China's projects affect approval. While we do not report these results in a table to reduce clutter, they are available on request.

[37] These results are robust to decreasing the bandwidth to 20 days and to increasing it to 40, 50, or 60 days.

not surprising that, when compared to projects financed at market or near-market rates, projects financed on highly concessional terms more effectively increase public support for donor governments—either due to perceived generosity or competence. In contrast, to the extent individuals reward donors for generosity, lower levels of concessionality may dilute the positive attitudinal impact of development projects.

Development projects also differ substantially in terms of their physical and financial size. We expect larger projects to produce greater public opinion effects not only because they signal more generosity but also because they possess higher levels of visibility within recipient countries. For one, larger projects have a higher probability that individuals within a developing country accurately attribute them to the donor country. Such attribution should not be taken for granted. Indeed, experimental evidence indicates that citizens often do not know which foreign governments finance specific development projects (Baldwin and Winters 2020). What is more, compared to smaller projects, larger aid projects are often more visible both in terms of their physical and media presence. Earlier research indeed suggests that development project visibility matters for both recipient and donor country governments.[38] Panel C includes only large projects, which we define as those with commitment values of US$ 1 million or more. As expected, the observed effect for large projects (of 5.7 percentage points) is stronger than for all projects. Moreover, approval of the Chinese government increases when concessional and large projects commence, at the five- and ten-percent level, respectively (see column 2).[39]

Finally, we test whether the effect of project events differs for respondents from the province where the project is located, compared to the effect for all individuals interviewed in the recipient country. To this end, we include the interaction of the treatment indicator with a binary variable that indicates that a project is from the same province as the interviewee.[40] The results show only two significant coefficients on this province-specific indicator in our twelve specifications (see Table B8 in Appendix B). First, the commitment of one additional project increases public approval for the Chinese government (among people interviewed in the project province) by 15.1 additional percentage points—as compared to the effect that is observed among all interviewees outside the project province (column 2). Second, albeit smaller in size, we also find that project completion events trigger a larger response for ODA projects (column 8). Since all other interaction terms are insignificant at conventional levels, it seems that the overall

[38]For recipients, completing highly visible projects with tangible site locations can benefit incumbent host country leaders' reelections (Marx 2018). Highly visible projects can also send clearer signals of political support to foreign and domestic audiences (Strange 2021).

[39]For completeness we also tested the effects of projects with funding below US$ 1 million and of OOF-like projects. Table B7 shows that 9 out of 10 coefficients are not significant at conventional levels. The exception is the effect of commitment-related news on small projects, which is negative at the ten-percent level of significance. However, this latter finding should not be overinterpreted as it relies on only four projects.

[40]Note that we include province-fixed effects that capture the constituent term of the interaction.

effects reported above are not driven by provincial- or local-level opinion effects, but rather by project-specific news or information that is accessible to citizens nationwide. Given that our event-study approach measures short-term effects where experiences with project outcomes should differ less across individuals, this result makes intuitive sense. To capture potentially heterogeneous individual experiences with project outcomes, we need to look at a longer time frame. We do this in the next section.

4 The Longer Run: Macro-level Analysis

4.1 Empirical Strategy

A disadvantage of the above event study is that we can only include a small set of projects that are committed, started, or completed during GWP survey windows in a particular country. This also implies that we rely on only a small portion of interviews from the GWP. Moreover, while the event study allows us to identify causal effects, we can only test effects shortly after an event has happened and cannot analyze potential longer-term effects. We therefore re-analyze our dataset at the annual level in order to exploit the full range of projects. We estimate two sets of equations, one at the province level and one at the country level.[41] The province-level regressions allow us to analyze more granular potential effects and are instrumental for our identification strategy at the country level, as we explain below. The country-level regressions capture the public opinion impacts of Chinese government-financed projects on an entire country regardless of individuals' physical proximity or even direct exposure to projects. From the perspective of a government interested in maximizing its soft power, the country level is arguably more important. Starting with the province level, we estimate the following regression equation:

$$Support_{cpy} = \beta ChineseProjects_{cpy-1} + \sum_{j} \delta_j X^j_{cpy} + \zeta_{cp} + \eta_{cy} + \epsilon_{cpy}, \tag{2}$$

where $Support_{cpy}$ is the share of individuals that approve of China's government in province p of country c interviewed in year y. $ChineseProjects_{cpy-1}$ denotes the number of Chinese development projects completed in a province in the previous year;[42] X^j_{pcy} are our j individual-level control variables introduced in the previous section and averaged at the province level; ζ_{cp} are province-fixed effects; and η_{cy} denotes fixed effects for country-years. The inclusion of country-year fixed effects implies that any effects of development projects that affect public perception equally across provinces are netted out so that the

[41] Panel B and C of Table B6 show the descriptive statistics on the province and country level.

[42] Given that this specification aims to test the longer-run effects of Chinese development projects, completion dates are arguably most appropriate.

effect of projects at the province level has to be interpreted relative to this average effect. Again, ϵ_{pcy} is the error term; we cluster standard errors at the level of countries.[43]

Estimates obtained from eq. (2) likely suffer from endogeneity bias as projects are not randomly distributed over time and space. For example, reverse causality might bias our results if aid projects are deliberately placed in regions to increase support at times when the Chinese government is unpopular (Asmus et al. 2021). Conversely, provinces with individuals who possess relatively favorable opinions of China in a certain year could obtain more projects if China believes that public support is conducive to project success or if provincial leaders maintain close ties to the Chinese government. For instance, Blair et al. (2021) find that Chinese development projects (in Africa) are often situated in regions where public opinion about China is more favorable relative to other locations. Jones (2018) similarly shows that public opinion about China in Africa is more favorable in the home regions of political leaders in aid-receiving countries, which tend to receive a higher share of Chinese-funded projects (Dreher et al. 2019).

We address the endogeneity of development projects using a Two-Stage-Least Squares (2SLS) regression, replacing $ChineseProjects_{cpy-1}$ in eq. (2) with $\widehat{ChineseProjects}_{cpy-1}$, based on the following first-stage regression:

$$ChineseProjects_{cpy-1} = \widetilde{\beta}(Input_{y-3} \times \mu_{cp}) + \sum_{j} \widetilde{\delta}_j X^j_{cpy-1} + \widetilde{\zeta}_{cp} + \widetilde{\eta}_{cy-1} + \widetilde{\epsilon}_{cpy-1}, \quad (3)$$

where we rely on a two-part instrumental variable for Chinese development projects introduced in Bluhm et al. (2020). First, relative to domestic demand, China overproduces cement, iron, and steel, and other construction inputs. China's government instructs Chinese commercial actors to offload excess production in foreign markets. Bluhm et al. show that excess supplies of physical project inputs in China leads to increases in Chinese development projects abroad. More precisely, we use a proxy for China's supply of potential project inputs that includes (logged) production of six raw materials in metric tons: aluminum, cement, glass, iron, steel, and timber. As in Bluhm et al., from these six inputs, we draw the first factor using factor analysis and detrend the resulting time series.

The first factor of Chinese raw material production captures annual fluctuations in (potential) Chinese project inputs, but does not include spatial variation in terms of the countries and provinces that receive the additional financing from China. The second part of the instrument, also introduced in Bluhm et al. (2020), is based on the intuition that locations that receive Chinese development projects more frequently will be

[43] Results are robust when we cluster at the level of (i) country×year and provinces, (ii) provinces, and (iii) province×year. When we cluster at the level of provinces, the first-stage F-statistic is however lower (8.6).

more impacted by changes in China's overall supply of project inputs. We thus interact the measure for China's project inputs described above with a province's probability of receiving Chinese development projects, which we proxy with the share of years during 2000–2014 in which at least one project was completed in a given country or province. Following a growing body of research on aid effectiveness, we thus interact a variable that varies exclusively over time with a variable that varies over space (ADM1 regions), resulting in an instrumental variable that varies in both dimensions.[44]

In eq. (3), $Input_{y-3}$ is the (logged and detrended) factor of the production levels of the six physical project inputs; μ_{cp} is the province-specific probability of receiving Chinese development projects.[45] ζ_{cp} are province-fixed effects, and η_{ct-1} are fixed effects for country-years, capturing the production of Chinese project inputs. On average, projects are completed within two years after commitment for the projects in our sample.[46] The time from commitment to project completion however largely varies by project sector, so using the time of project completion instead of commitment in combination with a two-year lag allows us to measure the impact of development projects more precisely. Allowing one additional year for the projects to take effect, we lag completed projects by one year. We lag input factor production by two additional years so that it is measured in $t-3$ relative to the year of an interview.

The intuition behind our identification approach resembles a difference-in-differences design. We investigate a differential effect of surplus Chinese project inputs on public opinion in regions with a high probability versus those with a low probability of receiving Chinese development finance. The identifying assumption is that, other than the effect of Chinese development finance on public opinion, public opinion in provinces with differing probabilities of receiving development finance from the Chinese government will not be differentially affected by changes in China's production of physical project inputs, after controlling for province- and country-year-fixed effects and the other variables in the model. As in any difference-in-differences setting, we rely on a conditionally exogenous treatment and the assumption of parallel trends across groups. In controlling for country-year-fixed effects, Chinese production volumes of project inputs cannot be correlated with the error term and are thus (conditionally) exogenous to China's provision of international development projects. For different trends to exist, these trends across the treatment and

[44] See Werker et al. (2009), Dreher et al. (2019), Gehring et al. (2019), and Lang (2021), among others. Dreher et al. (2021b) propose a second instrument—the change in China's currency reserves in a year interacted with the probability of receiving Chinese development finance. In our comparably short sample, currency reserves and the production of China's construction materials are highly correlated (0.85) so that little information is added by including the second instrument. When we do, results are almost identical, with substantially lower first-stage Kleibergen-Paap F-statistics.

[45] Specifically, we calculate this as the share of years in which at least one Chinese development project was completed over the entire time these data are available as follows: $\mu_{cp} = 1/15 \sum_{t=1}^{15} \mu_{cpt}$, where μ_{cpt} is a binary variable indicating if a development project has been completed in a given province in year t.

[46] Figure B3 in the Appendix visualizes the average time between project event dates; see Figure B4 for sector-specific results.

control groups—provinces with a high probability and provinces with a low probability of receiving development finance from China—would have to vary in tandem with period-to-period changes in the production of project inputs.

We assess the validity of this approach in several steps following Bluhm et al. (2020). First, the identifying assumptions of the above approach could be violated if fluctuations in China's production in project inputs had different effects on "regular" and "irregular" recipient provinces' probabilities of receiving Chinese development projects, and if such effects had unique consequences for public opinion toward China's government across these provinces. In other words, this approach provides plausibly exogenous timing of the intervention, but its validity still rests on parallel pre-treatment trends across regular and irregular provinces that receive high and low levels of Chinese development finance. In Figure B5 in the Appendix, panels A and B display raw production volumes of the six input materials—both in levels and linearly detrended. Panels C and D report the first factor of the production volumes that we extract via factor analysis (again, both in levels and detrended). Panels E and F plot variation in the number of projects completed and public opinion for districts with above- and below-median probabilities to receive development finance from China. Overall, there is minimal concern that the parallel trends assumption is violated. We observe a global upward trend in material production. After purging the linear trend, the series trends upwards until 2010 and then turns downward. This trend is reflected in China's global provision of development projects over the same period, as we would expect, since the former serve as inputs into the latter. Moreover, the probability-specific trends for projects and public opinion appear generally parallel for the provinces with above and below median probabilities to receive Chinese projects. There is no apparent non-linear trend that resembles the trend of the detrended first factor of Chinese domestic input production in one of the two groups (above and below median probability to receive development finance) more than the other (Christian and Barrett 2017).

Second, to obviate the assumption of parallel pre-treatment trends, we allow for correlated random trends. As Bluhm et al. (2020) point out, the identifying assumption is $Cov(Input_{y-3} \times \mu_{cp}, \epsilon_{cpt}) = 0$, conditional on the set of control variables and fixed effects. This approach minimizes potential confounding factors. One possibility is that the detrended input series might be correlated with production volumes or prices of other commodities apart from our six input materials. If so, and if the time-varying effects of these variables on public opinion were equal across all regions in a country, then detrending the raw series and including country-year-fixed effects would capture such effects. If the effects were instead linear but different across provinces, then province-fixed effects would capture them. Finally, if time-varying effects were both non-linear and different across provinces, one would need to account for such potential shocks. We

address this possibility in the robustness tests below.[47]

Third, a separate concern is whether China's domestic production of physical project inputs could be correlated with China's trade or foreign direct investment volumes (Bluhm et al. 2020, Dreher et al. 2021a). China's share of world manufacturing value added has risen steadily since 2000, and this coincided with a large demand shock for raw materials (Autor et al. 2016). What is more, frequent recipients of Chinese development projects might also be popular destinations for Chinese investment projects or have closer trade ties with China. If so, differences in public opinion across provinces in developing countries might actually be due to trade or investment rather than Chinese-financed development projects. To investigate this possibility, we conduct robustness tests that control for annual volumes of exports to China, imports from China, and Chinese foreign direct investment. We interact these volumes with a set of variables that makes it more or less likely that a province will be affected by variation in China's overall trade or investment.[48]

Our identification strategy is related to a growing literature that employs shift-share instrumental variables. Such instruments are often constructed as macro-level shocks to a variety of industries that have varying degrees of local exposure. Within this setting, one can achieve identification in two ways using alternative assumptions. In the first approach, if local industry shares are plausibly exogenous, they can be taken as instruments (Goldsmith-Pinkham et al. 2020). In the second, even when variation in local exposures may be endogenous, one can alternatively stake identification on exogenous variation in time-series shocks.[49] Our approach is somewhat different as we rely on endogenous exposure to a single (and perhaps endogenous) shock. Rather than arguing that the shock is plausibly endogenous, we rely on alternative assumptions discussed above.[50]

Next, we turn to country-level regressions, and employ the same approach used in our province-level regressions shown in eq. (2) and eq. (3). We aggregate the predicted

[47] See Table C5 in Appendix C.

[48] See Table C5 in Appendix C.

[49] For the panel case, Borusyak et al. (2022) show that the estimator is consistent when the covariance between the detrended input series and a weighted average of the within-location time variation in unobserved factors affecting public opinion approaches zero in large samples. This is likely with reasonably large T, combined with a set of fixed effects, and can be supported by including proxies for the remaining unobserved variation (Bluhm et al. 2020).

[50] We conduct several tests suggested by Christian and Barrett (2017) to probe the validity of these assumptions. In addition to visually examining trends in Figure B5, we conduct a randomization inference test where we reassign the number of projects and the corresponding instrumental variable to different countries and years in the sample. As can be seen from the results of 999 regressions reported in Figure B6, coefficient estimates are concentrated around zero. According to an exact Fisher test, the coefficient from our main estimate above (indicated by the vertical dashed line) is significantly different from the randomized coefficients (p-value: 0.078). This holds when we break the timing structure required for identification and instead randomize the entire time series between countries, years within countries, and countries within years. In short, it is unlikely that any omitted variables correlate with our variables of interest in a way that spuriously produces our main results.

number of projects in all provinces in a year from eq. (3) to the level of countries.[51] We then use these aggregates as instrumental variables for the total number of new projects at the country level.[52] We obtain the following first-stage regression equation:

$$ChineseProjects_{cy-1} = \widetilde{\beta} \sum_{p} \widehat{ChineseProjects}_{cpy-1} + \sum_{j} \widetilde{\delta}_j X^j_{cy-1} + \widetilde{\zeta}_c + \widetilde{\eta}_{y-1} + \widetilde{\epsilon}_{cy-1}. \quad (4)$$

In the second stage, we then run country-level regressions with individual-level variables averaged at the country level and controlling for fixed effects for countries and years:

$$Support_{cy} = \beta \widehat{ChineseProjects}_{cy-1} + \sum_{j} \delta_j X^j_{cy} + \zeta_c + \eta_y + \epsilon_{cy}, \quad (5)$$

where $Support_{cy}$ is the share of individuals that approve of China's government in country c interviewed in year y. $\widehat{ChineseProjects}_{cy-1}$ denotes the predicted number of projects completed in a country in the previous year; X^j_{cy} are our j individual-level control variables introduced in the previous section; ζ_p are country-fixed effects; and η_{cy} denotes year fixed effects. Again, ϵ_{cy} is the error term; we cluster standard errors at the level of countries.

4.2 Macro-level Results

Table 2 presents the results on the longer-term effects of completed development projects, following eqs. (2)–(5). Columns 1 and 2 show the results for all projects, at the level of provinces and countries, respectively. Columns 3 and 4 show the analogous regressions for ODA projects only; columns 5 and 6 those for large projects. While we calculate probabilities to receive aid for these regressions based on ODA and large projects, respectively, these probabilities are highly correlated with those to receive any type of development project from China. This violates the exclusion restriction to some extent. While we report these separate results for completeness, we acknowledge that our approach does not allow to neatly identify separate effects across project types.[53]

Panel A presents the results from ordinary least-squares (OLS) regressions that

[51] Alternatively, one might consider to directly estimate 2SLS regressions at the country level. However, first-stage Kleibergen-Paap F-statistics are too low.

[52] Note that standard errors are estimated consistently as long as the second-stage error term is not correlated with the instrumental variable of the regression we use to predict the generated instrument (Wooldridge 2010). In our case, the exclusion restriction using province-level probabilities to receive aid rather than probabilities at the country level does not pose additional demands. When we employ wild bootstrap at the second stage, results are unchanged.

[53] What is more, the local average treatment effects that we estimate with our input material-based instruments might capture similar projects in case we use them to predict ODA projects, large projects, or all of them. Very small projects, for example, are less likely to depend on input materials than large ones.

leverage within-country or -province variation. Consistent with the results from the event study, we find significant and positive (conditional) correlations at the level of countries. However, controlled for country-year fixed effects, we do not find additional effects at the province level. This suggests that the reputational benefits of completed development projects are not primarily based upon improved conditions near project sites. This pattern suggests that the public opinion gains resulting from Chinese development projects are attributable to changing national perceptions rather than the firsthand observations by or experiences of people with direct project exposure.

Panel B in Table 2 reports the reduced-form estimates for the same set of regressions. Here we regress average attitudes towards the Chinese government on our instrumental variable (in addition to the fixed effects and control variables). If our identification strategy holds in the presence of an effect of development projects on approval rates, we should also observe strong reduced-form effects. Indeed, there is a sizable and significant effect of the instrumental variable on approval at the level of countries and provinces. At the country level, the coefficient is positive for all projects combined (shown in column 2), ODA projects (column 4), and large projects (column 6) alike. The effect at the province level is negative and statistically significant at conventional levels (as shown in columns 1, 3, and 5), which suggests that those living in close proximity to Chinese development projects (i.e., those who have more project exposure and knowledge) develop less favorable views of the Chinese government, compared to the average effect in the same country and year. This finding is consistent with previous research that provides evidence of higher levels of corruption, political capture, ethnic tension, social protest, and environmental degradation in areas within close proximity of Chinese development projects (Isaksson and Kotsadam 2018a,b, Dreher et al. 2019, Isaksson 2020, Iacoella et al. 2021, Baehr et al. 2022). The effects will be passed through with the same sign if the corresponding first-stage regression is sufficiently strong and the coefficients on our instrument are positive, as expected.

In panel C of Table 2, we present our main results in which we instrument development projects completed one year ago with our instrument two years earlier as in eq. (3). At the country level (columns 2, 4, and 6), the coefficients increase slightly compared to the corresponding OLS estimates and remain statistically significant at least at the ten-percent level. Each additional Chinese development project that reaches completion increases public approval for the Chinese government by 0.21 percentage points. While this longer-run effect is smaller than the short-term increase of 3.03 percentage points identified in the previous section, this finding demonstrates that public opinion effects persist over a longer period of time. On balance, it appears that China's development program pays off in terms of soft power acquisition.[54]

Panel D in Table 2 reports our corresponding first-stage regression results. Recall that

[54] Table C1 provides sector-level results.

we instrument the number of country-wide projects with the sum of predicted province-level projects. It is reassuring that the corresponding first-stage Kleibergen-Paap F-statistics are all high with values of 463 (all projects), 554 (ODA projects), and 649 (large projects). As expected, we observe a positive relationship between our instrumental variable and the number of development projects completed. A two-standard deviation increase in *Input* (which is 0.6) creates an additional project in a province hosting projects in six years over the 2000–2014 period (the 10th percentile in the sample), but only by approximately 0.2 projects in a province hosting one project in the sample period (the median over the 2000–2014 period).

At the level of provinces (columns 1, 3, and 5 of panel C), the coefficients stay negative but increase by an order of magnitude compared to the corresponding OLS estimate (and gain statistical significance at conventional levels). Measurement error, reverse causality, and omitted variables seem to conspire to bias our OLS coefficients upwards, therein highlighting the need for instrumentation. Each additional Chinese development project reduces public approval for the Chinese government by 7.22 percentage points (relative to any country-wide effects that we capture in country-year fixed effects). Reassuringly, the coefficients in the first-stage regression presented in panel D are highly significant and the first-stage Kleibergen-Paap F-statistics associated with the province-level regressions are considerably larger than the conventional rule-of-thumb value of 10.[55]

Several factors may explain why development projects yield popularity gains for donor governments in recipient countries and why they are less pronounced in the target provinces themselves.[56] We test for possible explanations in the next subsection.

4.3 Testing Mechanisms

The existing literature suggests several mechanisms that may explain how aid increases public approval of a donor government. We test these mechanisms with country-level regressions following eq. (5) in panel A of Table 3, where we replace our dependent variable, $Support_{cy}$, with potential intermediate outcomes.

First, previous research shows that Chinese development projects lead to short-run economic growth through the creation of jobs and the spreading of economic activity (Bluhm et al. 2020, Guo and Jiang 2021, Dreher et al. 2022). Higher incomes in recipient-country populations lead to higher standards of living which may result in more satisfied citizens. In turn, this may result in gratitude towards the donor government. Rather

[55]Specific values are 22 (all projects), 28 (ODA projects), and 15 (large projects). The first-stage F-statistics remain strong when we compute Kleibergen-Paap F-statistics that are robust to heteroskedasticity, autocorrelation, and clustering (Olea and Pflueger 2013).

[56]Note, however, that the province-level results are not robust to how we define Chinese development funding. As can be seen in Table C2, coefficients at the province level do not reach statistical significance when we replace the number of projects with a binary indicator for any project or measure it in (log) US$ amounts.

than using aggregate measures of income or remote-sensing measures such as nighttime lights, we measure income at the household level. Specifically, we analyze the logged self-reported per capita annual income in international dollars in column 1 and perceived income on a 4-point scale that ranges from 1 ("Finding it very difficult on present income") to 4 ("Living comfortably on present income") in column 2. The results show that both actual and perceived income increase after the completion of Chinese development projects in recipient countries. An additional completed project increases the reported income by 0.4 percent and perceived income by 0.004 on the 4-point scale. Turning to perceived living standards, we find no significant overall effects on the perceived *change* of living standards (columns 3 and 4), but significantly more citizens report their living standard as good (column 5). In the year after a project's completion, citizens are 0.15 percent more likely to express that they have a good living standard. Although these quantitative effects are modest, this first set of results supports the idea that better income and living conditions are a channel that links Chinese development projects and support for the Chinese government.

Second, development projects might improve the delivery of social services in recipient countries. For example, foreign-financed education and health projects might improve social welfare, education outcomes, or health conditions of the recipient population (Cruzatti et al. 2020, Martorano et al. 2020). To test this, we use the Community Basics Index, which is the simple average of the share of respondents who express satisfaction with the following seven public amenities: education, healthcare, housing, water, air, roads, and public transport.[57] As the results in column 6 of Table 3 show, citizens are more likely to report satisfaction with community basics after the completion of Chinese projects. Public service provision thus appears to be a second channel that may link Chinese development projects and support for the Chinese government.

We also test for three channels that might reduce approval rates of China's government. First, earlier research focused on African countries finds evidence of increases in reported corruption around Chinese project sites (Brazys et al. 2017, Isaksson and Kotsadam 2018a). In stimulating economic activity and the availability of public and private goods, Chinese projects may increase demand for corruption. In turn, greater perceived corruption could lead to blame for China's government. On the other hand, improved living conditions might reduce individuals' willingness and opportunities to pay bribes.[58] To test these possibilities, we analyze the effects of Chinese project events on

[57]More precisely, the index is computed based on the answers to the following questions: "In the city or area where you live, are you satisfied or dissatisfied with [sector]?"— "educational system or the schools," "availability of quality healthcare," "availability of good affordable housing," "quality of water," "quality of air," "roads and highways," and "public transportation systems." Only respondents answering to all questions are included. We drop the answers "Don't Know" and "NA" before calculating the index.

[58]Such positive effects of income and development on corruption are well documented (e.g., Paldam 2021).

the average share of individuals that confirm widespread corruption within businesses in their respective country. In line with Dreher et al. (2022), we find evidence of *fewer* rather than more reports of corruption after the completion of Chinese projects. The absence of corruption-enhancing effects of Chinese development projects may also help explain their overall positive effects on Chinese government approval.

Second, many Chinese development projects are notorious for relying heavily on Chinese rather than local labor (Cervellati et al. 2022). While a large share of this labor is used during the implementation stage of the project, some staff, like project managers and maintenance workers, may remain on the project after its completion. Potential resentment toward foreign labor in general, and reservations towards Chinese migrant workers in particular, might help explain negative sentiments towards the Chinese government. We test this by looking at citizens' attitudes towards migration (in column 8). More precisely, we compute the share of respondents that confirm that the city or area where they live is a good place for immigrants from other countries. We do not find evidence for a change in the attitudes towards migration. Again, the absence of anti-immigration sentiments may help explain the overall positive effects on Chinese government approval.

Finally, Chinese development activities might induce environmental degradation. Baehr et al. (2022) find that Chinese development projects lead to forest cover loss in Cambodia and Tanzania. Construction-heavy, large-scale infrastructure, mining, and energy projects are especially likely to cause damage to the natural environment in project regions through heavy use of soil and water, pollution, soil degradation, and deforestation. We measure satisfaction with environmental protection based on the question "In the city or area where you live, are you satisfied or dissatisfied with efforts to preserve the environment?" (in column 9). We do not observe significant changes in attitudes towards satisfaction with environmental protection in the aftermath of completed Chinese development projects. Environmental damage does not seem to harm the formation of more positive attitudes towards the Chinese government in recipient countries.

In panel B of Table 3, we report the corresponding province-level results following eq. (3) for the same dependent variables. Again, these results have to be interpreted relative to the overall country effects (which are absorbed by the country-year fixed effects). We find that individuals living in project provinces feel *worse* off, controlled for country-level effects. They report their living standard to be deteriorating and experience greater difficulties to live on their current income. In contrast to Isaksson and Kotsadam (2018a), however, we do not find evidence for higher reported corruption in businesses or the government in project provinces. Attitudes towards migration also do not change and individuals living in project provinces do not report more or less satisfaction with communal services or environmental services.

Deteriorating living standards relative to the country level might be one explanation

for why the effect of Chinese development projects on popular support for the Chinese government is lower in provinces that host projects. However, the tests for mechanisms do not provide direct evidence for why this is the case. We suggest several possible explanations. One possibility is that project quality might be lower than originally expected, and this quality difference might be more strongly experienced locally in provinces with project sites.[59] Within provinces, individuals are able to compare their firsthand experiences and observations to their ex ante expectations, which might lead to negative ex post evaluations. The jobs, revenues, goods, and services generated by Chinese government-financed development projects might not meet the expectations that were created when the projects were announced or initiated. Mismatches between ex ante expectations and ex post evaluations are perhaps less common, or at least less striking, among individuals not living near project sites and lacking direct, visible exposure to project outcomes.

Alternatively, perceptions in provinces receiving Chinese projects might also be less positive because of fungibility. If Chinese government funding supports projects that would have otherwise been supported by a different financier, and if the alternative project was expected to be of a higher quality or greater importance to the people living in that area, individuals in project provinces might hold more negative views of the Chinese government in project areas compared to the country level (Cruzatti et al. 2020). The scale of our study and data availability make it difficult to pin down these channels. Future research could look specifically at identifying the mechanisms behind the differential province- and country-level effects.

In short, though the effect on the support for China's government is lower in project provinces, we find overall positive country-level opinion gains for China's government. This latter finding is arguably more consequential for donors looking to use aid as a soft power instrument. However, to comprehensively gauge whether aid promotes foreign support for donor governments, one must also consider whether aid projects shape attitudes beyond the host country. In the next section, we analyze third-country and global effects of Chinese development projects.

5 Perceptions of the Chinese Government in the Global South

A net assessment of the effects of aid on a donor's soft power must also account for how development activities are perceived in countries other than the recipient country itself. As such, in addition to provincial- and national-level tests discussed above,

[59] Relatedly, negative spillovers—such as increased levels of corruption and environmental degradation—might be greater than originally anticipated. These points can also explain the difference in effects that we find between the short and longer run.

we also consider whether Chinese development projects shape attitudes towards the Chinese government at the global level. Development projects do not exist in a vacuum and can often be observed and assessed by individuals who live far away from where projects take place. These observations do not stop at national borders, and information about individual development projects often resonates with international audiences. Of course, in the process of doing so, this information can be repackaged, distorted, and presented differently to different audiences. Sri Lanka's notorious Hambantota Port, the "birthplace" of the "debt trap diplomacy" narrative, offers a well-known illustration (Brautigam 2020).

These international reactions are certainly important for donor governments. While donors hope to win hearts and minds within the national and subnational jurisdictions where they finance development projects, they also care about how such activities are viewed on a global scale.

We therefore analyze whether our findings at the country level translate into global support for the Chinese government. Is Beijing able to use development finance to increase overall levels of global support for the Chinese government across developing countries? If yes, then earlier research only considering local or national public opinion effects might underestimate the attitudinal gains of Chinese development finance for China's governments. If not, the positive recipient-country effects could be offset by negative global reactions to Chinese financing from a global soft power perspective.

We test the public opinion effects of Chinese development projects at the global level relying on the macro-level instrumental-variables framework.[60] To this end, we run a modified version of eqs. (4) and (5) and estimate the effects of projects completed anywhere around the world (rather than only in the recipient country itself) on the country-level approval rate of the Chinese government. We aggregate the predicted number of projects in all provinces in a year to the global level. Since these aggregates are a time series without cross-sectional variation, we omit year-fixed effects as the latter would be perfectly correlated with the predicted number of projects worldwide.[61]

Table 4 shows the results. As can be seen in column 1 of panel A, projects completed globally do not affect public approval of the Chinese government. The positive effects we find at the country level are either not sufficiently large to affect global public opinion about the Chinese government or positive effects are cancelled out by negative opinions about development finance elsewhere. Either way, China's development finance does not significantly affect global approval of its government. The remaining columns of Table 4 focus on subsets of countries that we consider to be of particular importance for soft

[60] We focus on the longer term, as our micro-level analysis does not allow identifying the effects of (many) events that hit all countries globally, due to the lack of an adequate control group. In addition, we believe that the longer term is more relevant for analyzing global soft power.

[61] Alternatively, one might think to directly estimate 2SLS regressions at the global level. However, first-stage Kleibergen-Paap F-statistics are too low.

power acquisition to either China's government or its competitors for global influence: recipients of China's aid in the sample period (column 2), frequent recipients of China's aid (defined as countries that receive aid in more years than the median value of three, column 3), the world's least developed countries (column 4), countries in Asia (column 5), countries in Africa (column 6), countries with a low voting alignment with China in the UN General Assembly (defined as the lowest tercile of voting similarity, column 7), with a middle voting alignment (column 8), and high voting alignment (column 9), and countries with a low, middle, or high approval of the Chinese government (again defined as terciles, of the average approval rate over the sample period, in columns 10–12).

The results show positive and significant effects for the samples of African countries, politically neutral countries in terms of UN voting alignment, and countries with an already high level of approval of the Chinese government. By contrast, countries with an already low opinion of the Chinese government show a further reduction in their approval rate in response to Chinese global development finance activities. This suggests that opinions about the Chinese government become more polarized as China provides more projects. Quantitatively, 51 additional projects in the previous year improve support for the Chinese government on the African continent by one percentage point. Based on the median number of new projects per year worldwide (of 122) this estimate implies an aid-induced increase by more than 2.2 percentage points. Likewise, 56 additional projects in the previous year improve support for the Chinese government in swing states in the United Nations by one percentage point, and the same holds for 54 projects in countries with a high ex ante approval of the Chinese government. The negative effect in countries that disapprove of the Chinese government is slightly stronger in absolute terms, with 42 projects leading to an additional percentage point of disapproval. It thus seems that China's development projects increase its popular approval in three important subsets of countries.[62]

Our global analysis also considers whether projects given to a particular set of countries affect public opinion differentially. The further panels of Table 4 investigate whether public perceptions of Chinese development projects implemented abroad depend on who receives the projects. More precisely, panels B, C, and D investigate whether projects affect public opinion more strongly when they are given to countries 'closer' to one's own. In panel B, we therefore give larger weight to projects completed in countries with a greater similarity in the voting behavior in the United Nations General Assembly (UNGA), using an index provided by Voeten et al. (2009).[63] Panel C

[62]In Africa, China seeks to pursue natural resources and access to markets (Dreher et al. 018b); swing states in the United Nations General Assembly are those likely to be most accessible to exchange a specific vote for aid (Fuchs et al. 2015); and countries with high approval are more likely to be allies of China than those where approval rates are low.

[63]We use the S score which measures the voting similarity between two countries in a given session. It is calculated as $S_{ab} = 1 - (\sum|Y_{av} - Y_{bv}| \ / \ \mathrm{V})$, where $v = 1, ..., V$ indexes votes, a and b refer to two countries, and Y refers to votes, taking on one of three alternatives: yea ($Y = 1$), abstain ($Y = 2$), and

examines geographically proximate countries, measured by the inverted logarithm of the population-weighted geographic distance between two countries (data from Mayer and Zignago 2011). Panel D focuses on ethnic similarity using the inverse distance-adjusted ethno-linguistic fractionalization index on dissimilarity in ethno-racial characteristics (Kolo 2012). Again, we do this for the global sample in column 1 as well as all subsamples in columns 2–12.[64]

The results show no significant effect of the completion of Chinese development projects on public opinion globally, independent of how we weight projects (column 1). However, if China values soft power among a certain target group of countries, such as its (frequent) aid recipients, African recipients, or Asian recipients (columns 2–3 and 5–6), using development projects as a soft power tool can pay off: Aid creates support for the Chinese government in third countries that are politically aligned with the recipient country. Development projects also create a more favorable opinion in politically aligned third countries that are either politically neutral or China's friends (columns 8–9). When looking at the impact of Chinese development projects in third countries that are either geographically or ethnically proximate to the recipient country, results are mixed. For example, while China can attract neutral countries through projects in ethnically aligned third countries (column 8), such projects further reduce support in low-opinion countries if projects are carried out in Asia and ethnically proximate countries (columns 5 and 10).

Taken together, Chinese development finance leads to soft power gains in important third countries when these are politically aligned with the recipient country. This provides the Chinese government with a tool to simultaneously enhance its influence among groups of aligned countries. In the next section, we examine if Chinese development finance also boosts popular support for recipient governments.

6 Is Aid "Win-Win Cooperation" for Donor and Host Governments?

In addition to attitudes toward donors, the completion of development projects may impact citizens' views of their own government. Chinese development finance is often framed as "win-win cooperation" by the Chinese government, and if this principle holds true, we might also expect host governments to gain popularity for securing and implementing Chinese-financed projects. This contrasts with the conventional wisdom, which suggests that foreign aid may actually undermine state legitimacy. Many scholars

nay ($Y = 3$). An S score of 1 means complete agreement, a score of -1 total disagreement between the two countries. Also see Bailey et al. (2017) for further details.

[64]These regressions include the control variables age, age squared, gender, education, and urban, as well as fixed effects for countries and years. The inclusion of year-fixed effects affects the interpretation of our results, given that they capture any average effects the projects might have on public opinion globally. We also control for projects given to the country of interview.

have argued that when governments rely upon foreign aid (or other sources of "unearned income"), they are insulated from the consequences of poor policy decisions and more easily able to ignore taxpayers' preferences, effectively short-circuiting the accountability relationship between the governor and the governed (Djankov et al. 2008, Smith 2008, Bueno de Mesquita and Smith 2010). However, a new wave of empirical research calls the conventional wisdom into question. Dietrich and Winters (2015), Dietrich et al. (2018), and Blair and Roessler (2021) provide experimental evidence that the local receipt of foreign aid actually improves trust in government and citizen perceptions of the state. Marx (2018) finds that incumbent governments benefit from the implementation of aid projects. Similar effects in the case of Chinese development finance would be in line with the Chinese government's claims of "win-win cooperation."

Table 5 reports results of tests for whether Chinese development projects affect citizens' support of their own government. We show results for both the micro and macro level, changing the dependent variable to the approval of the national government of the recipient country.[65] Column 1 reports results for our event study based on eq. (1). Column 2 is based on the same equation, but includes a binary variable indicating the project province. Columns 3 and 4 report the macro-level results at the country level based on eq. (5) and the province level based on eq. (3), respectively.

Starting with the event-study results, we observe positive public opinion effects for the national government in project provinces (column 2) but not elsewhere in the country (column 1). Government approval rises by 11.6 percentage points after the completion of a Chinese project in the project province. Comparing these effects with those on Chinese government approval, it appears that short-term popularity gains for the national government are locally constrained, whereas support for the Chinese government improves countrywide. This is an important result for governments that seek to increase their support base in the short run, e.g., prior to elections.

Turning to longer-term public opinion effects, we present macro-level results in columns 3 and 4. Approval rates of one's own government improve with the number of Chinese projects completed, both at the province and country level. An additional project increases the approval rate of the national government by 0.2 percentage points. While this effect is small compared to the sample average of 54.5 percent, it is comparable in size to the effect on the approval of the Chinese government as reported in Table 2. At the province level, the results are stronger with an additional Chinese project leading to a popularity gain of 9.9 percent. It indeed appears that Chinese development projects are "win-win" for both the Chinese government and the national governments of recipient countries.

[65] Specifically, government approval is based on the question "Do you approve or disapprove the job performance of the (leader/head/president) of this country?"

7 Conclusion

This study provides a comprehensive analysis of whether and how foreign aid shapes public support for donor governments in developing countries. To address this question, we created a new dataset of Chinese development project events (including precise project commitment, commencement, and conclusion dates) and merged these data with granular, time-stamped data from Gallup World Poll in 126 countries and over 2,000 subnational jurisdictions. We chose to focus on Chinese development finance and its effects on foreign popular support for Beijing for several reasons: China's growing importance as an international donor and lender, its active pursuit of soft power, and the availability of high-quality, granular data on treatments and outcomes. Unlike previous analyses that only measure localized, short-run public opinion impacts near project sites, our approach provides a comprehensive picture of the public opinion effects of Chinese development projects by considering different time horizons and levels of geographical aggregation (provinces, countries, and groups of countries). Our analysis is underpinned by two causal identification strategies: a short-term event study wherein the timing of interviews can be considered as random relative to Chinese project events, and an annual analysis using an established instrumental-variables approach that exploits changes in China's overall production of project inputs and the differential effect of these shocks on different countries and subnational jurisdictions.

Our results show that, on average, public approval of the Chinese government increases in countries where Chinese development projects are completed. In the short run, this effect increases with the size of the project and the generosity of the financial commitment; in the long run, it is lower among people who live in close proximity to completed Chinese development projects. Perhaps most importantly, we find that these development projects create a more favorable public opinion environment for China among countries in Africa, potential "swing states" in the United Nations General Assembly, and countries with higher baseline (ex ante) levels of public support for the Chinese government. We also find that Chinese development finance leads to soft power gains in important third countries—when these are politically aligned with the recipient country. These positive spillover effects allow the Chinese government to simultaneously enhance its public profile among groups of politically aligned countries. In short, we find that China's overseas development program enhances its soft power.

At the same time, our findings help clarify a key source of confusion among policymakers, journalists, and scholars: whether the Belt and Road Initiative (BRI) is a reputational asset or liability. The existing debate about the BRI suggests that its public opinion impacts are either overwhelmingly positive or negative. One camp argues that Beijing is gaining the upper hand in a zero-sum, great power competition for international influence by bankrolling big-ticket infrastructure projects that Western

powers are unwilling to support. Another camp claims that Beijing is losing the battle for "hearts and minds" because of local exposure to the negative unintended consequences of Chinese development projects. Our findings suggest that neither camp is entirely right—or wrong. Consistent with previous studies, we find that individuals who live near completed Chinese development projects form less favorable views of China (than individuals from the same country in the same year). However, unlike previous studies, we measure the public opinion impacts of Chinese development projects *outside* of the subnational jurisdictions where such projects take place. Our findings indicate that indirect treatment exposure improves public sentiment towards China. These countervailing effects among individuals who experience direct treatment exposure and individuals who experience indirect treatment exposure appear to be a "net positive" at the country level, creating a more favorable public opinion environment for China.[66]

The fact that those who are most directly affected by the costs and benefits of Chinese development projects develop less favorable views of the Chinese government, as compared to the average effect in the same country and year, also helps explain why there are still many signs of BRI "backlash" around the globe.[67] In this regard, our study complements previous studies, which provide evidence that those who live in close proximity to Chinese development projects have higher levels of exposure to various negative externalities—including political capture (Dreher et al. 2019, Anaxagorou et al. 2020), corruption (Isaksson and Kotsadam 2018a), ethnic tensions (Isaksson 2020), public protests (Iacoella et al. 2021), environmental degradation (Baehr et al. 2022), and declining rates of labor union involvement (Isaksson and Kotsadam 2018b).

[66] That being said, a limitation of our study is that it does not capture the public opinion impacts of Chinese government-financed development projects in the Global North.

[67] Malik et al. (2021) find that at least 35% of the BRI infrastructure project portfolio has encountered major implementation problems, such as corruption scandals, labor law violations, and public protests.

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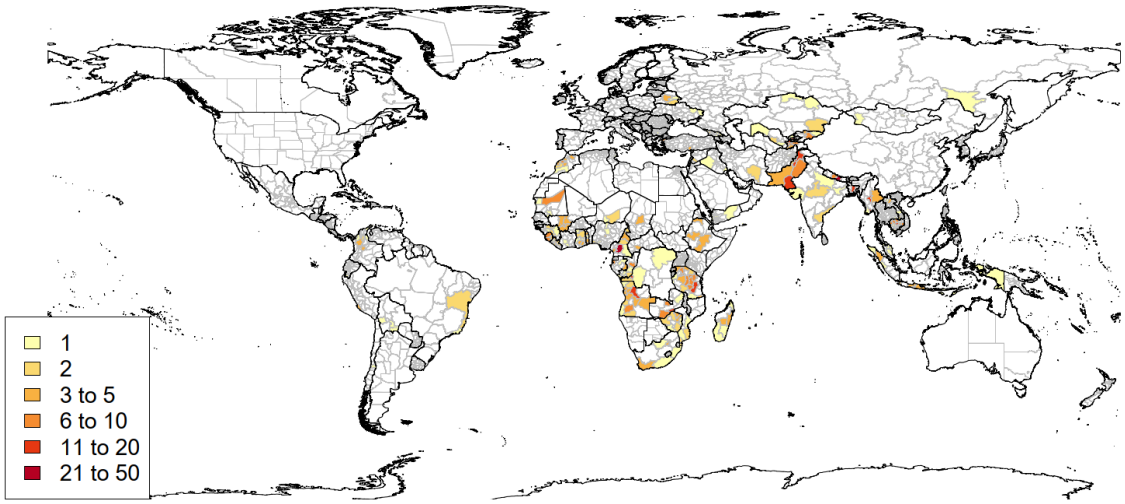
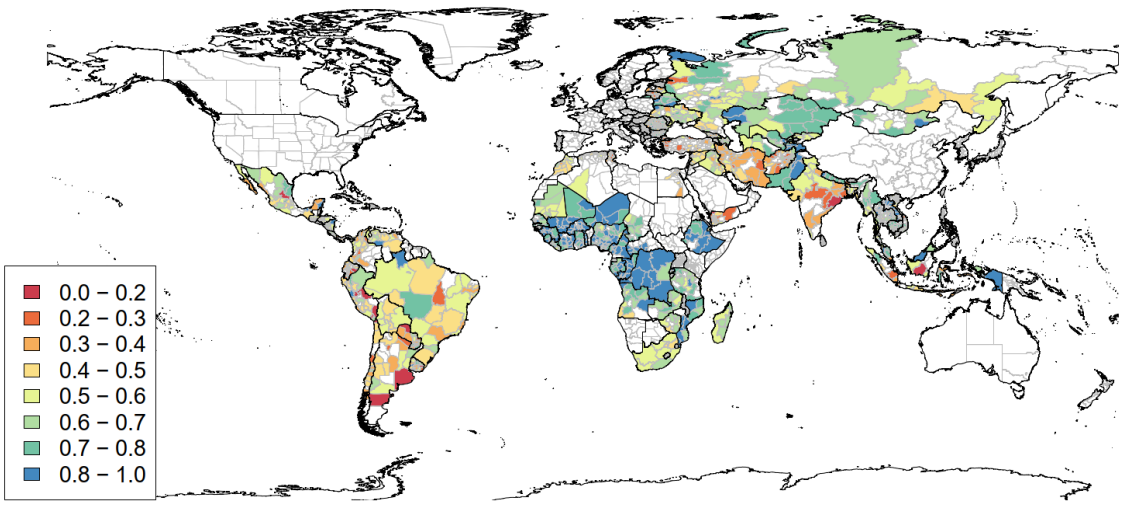
Figures and Tables

Figure 1 – Chinese development projects completed at the province level, 2006–2014



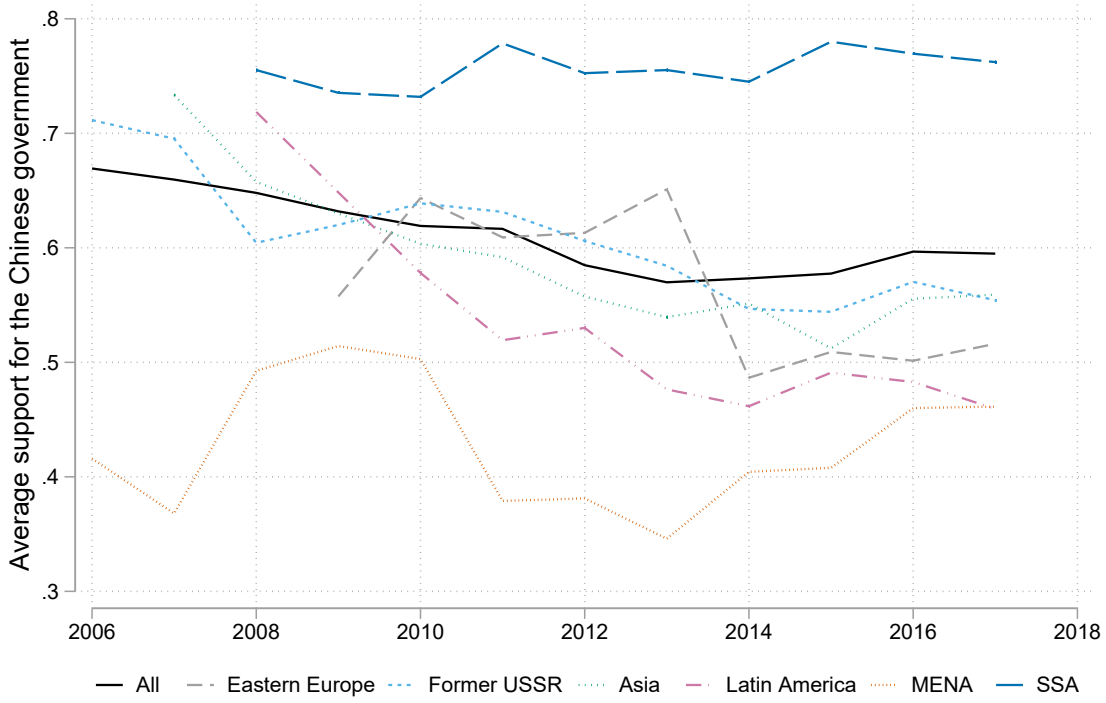
Notes: This figure shows the number of China's development projects by province (ADM1 region) that contain information on their completion date. Source: Bluhm et al. (2020), Dreher et al. (2022), and Authors' data.

Figure 2 – Average support of the Chinese government by province, 2006–2017



Notes: This figure shows the average share of interviewed individuals that approve of the Chinese government by province (ADM1 region). Data from Gallup (2018).

Figure 3 – Support for the Chinese government by world region over time, 2006–2017



Notes: The figure displays the average approval of the Chinese government by world region over the 2006–2017 period. We first create country means and then world region averages. Abbreviations: USSR–Union of Soviet Socialist Republics; MENA: Middle East and North Africa; SSA: Sub-Saharan Africa. Data from Gallup (2018).

Table 1 – Chinese projects and government support, event study results

	(1) All	(2) Commit.	(3) Start	(4) End
	Panel A: All projects			
Post	0.0108	-0.0509	0.0225	0.0303*
	(0.0121)	(0.0373)	(0.0154)	(0.0156)
Observations	29,331	5,610	15,362	15,465
Number of countries	35	9	19	20
Number of provinces	420	128	185	247
Number of projects	41	10	21	22
Province-year FE	✓	✓	✓	✓
	Panel B: ODA projects			
Post	0.0228	-0.0421	0.0462**	0.0412**
	(0.0145)	(0.0812)	(0.0183)	(0.0171)
Observations	19,017	1,744	10,528	12,226
Number of countries	22	3	14	15
Number of provinces	265	58	125	171
Number of projects	26	3	15	17
Province-year FE	✓	✓	✓	✓
	Panel C: Large projects			
Post	0.0243	0.0347	0.0413*	0.0574**
	(0.0185)	(0.0561)	(0.0249)	(0.0272)
Observations	13,783	2,169	5,619	7,865
Number of countries	19	5	7	11
Number of provinces	254	61	62	161
Number of projects	21	5	8	11
Province-year FE	✓	✓	✓	✓

Notes: The dependent variable is binary and indicates whether or not an interviewed individual approves of the Chinese government, based on the question "Do you approve or disapprove of the job performance of the leadership of China?" The sample is restricted to individuals interviewed within 30 days before or after ("Post") a project-related event date. Panel A shows results for the full sample of projects that contain information on the specific event date and fall into the interview window. Panel B only includes "Official Development Assistance-like" projects. Panel C only includes large projects, i.e., those with a size of US$ 1 million or above. All specifications include individual-level and survey controls. Standard errors are clustered by country-day: *** p<0.01, ** p<0.05, * p<0.1.

Table 2 – Chinese projects and government support, instrumental variables results

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: OLS					
Chinese projects $_{t-1}$	-0.00380	0.00184**	-0.00390	0.00167**	-0.000135	0.00127*
	(0.00301)	(0.000852)	(0.00353)	(0.000741)	(0.00342)	(0.000669)
	Panel B: Reduced form					
Input*probability $_{t-3}$	-0.139**	0.00252**	-0.173**	0.00233**	-0.188*	0.00172*
	(0.0677)	(0.00109)	(0.0721)	(0.000972)	(0.0997)	(0.000893)
	Panel C: 2SLS					
Chinese projects $_{t-1}$	-0.0722*	0.00206**	-0.0864**	0.00189**	-0.0682*	0.00140*
	(0.0389)	(0.000973)	(0.0409)	(0.000859)	(0.0400)	(0.000771)
	Panel D: First stage					
Input*probability $_{t-3}$	1.929***	1.222***	1.998***	1.230***	2.758***	1.230***
	(0.410)	(0.0568)	(0.375)	(0.0522)	(0.719)	(0.0483)
Level	Province	Country	Province	Country	Province	Country
Project type	All	All	ODA	ODA	Large	Large
Observations	6,296	452	6,296	452	6,296	452
Number of countries	91	90	91	90	91	90
Number of provinces	1,399	-	1,399	-	1,399	-
Country FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Country-year FE	✓		✓		✓	
Province FE	✓		✓		✓	
F-Stat	22.14	463.3	28.32	553.8	14.72	649.1

Notes: The dependent variable in panels A–C is the share of individuals that approve of the Chinese government in a given province/country, based on the question "Do you approve or disapprove of the job performance of the leadership of China?" The dependent variable in panel D and variable of interest in panels A–C is the number of Chinese development projects completed in the previous year ("Chinese projects $_{t-1}$"). Columns with project type "ODA" include only "Official Development Assistance-like" projects. Columns with project type "Large" include only projects with a size of US$ 1 million or above. Columns with level "Province" ("Country") contain results of regressions at the province-year (country-year) level. All specifications include the control variables age, age squared, gender, education, and urban in addition to the set of fixed effects indicated in the table. Standard errors are clustered by country: *** p<0.01, ** p<0.05, * p<0.1.

Table 3 – Testing mechanisms, instrumental variable results

	(1) Income	(2) Perceived income	(3) Living std up	(4) Living std down	(5) Living std good	(6) Community basics	(7) Corruption	(8) Migration	(9) Environment
	Panel A: Country level								
Chinese projects $_{t-1}$	0.00397*	0.00364**	0.000181	0.000454	0.00152**	0.000896**	-0.00118***	6.74e-05	-0.000435
	(0.00237)	(0.00148)	(0.000604)	(0.000787)	(0.000585)	(0.000416)	(0.000434)	(0.000399)	(0.000552)
Observations	417	481	472	472	484	462	470	474	473
Number of countries	90	95	94	94	95	93	94	94	94
Mean of dependent variable	7.419	2.455	0.448	0.249	0.532	0.562	0.784	0.599	0.494
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
F-stat	327.7	328.9	332.5	332.5	328.1	316.2	328	331.4	337.2
	Panel B: Province level								
Chinese projects $_{t-1}$	0.225	-0.210**	-0.0619	0.0603*	-0.0408	0.0354	0.0231	0.0511	0.0203
	(0.200)	(0.0948)	(0.0395)	(0.0344)	(0.0464)	(0.0277)	(0.0377)	(0.0446)	(0.0480)
Observations	6,037	6,686	6,478	6,478	6,705	6,405	6,549	6,517	6,542
Number of countries	91	95	94	94	95	93	94	94	94
Number of provinces	1,415	1,465	1,439	1,439	1,465	1,444	1,443	1,456	1,448
Mean of dependent variable	7.540	2.476	0.433	0.249	0.543	0.577	0.799	0.590	0.495
Country-year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Region FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
F-stat	5.037	21.61	21.37	21.37	21.97	12.18	22.59	23.74	21.22

Notes: This table shows regression results at the country level following eq. (5) and at the province level following eq. (3), where we change the dependent variable as indicated in the column header. "Income" is respondents' average logged self-reported per capita annual income in international dollars. "Perceived income" is respondents' average perception of household income on a scale from 1 ("Finding it very difficult on present income") to 4 ("Living comfortably on present income"). "Living std up (down)" measures the share of individuals that indicate that their standard of living is going up (down). "Living std good" measures the share of respondents satisfied with their current standard of living. "Community basics" is an index taken from the Gallup World Poll for everyday life in the community, including education, housing, and infrastructure (we do not include the responses "Don't know" and "NA"). "Corruption" is the share of respondents that replied "yes" to the following question: "Is corruption widespread within businesses located in (this country), or not?" "Migration" is the share of respondents that replied "yes" to the following question: "Is the city or area where you live a good place or not a good place to live for immigrants from other countries?" "Environment" is the share of respondents that replied "yes" to the following question: "In the city or area where you live, are you satisfied or dissatisfied with efforts to preserve the environment." Standard errors are clustered by country: *** p<0.01, ** p<0.05, * p<0.1.

Table 4 – Chinese projects and government support at the global level, instrumental variables results

	(1) All	(2) Aid recipient	(3) Freq. recipient	(4) LDC	(5) Asia	(6) Africa	(7) Political foes	(8) Political neutral	(9) Political friends	(10) Opinion: low	(11) Opinion: neutral	(12) Opinion: high
	Panel A: Global South											
Chinese projects worldwide $_{t-1}$	7.71e-05	6.23e-05	0.000115	0.000160	-0.000145	0.000196**	1.07e-05	0.000180*	3.04e-05	-0.000236**	0.000199	0.000186**
	(6.38e-05)	(7.12e-05)	(9.26e-05)	(0.000103)	(0.000166)	(7.76e-05)	(0.000136)	(0.000102)	(0.000106)	(0.000113)	(0.000133)	(7.75e-05)
Observations	452	388	264	170	119	160	66	177	200	136	154	162
	Panel B: Third country (projects weighted by political proximity to recipient country)											
Chinese projects abroad $_{t-1}$	0.00122	0.00200**	0.00324***	0.000291	0.00407**	0.00478**	-0.00317	0.00239*	0.00438***	-0.00149	0.000119	0.00125
	(0.000777)	(0.000906)	(0.00110)	(0.00155)	(0.00156)	(0.00185)	(0.00226)	(0.00134)	(0.00133)	(0.00185)	(0.00118)	(0.000785)
Observations	443	382	257	169	113	160	64	177	200	126	154	161
	Panel C: Third country (projects weighted by geographic proximity to recipient country)											
Chinese projects abroad $_{t-1}$	0.00962	0.0104	-0.00566	0.00774	-0.109**	0.0298	0.0568**	0.0175	-0.00376	-0.0247	0.0303	0.00838
	(0.0140)	(0.0162)	(0.0234)	(0.0264)	(0.0491)	(0.0198)	(0.0221)	(0.0210)	(0.0200)	(0.0302)	(0.0292)	(0.0169)
Observations	449	388	263	169	119	160	64	177	200	132	154	161
	Panel D: Third country (projects weighted by ethnic proximity to recipient country)											
Chinese projects abroad $_{t-1}$	7.57e-05	0.000101	9.80e-05	5.27e-05	-0.00183***	0.000131	-0.000101	0.000189*	8.55e-05	-0.000478*	-6.42e-05	6.81e-05
	(6.62e-05)	(6.85e-05)	(9.17e-05)	(0.000114)	(0.000576)	(9.02e-05)	(0.000322)	(0.000102)	(9.60e-05)	(0.000275)	(0.000140)	(0.000101)
Observations	449	388	263	169	119	160	64	177	200	132	154	161

Notes: This table reports the results of the global analysis. Panel A shows the results from eq. (5), where we aggregate the number of projects to a time series at the global level. Column 1 ("All") reports the results for all countries in the sample. Columns 2–12 restrict the sample to subsets of countries. "Aid recipient" includes countries that have received any Chinese aid in the sample period. "Freq. recipient" includes countries that received aid in more than three years (median). "LDC" includes the Least Developed Countries according to the World Bank's income categories. "Asia" and "Africa" include countries from the respective continent. "Political foes" ("Political neutral," "Political friends") include those countries in the lowest (middle/highest) tercile of mean political agreement with China in the UN General Assembly. "Opinion: low" ("Opinion: neutral," "Opinion: high") are those countries in the lowest (middle/highest) tercile of mean approval of the Chinese government. Panels B–D report results for the number of projects completed in third countries ("Chinese projects abroad $_{t-1}$"). We aggregate the province-level predictions from eq. (3) to the global level, excluding the country of interview. Projects are weighted using the following spatial weights: "Political proximity" ("Geographic proximity"/ "Ethnic proximity") weight the number of projects completed abroad by similarity in terms of UNGA voting alignment, geographic distance, and ethnic similarity. All specifications include the control variables age, age squared, gender, education, and urban. Panel A includes country-fixed effects. Panels B–D include country- and year-fixed effects and control for the number of projects completed in the country of interview. Kleibergen-Paap F-statistics are above 10 in all specifications. Standard errors are clustered by country: *** p<0.01, ** p<0.05, * p<0.1.

Table 5 – Chinese projects and approval of the national government

	(1) Short-term country	(2) Short-term province	(3) Longer-term country	(4) Longer-term province
Post/project completed	0.0115	-0.00148	0.00211**	0.0992**
	(0.0178)	(0.0180)	(0.000821)	(0.0453)
Post*project province		0.116***		
		(0.0437)		
Observations	18,994	18,994	443	6,236
Number of countries	19	19	86	86
Number of provinces	248	248	-	1,337
Number of projects	21	21	-	-
F-stat	-	-	87.69	16.38
Province-year FE	✓	✓		
Country FE			✓	
Year FE			✓	
Country-year FE				✓
Region FE				✓

Notes: This table reports results for the effect of Chinese development projects on government approval in recipient countries. Columns 1 and 2 report short-term results from eq. (1). The dependent variable is binary and indicates whether or not an interviewed individual approves of the national government based on the question "Do you approve or disapprove the job performance of the (leader/head/president) of this country?" The sample is restricted to individuals interviewed within 30 days before or after ("Post") a project-related event date. Columns 3 and 4 report the longer-term results based on eq. (3) and eq. (5). The dependent variable is the share of individuals that approve of the national government in a given province/country, based on the same question. The variable of interest is the number of Chinese development projects completed in the previous year. Standard errors are clustered by country-day in columns 1 and 2, and by country in columns 3 and 4: *** p<0.01, ** p<0.05, * p<0.1.

Appendix A: Codebook for Chinese development project dates collection

This appendix summarizes the method we have used to gather specific commitment, start, and end dates of Chinese-financed development projects included in AidData's Geocoded Global Chinese Official Finance Dataset (version 1.1.1) (Bluhm et al. 2020, Dreher et al. 2022), which is based on AidData's Global Chinese Official Finance Dataset (version 1.0) created with AidData's TUFF 1.3 methodology (Dreher et al. 2021b, Dreher et al. 2022). We outline the additional variables we have coded below. We have organized data collection instructions into general data collection principles and specific procedures that include detailed step-by-step coder instructions (largely omitted from this appendix). Readers interested in the full methodology document, which includes several detailed coding examples, may contact the authors.

A.1. Date Variables

When coding, use the date format "mm/dd/yyyy."

Commitment dates

The commitment date indicates a project was officially agreed upon and announced by the recipient and/or the donor government.

- Commitment date (*cdate*):
  - The date that a donor country and a recipient country reach agreement and exchange letters (换).
  - The date that a contract for future projects was signed.
  - The date that a construction company wins the bid of a project (中标).
  - The date that government authorities publicly announce a project or show commitment for a yet-to-begin project during a meeting report or a speech.

Note: While we provide coding definitions for commitment dates above, we did not search for commitment dates comprehensively and instead focused on start and end dates during our own research. The reason for this is that commitment dates have proven to be more difficult to effectively capture using the open-source methods we have developed.

Start dates

The start date indicates the start of the project's construction or groundbreaking ceremony. We separate start dates into opening ceremonies, start of implementation, and others to improve coding accuracy:

- Ceremonial date (*sdate_ceremony*):
  - Opening or groundbreaking ceremonies that signal the start of construction (in Chinese, often 开工 or 动工仪式).
  - Significant political or social figures appear at an event and signal the start of the project. An example is officials laying the first stone on a bridge before construction or officials giving a sign to signal the project is about to start. (揭牌仪式).
- Actual implementation date (*sdate_implementation*):
  - The date that donations, supplies, loans, or equipments are given (捐赠).
  - The date that performing teams, scholarships, or long-term technical (educational, medical) support are sent to countries in need.
  - The date that actual construction of a project, such as bridge, stadium, or building, started.
- Other (*sdate_other*):
  - If the data do not fit the above categories, note why in the variable *note_sdate*.

Note: If the start date found fits into more than one of the above categories, put the date in all relevant categories. For example, the actual construction begins at the opening ceremony on 05/06/2007, code 05/06/2007 for both opening ceremony and implementation.

End dates

The end date includes official completion dates, acceptance dates, end of implementation, start of utilization, and others:

- Completion ceremony (*edate_ceremony*):
  - The date that a ceremony was held to signal a project's completion (竣工仪式).
- Acceptance/Inspection date (*edate_acceptance*):
  - The date that a project passed inspection (验收).
- Actual implementation end date (*edate_implementation*):
  - The date that donations, supplies, loans, or equipment are received (捐赠).
  - The date that the donor country handed over a finished project to the receiver country (交接仪式).

  - The date that performing (medical) teams, scholarships, or long-term technical (educational) support finished assisting and leave the recipient country.

- Utilization date (*edate_utilization*):
  - The date that a project was fully finished and put into use (投入使用).

- Other (*edate other*):
  - If the data do not fit the above categories, make notes in the variable *note_sdate*.

Note: If the end date found fits into more than one of the above categories, we put the date in all relevant categories. For example, if a project was first put into use at the completion ceremony at 05/06/2007, code 05/06/2007 in both "end ceremony" and "start of utilization."

A.2. Searching for Dates Information with Online Search Engines

We used the search engine Baidu first and changed to Google if open-source project date information does not appear readily available for a given development project. Search results can vary significantly across search engines.

A.3. Specific Procedures

The coding steps below have been repeatedly tested by multiple coders and have proven to be efficient for collecting dates information on Chinese-financed development projects. Following this set of steps can potentially optimize coding workflow.

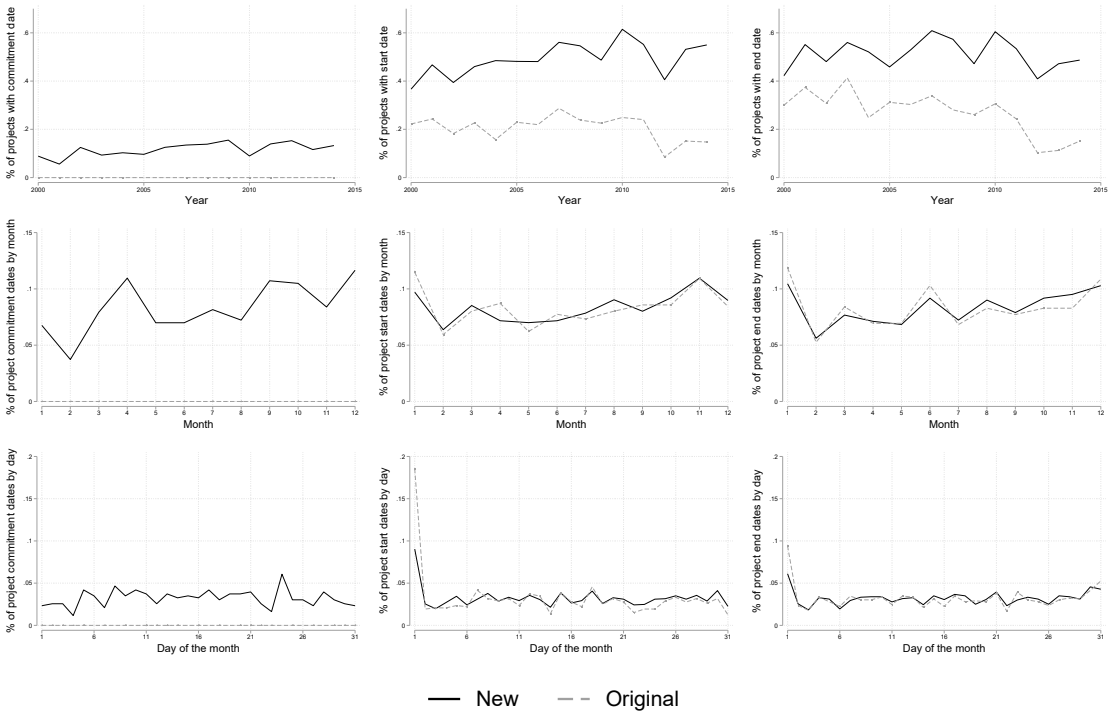
- Open Excel, click view, and freeze panes to keep the variables on display when scrolling down a worksheet.

- Open Google translation page, https://translate.google.com/, and translate the title of the project into Chinese.

- Open Baidu, enter China (中国), recipient country's Chinese name, a broad description of the project's name, and year.

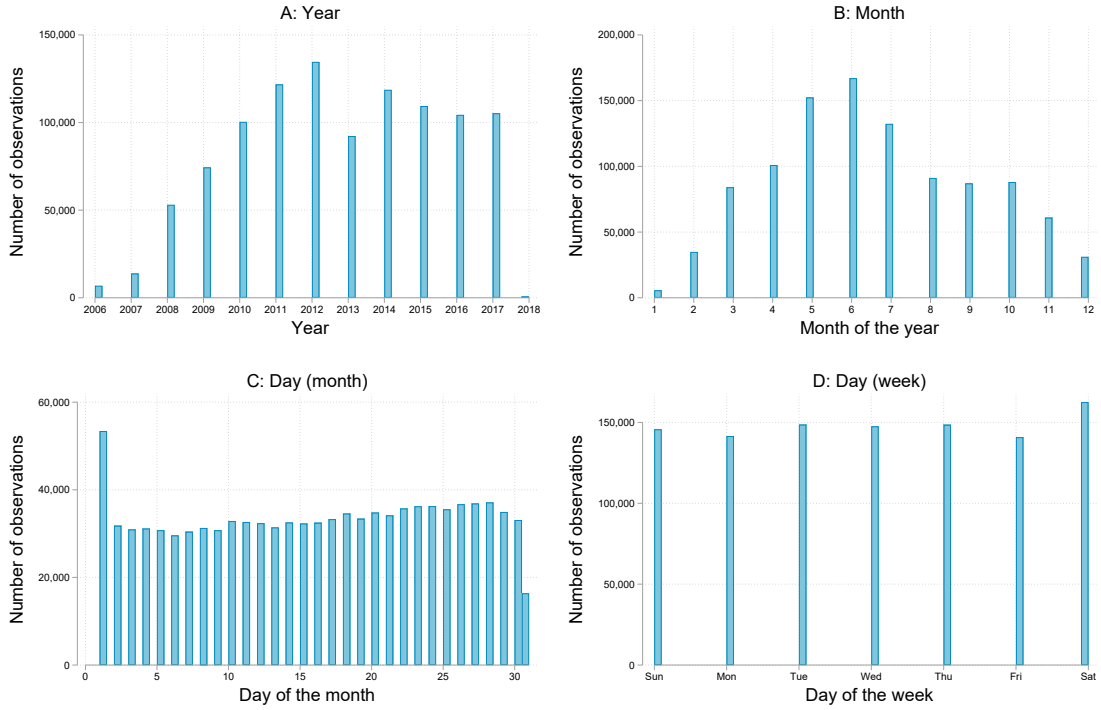
Appendix B: Additional Figures and Tables

Figure B1 – Coverage of Chinese development project dates over time, 2006–2017



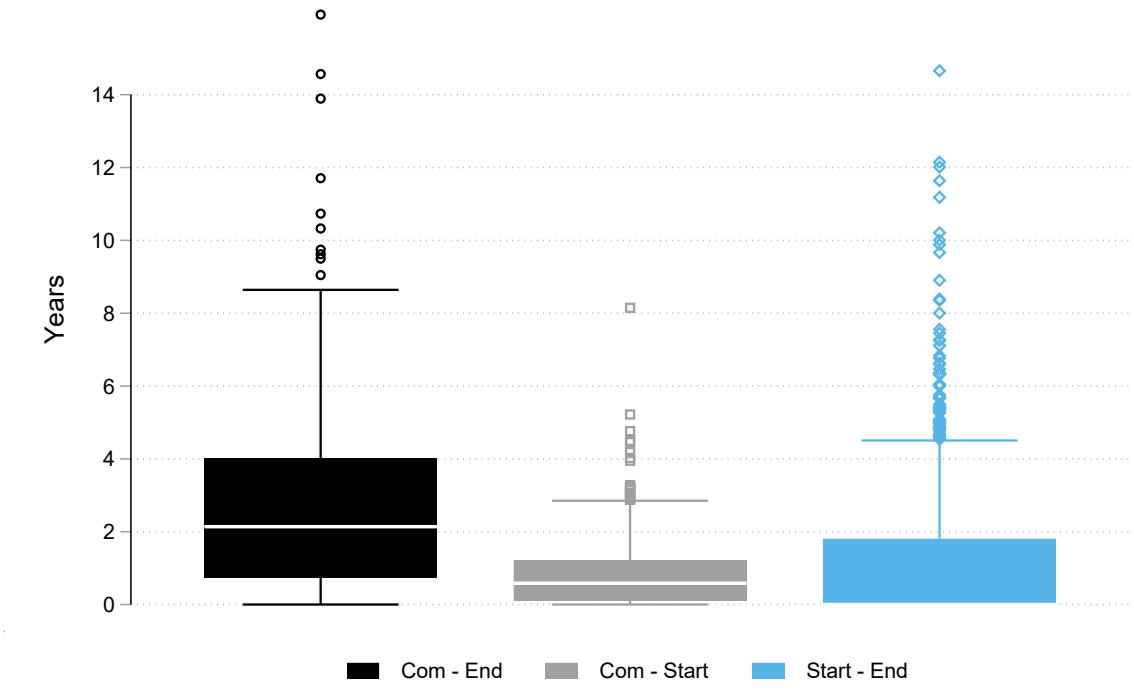
Notes: This figure shows the share of China's development projects for which we have information on commitment, start, and end dates. "Original" refers to information available on project-level events in AidData's Geocoded Global Chinese Development Finance Dataset (version 1.1.1) (Bluhm et al. 2020, Dreher et al. 2022). "New" refers to the dataset we provide in this study. The top row shows the percentage of projects with information on the day of project commitment, start, and end by commitment year (note that no information on commitment dates is available in the original data). The middle and bottom rows show the percentage of projects committed, started, and ended per month of the year and day of the month, respectively.

Figure B2 – Distribution of Gallup World Poll interview dates over time, 2006–2017



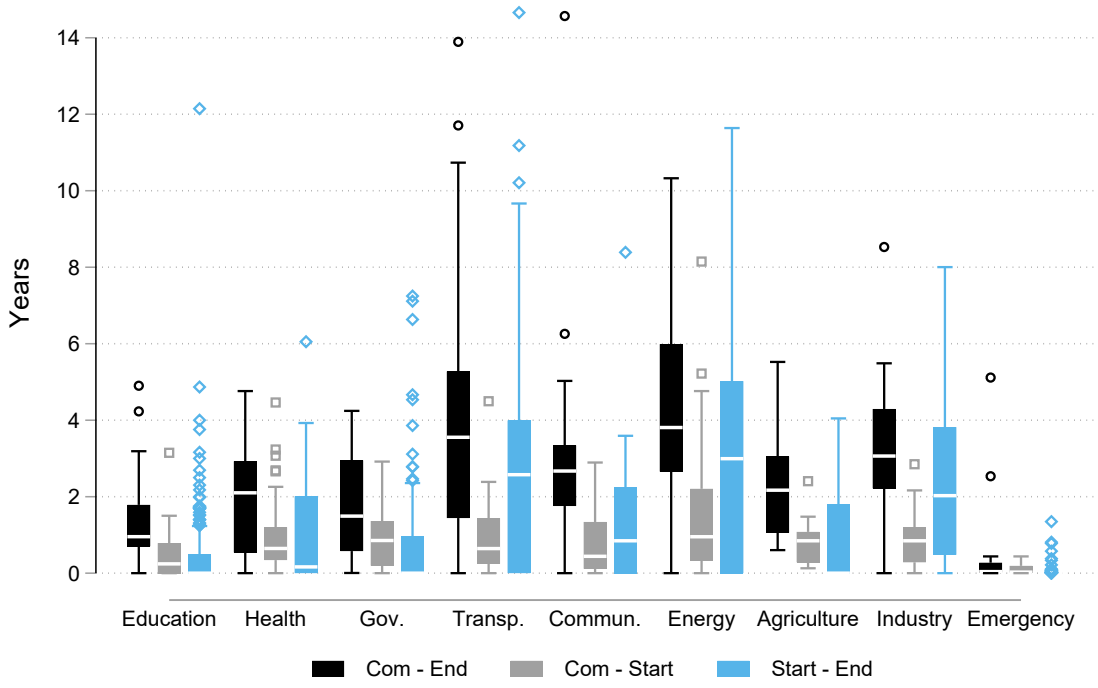
Notes: The figure provides an overview of the distribution of Gallup World Poll interview dates over surveyed years (panel A), months of the year (panel B), days of the month (panel C) and day of the week (panel D).

Figure B3 – Average duration of China's development projects, 2006–2017



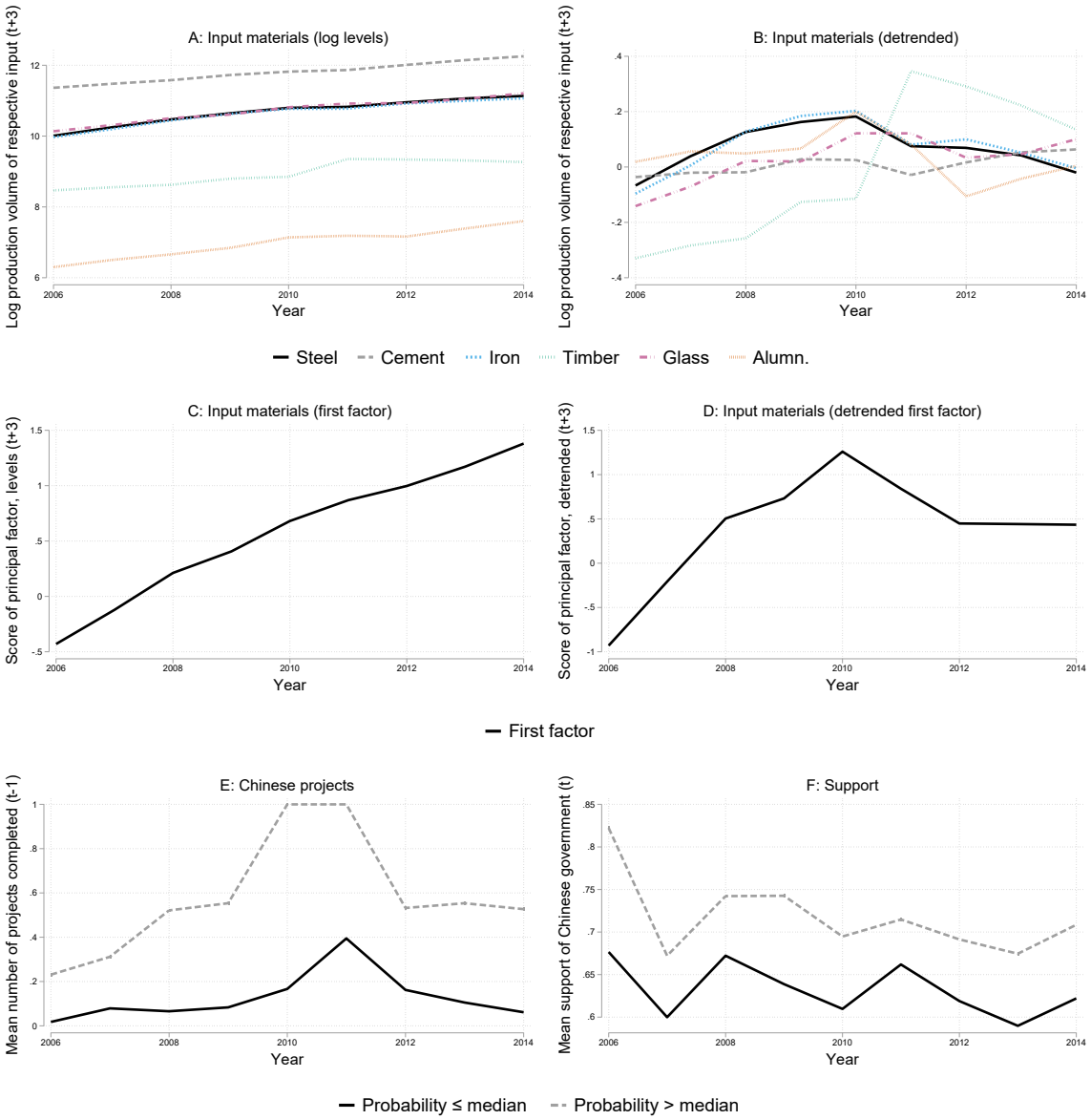
Notes: The figure displays conventional boxplots indicating the time between events for each project in years. 25^{th} percentile, median, and 75^{th} percentile are displayed by the boxes; the whiskers display the upper and lower adjacent values, and dots mark outliers. "Com-End" refers to the time between project commitment and completion, "Com-Start" to the time between project commitment and start, and "Start-End" to the time between start and end date. We exclude projects where the relevant information is missing.

Figure B4 – Average duration of China's development projects, 2006–2017



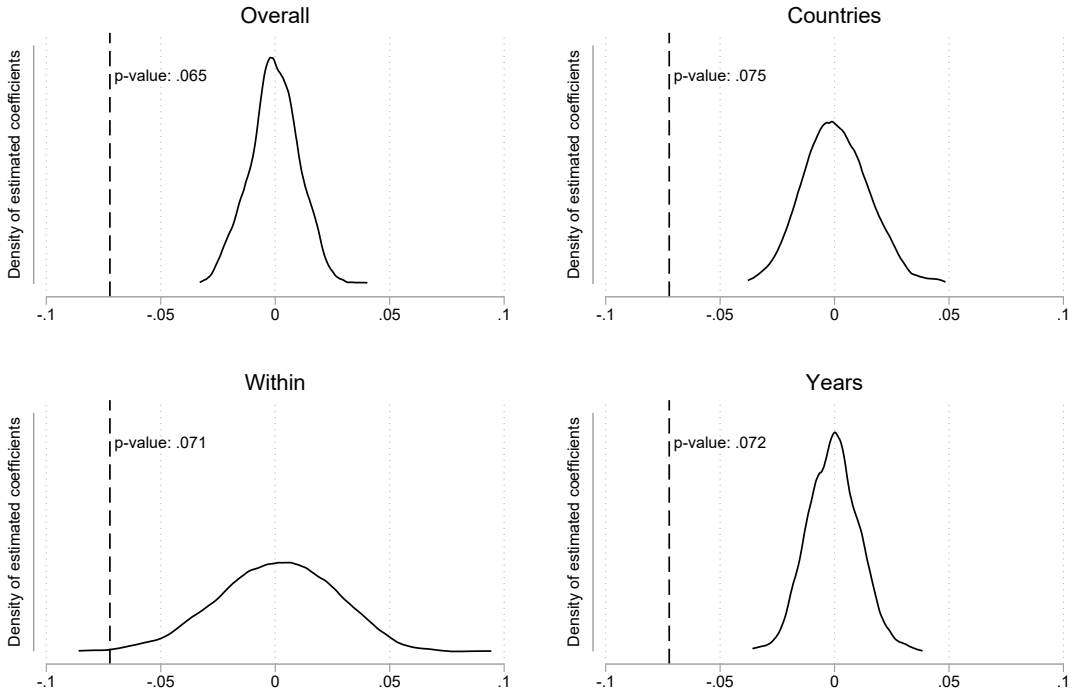
Notes: The figure displays conventional boxplots indicating the time between events for each project in years by sector for the 9 sectors that received most projects. 25^{th} percentile, median, and 75^{th} percentile are displayed by the boxes; the whiskers display the upper and lower adjacent values, and dots mark outliers. "Com-End" refers to the time between project commitment and completion, "Com-Start" to the time between project commitment and start, and "Start-End" to the time between start and end date. We exclude projects where the relevant information is missing.

Figure B5 – Project inputs, development projects, and support for the Chinese government, 2006–2014



Notes: The figures show the time series of Chinese input material production in logs (panel A), detrended logged production (panel B), the first factor of these input materials (panel C), the detrended first factor (panel D), the average number of completed Chinese development projects in recipient provinces grouped by the median probability of receiving projects over the sample period (panel E), and the average support of the Chinese government grouped by the median probability of receiving projects over the sample period (panel F).

Figure B6 – Randomization inference test



Notes: The figure shows the distribution of point coefficients of the completion of Chinese development projects based on 999 Monte Carlo replications under different randomization inference tests. "Overall" swaps the number of projects completed and the instrument for all observations, "Countries" swaps the entire time series between countries, "Within" swaps years within countries, and "Years" swaps countries within years. The original estimate from column 1 of Table 2 is shown by dashed vertical lines. The p-values are calculated as the proportion of times that the absolute value of the t-statistics in the simulated data exceed the absolute value of the original t-statistic.

Table B1 – List of countries

Afghanistan	*Guinea*	Northern Cyprus
Algeria	Haiti	*Pakistan*
Angola	Honduras	Palestina
Argentina	*India*	Panama
Armenia	*Indonesia*	Paraguay
Azerbaijan	Iran	Peru
Bangladesh	Iraq	*Republic of Congo*
Belarus	*Israel*	Romania
Bolivia	Ivory Coast	Russia
Brazil	*Kazakhstan*	Rwanda
Bulgaria	Kyrgyzstan	*Senegal*
Burkina Faso	*Laos*	*Sierra Leone*
Burundi	Latvia	*Somalia*
Cambodia	*Lebanon*	South Africa
Cameroon	*Liberia*	*Sudan*
Central African Republic	Lithuania	*Suriname*
Chad	*Madagascar*	Syria
Chile	Malaysia	Tajikistan
Colombia	*Mali*	Tanzania
Comoros	Mauritania	Thailand
Costa Rica	*Mauritius*	*Togo*
Dem. Rep. of the Congo	Mexico	Tunisia
Djibouti	Moldova	Turkey
Dominican Republic	Mongolia	Turkmenistan
Ecuador	Morocco	Ukraine
Egypt	Mozambique	Uruguay
El Salvador	Myanmar	*Uzbekistan*
Ethiopia	*Namibia*	*Venezuela*
Gabon	Nepal	*Vietnam*
Georgia	Nicaragua	Yemen
Ghana	Niger	*Zambia*
Guatemala	*Nigeria*	*Zimbabwe*

Notes: The table lists all countries and territories included in our regression analysis. For all countries, we map the Gallup spatial identifiers with the subnational regions at the ADM1 level from GADM. The list includes the 34 countries included in our micro-level event study (*in italics)*, and the 91 countries in our macro-level analysis, totalling 96 countries. Israel, Namibia, Somalia, Sudan, and Suriname only feature in the micro-level analysis.

Table B2 – Individual-level event study: Project representativeness, 2006–2017

	(1) Commitment	(2) Start	(3) End	(4) Commitment	(5) Start	(6) End
ODA	-0.0240	8.59e-05	0.00140	-0.00519**	0.000394	0.00170
	(0.0166)	(0.00653)	(0.00679)	(0.00229)	(0.00332)	(0.00340)
Social infrastructure	0.00785	0.00497	-0.000490	0.00127	0.00257	-0.000704
	(0.0247)	(0.00723)	(0.00721)	(0.00257)	(0.00373)	(0.00382)
Economic infrastructure	0.0108	0.0162*	0.00795	0.00331	0.00772*	0.00274
	(0.0251)	(0.00870)	(0.00888)	(0.00309)	(0.00447)	(0.00459)
Production sector	0.0448	0.00247	-0.00385	0.00899**	0.00107	-0.00266
	(0.0294)	(0.0107)	(0.0108)	(0.00371)	(0.00538)	(0.00552)
Amount	-0.0252	-0.00722	-0.00355	-0.00130	-0.00366	-0.00174
	(0.0171)	(0.00559)	(0.00562)	(0.00195)	(0.00282)	(0.00289)
Year	0.00440**	0.00216***	0.000923	0.000553**	0.00111***	0.000429
	(0.00208)	(0.000718)	(0.000721)	(0.000243)	(0.000352)	(0.000361)
Africa	-0.0269	-0.0113	-0.0183	-0.0106**	-0.00438	-0.00681
	(0.0285)	(0.0140)	(0.0148)	(0.00472)	(0.00684)	(0.00702)
Asia	0.00282	-0.0203	-0.0197	-0.00616	-0.00912	-0.00779
	(0.0288)	(0.0142)	(0.0151)	(0.00482)	(0.00699)	(0.00717)
Europe	-0.0359	-0.0287	-0.0312	-0.0140**	-0.0125	-0.0132
	(0.0468)	(0.0198)	(0.0207)	(0.00703)	(0.0102)	(0.0105)
Oceania	-0.0391	-0.00674	-0.0125	-0.0130*	-0.00319	-0.00375
	(0.0527)	(0.0206)	(0.0209)	(0.00700)	(0.0101)	(0.0104)
South America	-0.0825	-0.0292	-0.0298	-0.0118**	-0.0127	-0.0139*
	(0.0798)	(0.0207)	(0.0202)	(0.00560)	(0.00811)	(0.00832)
Observations	429	1,771	1,798	3,485	3,485	3,485
R-squared	0.045	0.013	0.004	0.010	0.007	0.002

Notes: This table analyzes the representativeness of projects. One observation corresponds to a project in our event database of Chinese development projects. We regress a binary variable that takes a value of one if a project event date falls into a GWP survey window on the project characteristics listed below. Columns 1–3 include only projects with a commitment (start/end) date. Columns 4–6 include all projects independent of whether we have information on the commitment (start/end) date. "ODA" takes a value of one if the project is classified as official development assistance; "Social infrastructure" ("Economic infrastructure"/"Production sector") takes a value of one if the project is a part of the broad sector Social Infrastructure and Services (Economic Infrastructure and Services/Production Sectors); "Amount" denotes the commitment amounts per project in US$; and "Year" is the commitment year. Finally, we include binary variables for each of the five world regions named. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

Table B3 – Individual-level event study: Identifying projects with commitment date

Recipient	Title	Type	Flow	Sector	Year	ID	Value (US$ M)
Mali	Chinese organization signs agreement to build Confucius Classroom	Grant	OOF-like	Education	2008	31316	-
Cambodia	Construction project of the National Road No. 3762	Loan	ODA-like	Transport and Storage	2009	32180	20.67
Angola	3rd medical team to Angola	Technical assistance	ODA-like	Health	2013	34934	-
Argentina	China commits 2.1 Billion USD loan for rehabilitation of Belgrano Cargas railway	Loan	OOF-like	Transport and Storage	2014	36517	2100
Venezuela	Chinalco awarded 403 million USD contract for construction of Alcasa aluminum plant	Loan	OOF-like	Industry, Mining, Construction	2011	37914	-
Kazakhstan	China Development Bank commits 1 billion RMB for financing of Aktogay mine	Loan	OOF-like	Industry, Mining, Construction	2011	39557	167.8
Uzbekistan	China loans Uzbekistan 70.11m for purchase of Chinese electric locomotives	Export credits	OOF-like	Transport and Storage	2008	40070	95.15
India	China pledges to train 100 Indian officials on heavy haul transportation	Technical assistance	ODA-like	Transport and Storage	2014	42676	-
India	China opens Confucius Institute at University of Mumbai	Grant	OOF-like	Education	2012	43953	-
Laos	Preferential loan for Laos Xesalalong irrigation project	Loan	Vague	Agriculture, Forestry, Fishing	2011	47306	58.72

Notes: The table displays project-level information for committed projects included in panel A of column 2 of Table 1.

Table B4 – Individual-level event study: Identifying projects with start date

Recipient	Title	Type	Flow	Sector	Year	ID	Value (US$ M)
Mauritania	China issues 2 billion yuan loan to fund Port of Friendship expansion project	Loan	ODA-like	Transport and Storage	2009	3	396.9
Ghana	Bui Dam Complex	Export credits	OOF-like	Energy Generation and Supply	2008	183	475.2
Mauritius	Exim Bank loans 260 mil for the expansion of the Sir Seewoosagur Ramgoolam Airport terminal	Loan	ODA-like	Transport and Storage	2011	1156	352.8
Congo, Rep.	Scholarships for higher education, 2012-2013	Scholarships/training	ODA-like	Education	2012	30143	-
Sudan	China Exim Bank loans 700 million USD for construction of new Khartoum Airport	Loan	ODA-like	Transport and Storage	2014	30543	700
Congo, D.R.	16th Chinese peacekeeping force	Technical assistance	ODA-like	Government and Civil Society	2013	30731	-
Congo, Rep.	22nd Chinese medical team	Technical assistance	ODA-like	Health	2013	31032	-
Senegal	Confucius Institute at University of Dakar	Grant	OOF-like	Education	2011	31282	-
Mali	Chinese organization signs agreement to build Confucius Classroom	Grant	OOF-like	Education	2008	31316	-
Madagascar	China donates anti-malaria medicine	Grant	ODA-like	Health	2008	35213	-
Togo	China sends 19th medical team to Togo	Technical assistance	ODA-like	Health	2011	35492	-
Zimbabwe	13th Chinese medical team	Technical assistance	ODA-like	Health	2013	35655	-
Pakistan	China provides relief material to Pakistan for internally displaced persons	Grant	ODA-like	Emergency Response	2009	35903	5.960
Somalia	China donates goods to Banadir Hospital	Grant	ODA-like	Health	2014	36408	-
Suriname	China Exim Bank commits 50 million USD loan to Suriname housing	Loan	Vague	Industry, Mining, Construction	2012	36772	52.95
Colombia	China donates two Harbin Y-12 aircrafts to Satena, Colombian national airline	Grant	ODA-like	Transport and Storage	2013	37138	-
Pakistan	China loans 1.35 billion USD for Suki Kinari Hydropower Project in Pakistan	Loan	OOF-like	Energy Generation and Supply	2017	39014	1350
Costa Rica	China offers 50 Scholarships per year to Costa Rican students	Scholarships/training	ODA-like	Education	2010	40099	-
Namibia	China donates N50 million to Hardap Inland Aquaculture Centre in Namibia	Grant	ODA-like	Other Social Infrastructure	2014	41578	4.607
India	China signs MoU to help improve Indian Chennai-Mysore Railway	Vague TBD	Vague	Transport and Storage	2014	42673	-
Sierra Leone	China constructs Ministry of Foreign Affairs building for Sierra Leone	Grant	ODA-like	Government and Civil Society	2010	43180	-

Notes: The table displays project-level information for started projects included in panel A of column 3 of Table 1.

Table B5 – Individual-level event study: Identifying projects with end date

Recipient	Title	Flow	Type	Sector	Year	ID	Value (US$ M)
Gabon	Loan for Grand Poubara Hydroelectric Project	ODA-like	Loan	Energy Generation and Supply	2013	85	114.6
Mauritius	China granted 480 billion CNY for the sewer netwok LOT2 project	ODA-like	Loan	Water Supply and Sanitation	2014	145	102.7
Cote D'Ivoire	Post-crisis reconstruction	ODA-like	Grant	Health	2009	718	80.06
Liberia	China contributes peacekeepers to UN mission in Liberia	ODA-like	Technical assistance	Government and Civil Society	2010	1552	-
Nigeria	China constructs four primary schools	ODA-like	Grant	Education	2012	2134	4.404
Guinea	China provides 335 million USD loan for Keleta dam	OOF-like	Loan	Energy Generation and Supply	2015	13823	371.8
Togo	China sends 18th medical team to Togo	ODA-like	Technical assistance	Health	2011	25286	-
Congo, Rep.	Scholarships for higher education, 2012-2013	ODA-like	Scholarships/training	Education	2012	30143	-
Sudan	China Exim Bank loans 700 million USD for construction of new Khartoum Airport	ODA-like	Loan	Transport and Storage	2014	30543	700
Zambia	CDB loans 179.5 million USD for Mansa-Luwingu Road	OOF-like	Loan	Transport and Storage	2016	30719	186.3
Vietnam	Exim Bank loans USD 250 million for Ninh Binh Nitrogenous fertilizer plant	Vague	Loan	Industry, Mining, Construction	2012	34478	515.2
Madagascar	China donates anti-malaria medicine	ODA-like	Grant	Health	2008	35213	-
Liberia	South-South Cooperation in Liberia	ODA-like	Technical assistance	Developmental Food Aid	2014	35267	1.110
Pakistan	China grants materials and funds for a digital seismic network in Pakistan	ODA-like	Grant	Emergency Response	2013	35615	-
Pakistan	China provides relief material to Pakistan for internally displaced persons	ODA-like	Grant	Emergency Response	2009	35903	5.960
Somalia	China donates goods to Banadir Hospital	ODA-like	Grant	Health	2014	36408	-
Colombia	China donates two Harbin Y-12 aircrafts to Satena, Colombian national airline	ODA-like	Grant	Transport and Storage	2013	37138	-
Indonesia	China develops earthquake and tsunami early warning system for Indonesia	ODA-like	Grant	Emergency Response	2010	37897	-
Venezuela	Construction of 3rd Joint Satellite	OOF-like	Loan	Communications	2017	38297	172.8
Costa Rica	China offers 50 scholarships per year to Costa Rican students	ODA-like	Scholarships/training	Education	2010	40099	-
Lebanon	Chinese engineers clear landmines in South Lebanon	ODA-like	Technical assistance	Government and Civil Society	2013	40968	-
Israel	China hosts 'Experience China' cultural event in Israel	OOF-like	Grant	Education	2009	41293	-

Notes: The table displays project-level information for completed projects included in panel A of column 4 of Table 1.

Table B6 – Descriptive statistics

	Obs	Mean	SD	Min	Max
	Micro: Individual level				
Approval of China	29,331	0.70	0.46	0.00	1.00
Post	29,331	0.45	0.50	0.00	1.00
Gender	29,331	0.47	0.50	0.00	1.00
Age	29,331	36.37	15.40	13.00	99.00
Age squared	29,331	1,560	1,348	169	9,801
Education	29,331	1.65	0.64	1.00	3.00
Rural/urban	29,331	2.43	1.14	1.00	4.00
	Macro: Province level				
Approval of China	6,296	0.60	0.25	0.00	1.00
Projects completed (province)	6,296	0.10	0.55	0.00	11.00
Province probability	6,296	0.04	0.09	0.00	0.80
Input factors	6,296	0.63	0.32	-0.93	1.26
Age	6,296	37.53	6.00	20.60	71.74
Age squared	6,296	1,693	540	461	5,202
Gender	6,296	0.52	0.11	0.00	1.00
Education	6,296	1.61	0.33	1.00	2.78
Rural/urban	6,296	2.21	0.85	1.00	4.00
	Macro: Country level				
Approval of China	452	0.63	0.17	0.12	0.97
Projects completed (country)	452	1.46	4.70	0.00	84.00
Projects completed pred. (country)	452	1.35	3.90	-0.00	65.00
Age	452	36.47	3.61	30.53	48.99
Age squared	452	1,601	318	1,111	2,783
Gender	452	0.51	0.02	0.45	0.57
Education	452	1.58	0.29	1.05	2.28
Rural/urban	452	2.26	0.53	1.09	3.58

Notes: The table displays the descriptive statistics for the samples used in the micro analysis (Table 1, column 1, panel A) and the macro analysis Table 2, column 2, panel C. for the province level and Table 2, column 1, panel C for the country level).

Table B7 – Chinese projects and government support, event study results, alternative specifications

	(1) All	(2) Commit.	(3) Start	(4) End
	Panel A: OOF projects			
Post	-0.0178	-0.0329	-0.0440	0.0224
	(0.0216)	(0.0447)	(0.0295)	(0.0382)
Observations	11,277	3,866	4,834	3,239
Number of countries	15	7	6	5
Number of provinces	184	84	64	76
Number of projects	16	7	6	5
Province-Year FE	✓	✓	✓	✓
	Panel B: Non-large projects			
Post	0.000304	-0.0915*	0.0122	0.0213
	(0.0159)	(0.0511)	(0.0197)	(0.0200)
Observations	15,548	3,441	9,743	7,600
Number of countries	19	4	12	11
Number of provinces	205	67	123	105
Number of projects	20	5	13	11
Province-Year FE	✓	✓	✓	✓

Notes: The dependent variable is binary and indicates whether or not an interviewed individual approves of the Chinese government, based on the question "Do you approve or disapprove of the job performance of the leadership of China?" The sample is restricted to individuals interviewed within 30 days before or after ("Post") a project-related event date. Panel A only includes "Other Official Flows-like" projects. Panel B only includes projects with a size below US$ 1 million (or where information on financial values is not available). All specifications include individual-level and survey controls. Standard errors are clustered by country-day: *** p<0.01, ** p<0.05, * p<0.1.

Table B8 – Individual-level event study: Chinese projects, public opinion, and project provinces

	(1) All	(2) Commit.	(3) Start	(4) End	(5) All	(6) Commit.	(7) Start	(8) End	(9) All	(10) Commit.	(11) Start	(12) End
	Panel A: All projects				*Panel B: ODA projects*				*Panel C: Large projects*			
Post	0.00663	-0.0715**	0.0219	0.0254	0.0217	-0.0409	0.0484***	0.0344*	0.0184	0.000968	0.0330	0.0584**
	(0.0116)	(0.0362)	(0.0147)	(0.0158)	(0.0146)	(0.0747)	(0.0179)	(0.0178)	(0.0162)	(0.0518)	(0.0231)	(0.0241)
Post * Project province	0.0329	0.151*	0.00667	0.0402	0.00764	-0.0601	-0.0192	0.0586*	0.0394	0.141	0.0844	-0.00528
	(0.0261)	(0.0813)	(0.0343)	(0.0322)	(0.0293)	(0.235)	(0.0357)	(0.0340)	(0.0353)	(0.0927)	(0.0517)	(0.0425)
Sum of coefficients	0.0395	0.0795	0.0285	0.0656**	0.0293	-0.1011	0.0292	0.0929**	0.0577*	0.1422	0.1174**	0.0531
Joint sign. (p-value)	(0.1167)	(0.3173)	(0.3949)	(0.0379)	(0.2973)	(0.6792)	(0.3942)	(0.0059)	(0.0931)	(0.1330)	(0.0246)	(0.1974)
Observations	29,331	5,610	15,362	15,465	19,017	1,744	10,528	12,226	13,783	2,169	5,619	7,865
R-squared	0.217	0.317	0.157	0.210	0.179	0.373	0.132	0.183	0.168	0.269	0.089	0.158
Number of countries	35	9	19	20	22	3	14	15	19	5	7	11
Number of provinces	420	128	185	247	265	58	125	171	254	61	62	161
Number of projects	41	10	21	22	26	3	15	17	21	5	8	11
Province-year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: The dependent variable is binary and indicates whether or not an interviewed individual approves of the Chinese government, based on the question "Do you approve or disapprove of the job performance of the leadership of China?" The sample is restricted to individuals interviewed within 30 days before or after ("Post") a project-related event date. "Project province" is a binary variable indicating if a province hosts the respective Chinese development project. Panel A shows results for the full sample of projects that contain information on the specific event date and fall into the interview window. Panel B only includes "Official Development Assistance-like" projects. Panel C only includes large projects, i.e., those with a size of US$ 1 million or above. All specifications include individual-level and survey controls. Standard errors are clustered by country-day: *** p<0.01, ** p<0.05, * p<0.1.

Appendix C: Extensions and Robustness

C.1. Sector-specific Results

This section tests possible transmission channels by investigating sector-specific projects. Projects in some sectors potentially affect public opinion with China differentially from others, for example because they receive more attention (in the project location or elsewhere) or because they induce greater externalities. We also expect that projects targeted at large portions of a recipient country population should be more likely than more narrowly-targeted projects to produce positive, widespread public opinion gains for a donor government.

We test whether the number of Chinese development projects completed in a province or country in the previous year affects approval of China differently if at least one of these projects was given to a specific main sector—social, economic, or production—or sub-sector.[68] To this end, we add a dummy indicating the sector and the interaction of the dummy with the number of projects to eq. (2) and estimate it with a Control Function (CF) Approach. This implies that we control for the first-stage regression residual (shown in eq. (3) above) in all second stages. Alternatives to this approach are 2SLS employing the interaction of our instrument with the sector indicator or separate regressions for each sector. The first approach treats the interaction of the endogenous variable as separate, implying it "can be quite inefficient relative to the more parsimonious CF approach" (Wooldridge 2015, p. 429).[69] The second violates the exclusion restriction, as for each regression we have to assume that Chinese development projects affect public approval exclusively via the sector the regression focuses on.[70]

Panel A of Table C1 shows the results at the level of countries. First, no sector seems to be driving the positive effect of project completion on the support for the Chinese government. The positive effect of Chinese projects is reduced if at least one project went to the production sector. In terms of sub-sectors, the same holds for the agriculture and industry sectors. Agriculture includes agricultural equipment and demonstration centers, fertilizer factories and land development. Industry includes mines, pipelines and industrial plants for potash, aluminium, and platinum. If anything, these projects are rather private goods of commercial character that do not benefit a wider audience, which might explain this finding.

At the province level in Panel B, the picture is different. Chinese projects are seen as

[68] Note that we focus on the longer-term analyses in this and the following sections given that the number of projects in the event specification is too low for sector-specific analyses.

[69] This increase in efficiency comes at the cost of an additional assumption; that is, we need to assume that the bias is constant in all sectors. Note that we adjust standard errors to take account of the predicted estimator from the first stage.

[70] In the Control Function specification, the first-stage regressions (and F-statistics) are identical to those shown in columns 1 and 2 of Table 2.

more positive if at least one of them is completed in the production sector. The positive effect is driven by projects completed in the agricultural sector, providing evidence that the transfer of technical equipment and land development is positively perceived around the places where these projects are undertaken. The same holds true for emergency aid. Finally, there is an additional negative support premium on the completion of water-related projects in project regions.

Both the positive country effect, as well as the negative province effect does not seem to be driven by a specific sector, but rather prevail among all Chinese development activities. The sector-specific analysis provides some evidence in line with the expectation that projects targeted at large portions of a recipient country population are more likely than more narrowly-targeted projects to produce positive, widespread public opinion gains for a donor government.

Table C1 – Chinese projects and government support, instrumental variables results by sector

	(1) Social (S)	(2) Economic (E)	(3) Production (P)	(4) Education (S1)	(5) Health (S2)	(6) Water (S3)	(7) Government (S4)	(8) Transport (E1)	(9) Communication (E2)	(10) Energy (E3)	(11) Agriculture (P1)	(12) Industry (P2)	(13) Emergency (.)
Panel A: Country level													
Chinese Projects $_{t-1}$	0.00581*	0.00483**	0.00597***	0.00199***	0.00246	0.00206***	0.00191***	0.00219***	0.00412*	0.00195***	0.00544***	0.00204***	0.00201***
	(0.00341)	(0.00224)	(0.00157)	(0.000669)	(0.00206)	(0.000698)	(0.000617)	(0.000775)	(0.00232)	(0.000627)	(0.00168)	(0.000652)	(0.000643)
Sector dummy	0.0116	0.0262*	0.00458	0.0153	0.00280	0.00102	-0.00476	0.0305	-0.0338	0.0326	-0.0103	0.0636*	0.0173
	(0.0108)	(0.0147)	(0.0236)	(0.0181)	(0.0138)	(0.0491)	(0.0224)	(0.0361)	(0.0279)	(0.0263)	(0.0299)	(0.0354)	(0.0314)
Interaction	-0.00421	-0.00366	-0.00491**	-0.000304	-0.000539	-0.00518	0.00166	-0.00402	-0.00183	-0.00162	-0.00399*	-0.0227**	-0.000872
	(0.00358)	(0.00223)	(0.00193)	(0.00263)	(0.00248)	(0.0104)	(0.00320)	(0.00490)	(0.00297)	(0.00738)	(0.00208)	(0.0105)	(0.00420)
Observations	452	452	452	452	452	452	452	452	452	452	452	452	452
Number of countries	90	90	90	90	90	90	90	90	90	90	90	90	90
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Panel B: Province level													
Chinese Projects $_{t-1}$	-0.0668	-0.0758*	-0.0711*	-0.0695	-0.0705	-0.0723*	-0.0724*	-0.0718*	-0.0725*	-0.0751*	-0.0720*	-0.0718*	-0.0713*
	(0.0441)	(0.0420)	(0.0421)	(0.0430)	(0.0449)	(0.0420)	(0.0421)	(0.0418)	(0.0418)	(0.0412)	(0.0417)	(0.0422)	(0.0421)
Sector dummy	0.00535	0.0275	-0.118	-0.0134	-0.00268	0.0410	0.0187	-0.00536	0.0270	0.0438	-0.135	-0.163	-0.0689
	(0.0219)	(0.0323)	(0.0716)	(0.0326)	(0.0280)	(0.0580)	(0.0291)	(0.0494)	(0.0606)	(0.0418)	(0.0895)	(0.213)	(0.0468)
Interaction	-0.00954	0.00335	0.0367***	-0.00214	-0.00199	-0.0376*	0.00204	-0.00231	0.000512	0.0157	0.0392**	0.0932	0.0216*
	(0.0128)	(0.00999)	(0.0131)	(0.0136)	(0.0130)	(0.0223)	(0.00852)	(0.0139)	(0.0107)	(0.0110)	(0.0154)	(0.110)	(0.0122)
Observations	6,296	6,296	6,296	6,296	6,296	6,296	6,296	6,296	6,296	6,296	6,296	6,296	6,296
Number of countries	91	91	91	91	91	91	91	91	91	91	91	91	91
Number of provinces	1,399	1,399	1,399	1,399	1,399	1,399	1,399	1,399	1,399	1,399	1,399	1,399	1,399
Country-year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Province FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: The table reports results from a Control Function Approach, where we control for the first-stage residual of column 2 (1) of Table 2 at the country (province) level. "Social," "Economic," and "Production" are the main sectors. We also report key sub-sectors and emergency aid. "Education," "Health," "Water," and "Government" are sub-sectors of "Social"; "Transport," "Communication," and "Energy" are sub-sectors of "Production"; and "Agriculture" and "Industry" are sub-sectors of "Production." "Emergency" is not included in a main sector. Standard errors (adjusted for uncertainty arising from the use of the predicted value from the first stage) are clustered by country: *** p<0.01, ** p<0.05, * p<0.1.

C.2. Tests for Robustness

We test the robustness of our key results in a number of ways. First, we complement the results shown in Tables 1 and 2 with analyses of Other Official Flows and projects with commitment volumes below US$ 1 million ("non-large"). Second, we define development finance in terms of a binary indicator for any project or commitment amounts rather than numbers. Third, we investigate different timings with which development projects could affect public opinion. Fourth, we test the robustness of results to variants of our instrumental variable. And fifth, we investigate robustness to other shocks originating in China that might potentially violate the exclusion restriction for our instrument to be valid.

Table B7 shows that there are no effects of non-concessional OOF projects on public opinion at the micro-level. Non-large projects similarly register insignificant effects, the exception being project commitments, which reduce public approval of the Chinese government. This result is however based on very few observations and projects.

Columns 1–4 of Table C2 shows the results for OOF and non-large projects at the macro-level. While there is no significant effect off OOF projects on support for China's government, the effect of non-large projects stays significant at the country (but not province) level. Surprisingly, the coefficient is larger rather than smaller compared to those for large projects shown in Table 2.

In columns 5–8 of Table C2 we turn to the results for our alternative definitions of Chinese development funding. At the country level, our results are robust when we use a binary project indicator or (log) commitment amounts instead of the project count. The negative coefficient at the level of provinces however is estimated less precisely.

Table C3 investigates different timings with which projects might affect approval of the Chinese government. As can be seen, there are no significant effects two years after project completion, though the marginal effect is almost identical to the one-year lag we chose for our main analysis, both at the level of provinces and countries. The table also shows that deeper lags are insignificant as well. The same holds for future projects which serves as important placebo test.

Table C4 probes our instrument in various ways. First, we calculate the "probability of receiving projects" based on pre-sample years (2000-2006). This has the advantage of being more plausibly exogenous unconditionally. It comes at the cost of reduced information from a small number of years, so that we expect the power of the instrument to be lower. Second, we employ an additional instrumental variable, suggested by Dreher et al. (2021b). Dreher et al. show that the larger availability of foreign currency reserves increases the supply of China's development funding. This is because much of China's funding comes as interest-bearing loans, which represents a financially attractive means to hold such reserves. In line with Dreher et al. we interact China's net currency reserves

in US$ with the "probability of receiving projects," so that the instrument again varies across space as well as over time. Third, we purge the input materials that we use to construct our main instrument by China's GDP (relying on a regression of each input factor on China's GDP in constant local currency units), so that we take account of China's varying domestic needs for input materials before constructing our instrument. Fourth, we replace the six input materials by just one—steel, before we interact it with the "probability of receiving projects," in line with Dreher et al. (2021a), who originally introduced this instrument. Finally, we offer a placebo regression, where we instrument China's development projects with yearly volumes of U.S. steel production (Bluhm et al. 2020).

We restrict these tests to the province-level regressions given that they refer to the instrumental variable, which we construct on this level.[71] Table C4 shows that the results are robust to these perturbations of the instrument. Column 2 includes the second instrument, based on China's net currency reserves. Compared to column 1, which includes the original estimate based on the input factor-based instrument, the coefficient hardly changes, and is more precisely estimated. Column 3 returns to the original instrument, but uses "historical" probabilities to receive projects as part of the instrument. In column 4, we combine the two changes (i.e., we use both instruments, based on "historical" probabilities). Coefficients increase in size, with marginal (in-)significance. Column 5 shows results focussing on "overproduction," where we have residualized factor inputs by running a regression of each input on the log of Chinese GDP (in constant local currency) before the first factor was extracted. Again, results hardly change. When we base the instrument on just steel (in column 6), results are again similar, though the coefficient is less precisely estimated.[72] The placebo regressions in column 7, 8, and 9 instead shows a very weak first stage when we replace Chinese raw material inputs with US steel production, US raw material production, or Chinese toilet paper production, with a completely insignificant coefficient in the second stage.[73]

Table C5 probes the exclusion restriction for our instrument to be valid, both at the

[71] We only aggregate province level predictions where F-statistics are above the conventional threshold (Columns 1, 2, 5, and 6). For these, country level results are almost identical to the baseline.

[72] More specifically, we use the linearly detrended log of Chinese steel production from the National Bureau of Statistics of China as the time-series shock. We standardize this variable before multiplying it with the exposure term so that the coefficient is comparable with that using the first common factor of all inputs.

[73] Column 7 uses a US construction steel production index from FRED hosted by the Federal Reserve Bank of St. Louis (Series IPN3311A2BS). We log, detrend, and standardize the series, just like Chinese steel production in the previous column. Column 8 constructs the logged, detrended first factor of US raw material production in equivalence to the input factor used for Chinese raw material production, relying on FRED data on US production of aluminum (IPG3313S), cement (IPG3273SQ), glass (IPG3272S), iron (IPG3311A2NQ), steel (IPN3311A2BS), and timber (IPG321S). Column 9 interacts the province-specific probability of receiving aid with Chinese production of household and sanitary papers in tonnes from FAOSTAT) as a placebo instrument. We log, detrend, and standardize the series, just like the steel production.

level of provinces (Panels A and B) and countries (Panels C and D). Column 1 adds the interaction of Chinese FDI outflows (in logs of current US dollars) interacted with the "probability of receiving projects." Column 2 focuses on 'Imports' rather than FDI, defined as bilateral imports from China (in logs of current US dollars) from the IMF Direction of Trade Statistics. 'Exports' (in column 3) is the value of donor-country exports to China (in logs of current US dollars) from the IMF Direction of Trade Statistics. We do so because countries that often receive aid from China are likely to be also countries were China invests and trades. The "probability of receiving projects" could thus proxy the "probability of trading and investing." Given that material input production is likely to be correlated with trade and investment as well as with aid, results for aid might be spurious. However, Table C5 shows that results hardly change when we include these variables, individually (in columns 1–3), or jointly (column 4). While we cannot rule out that other omitted variables violate the exclusion restriction, we consider it unlikely given that controlling for the three variables that are most plausibly related to China's development projects and its input material production hardly change our results.

Table C2 – Chinese projects and government support, instrumental variables results, alternative specifications

	(1) OOF	(2) OOF	(3) Non-large	(4) Non-large	(5) Dummy	(6) Dummy	(7) Amounts	(8) Amounts
				Panel A: OLS				
Chinese projects $_{t-1}$	-0.00302	0.00431	-0.0168**	0.00625**	-0.0106	0.0104***	0.000541	0.000418**
	(0.0114)	(0.00404)	(0.00734)	(0.00267)	(0.0102)	(0.00244)	(0.000738)	(0.000183)
				Panel B: Reduced form				
Input*probability $_{t-3}$	-0.0465	0.00378	-0.134	0.00655**	-0.139**	0.0119***	-0.139**	0.000503**
	(0.187)	(0.00396)	(0.0950)	(0.00292)	(0.0677)	(0.00316)	(0.0677)	(0.000232)
				Panel C: 2SLS				
Chinese Projects $_{t-1}$	-0.0356	0.00380	-0.0983	0.00630**	-0.323	0.0112***	-0.0159	0.000466**
	(0.140)	(0.00398)	(0.0907)	(0.00282)	(0.248)	(0.00298)	(0.00993)	(0.000215)
				Panel D: First stage				
Input*probability $_{t-3}$	1.515**	0.990***	1.008	1.019***	0.399**	1.037***	9.380***	1.062***
	(0.643)	(0.0105)	(0.701)	(0.0230)	(0.180)	(0.0308)	(2.801)	(0.0357)
Observations	6,296	452	6,296	452	6,296	452	6,296	452
Level	Province	Country	Province	Country	Province	Country	Province	Country
Size	OOF	OOF	Non-Large	Non-Large	All	All	All	All
Number of countries	91	90	91	90	91	90	91	90
Number of provinces	1,399	1,399	1,399	1,399	1,399	1,399	1,399	1,399
Country FE		✓		✓		✓		✓
Year FE		✓		✓		✓		✓
Country-year FE	✓		✓		✓		✓	
Province FE	✓		✓		✓		✓	
F-Stat	4.989	13,103	3.082	7437	5.027	1795	8.951	1255

Notes: The dependent variable in panels A–C is the share of individuals that approve of the Chinese government in a given province/country, based on the question "Do you approve or disapprove of the job performance of the leadership of China?" The dependent variable in panel D and variable of interest in panels A–C is the number of Chinese development projects completed in the previous year ("Chinese projects $_{t-1}$"). Columns with project type "OOF" include only non-"Official Development Assistance-like" projects. Columns with project type "Non-large" include only projects with a size of below US$ 1 million or those without financial values reported. "Dummy" indicates that we change the variable of interest to a binary variable indicating whether or not a Chinese development project was completed. "Amounts" indicates that we exchanged the variable of interest to the log amount of projects completed. Columns with level "Province" ("Country") contain results of regressions at the province-year (country-year) level. All specifications include the control variables age, age squared, gender, education, and urban in addition to the set of fixed effects indicated in the table. Standard errors are clustered by country: *** p<0.01, ** p<0.05, * p<0.1.

Table C3 – Chinese projects and government support, instrumental variables results, leads and lags

	(1) t-4	(2) t-3	(3) t-2	(4) t-1	(5) t+0	(6) t+1	(7) t+2
	Panel A: Country Level						
Chinese projects	-0.00201	0.000101	0.000310	0.00206**	0.000804	-0.000168	0.000519
	(0.00153)	(0.00194)	(0.000806)	(0.000973)	(0.000513)	(0.00100)	(0.000712)
Observations	452	452	452	452	452	452	452
Number of countries	90	90	90	90	90	90	90
Baseline				✓			
Country FE	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓
F-stat	3,975	12,743	6,593	463.3	3,582	1,211	1,395
	Panel B: Province Level						
Chinese projects	0.0323	-0.00110	-0.0702	-0.0722*	-0.0757	-0.171	-0.0780
	(0.0304)	(0.0295)	(0.0456)	(0.0389)	(0.149)	(0.151)	(0.166)
Observations	6,296	6,296	6,296	6,296	6,296	5,094	3,943
Number of countries	91	91	91	91	91	89	84
Number of provinces	1,399	1,399	1,399	1,399	1,399	1,321	1,199
Baseline				✓			
Country-year FE	✓	✓	✓	✓	✓	✓	✓
Province FE	✓	✓	✓	✓	✓	✓	✓
F-stat	6.945	13.92	6.023	22.14	0.944	1.871	0.671

Notes: The table reports results from eq. (2) changing the lag structure of the dependent variable and the instrument. Column titles indicate the lag of the independent variable (Chinese development projects); the instrumental variable (raw material inputs) is lagged by two additional years relative to the independent variable. Panel A reports province level results, panel B the aggregated country level results. Column 4 reports the baseline. Standard errors are clustered by country: *** p<0.01, ** p<0.05, * p<0.1.

Table C4 – Chinese projects and government support, instrumental variables results, robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Shift	Input	Input + reserves	Input + reserves	Input	Over-production	Detrended steel	US steel placebo	US input placebo	Toilet paper
Share	*All*	*All*	*Historic*	*Historic*	*All*	*All*	*All*	*All*	*All*
Chinese Projects $_{t-1}$	-0.0722*	-0.0762**	-0.175*	-0.166	-0.0797**	-0.0707	-0.142	-0.105	-0.131
	(0.0389)	(0.0377)	(0.0985)	(0.137)	(0.0395)	(0.0429)	(0.543)	(0.101)	(0.0992)
Observations	6,296	6,296	6,296	6,296	6,296	6,296	6,296	6,296	6,296
Number of countries	91	91	91	91	91	91	91	91	91
Number of provinces	1,399	1,399	1,399	1,399	1,399	1,399	1,399	1,399	1,399
Country-year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Province FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
F-stat	22.14	11.11	6.840	7.822	12.19	15.09	0.145	2.241	3.190

Notes: The table reports results from eq. (2) changing the components of the instrumental variable. Column 1 reports the baseline. In columns 2 and 3, we use a second instrument consisting of the changes in China's net currency reserves interacted with the same probability of receiving aid (Dreher et al. 2021b). Column 4 interacts with the probability of receiving aid in the pre-sample period (2000-2006). Columns 5 – 7 change the definition of the shift variable. "Overproduction" implies that the factor inputs were residualized by running a regression of each input on the log of Chinese GDP in constant local currency before the first factor was extracted. We standardize this variable before multiplying it with the exposure term so that the coefficient is comparable with that using the first common factor of all inputs. "Detrended steel" uses the standardized, linearly detrended log of Chinese steel production from the National Bureau of Statistics of China as the time-series shock. 'US Steel Placebo' uses a standardized, linearly detrended log US steel production index from FRED hosted by the Federal Reserve Bank of St. Louis (Series IPN3311A2BS) as a placebo instrument. 'US Input Placebo' uses the first factor of US raw materials production indices from FRED of aluminum (IPG3313S), cement (IPG3273SQ), glass (IPG3272S), iron (IPG3311A2NQ), steel (IPN3311A2BS), and timber (IPG321S) as a placebo instrument. 'Toilet Paper' uses the standardized, linearly detrended log Chinese production of household and sanitary papers in tonnes from FAOSTAT as placebo instrument. Standard errors are clustered by country: *** p<0.01, ** p<0.05, * p<0.1.

Table C5 – Chinese projects and government support, instrumental variables results, other "China shocks"

	(1) FDI	(2) Imports	(3) Exports	(4) All
Country level				
	Panel A: 2SLS			
Chinese Projects $_{t-1}$	0.00189**	0.00174*	0.00190*	0.00184*
	(0.000939)	(0.000942)	(0.000987)	(0.000997)
	Panel B: First stage			
Input*probability $_{t-3}$	1.223***	1.222***	1.224***	1.224***
	(0.0571)	(0.0574)	(0.0571)	(0.0575)
Observations	452	438	438	438
Number of countries	90	87	87	87
F-stat	458.6	454	460.3	453.8
Province level				
	Panel C: 2SLS			
Chinese Projects $_{t-1}$	-0.0665*	-0.0674	-0.0717*	-0.0663*
	(0.0364)	(0.0409)	(0.0399)	(0.0386)
	Panel D: First stage			
Input*probability $_{t-3}$	1.937***	1.904***	1.899***	1.920***
	(0.385)	(0.409)	(0.391)	(0.427)
Observations	6,296	6,207	6,207	6,207
Number of countries	91	88	88	88
Number of provinces	1,399	1,379	1,379	1,379
F-stat	25.38	21.70	23.52	20.19

Notes: The table reports instrumental variables results adding "China shock" control variables. Panels A and B report results on the country level based on eq. (4) and eq. (5), panels C and D report results on the province level based on eq. (2) and eq. (3). Panel A (C) shows the second stage of two-stage least-squares fixed-effects regressions where the dependent variable is the share of individuals that approve of the Chinese government in a given province/country, based on the question "Do you approve or disapprove of the job performance of the leadership of China?" Panel B (D) shows the corresponding first-stage least-squares fixed-effects regressions where the dependent variable is the number of Chinese development projects completed in the previous year. Each column adds a "China Shock" variable interacted with the country- (province-) specific probability of receiving aid. "FDI" are Chinese FDI outflows (in logs of current US dollars) from UNCTAD. "Imports" are recipient-country imports from China (in logs of current US dollars) from the IMF Direction of Trade Statistics. "Exports" is the value of recipient-country exports to China (in logs of current US dollars) from the IMF Direction of Trade Statistics. "All" reports the results when including all three "China shock" control variables. Province-level specifications include province-fixed effects and country-year-fixed effects, country-level specifications include country- and year-fixed effects. All specifications include the control variables age, age squared, gender, education, and urban. Standard errors are clustered by country: *** p<0.01, ** p<0.05, * p<0.1.

Bibliography Appendix

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