

# KIEL WORKING PAPER

**Tracking Chinese Aid  
through China  
Customs:  
Darlings and Orphans  
after the COVID-19  
Outbreak**



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*Andreas Fuchs, Lennart Kaplan, Krisztina Kis-Katos, Sebastian S. Schmidt, Felix Turbanisch,  
Feicheng Wang*

# ABSTRACT

## TRACKING CHINESE AID THROUGH CHINA CUSTOMS: DARLINGS AND ORPHANS AFTER THE COVID-19 OUTBREAK

*Andreas Fuchs, Lennart Kaplan, Krisztina Kis-Katos, Sebastian S. Schmidt, Felix Turbanisch and Feicheng Wang*

Since the outbreak of the COVID-19 pandemic, China's mask and vaccine diplomacy have been widely discussed, but the debate relies on a few stylized data points. This article introduces a systematic way to measure China's foreign aid in almost real-time through official customs records of exported aid goods. Our results show significant shifts in China's aid after the outbreak of the COVID-19 pandemic. First, medical aid skyrocketed after the outbreak. It was initially dominated by face masks and other protective equipment and later by vaccines. This came at the expense of non-medical aid, which was 16.3 percent below its pre-pandemic level. Second, China's aid became global, clearly extending beyond the Global South. Third, in the aftermath of the initial outbreak in March 2020, China's aid became less responsive to both recipient need and political friendship, which can be mainly attributed to the rise of aid through non-government sources. However, in the vaccine diplomacy period of 2021, economic needs and political factors have regained their original importance.

**Keywords:** official development assistance, aid exports, China, COVID-19, mask diplomacy, vaccine diplomacy, Health Silk Road

**JEL classification:** F35, F59, H12, H84, I15, I18, P33

**Andreas Fuchs**

Kiel Institute for the World Economy /  
University of Göttingen  
Georg-August-Universität Göttingen  
Faculty of Business and Economics,  
Platz der Göttinger Sieben 3,  
D-37073 Göttingen, Germany

*Email:*

*mail@andreas-fuchs.net.*

**Lennart Kaplan**

University of Göttingen /  
German Development Institute

**Krisztina Kis-Katos**

University of Göttingen

**Sebastian S. Schmidt**

University of Göttingen

**Felix Turbanisch**

University of Göttingen

**Feicheng Wang**

University of Groningen

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# 1 Introduction

Western observers raise concerns that the coronavirus pandemic has been a catalyst of China’s rise as a world power. For example, in April 2020, [The Economist \(2020\)](#) noted that “[h]ardly a day goes by without news of Chinese medical supplies, from masks to ventilators, reaching grateful recipients” and concluded that Beijing was “trying to paint a new picture—of itself as a model for taming the disease, and as the world’s saviour.” One year later, in March 2021, observers worry that where China’s vaccines go, “its influence will follow” ([Huang, 2021](#)), filling the void left by traditional public health donors ([Cohen, 2020](#)). Anecdotal evidence of growing Chinese political influence due to its aid diplomacy abounds. Reportedly, Beijing offered vaccines as a *quid pro quo* only in exchange for diplomatic recognition from countries that maintained diplomatic ties with the government in Taipei on Taiwan rather than Beijing ([Reuters, 2021](#)). For example, Nicaragua broke diplomatic relations with Taiwan and reestablished relations with Beijing on December 10, 2021, and received the first vaccine donations from China only three days later ([Global Times, 2021](#)). Another case in point is China’s use of aid diplomacy to access foreign markets. For example, Brazil withdrew a decision to bar the Chinese telecom giant Huawei from developing its 5G network in order to obtain Chinese vaccines ([Gramer, 2021](#)).

Despite its widely recognized importance, we lack a comprehensive picture of China’s foreign aid in times of COVID-19. This is problematic also from a development perspective. The dynamic pandemic environment creates so-called aid darlings and orphans, i.e., recipient countries that receive significantly more or fewer donations, respectively, than anticipated ([Davies and Klasen, 2019](#)). Knowledge about aid darlings and orphans is also crucial for successful coordination of relief efforts among donors and for preventing adverse side effects of aid withdrawals ([Nielsen et al., 2011](#)).

This article provides the first comprehensive picture of the allocation and correlates of China’s foreign aid during the global pandemic and compares these patterns with the situation prior to the global outbreak of the coronavirus. To do so, we first assemble a new *Chinese Aid Exports Database*. It is the first comprehensive database of all in-kind aid flows from China to all countries in the world and relies exclusively on official Chinese government information.

Our results show some remarkable shifts in Chinese aid composition. Since the pandemic outbreak, we have not only seen a marked increase in the total volume of Chinese aid exports but also a sizeable shift in product composition. Compared to the previous three years, after March 2020, the share of medical products in total aid exports increased from 17.2% to 62.4%. This was partially at the expense of non-medical aid, which was 22.8% below its pre-pandemic level. At the same time, the group of aid recipient countries has also substantially expanded, now including wealthy countries, such as the United States and Germany, and China’s regional competitors, such as India and Russia. Whereas before 2020, significantly more Chinese aid was channeled towards poorer countries and China’s political friends, after the COVID-19 outbreak, our regression results show declining importance of recipients’ economic needs and political alignment as explanatory factors. More precisely, in the first pandemic year (2020),

countries' voting alignment in the United Nations and per capita income have become *less* associated with Chinese aid. This can be mainly attributed to the rise of aid through non-government sources. Political factors and need orientation quickly regained importance in China's aid allocation once the first pandemic shock subsided.

Previous efforts to track Chinese aid combine various sources, including media reports, government websites, recipient-country records, and reports by non-governmental organizations (NGOs) to construct project-level aid data (e.g., [Strange et al., 2017](#); [Dreher et al., 2021, 2022](#); [Horn et al., 2021](#); [Ray et al., 2021](#)). While these contributions provide a very detailed picture of the universe of China's development footprint and are very valuable resources for a multitude of important research applications, the *Chinese Aid Exports Database* has several advantages over these previous contributions. First, by relying on official information, it records *all* foreign aid that is embodied in goods exports and is thus, by construction, more comprehensive than the existing databases that collect information on in-kind aid (at least partly) from unofficial data sources. Second, the new database captures actual flows of goods rather than commitments (or pledges) of future aid, which might get delayed, suspended, or even canceled. Third, it captures aid flows at monthly frequency and is updated almost in real time, which allows the tracking of recent policy dynamics at a higher temporal resolution. Fourth, it contains information on the province of origin of aid flows within China and thus enables analyses of the domestic dynamics that drive China's foreign aid ([Fuchs et al., 2020](#)). Fifth, in addition to official aid, it also covers aid by non-government actors, including civil society organizations and corporations. Sixth, it reports aid information at the detailed product level, following the 8-digit classification of the Harmonized System (HS), rather than being confined to broad sectoral designations.<sup>1</sup> Finally, it covers the entire world and not just the Global South or a single world region, facilitating global comparisons.

All these advantages come at the cost of recording only aid embodied in goods shipped from China, i.e., we do not cover the value of Chinese labor, financial aid, or Chinese-financed goods and services purchased locally or from third countries. Below we carefully discuss the advantages and drawbacks of tracking Chinese aid with export data and outline how this approach compares with existing unofficial data sources. Given the dearth of official Chinese foreign aid data, the database will add to a better understanding of aid as a Chinese foreign policy tool and enable researchers to study its effectiveness in promoting economic development in almost real time.

We proceed as follows. In Section 2, we present our approach to measuring Chinese aid with customs trade data. Section 3 presents several stylized facts on China's aid before and after the global coronavirus outbreak that we can derive from the database. In Section 4, we compare the correlates of China's

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<sup>1</sup>[GACC \(2022\)](#) reports export products according to the Harmonized System (HS), an international nomenclature for the classification of products governed by the World Customs Organization ([WCO, 2018](#)). It allows participating countries to classify traded goods on a common basis for customs purposes. At the international level, the HS classifies products with six-digit codes. Countries can add more digits for further classification. [GACC \(2022\)](#) reports products based on eight-digit codes, of which the first six digits follow the international standard.

aid allocation with country characteristics prior to the pandemic with the patterns during the “mask diplomacy” and “vaccine diplomacy” periods of China’s aid giving. We conclude in Section 5 and outline potential future uses of the *Chinese Aid Exports Database*.

## 2 Measuring Chinese Aid with Export Data

The Chinese government does not disclose a comprehensive database on its foreign aid activities around the globe.<sup>2</sup> In China, aid is considered “a sensitive area, a state secret” (Bräutigam, 2009, p.2). China’s Ministry of Commerce, the country’s leading aid agency, is—together with counterpart agencies in Turkey and the United Arab Emirates, listed in the ‘very poor’ category of the 2022 Aid Transparency Index, which evaluates the transparency of 50 international donors worldwide (Tilley, 2022). China’s State Council has published three white papers on foreign aid over the last ten years, which cover only aggregate statistics by world regions and over groups of years (State Council, 2011, 2014, 2021). Official country-level or project-level data at annual (or even sub-annual) frequency do not exist.<sup>3</sup>

Facing this dearth of official data, several research initiatives have captured the universe of Chinese aid to the Global South. These initiatives collect project-level data from official and unofficial sources.<sup>4</sup> While they added tremendously to our understanding of China’s foreign aid despite the lack of official data, these unofficial datasets face several limitations. These initiatives cover only countries in the Global South. Some of them are only confined to certain world regions, such as Latin America, Africa, or the Pacific (Brant, 2015; Strange et al., 2017; Gallagher and Myers, 2021), which constrains possibilities of inter-regional and global comparisons. Some only focus on specific sectors such as energy (Gallagher, 2021). Others cover only flows provided by certain development finance providers, such as the China Export-Import Bank and the China Development Bank (Ray et al., 2021), facing the issue of limited coverage again. As most of the projects do not qualify as official development assistance (ODA) due to their lack of concessionality or the primary goal of export promotion, they do not constitute databases of aid strictly speaking. Again others only track historic Chinese aid, including the Cold War period (Dreher and Fuchs, 2015; Morgan and Zheng, 2019). While this is insightful from an academic perspective, it has only limited implications for today’s dynamics.

AidData’s Global Chinese Official Finance Dataset (Dreher et al., 2021, 2022) is the most

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<sup>2</sup>There is a debate why China chooses to hold back information on its development assistance (Dreher et al., 2022). Low administrative performance and disinterest in meeting Western transparency standards figure prominently among the potential reasons. China might also attempt to avoid peer pressure from recipient countries in hiding official aid activities. Finally, China might try to bypass domestic criticism in light of rising inequality within China. On the domestic determinants of aid support among the Chinese population, see Cheng and Smyth (2016).

<sup>3</sup>For 1990–2005, the China Commerce Yearbooks contained information on completed projects and dispatched medical teams (Hawkins et al., 2010; Dreher and Fuchs, 2015). As such, these data covered only certain types of projects and did not contain information on the associated monetary amounts. In 2006, this entry disappeared from the yearbooks without explanation.

<sup>4</sup>See Table B.1 in the Appendix for a comprehensive list and comparison of all datasets known to us that cover various dimensions of contemporaneous Chinese aid and other forms of development finance.

comprehensive among the various data-gathering efforts. It tracks the universe of Chinese development finance institutions (both aid strictly speaking and more commercially-oriented official financing flows) to the entire developing world since 2000.<sup>5</sup> However, the data end in 2017, rely partially on unofficial information (such as media reports), lack monetary amounts for about 38% of the projects, and do not cover actual disbursement amounts.<sup>6</sup>

## 2.1 Our Approach

In contrast to these previous initiatives, the new *Chinese Aid Exports Database* measures China’s aid by relying on official export information by the General Administration of Customs of China. Proprietary transaction-level data from China Customs are widely used by researchers in economics and other social sciences to study Chinese trading behavior (e.g., [Feenstra and Hanson, 2005](#); [Manova and Zhang, 2012](#); [Khandelwal et al., 2013](#); [Yu, 2015](#); [Davis et al., 2019](#)). For the period since 2017, a China Customs database that records trade flows, both exports and imports, by product, customs regime, partner country, and Chinese province is publicly available ([GACC, 2022](#)). Most importantly, it enables us to separate aid export flows from other (commercial) exports. Specifically, we use the customs regime variable and extract all export flows that are coded as either “Aid or Donation between Governments and International Organizations” (category 11) or “Other Donations” (category 12). The former category includes all types of aid exports that the Chinese government provides to other governments and recipient organizations.<sup>7</sup> The latter category includes materials donated by non-governmental donors for the purpose of poverty alleviation, charity, and disaster relief. We use the term “unofficial aid” hereafter for this latter category.

As visualized in the world map in [Figure 1](#), the resulting database covers 193 countries, of which 184 received aid exports between January 2017 and December 2021. Altogether, we are able to trace aid exports valued at US\$ 4.2 billion over these 60 months, which corresponds to an annual average of US\$ 835.6 million. There are only nine (small) independent countries that did not receive any aid from China.<sup>8</sup> Six of them recognize the Chinese government in Taipei on Taiwan rather than the government in Beijing. It is also immediately visible from visual inspection that China channels a large share of its aid exports towards recipient countries of strategic interest: The top aid recipient countries according to

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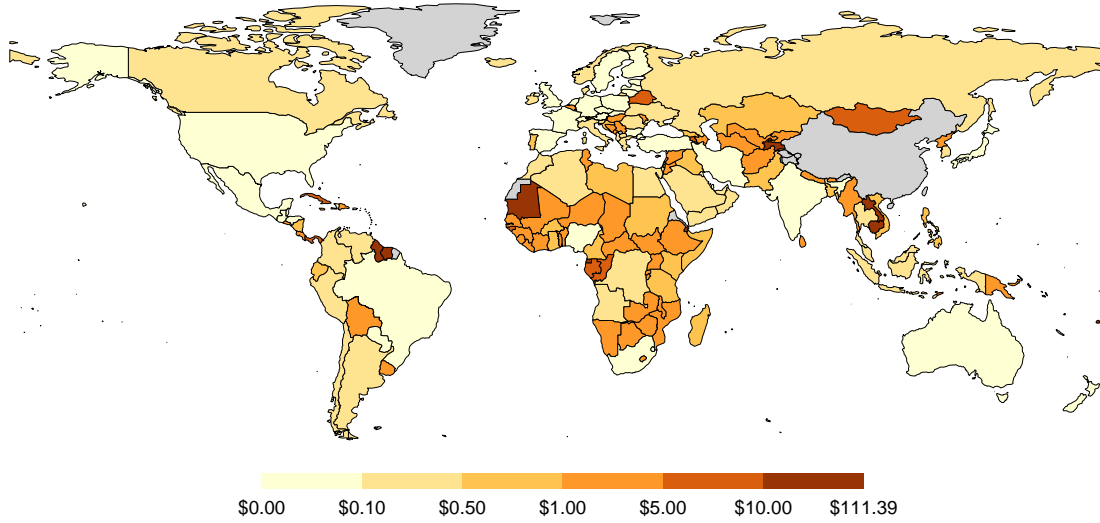
<sup>5</sup>[Bluhm et al. \(2020\)](#) have geo-coded project locations of all projects that have at least reached the implementation stage. The dataset is based on earlier data-gathering efforts that focused on ecologically-sensitive hotspots and Africa exclusively ([BenYishay et al., 2016](#); [Dreher et al., 2019](#)).

<sup>6</sup>What is more, the data do not cover sub-annual information for most projects and have no information on the Chinese province of origin. [Wellner et al. \(2022\)](#) have improved coverage on aid events, including commitment, start, and end dates, but the data still contain considerable gaps.

<sup>7</sup>According to the official definition ([GACC, 2019](#)), exports within customs regime 11 include the “provision of gratuitous aid, donations, or materials donated by the Chinese government or Chinese organizations to the government or organizations of the partner country based on an agreement or a temporary decision between the two governments or in accordance with friendly relations” (Authors’ translation from Mandarin).

<sup>8</sup>These nine countries are Andorra, Eswatini, Honduras, Liechtenstein, San Marino, St. Kitts Nevis, St. Lucia, St. Vincent Grenadines, and Tuvalu.

**Figure 1** – Chinese Aid Exports in US\$ per capita, 2017–2021



*Note:* Monthly aid exports are measured in US\$, summed over January 2017 to December 2021, and divided by recipient-country population size. Export data come from [GACC \(2022\)](#); population data (2020 values) originate from [World Bank \(2021\)](#).

the total amount received are Cambodia, Pakistan, Tajikistan, Ethiopia, and Laos (see Table 1).<sup>9</sup> This is in line with previous research that shows that China provides greater aid flows to “friendly” countries ([Dreher and Fuchs, 2015](#); [Dreher et al., 2018](#)). In per capita terms, however, small island nations are the top aid recipients, with the top three being Dominica, Antigua & Barbuda, and the Maldives. 31 of the 184 recipient countries received only unofficial aid from China, i.e., aid flows that are not under direct government control and may thus not be the outcome of a government strategy.<sup>10</sup>

The sectoral distribution of Chinese aid exports reflects the effects of the pandemic, with the pharmaceutical sector (HS 30) taking first place in terms of total export values (see Table B.3 in the Appendix). On aggregate, Chinese aid is dominated by exports of various forms of machinery, but the product portfolio of aid exports is highly diverse and covers both heavy and light industries. Food aid is mostly delivered in the form of cereals (HS 10), the sixth most frequently exported 2-digit product category. At the more detailed 8-digit product level, human vaccines dominate Chinese aid exports by far (HS 30022000), followed by made-up articles that mostly cover surgical masks (HS 63079000) and X-ray machines (HS 90221990).

The dataset also allows us to study the origins of aid within China (see Figure B.1 in the Appendix). Most aid originates from Beijing (62.0%), where national ministries and the big policy banks are based, followed by Jiangsu (8.3%) and Guangdong (4.3%). Finally, we observe that Chinese aid is mainly a

<sup>9</sup>See Table B.2 in the Appendix for the full list of aid recipients.

<sup>10</sup>These countries are Australia, Bahrain, Belgium, Belize, Czechia, Estonia, Finland, Guatemala, Haiti, Iceland, India, Ireland, Israel, Kuwait, Latvia, Lithuania, Luxembourg, Marshall Islands, Monaco, Nauru, Netherlands, Norway, New Zealand, Palau, Qatar, Slovakia, Sweden, Switzerland, Turkey, the United Arab Emirates, and the United Kingdom.



**Table 1** – Top 15 Countries Receiving Chinese Aid Exports, 2017–2021

Rank	Country	Total aid (M\$)	Share (%)	Per capita (\$)	Medical aid (M\$)	Unofficial aid (M\$)	Mask diplomacy period (M\$)	Vaccine diplomacy period (M\$)
1	Cambodia	231.64	5.54	13.86	83.54	10.35	43.49	94.99
2	Pakistan	165.97	3.97	0.75	97.32	16.51	37.27	104.79
3	Tajikistan	155.27	3.72	16.28	50.19	2.48	15.24	72.59
4	Ethiopia	126.77	3.03	1.10	42.38	42.93	58.36	39.52
5	Laos	114.14	2.73	15.69	53.77	10.19	18.23	64.49
6	Myanmar	114.00	2.73	2.10	70.03	27.77	17.96	73.87
7	Bangladesh	93.99	2.25	0.57	42.10	5.06	11.15	39.05
8	Sri Lanka	93.15	2.23	4.25	34.30	0.68	14.88	30.03
9	North Korea	91.19	2.18	3.54	0.00	0.00	0.00	0.00
10	Mozambique	85.60	2.05	2.74	10.52	0.34	16.44	18.68
11	Cuba	80.77	1.93	7.13	15.93	1.12	4.43	8.36
12	Philippines	77.31	1.85	0.71	60.06	6.98	14.90	37.76
13	Uzbekistan	72.67	1.74	2.12	31.21	2.98	7.42	0.00
14	Zimbabwe	72.62	1.74	4.89	16.48	2.55	13.31	28.87
15	Afghanistan	71.69	1.72	1.84	21.25	3.37	14.93	24.11

*Notes:* Table shows the top 15 countries importing Chinese aid goods between January 2017 and December 2021. “Rank” is based on total aid values. “Total aid,” “Medical aid,” “Unofficial aid,” and aid during the “Mask diplomacy period” and the “Vaccine diplomacy period” are measured in million US\$. “Share” refers to each country’s share in China’s global aid exports. “Per capita” aid is measured in US dollars. “Medical aid” is identified according to the list provided by [Helble \(2012\)](#) and [WTO \(2020\)](#). “Unofficial aid” denotes aid exports under the customs regime “12,” i.e., aid provided by non-government sources. The “Mask diplomacy period” covers total aid in the period from March to December 2020. The “Vaccine diplomacy period” covers total aid in the period from January to December 2021. Export data come from [GACC \(2022\)](#); population data (2020 values) originate from [World Bank \(2021\)](#).



government undertaking as only 10.5% of the total aid flows originate from non-government sources.

## 2.2 Advantages and Disadvantages of the Database

Many of the advantages of the *Chinese Aid Exports Database* stem from the fact that it is based on official customs trade data.<sup>11</sup> First, since these data are derived from administrative records, there are no instances of missing financial information. Instead, the exact export value is always reported, typically accompanied by quantities. This is a clear advantage compared to project-level data based on a multitude of sources of varying quality and precision, including newspapers, project reports, NGO documents, and government websites (both from recipient governments and China), which in many cases report only rough values. These sources may also lack coverage of less visible (or more sensitive) aid activities that do not make it into the headlines of major news outlets or embassy websites.

Second, the aid exports data capture actual flows of goods rather than commitments (or pledges) of future aid, which might not get realized or only with very substantial delay. This reduces the measurement error in actual aid disbursements substantially. Third, the monthly frequency of aid exports data enables us to observe aid donations promptly after they are realized. All previous databases end in 2020 or earlier, which prevents researchers from analyzing more recent developments like China’s vaccine diplomacy during the coronavirus pandemic. The almost immediate online availability of the customs data, reporting aid flows with a delay of about one month, allows for analyses of new policy dynamics nearly in real time and at higher frequencies than yearly data with several years of time lag would do.<sup>12</sup> Fourth, by providing information on the province of origin of each aid donation within China, the customs data open new avenues for analyzing the economic geography of the sourcing of Chinese aid exports (Fuchs et al., 2020). Fifth, aid exports data also cover unofficial aid, i.e., aid flows not financed by government entities such as the Ministry of Commerce. This includes NGOs and corporations. Aid exports data can open up new avenues for research in this dimension.

Sixth, the data report aid flows at the product level rather than confined to broad sectoral designations. Since we built the database from trade data, we have information at the 8-digit product level according to the Harmonized System (HS) of tariff nomenclature. To provide examples, we can report separate aid figures for face masks (HS code 63079000) or human vaccines (HS code 30022000), allowing us to analyze the patterns of China’s mask diplomacy and vaccine diplomacy below. This granularity distinguishes this database not only from the existing unofficial Chinese aid databases but also from the standard databases used for analyses of development assistance more broadly (e.g., OECD Development Assistance Committee Creditor Reporting System, International Aid Transparency Initiative). Finally, since the customs data cover all countries in the world, including advanced economies, they allow for

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<sup>11</sup>Of course, customs data are not free from biases. For example, Fisman and Wei (2004) and Ferrantino et al. (2012) highlight the role of tax evasion in misreporting. Nevertheless, these biases are likely of a much smaller order of magnitude as there is less incentive to misreport in the case of foreign aid.

<sup>12</sup>For example, AidData published in September 2021 its updated database that covers aid commitments until 2017.

truly global analyses of China’s aid activities without focusing on a selected set of countries or world regions.

The major disadvantage of this database comes from the nature of the recorded administrative data. By tracking aid exports through China Customs, we can only measure in-kind aid embodied in export goods that leave China. We thus cannot cover costs incurred by China for project preparation and planning within China, monetary transfers, service exports (such as services carried out by Chinese managers, workers, and experts in recipient countries), and goods and services that are purchased from local entrepreneurs or sourced from third countries but financed by China. However, this is of less concern in the Chinese case than it would be for OECD donors since Chinese aid is strongly tied to goods that are produced in China (Kaplinsky and Morris, 2016; Dreher et al., 2022). For instance, the Belt and Road Initiative has an explicit focus on addressing Chinese overcapacities in production (Du and Zhang, 2018), which makes it less likely that China finances recipient countries’ imports from the rest of the world.

## 2.3 Comparison With Other Data Sources

To put the coverage of the *Chinese Aid Exports Database* into perspective, we first compare its global coverage with the data provided by the Japan International Cooperation Agency (JICA) (Kitano and Miyabayash, 2020). From 2017 to 2020, JICA reports a total portfolio of US\$ 11.2 billion of Chinese bilateral grants and interest-free loans. For the same time frame, the aid exports data capture US\$ 2.9 billion official aid exports, amounting to 25.9% of the total value of bilateral grants and interest-free loans. This considerable difference is not surprising given the previously noted caveat that in-kind aid does not cover salaries, financial transfers, and goods sourced locally or from third countries, among others.<sup>13</sup>

To demonstrate the benefits of the aid exports data in terms of its coverage, we compare them with the AidData’s Global Chinese Official Finance Dataset (Dreher et al., 2021, 2022).<sup>14</sup> The database “synthesiz[es] and standardiz[es] vast amounts of unstructured, open-source, project-level information published by governments, intergovernmental organizations, companies, NGOs, journalists, and research institutions” (Custer et al., 2021) based on the Tracking Underreported Financial Flows (TUFF) methodology (Strange et al., 2014, 2017). We focus on 2000 to 2006, the period for which we could obtain information on Chinese (in-kind) aid from both sources.<sup>15</sup> In order to compare aid exports with

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<sup>13</sup>This share is further reduced to 17.8% if we also account for JICA’s reporting of bilateral concessional loans.

<sup>14</sup>We choose AidData for our comparison because other databases with bilateral data (e.g., Horn et al., 2021; Ray et al., 2021) have less coverage and/or focus on non-concessional finance rather than official development assistance as we do.

<sup>15</sup>China Customs provide product-level trade data for the years between 2000 and 2006. We got access to it through the Resset database (<http://www.resset.com>). We have data from both sources for 2017 as well. The comparison would be rather coarse since AidData records only a small number of ODA-like projects with non-missing monetary values for 2017 (222). Another challenge for the comparison with AidData is that some projects implemented in 2017 may only be observable in 2018 or even later, which are not covered yet in the dataset.

projects for development purposes, we restrict the AidData data to ODA-like projects that fall into the flow type categories “Grant” and “Loan (excluding debt rescheduling).” We create country-level aggregates of the total monetary values of product-level aid exports recorded by China Customs during 2000–2006 on the one hand and of all projects identified by AidData with (start) years between 2000 and 2006 on the other.<sup>16</sup>

Figure 2 displays three scatter plots, contrasting Chinese aid amounts in millions of US dollars by recipient country for 2000 to 2006. We transform all aid values by an inverse hyperbolic sine transformation to ease comparisons irrespective of scale issues. In panel a, we compare total aid as reported in both datasets. We depict the AidData values on the vertical axis and values of aid exports based on China Customs data on the horizontal axis. The subfigure covers 152 countries with positive aid exports according to either China Customs or AidData. While 151 countries received aid according to the underlying customs data, 94 countries receive aid according to the AidData database. The other 58 countries are coded as zero aid flows and are displayed along the horizontal axis. Panels b and c focus on two selected product groups that figure prominently in China’s aid portfolio and are at the same time relatively precisely identifiable in the AidData database: medical products in panel b and office equipment in panel c. We use aid exports data based on lists provided by Helble (2012) and WTO (2020) for medical products and the two four-digit HS product categories for office equipment.<sup>17</sup> Since the aid exports data only cover merchandise trade, we filter in-kind aid in AidData by a two-step approach. We first identify “health” projects for health equipment based on the variable “CRS (Creditor Reporting System) sector.” To be conservative, we exclude observations that do not refer to in-kind donations but comprehensive health infrastructure projects (e.g., hospital construction) in a second step. For office equipment, we select in a first step all projects of which the project description includes the keyword “computer” or “laptop.” In a second step, we manually identify further projects which explicitly refer to office equipment.

We observe a relatively high consistency of aid records in all three panels according to both data sources. First, a large share of countries is situated around the 45-degree line. Second, we observe positive correlations of 52.2%, 7.6%, and 5.0% for total aid, medical products, and office equipment, respectively, when considering the inverse hyperbolic sine (as displayed in the figure).<sup>18</sup> Analyzing ranks, we find large positive Spearman rank correlations of 62.8%, 23.8%, and 17.8%, respectively.

Overall, we observe that aid flows measured with official customs trade data and with the alternative

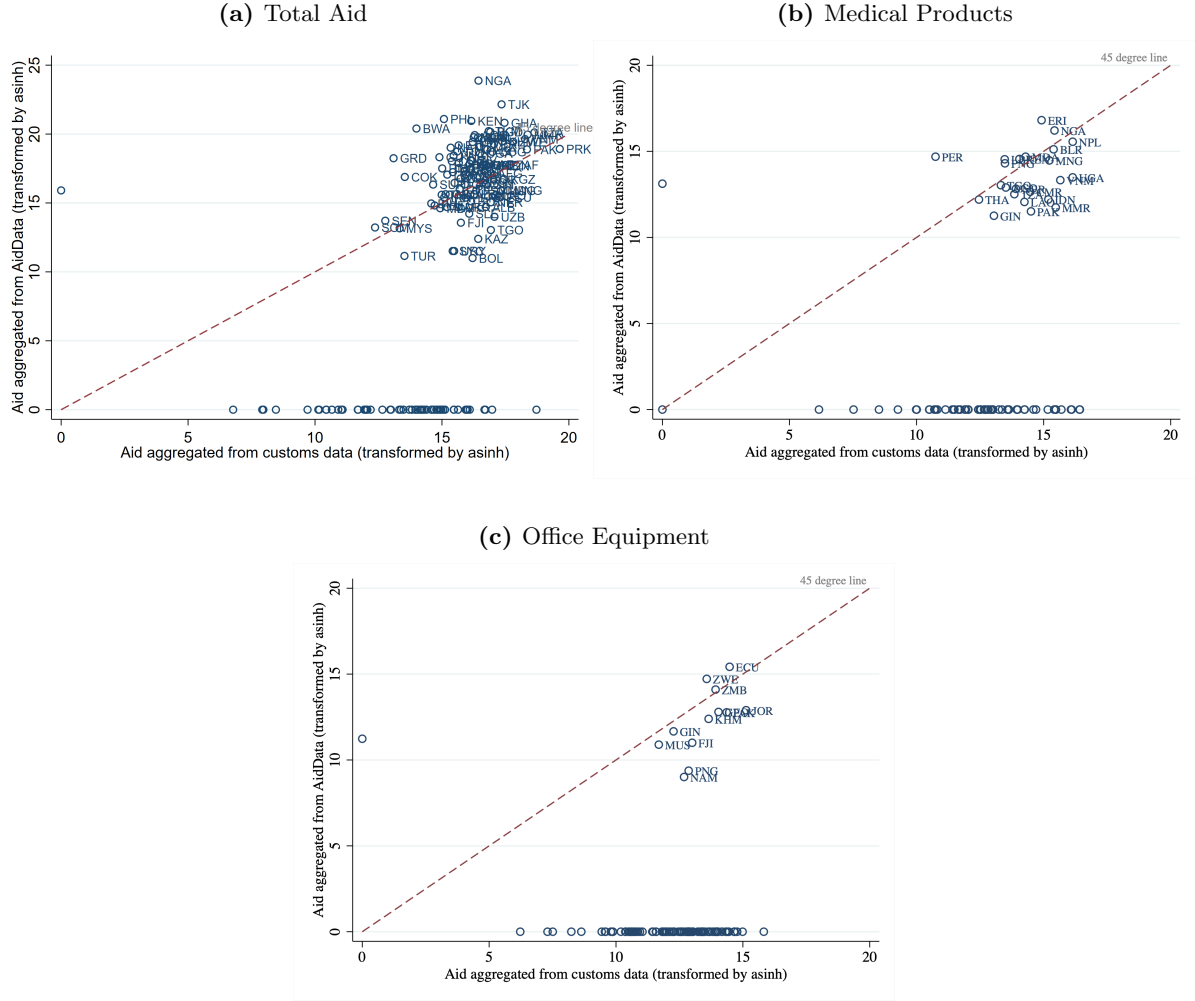
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<sup>16</sup>This requires a couple of notes of caution that result from the open-source nature of AidData’s measurement of Chinese aid. 237 of 816 grant projects and 7 of 189 loan projects between 2000 and 2006 do not contain information on their monetary amount. We rely on the actual start year for projects where the year of commitment differs from the actual start year. Due to the unclear timing of commitment and disbursement, we include projects both in the implementation and completion stage, yielding a more conservative comparison.

<sup>17</sup>Specifically, we use the HS codes 8471 (automatic data-processing machines and units thereof; magnetic or optical readers, machines for transcribing data onto data media in coded form and machines for processing such data, n.e.s.) and 8472 (office machines).

<sup>18</sup>Correlations of aid levels are positive but lower and amount to 2.7%, 5.1%, and 15.7% for total aid, medical products, and office equipment, respectively.

**Figure 2** – China’s Aid by Country (in Million US\$): China Customs Data vs AidData, 2000–2006



*Notes:* This figure compares the amount of aid as recorded by Chinese aid exports data and AidData project-level data. Aid is measured in millions of current US\$ and transformed by the inverse hyperbolic sine transformation. AidData data: We include only projects coded as ODA-like grants and loans in the figures. Medical products indicate projects that are coded as “Health” projects according to the sector classification and that could not be identified as infrastructure projects (e.g., hospital construction). Office equipment indicates projects that include computers or laptops in the project description. Chinese customs trade data: Medical products include 228 HS product categories as detailed in [Helble \(2012\)](#) and [WTO \(2020\)](#). Office equipment includes two four-digit HS categories as detailed in footnote 17. Along the axes, we place observations for which positive aid amounts are reported in one database only but are missing in the other.

data source, AidData, are positively correlated but differ significantly for the aforementioned reasons. However, the aid exports data offer better coverage by including more transactions to countries with zero aid flows on AidData.

### 3 Did the Pandemic Change Chinese Aid (Allocation)?

We utilize the *Chinese Aid Exports Database* to deduct new stylized facts on China’s aid before and after the COVID-19 outbreak in March 2020.

### **Stylized Fact 1: Chinese aid exports increased significantly after the global outbreak.**

Figure 3 plots China’s monthly aid exports in millions of US dollars since January 2017. We observe substantial fluctuations that could partially reflect seasonality and the lumpiness of certain aid exports. Before the pandemic, Chinese aid exports showed an increasing trend over time. Whereas aid exports totaled US\$ 538.6 million in 2017, they increased to US\$ 712.8 million in 2019. Not surprisingly, we observe a clear drop in the value of total aid exports in February 2020, at the same time as strict lockdown measures practically froze the Chinese economy. This did not lead to a full cessation of aid exports, but with US\$ 19.3 million, they clearly fell below the average of US\$ 40.6 million in February of previous years. Once the pandemic started to spread globally in March 2020 (and the situation in China improved), Chinese aid exports rebounded strongly. In May 2020, Chinese aid exports reached an unprecedented US\$ 168.6 million. After a relative decline in the second half of 2020, Chinese aid exports jumped again in early 2021 when China’s vaccine aid campaign gained traction. Overall, Chinese aid almost doubled with a monthly average of US\$ 93.4 million after the outbreak compared to US\$ 54.8 million in 2017–2019.

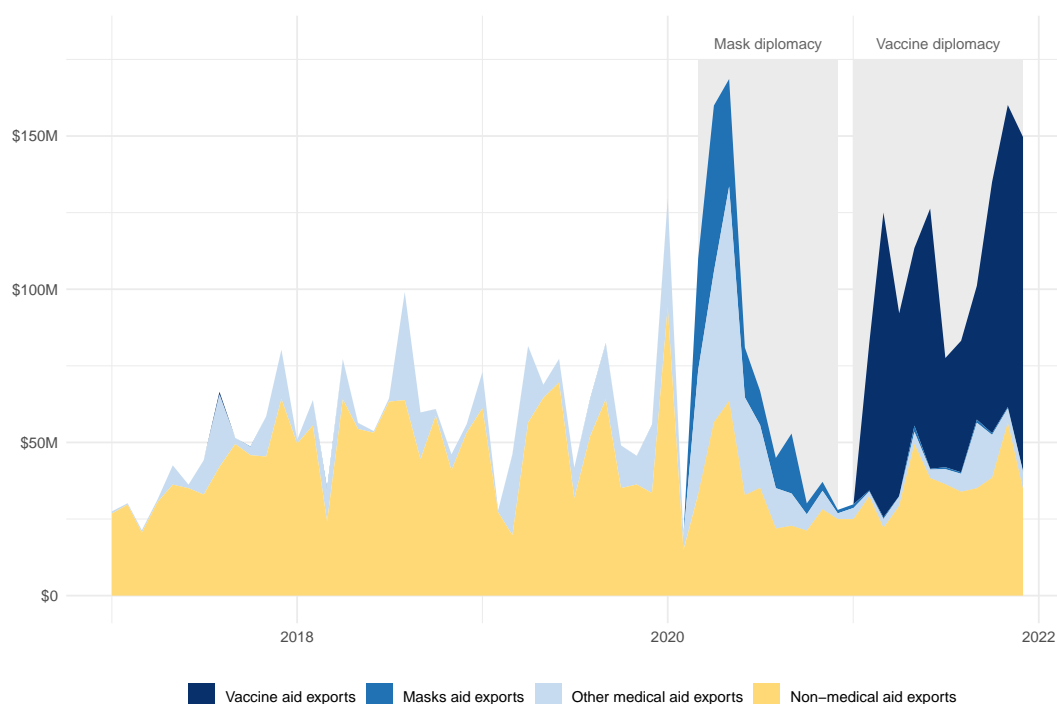
### **Stylized Fact 2: Chinese aid exports became dominated by medical products.**

In Figure 3, we also split Chinese aid exports into medical and non-medical goods. We observe that medical products play a much larger role in Chinese aid exports after the pandemic outbreak.<sup>19</sup> In the three pre-pandemic years (2017–2019), medical aid exports amounted to only 17.2% of total aid exports. However, after the beginning of the global pandemic, more than half of Chinese aid exports were medical products (62.4%). The increase in medical aid came with a reduction in non-medical aid in absolute terms. Average monthly non-medical aid fell from US\$ 45.4 million over 2017–2019 to US\$ 35.1 million over the 2020–2021 period, which corresponds to a 22.8% decline. What is more, aid exports became substantially more concentrated on specific goods with the surge in medical aid (indicated by an increase in the Herfindahl index of product concentration from 199 before the pandemic outbreak to 1,551). Further sub-dividing medical aid into specific products (see Table B.5 in Appendix B for details), we observe that the first year of the pandemic (March to December 2020) was dominated by face masks (24.4% of all aid) and the second year (January to December 2021) was overshadowed by vaccines (59.7% of all aid). This aligns with the public debates that termed China’s aid giving “mask diplomacy” and “vaccine diplomacy” during the respective periods (see again Figure 3).

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<sup>19</sup>See Table B.4 for a comprehensive list of COVID-19-related medical goods as defined by the WTO.

**Figure 3 – Chinese Medical vs. Non-Medical Aid Exports in Million US\$, 2017–2021**



*Notes:* Aid exports are measured in million US\$ per month. Medical aid exports are split into vaccines, masks, and other medical aid exports. The mask diplomacy period denotes March to December 2020. The vaccine diplomacy period refers to the period from January 2021 to December 2021. Own visualization based on data from [GACC \(2022\)](#).

### **Stylized Fact 3: Chinese aid became temporarily less centralized.**

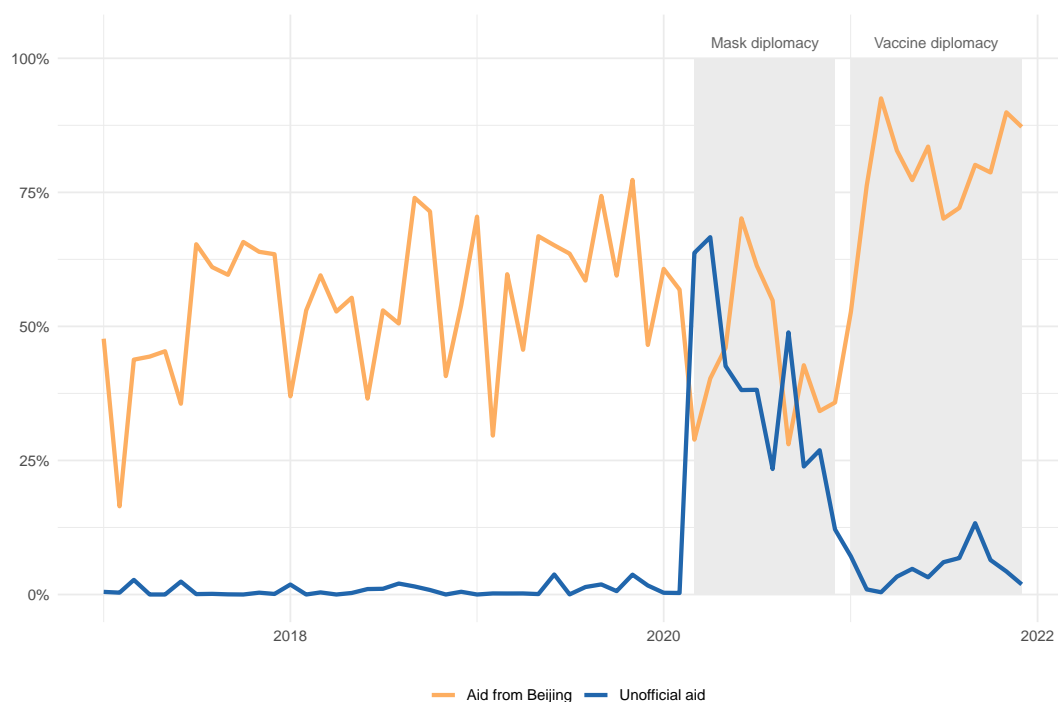
The share of unofficial aid (by non-government sources) in total aid was negligible before the pandemic (0.9%). As can be seen from Figure 4, it increased enormously in the period of mask diplomacy (to 46.4%) but reduced quickly once again (to 4.6%) in 2021, i.e., once vaccines became the dominant Chinese aid product.<sup>20</sup> In geographical terms, Chinese aid provision became less Beijing-centric but only for a short while. Before the pandemic outbreak, 56.5% of all aid exports were performed by donors based in Beijing, such as the ministries and policy banks active in foreign aid. In the period of mask diplomacy, the capital's share in total aid exports reduced to 44.5%; it increased sharply to 81.5% with the new vaccine-focused aid regime.

### **Stylized Fact 4: COVID-19 created Chinese aid darlings and orphans.**

The range of countries receiving aid from China has expanded significantly since March 2020. 55 countries received aid export flows from China that did not get any aid flows in the three years before (see Figure B.2). This group includes several highly developed countries, including Canada, Germany, and the United Kingdom. Other strategic competitors of China, such as Russia, India, and Saudi Arabia, also figure among the new aid recipients. Many previous recipients experienced increased aid inflows from

<sup>20</sup>As a comparison, private philanthropy (a sub-component of unofficial aid) is estimated to equal 7.1% for OECD donors for 2016–2019 ([OECD, 2021](#)).

**Figure 4** – Chinese Aid Exports from Beijing-based Donors and Non-government Sources in Percent, 2017–2021



*Notes:* “Aid from Beijing” tracks monthly aid exports performed by Beijing-based donors as a share of total monthly aid exports. “Unofficial aid” tracks monthly aid exports registered under the customs regime “12,” i.e., provided by non-government sources, as a share of total monthly aid exports. The mask diplomacy period covers the period from March to December 2020. The vaccine diplomacy period refers to the period from January 2021 to December 2021. Own visualization based on data from [GACC \(2022\)](#).

China. China’s post-outbreak aid darlings, i.e., the biggest winners in absolute terms, are Pakistan, Ethiopia, Cambodia, Myanmar, and Tajikistan. To assess the development opportunities and risks from China’s changed allocation patterns post-COVID-19 outbreak, we also analyze the per capita changes in Figure 5. Once we account for country size, Tonga, Nauru, Luxembourg, Djibouti, and Solomon Islands experience the largest gains and would be considered Chinese aid darlings.

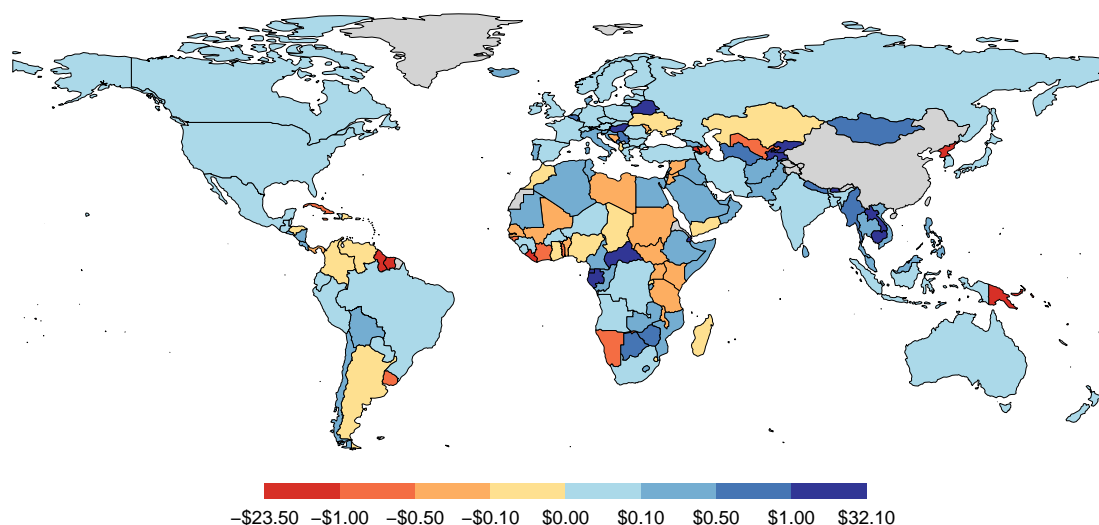
However, this aid expansion came at a cost since some of China’s traditional aid recipients turned into aid orphans, i.e., experienced substantial losses in aid inflows from China. North Korea, Uzbekistan, and Côte d’Ivoire suffered the largest losses in terms of total aid values.<sup>21</sup> The biggest losers in per capita terms are smaller countries: Antigua and Barbuda, Samoa, the Maldives, Micronesia, and Vanuatu, leaving those aid orphans more vulnerable during the pandemic (see again Figure B.3). For other countries, like Peru or Bolivia, there was only a restructuring of Chinese aid exports from non-medical to medical aid (see Figure B.3 in the Appendix). These descriptive trends already offer suggestive evidence for a rearrangement of the political geography of China’s foreign aid since the outbreak of the pandemic. The next section uses econometric methods to study the shifts in China’s strategic motivations before

<sup>21</sup>North Korea is the only country that received Chinese aid before 2020 but not afterward. It has shut down the border to foreign aid and international business since August 2020 as a means to control the spread of the coronavirus ([Choe, 2020](#)). This highlights that demand-side factors can play a significant role in aid allocation and supply-side factors.



and after the coronavirus outbreak.

**Figure 5** – Darlings and Orphans: Change in Yearly Average Per Capita Aid Exports by Recipient Country in US\$ after March 2020



*Note:* The map displays the change in Chinese aid exports per capita measured in US\$ after the global coronavirus outbreak (March 2020–December 2021) relative to the pre-pandemic period (January 2017–December 2019). Monthly aid exports are re-scaled to refer to annual averages. Own visualization based on data from [GACC \(2022\)](#).

## 4 Correlates of China’s Aid Exports before and after the COVID-19 Outbreak

It is well-documented that aid from China targets poorer countries, and hence, it is needs-oriented to at least a certain extent ([Dreher and Fuchs, 2015](#)). At the same time, strategic interests also affect its aid allocation pattern. Similar to other OECD donors ([Alesina and Dollar, 2000](#); [Hoeffler and Outram, 2011](#)), China allocates more aid to politically aligned countries ([Dreher et al., 2018](#)). For instance, recognizing the Chinese government in Beijing rather than the one on Taiwan is a precondition for receiving Chinese aid ([Rich, 2009](#)). There are only a few exceptions to this rule, either including countries that are about to switch diplomatic relations to Beijing or countries struck by humanitarian catastrophes ([Tubilewicz, 2012](#); [Dreher et al., 2022](#)). Countries that vote with China in international organizations are also rewarded with aid ([Dreher and Fuchs, 2015](#); [Xun and Shuai, 2018](#)).

Since the outbreak of the pandemic, there have been rising concerns that China’s decisions to provide aid have become more politicized and were primarily driven by strategic calculations aimed at improving the country’s image and influence rather than recipients’ needs ([CSIS, 2021](#)). To increase the visibility of its aid deliveries, China invoked the branding concept of a “Health Silk Road”—an idea dating back to 2015 that gained prominence during the pandemic. By linking its medical aid to combat COVID-19 to

the prospect of greater cooperation within the context of the Belt and Road Initiative after the pandemic, China’s aid deliveries may yield political rewards well beyond the pandemic period (Rudolf, 2021).

We investigate whether such a shift towards a stronger politicization of aid giving has taken place in a more systematic way by regressing the size of average monthly aid exports to partner countries on a set of partner-country characteristics in cross-country regressions of the following form:

$$Aid_i = \beta_0 + \beta_1 Needs_i + \beta_2 Political_i + \beta_3 Commercial_i + \beta_4 Other_i + \epsilon_i,$$

where  $Aid_i$  denotes average monthly aid exports to country  $i$ , split into medical and non-medical aid and transformed by the inverse hyperbolic sine transformation (which allows a log-like interpretation) (Bellemare and Wichman, 2020). We analyze aid patterns separately for three time periods: the pre-pandemic period (from January 2017 to December 2019), the early months of the global pandemic that we label the time of “mask diplomacy” (from March to December 2020), and the “vaccine diplomacy” period, which reflects the recent surge of global aid exports of vaccines (from January 2021 to December 2021). We thus exclude January and February 2020, when China was severely affected by the coronavirus outbreak as the first country globally.<sup>22</sup>

Among the potential determinants of aid exports, we distinguish between four groups of factors: (i) variables that capture the economic or humanitarian *need*, (ii) variables that measure the strength of *political* ties between China and partner countries, (iii) variables that capture China’s *commercial* interests, and finally, (iv) a set of further controls. In order to mitigate simultaneity bias, for most of these variables, we rely on past values, calculated over the period preceding our analysis and averaged over three years.<sup>23</sup>

We capture two dimensions of economic and humanitarian need. First, if aid flows are needs-based, we would expect them to be negatively related to per capita GDP (Alesina and Dollar, 2000; Hoeffler and Outram, 2011).<sup>24</sup> Second, after March 2020, the need for (medical) aid flows could also be determined by the average severity of local coronavirus outbreaks, which we proxy for with the number of reported deaths during the respective periods of “mask diplomacy” and “vaccine diplomacy.”<sup>25</sup>

We capture the strength of political ties with three variables. First, we rely on an indicator of whether a country recognizes the government of Taiwan—a stance that makes keeping diplomatic relationships with the Chinese government in Beijing impossible (Dreher and Fuchs, 2015). As a change in the diplomatic recognition of Taiwan usually triggers an immediate response from China, we rely on a

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<sup>22</sup>Note that adding these two months as parts of the pre-pandemic period does not qualitatively change our results reported below.

<sup>23</sup>For the main regressions, we calculate past averages over 2014 to 2016 and check the robustness of our estimates averaging controls from 2017 to 2019.

<sup>24</sup>However, income is not only an indicator of developmental need but could also reflect the fact that it is supposedly cheaper to buy policy concessions from poorer countries (Bueno de Mesquita and Smith, 2009).

<sup>25</sup>As a placebo test, we also included the same variable as a control in the pre-pandemic period to see whether countries with more exposure to the pandemic were receiving different aid flows already before the outbreak. We do not find evidence for this. Results are available upon request.

contemporaneous indicator instead of past values. Second, we capture the ideal point distance between China and partner countries based on their past voting behavior in the United Nations General Assembly (UNGA), which has been widely used to capture bilateral political alignment (see, e.g., [Kim and Russett, 1996](#); [Dreher et al., 2008](#); [Rommel and Schaudt, 2020](#)). UNGA ideal point distance measures voting alignment between countries in the General Assembly. Unlike more simplistic measures, the ideal point distance is robust to changes in the UN’s agenda over time ([Bailey et al., 2017](#)). Our third political variable measures the strength of political linkages below the central state level. We collect the number of sister linkages between Chinese provinces, prefectures and counties on the one hand and foreign subnational administrative units on the other ([Liu and Hu, 2018](#); [Fuchs et al., 2020](#)).

We expect commercial interests to enhance aid exports similarly to political ties. We control for the strength of bilateral commercial ties by the monetary value of past commodity trade flows between China and recipient country as reported by [UN Comtrade \(2021\)](#). A further often-cited allegation is that China directs more aid to countries that are rich in natural resources, although existing empirical evidence does not confirm this expectation for earlier years ([Hendrix and Noland, 2014](#); [Dreher and Fuchs, 2015](#)).<sup>26</sup> We take this into account by relying on the natural resource revenues as a share of GDP ([World Bank, 2021](#)).

Finally, we add two control variables. First, we control for a liberal democracy index, which captures how well individual freedoms are protected from encroachment by public authorities ([Coppedge et al., 2021](#)). While it has been argued that China would direct more aid to more authoritarian countries, the Chinese government claims to follow the foreign-policy principle of non-interference in the internal affairs of other countries, which would make it unlikely that its aid is more targeted at authoritarian countries. A lack of an authoritarian bias is supported by previous empirical research ([Dreher and Fuchs, 2015](#); [Broich, 2017](#)). Second, we control for population size as larger countries have a larger capacity to absorb aid in absolute terms. At the same time, if aid is targeted toward buying political alliances, it may also be negatively correlated with population size as smaller countries’ allegiance is less costly to purchase on the margin ([Vreeland and Dreher, 2014](#)).

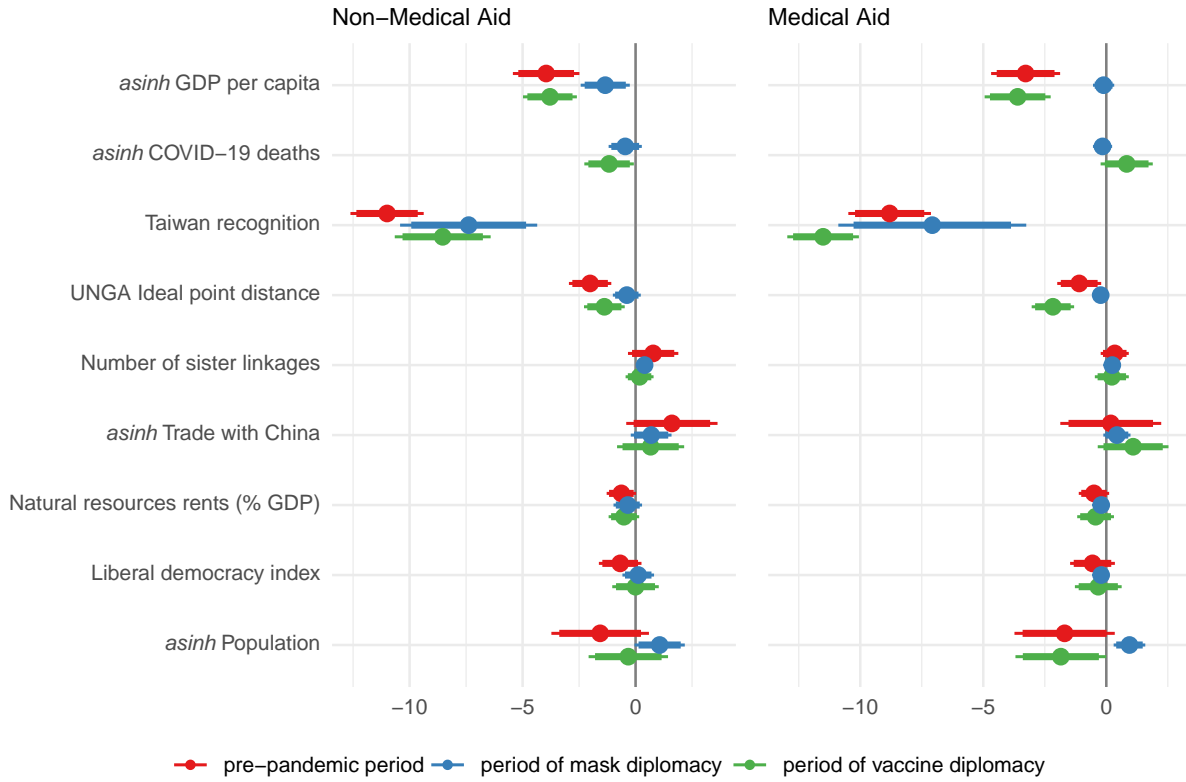
Coefficient plots in [Figure 6](#) report the results of six separate estimation models, contrasting medical and non-medical aid flows and differentiating between our three periods of interest: the pre-pandemic period, the period of “mask diplomacy,” and the period of “vaccine diplomacy.”<sup>27</sup> The results confirm that before the pandemic, China provides significantly more aid to poorer countries, with both medical and non-medical aid flows being negatively correlated with recipient countries’ GDP per capita at the 1%-level of significance. This relationship gets muted for non-medical aid and even breaks down for medical aid in the early stages of the pandemic. As argued before, China expanded its outreach by providing aid to more countries during that period. It appears that China seized the opportunity to

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<sup>26</sup>When considering official development finance that is less concessional than official development assistance, [Dreher et al. \(2018\)](#) find evidence that natural resources play a role in the allocation of development projects.

<sup>27</sup>We provide full regression results in [Table B.6](#).

**Figure 6** – Correlates of China’s Aid Exports before and after the Pandemic Outbreak

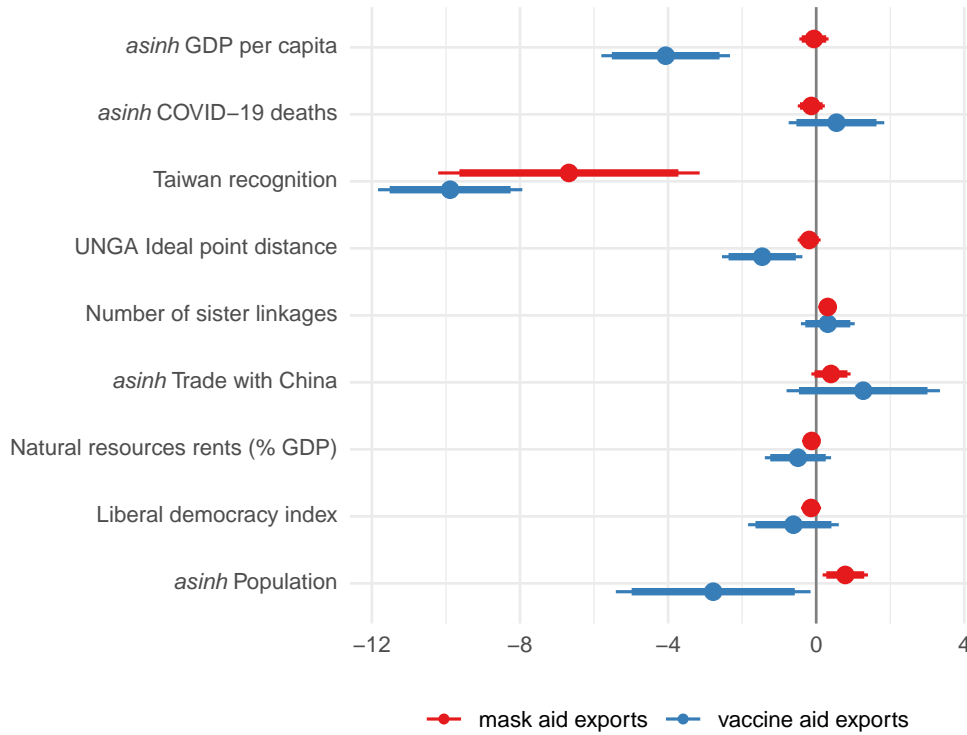


*Note:* Results are based on a cross-sectional OLS regression of China’s average monthly medical and non-medical aid exports (transformed using inverse hyperbolic sine) in each period on the reported measures of need, bilateral political ties, and commercial interests. The pre-pandemic period includes the months from January 2017 to December 2019. The period of mask diplomacy includes March to December 2020. The period of vaccine diplomacy includes the months from January to December 2021. The values of the explanatory variables are the three-year averages from 2014 to 2016. Exceptions are COVID-19 deaths (computed as the sum of deaths in each period), the Taiwan recognition indicator (one if a country recognized the Republic of China and had diplomatic relations with it throughout the respective period), and the number of sister linkages (counted in 2015, the last year included in Liu and Hu (2018)). All variables prefixed with *asinh* have been transformed using inverse hyperbolic sine. All coefficient estimates are scaled to show the effect of a one-standard-deviation change except Taiwan recognition, which is a binary variable. The horizontal bars reflect confidence intervals for the 90% and 95% levels based on robust standard errors. We provide full regression results in Table B.6.

present its aid deliveries to advanced Western economies, resulting in a decoupling of aid flows from economic needs (Kobierecka and Kobierecki, 2021). This negligence of economic need during the mask diplomacy period did not last long, though. China started channeling again aid towards countries with larger economic needs in the subsequent vaccine diplomacy period. The associated effects are similar to those during the pre-pandemic period. What is more, it is worrisome that Chinese aid allocations of medical aid are not significantly associated with the extent of the humanitarian effects of the pandemic as measured by a country’s COVID-19 deaths. During the vaccine diplomacy period, we even observed a significant negative link between non-medical aid and COVID-19 deaths, suggesting the substitution of non-medical aid with medical aid in severely affected countries.

As expected, we observe significant links of Chinese aid with political variables. Recognition of

**Figure 7** – Correlates of China’s Mask and Vaccine Aid Exports



*Note:* Results are based on a cross-sectional OLS regression of China’s average monthly aid exports of surgical masks and human vaccines (transformed using inverse hyperbolic sine) on the reported measures of need, bilateral political ties, and commercial interests. The averages are calculated for the periods relevant for each aid product: the period of mask diplomacy (March to December 2020) for masks and the period of vaccine diplomacy (January to December 2021) for vaccines. The values of the explanatory variables are the three-year averages from 2014 to 2016 (preceding the coverage by China Customs). Exceptions are COVID-19 deaths (computed as the sum of deaths in each period), the Taiwan recognition indicator (one if a country recognized the Republic of China and had diplomatic relations with it throughout the respective period), and the number of sister linkages (counted in 2015, the last year included in [Liu and Hu \(2018\)](#)). All variables prefixed with *asinh* have been transformed using inverse hyperbolic sine. All coefficient estimates are scaled to show the effect of a one-standard-deviation change except for Taiwan recognition, which is a binary variable. The horizontal bars reflect confidence intervals for the 90% and 95% levels based on robust standard errors. We provide full regression results in Table B.7.

Taiwan locks countries out of Chinese aid deliveries of medical and non-medical products.<sup>28</sup> In a similar vein, countries that are more politically aligned with China (reflected in lower values of *UNGA Ideal point distance*) received significantly more aid before the outbreak of the pandemic and during the vaccine diplomacy period. For an average recipient country (concerning its UNGA voting alignment with China), a reduction of its *UNGA ideal point distance* to China by 1% was—on average—associated with an increase of medical aid exports by 1.3% in the pre-pandemic period and 2.6% in the period of vaccine diplomacy.<sup>29</sup> In contrast, political alignment was irrelevant during the mask diplomacy period right after the pandemic outbreak. We observe the opposite pattern for subnational political ties, measured by the *number of sister linkages*. It is significantly positively associated with medical aid only during the mask

<sup>28</sup>The reduction exceeds 99.9% in all specifications of Table B.6.

<sup>29</sup>Note that our quantitative interpretations here in the following are approximate numerical interpretations ([Bellemare and Wichman, 2020](#)).

diplomacy period but not before and after. For an average recipient country (concerning its number of sister linkages), an increase of the *number of sister linkages* by 1% was—on average—associated with an increase of medical aid exports by 0.1% during the mask diplomacy period. The increased importance of subnational political ties could be driven by China’s aid provision becoming less centralized as more aid exports went through provinces other than Beijing after the sudden pandemic outbreak.<sup>30</sup>

Results are broadly comparable when we focus on the two flagship aid products—surgical masks and human vaccines—in the periods of mask diplomacy and vaccine diplomacy, respectively (see Figure 7). As was the case for medical and non-medical aid, mask and vaccine aid exports are unrelated to *COVID-19 deaths* counts in both periods. The results for *GDP per capita* and *UNGA ideal point distance* show that poorer countries and those that are political friends of the central government were not favored as recipients of face masks, controlled for the severity of the pandemic in a given country, and the other variables in our model. However, both need orientation and political friendship at the national level played a significant role for vaccines. An increase of *GDP per capita* by 1% was—on average—associated with a decrease of vaccine aid exports by 2.8%. For an average country (concerning its UNGA voting alignment with China), an increase of its *UNGA ideal point distance* to China by 1% was—on average—associated with a decrease of vaccine aid exports by 1.8%. These results for face masks and vaccine aid are in line with the results for all aid during the mask diplomacy period and vaccine diplomacy period discussed above.

Investigating the mechanisms behind this temporary lack of need orientation and neglect of (national-level) political friends, we find that the emergence of unofficial Chinese aid drove this pattern. Excluding unofficial aid (which peaked during this period) leads to coefficients on GDP per capita, Taiwan recognition, and UNGA ideal point distance that are much more in line with those in the pre-pandemic period and the period of vaccine diplomacy (see Tables C.4 and C.5). These results suggest that the politicization of *official* aid did not decrease temporarily in the aftermath of the COVID-19 outbreak. Rather, Chinese aid through non-government sources follows different aid motives.

With respect to the other potential explanatory factors in our model, we do not observe robust significant positive effects of either past economic ties (measured by *asinh Trade with China*) or resource-seeking interests as captured by *Natural resource rents as % of GDP*. If anything we observe a significant negative correlation with natural resources, which is in line with previous research (Dreher and Fuchs, 2015). In line with China’s non-interference policy, we do not find that China systematically favors more authoritarian countries as measured by the *liberal democracy index*.<sup>31</sup>

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<sup>30</sup>Our main conclusions are unchanged to using the three-year period from 2017 to 2019 for the averages of explanatory variables (Table C.1), splitting trade with China into exports and imports (Table C.2), and adding the number of deaths from disasters as an explanatory variable (Table C.3).

<sup>31</sup>Medical aid during the mask diplomacy period is an exception here. More aid goes to less democratic countries during this short period of time.

## 5 Conclusion

A growing body of literature highlights Chinese aid activities as an alternative to existing aid regimes, thus challenging development policies by OECD donors. Particularly during the ongoing COVID pandemic, those fundamentally different approaches have been publicly pitted against each other under big headlines on “mask diplomacy” and “vaccine diplomacy.” Since the pandemic outbreak, there have been rising concerns that China’s decisions to provide aid have become more politicized and were primarily driven by strategic calculations. Yet, China’s aid flows remain hidden to the international observer, constraining a meaningful and fact-based analysis. This article introduces a new way of measuring Chinese aid based on export data. Most importantly, these data allow for a near real-time tracking of Chinese aid activities. Additionally, we can distinguish between official and unofficial aid and analyze the pattern of Chinese aid giving within China. Based on these data, we document that Chinese aid became *internally* less centralized after the pandemic outbreak, both regarding geography and actors. Moreover, we show that China *externally* extended its geographic reach beyond the Global South, now also covering many wealthy countries in Europe and North America. We also measure a strong shift towards medical aid, which is mainly driven by vaccines, face masks, and other protective equipment at the expense of non-medical aid. We find that after the initial outbreak of the pandemic in March 2020, the rising share of unofficial donations in Chinese aid *reduced* the salience of both political friendships but also to recipients’ economic needs. Yet, with the return of Beijing-dominated aid in the vaccine diplomacy period of 2021, there was a return to the original importance of recipient need and political factors.

The data we introduce should enable future research on the causal mechanisms behind the political economy of Chinese aid allocation and its effectiveness, for example, in the framework of China’s Belt and Road Initiative. Development policymakers will find the data valuable for real-time tracking of Chinese aid and understanding a leading but opaque donor to avoid abandoning “aid orphans.”



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# Appendices

## Appendix A Data Generation and Description of Variables

**Estimation sample** We choose the 193 countries and territories covered by the World Development Indicators ([World Bank, 2021](#)) that remain after removing non-UN entities (e.g., Kosovo, overseas territories), as well as Hong Kong, Macao, Taiwan, and China itself as our sample. By doing so, we include countries and territories that have not received any aid according to China Customs. These countries (receiving a value of zero aid exports) are Andorra, Honduras, St. Kitts and Nevis, St. Lucia, Liechtenstein, San Marino, Eswatini, Tuvalu, and St. Vincent and the Grenadines. The estimation sample is reduced to 166 countries due to missing covariate data for Andorra, Antigua & Barbuda, Bahamas, Belize, Brunei, Dominica, Eritrea, Micronesia (Federated States of), Grenada, Kiribati, St. Kitts & Nevis, St. Lucia, Liechtenstein, Monaco, Marshall Islands, Nauru, Palau, North Korea, Palestinian Territories, San Marino, Somalia, Serbia, Syria, Tonga, Tuvalu, St. Vincent & Grenadines, and Samoa. Including COVID-19 deaths as an explanatory variable additionally removes Turkmenistan from the estimation sample.

**Aggregation into cross section** Since we run cross-sectional regressions for three different periods (the pre-pandemic period from January 2017 to November 2019, the period of mask diplomacy from March to December 2020, and the period of vaccine diplomacy from January to December 2021), we calculate the (monthly) averages of the dependent variable (Chinese aid exports) for each of these periods. Our results are robust to removing seasonality before taking the average. With respect to the explanatory variables, we use pre-determined values before the pandemic. We use two sets of 3-year averages of annual values: the three years (2014–2016) leading up to the period covered by China Customs in our baseline regressions and the three years that follow (2017–2019) in robustness checks. Exceptions are COVID-19 deaths (computed as the sum of deaths in each period), the Taiwan recognition indicator (one if a country recognized the Republic of China and had diplomatic relations with it throughout the respective period), and the number of sister linkages (counted in 2015, the last year included in [Liu and Hu \(2018\)](#)).

**Classification of medical goods** To identify goods as medical goods by their HS code, we use the list of medical products from [Helble \(2012\)](#) and complement it with a list of medical products specific to the treatment and prevention of COVID-19 issued by [WTO \(2020\)](#). Helble’s list contains a selection of medicines, inputs specific to the pharmaceutical industry, chemical inputs of general-purpose, hospital and laboratory inputs, and medical technology equipment. We use all codes from Helble’s Appendix 1 identifiable as HS revision 2007 codes and convert them to HS revision 2017 to match the Chinese aid data. For a complete list of medical goods and a comparison of the WTO/[Helble \(2012\)](#) data, see Table B.4.



**Separating aid exports from other exports** We rely on the customs regimes reported by China Customs to identify aid exports. We include exports under the customs regimes “Aid or Donation between Governments and International Organizations” (code 11) and “Other Donations” (code 12). We refer to these customs regimes as “official” and “unofficial” aid exports in the text for brevity.

Source: China Customs Statistics ([GACC, 2022](#)).

**GDP per capita** GDP per capita in current US\$ (WDI code: NY.GDP.PCAP.CD).

Source: [World Bank \(2021\)](#), accessed via [Arel-Bundock \(2021\)](#)

**COVID-19 deaths** Number of deaths related to COVID-19 in each of the three periods (i.e., the pre-pandemic period, the period of mask diplomacy, or the period of vaccine diplomacy) as reported by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University. The numbers reported by CSSE are sourced from each of the countries’ government ministries, health departments, and media outlets. We compute the death counts for each period as the sum of daily cases within that period.

Source: [Center for Systems Science and Engineering \(CSSE\) at Johns Hopkins University \(2021\)](#)

**Disaster deaths** Number of deaths caused by natural, technological and “complex” disasters in each of the three periods (i.e., the pre-pandemic period, the period of mask diplomacy, or the period of vaccine diplomacy). This measure is based on the Emergency Events Database (EM-DAT), provided by the Centre for Research on the Epidemiology of Disasters (CRED) at Université Catholique de Louvain. We compute the death counts for each period as the sum of all disaster-related deaths in a given country within that period (by date of disaster onset).

Source: [Guha-Sapir et al. \(2022\)](#)

**Taiwan recognition** Binary variable that equals one if a country recognized the Republic of China and had diplomatic relations with it throughout the entire period in question (i.e., the pre-pandemic period, the period of mask diplomacy, or the period of vaccine diplomacy).

Source: [Wikipedia \(2021a\)](#) and [Wikipedia \(2021b\)](#)

**UNGA Ideal point distance** Ideal point distance inferred from UNGA roll-call voting, calculated as in [Bailey et al. \(2017\)](#).

Source: [Voeten et al. \(2009\)](#)

**Number of sister linkages** Number of sister linkages (at any administrative level) with China. This variable is based on a dataset of 2,310 sister relationships on the provincial and sub-provincial levels (including prefectures and counties) from the China International Friendship Cities Association (CIFCA). For our analyses, we count the number of sister relationships of various administrative units within a country established with administrative units in China (at the provincial or lower

administrative level) and aggregate them by country. We measure ties that existed by the end of 2015.

Source: [Liu and Hu \(2018\)](#)

**Liberal democracy index** This index measures how well the individual's freedom is protected from encroachment by public authorities, from low to high (0–1). It considers the quality of constitutionally protected civil liberties, the rule of law, independence of the judiciary, effective checks and balances, and the level of electoral democracy.

Source: [Coppedge et al. \(2021\)](#), accessed via [Maerz et al. \(2021\)](#)

**Trade with China, exports to China, imports from China** A given country's commodity trade with China, exports to China, and imports from China (as reported by China) in current US\$.

Source: UN Comtrade, accessed via [Muir \(2018\)](#)

**Natural resources rents** A country's total natural resources rents (% of GDP) (WDI code: NY.GDP.TOTL.RT.ZS). This measure indicates what share of GDP is accounted for by earnings from natural resources. It is computed as the sum of oil rents, natural gas rents, coal rents, mineral rents, and forest rents.

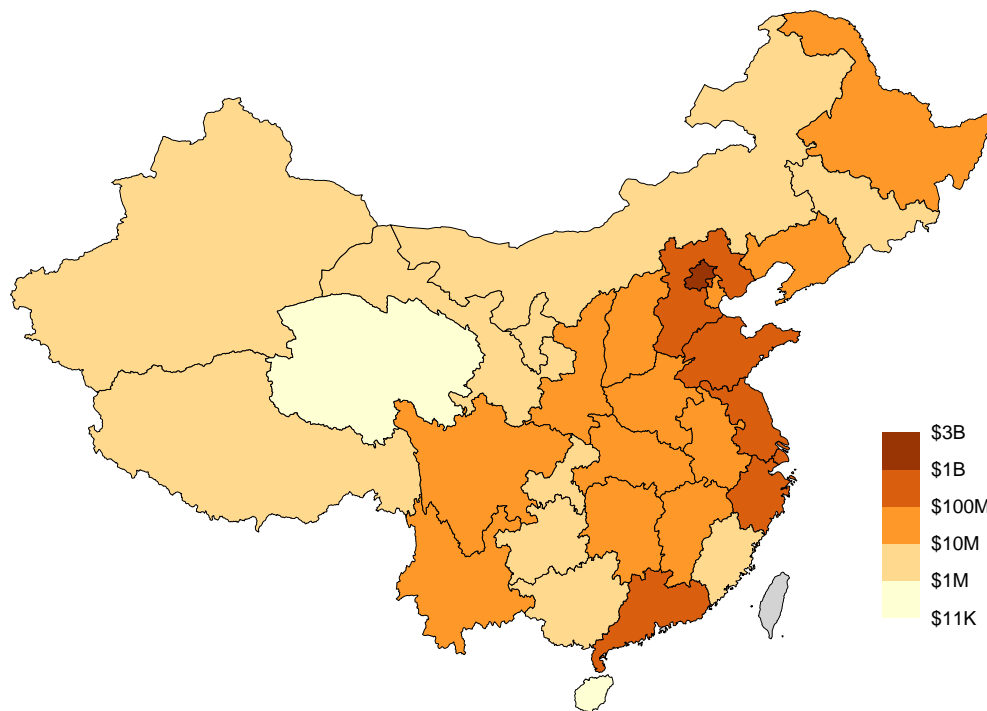
Source: [World Bank \(2021\)](#), accessed via [Arel-Bundock \(2021\)](#)

**Population** A country's total population size (WDI code: SP.POP.TOTL).

Source: [World Bank \(2021\)](#), accessed via [Arel-Bundock \(2021\)](#)

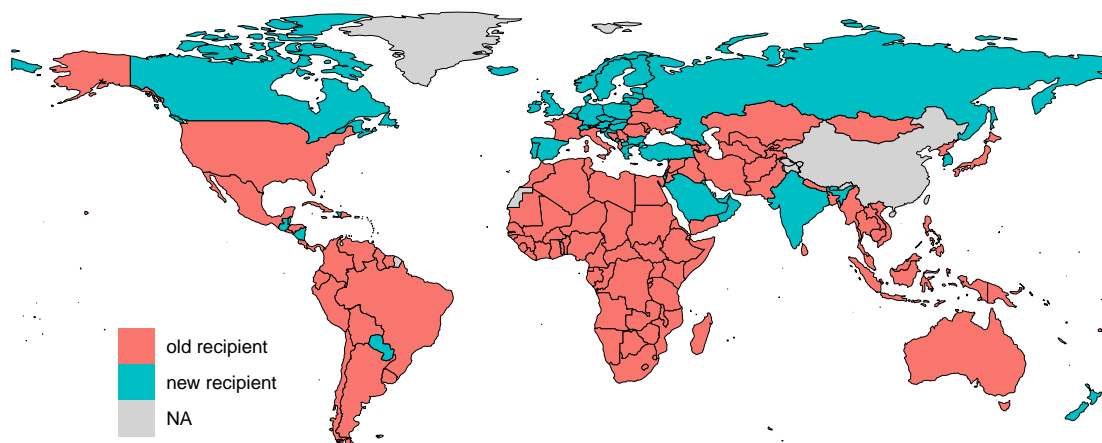
## Appendix B Additional Figures and Tables

**Figure B.1** – Chinese Aid Exports by Chinese Province in US\$, 2017–2021



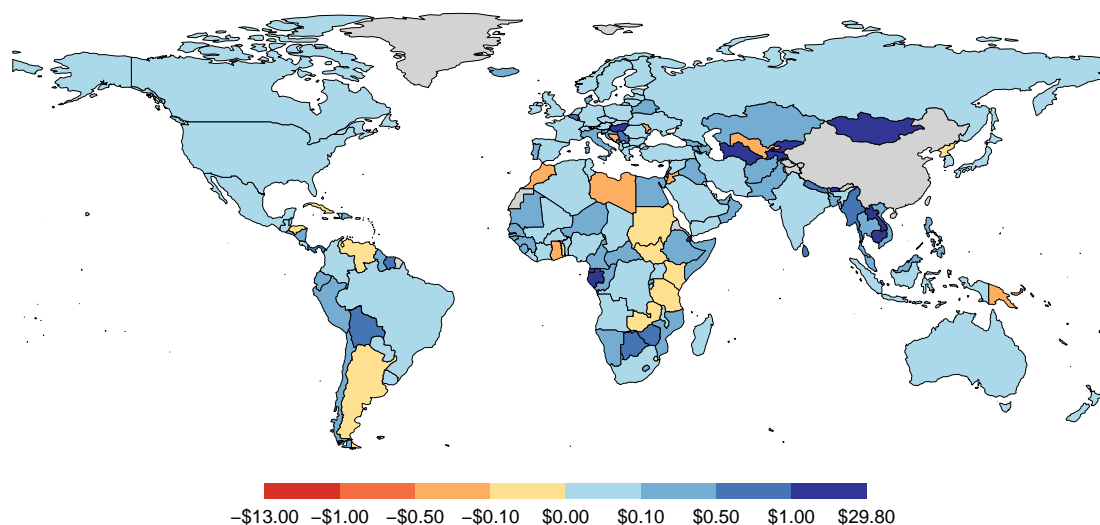
*Notes:* The map shows Chinese total aid exports by the province location of exporters between 2017 and 2021. Own visualization based on data from [GACC \(2022\)](#).

**Figure B.2** – New Aid Recipients after the Pandemic Outbreak

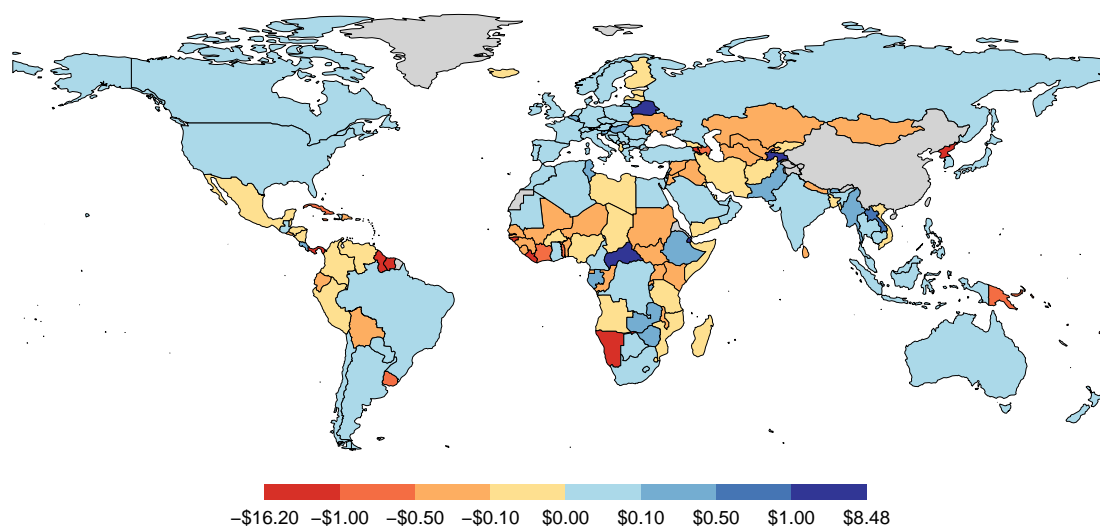


*Note:* This map displays countries that received Chinese aid goods only after the global coronavirus outbreak (March 2020–December 2021) but not before the outbreak (January 2017–December 2019). Own visualization based on data from [GACC \(2022\)](#).

**Figure B.3** – Darlings and Orphans: Change in Yearly Average Per Capita Chinese Aid Exports by Recipient Country in US\$ after March 2020



(a) Medical Aid Exports



(b) Non-Medical Aid Exports

*Notes:* The maps display the change in Chinese aid exports per capita measured in US\$ after the global coronavirus outbreak (March 2020–December 2021) relative to the pre-pandemic period (January 2017–December 2019). Monthly aid exports are re-scaled to refer to annual averages. We split aid goods into medical aid (panel a) and non-medical aid (panel b). We define medical and non-medical aid exports according to the classifications by [Helble \(2012\)](#) and [WTO \(2020\)](#). Own visualization based on data from [GACC \(2022\)](#).

**Table B.1** – Features of Existing Datasets on Chinese Aid and Other Official Finance Flows

Source	Source type	Unit of observation	Aid type	Time coverage	Frequency	Geographic aggregation	Geographic coverage
China Customs (our contribution)	Official customs reports	Product	ODA and unofficial aid	2017–2021	Monthly	Dyadic: Country level and level of Chinese provinces	Global
China’s Overseas Development Finance Database (Ray et al., 2021)	Media reports; company filings and bond prospectuses at security exchanges; Chinese and host government sources	Loan	Loans from the China Development Bank and Export-Import Bank to governments, inter-governmental bodies, and state-owned entities	2008–2019	Annual	Country level and georeferenced projects	Global
China’s Global Energy Finance Database (Gallagher, 2021)	Media reports; company filings and bond prospectuses at security exchanges; Chinese and host government sources	Loan	Financing for energy projects by the China Development Bank and the Export-Import Bank	2000–2020	Annual	Country level	Global
Chinese Loans to Africa Database (CARI and BUDPC, 2021)	Media reports; Chinese and African government sources; company filings and bond prospectuses at security exchanges; websites of Chinese contractors, subcontractors, and suppliers; IMF reports	Loan	Loans issued from Chinese public and commercial banks	2000–2019	Annual	Country level	Africa
China’s Global Power Database (Gallagher et al., 2019)	Media reports; company filings and bond prospectuses at security exchanges; official gazettes of host countries; Chinese government websites	Loan	Loans from the China Development Bank and Export-Import Bank; FDI	2000–2019 <sup>32</sup>	Annual	Country level	Global
China-Latin America Finance Database (Gallagher and Myers, 2021)	Media reports; company filings and bond prospectuses at security exchanges; official gazettes of host countries; Chinese government websites	Loan	Loans from China’s policy banks, China Development Bank and Export-Import Bank and commercial banks	2005–2020	Monthly	Country level	Latin America

<sup>32</sup>Project status date. The database also includes the projected commission date until 2033

Lowy Institute: Chinese Aid in the Pacific (Brant, 2015)	Media reports; Chinese government websites and official statements; host government documents; Chinese contractor websites/annual reports; site visits; face-to-face interviews and electronic correspondence with project personnel and stakeholders	Project	ODA	2006–2014	Annual	Country level	Pacific Region
JICA: Estimating China’s Foreign Aid (Kitano and Miyabayash, 2020)	Ministry of Commerce final accounts	Global aggregates	ODA and preferential buyer’s credits	2001—2020	Annual	Country level	
Global Reconnecting Asia Project Database (Hamre et al., 2020)	Government agencies in host countries, development banks, and project contracts	Infrastructure project	ODA and unofficial aid	2006—2020	Starting date and completion (or projected) completion date	Country level and georeferenced projects	Asia and Europe
AidData’s Global Chinese Official Finance Dataset Version 2.0 (Custer et al., 2021)	Media reports; data and documentation from aid and debt management institutions in China; annual reports of lending and granting institutions; websites of Chinese embassies and economic and commercial counselor’s offices (ECCOs); case studies and field reports by researchers and NGOs; IMF reports	Project	ODA and unofficial aid including financial or in-kind transfer: Loan, Export Buyer’s Credit, Supplier’s Credit/Export Seller’s Credit, Debt Forgiveness, Debt Rescheduling, Grant, Scholarships/Training in Donor Country, Freestanding Technical Assistance,	2000—2017	Starting date and completion (or projected) completion date	Country level and georeferenced projects	Global

Source: Own visualization.

**Table B.2** – Chinese Total Aid Exports by Recipient Country, 2017–2021

Region/Country	Total aid	Share (%)	Per capita	Medical aid	Unofficial aid	Mask diplm. period	Vaccine diplm. period
<b>East Asia &amp; Pacific</b>							
Australia	0.88	0.02	0.03	0.80	0.88	0.88	0.00
Brunei	1.33	0.03	3.03	1.30	0.00	0.06	1.27
Cambodia	231.64	5.54	13.86	83.54	10.35	43.49	94.99
Fiji	19.67	0.47	21.94	8.99	2.28	2.76	0.86
Indonesia	43.28	1.04	0.16	37.49	16.51	15.33	26.81
Japan	9.38	0.22	0.07	5.70	8.56	9.36	0.00
Kiribati	1.07	0.03	8.96	0.59	0.02	0.18	0.89
Laos	114.14	2.73	15.69	53.77	10.19	18.23	64.49
Malaysia	14.38	0.34	0.44	11.43	4.66	11.98	2.35
Marshall Islands	0.26	0.01	4.47	0.26	0.26	0.26	0.00
Micronesia (Federated States of)	7.29	0.17	63.42	0.31	0.29	1.30	0.02
Mongolia	18.07	0.43	5.51	7.83	4.22	4.49	5.07
Myanmar (Burma)	114.00	2.73	2.10	70.03	27.77	17.96	73.87
Nauru	0.26	0.01	24.41	0.26	0.26	0.26	0.00
New Zealand	0.37	0.01	0.07	0.33	0.37	0.37	0.00
North Korea	91.19	2.18	3.54	0.00	0.00	0.00	0.00
Palau	0.01	0.00	0.34	0.00	0.01	0.01	0.00
Papua New Guinea	41.06	0.98	4.59	17.58	0.50	0.74	2.39
Philippines	77.31	1.85	0.71	60.06	6.98	14.90	37.76
Samoa	11.98	0.29	60.36	0.54	0.29	0.72	0.43
Singapore	1.26	0.03	0.22	1.16	1.24	1.17	0.00
Solomon Islands	6.82	0.16	9.93	1.05	0.30	0.36	6.46
South Korea	8.83	0.21	0.17	6.18	6.84	8.78	0.00
Thailand	33.89	0.81	0.49	29.90	4.25	8.03	24.56
Timor-Leste	11.27	0.27	8.55	3.45	0.58	2.33	2.47
Tonga	7.64	0.18	72.28	5.98	0.80	0.42	6.31
Tuvalu	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vanuatu	14.73	0.35	47.95	5.85	0.13	2.08	0.72
Vietnam	51.20	1.23	0.53	32.06	5.25	1.02	32.88
<b>Europe &amp; Central Asia</b>							
Albania	0.74	0.02	0.26	0.18	0.08	0.26	0.00
Andorra	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Armenia	17.39	0.42	5.87	1.40	0.01	0.02	1.37
Austria	0.89	0.02	0.10	0.77	0.80	0.89	0.00
Azerbaijan	33.63	0.81	3.33	3.78	1.40	1.41	2.53
Belarus	60.28	1.44	6.43	26.20	3.96	11.18	31.73
Belgium	16.35	0.39	1.42	10.77	16.35	16.35	0.00
Bosnia & Herzegovina	6.21	0.15	1.89	6.19	0.23	0.26	0.68
Bulgaria	0.52	0.01	0.07	0.29	0.01	0.52	0.00
Croatia	2.23	0.05	0.55	1.71	1.86	2.17	0.06
Cyprus	0.25	0.01	0.21	0.17	0.00	0.25	0.00
Czechia	0.39	0.01	0.04	0.33	0.39	0.39	0.00
Denmark	2.06	0.05	0.35	1.99	0.67	0.67	1.39
Estonia	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Finland	0.03	0.00	0.01	0.03	0.03	0.03	0.00
France	6.01	0.14	0.09	5.00	4.81	5.96	0.00
Georgia	2.98	0.07	0.80	1.92	0.54	0.09	1.84
Germany	4.86	0.12	0.06	3.86	4.18	4.86	0.00
Greece	1.08	0.03	0.10	1.06	0.63	1.08	0.00
Hungary	38.12	0.91	3.91	34.98	37.48	38.11	0.01
Continued on next page							

Table B.2 – Chinese Total Aid Exports by Recipient Country, 2017–2021 (continued)

Region/Country	Total aid	Share (%)	Per capita	Medical aid	Unofficial aid	Mask diplm. period	Vaccine diplm. period
Iceland	0.07	0.00	0.19	0.07	0.07	0.07	0.00
Ireland	0.61	0.01	0.12	0.57	0.61	0.61	0.00
Italy	22.44	0.54	0.38	19.26	18.00	22.40	0.02
Kazakhstan	12.37	0.30	0.66	3.83	1.91	4.63	0.00
Kyrgyzstan	25.69	0.61	3.90	17.50	1.95	5.31	12.97
Latvia	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Liechtenstein	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lithuania	0.02	0.00	0.01	0.01	0.02	0.02	0.00
Luxembourg	12.61	0.30	20.01	8.39	12.61	12.61	0.00
Moldova	7.85	0.19	3.00	7.84	0.00	0.26	2.06
Monaco	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Montenegro	1.14	0.03	1.83	1.05	0.60	0.67	0.47
Netherlands	0.94	0.02	0.05	0.70	0.94	0.94	0.00
North Macedonia	0.35	0.01	0.17	0.20	0.00	0.35	0.00
Norway	0.94	0.02	0.17	0.60	0.94	0.94	0.00
Poland	0.45	0.01	0.01	0.39	0.19	0.45	0.00
Portugal	5.19	0.12	0.50	4.06	5.18	5.18	0.00
Romania	2.19	0.05	0.11	0.19	0.26	2.08	0.00
Russia	19.61	0.47	0.14	12.17	9.20	19.61	0.01
San Marino	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Serbia	13.14	0.31	1.90	10.06	6.01	8.64	2.60
Slovakia	0.25	0.01	0.05	0.15	0.25	0.25	0.00
Slovenia	1.00	0.02	0.47	0.61	0.26	1.00	0.00
Spain	2.51	0.06	0.05	1.98	1.98	2.51	0.00
Sweden	0.56	0.01	0.05	0.48	0.56	0.56	0.00
Switzerland	0.69	0.02	0.08	0.49	0.69	0.69	0.00
Tajikistan	155.27	3.72	16.28	50.19	2.48	15.24	72.59
Turkey	1.61	0.04	0.02	1.39	1.61	1.61	0.00
Turkmenistan	17.05	0.41	2.83	12.28	0.22	0.92	11.45
Ukraine	17.98	0.43	0.41	2.78	1.19	2.82	0.00
United Kingdom	6.45	0.15	0.10	5.06	6.45	6.45	0.00
Uzbekistan	72.67	1.74	2.12	31.21	2.98	7.42	0.00
<b>Latin America &amp; Caribbean</b>							
Antigua & Barbuda	10.88	0.26	111.12	5.22	0.06	0.57	0.79
Argentina	13.83	0.33	0.30	13.54	1.82	2.02	0.02
Bahamas	0.02	0.00	0.04	0.01	0.00	0.02	0.00
Barbados	5.43	0.13	18.91	1.09	0.04	0.09	0.45
Belize	0.01	0.00	0.01	0.01	0.01	0.01	0.00
Bolivia	42.93	1.03	3.68	27.72	0.22	0.41	18.18
Brazil	1.71	0.04	0.01	1.46	1.53	1.43	0.28
Chile	7.32	0.18	0.38	6.16	6.70	4.41	2.32
Colombia	5.52	0.13	0.11	0.85	0.63	1.28	0.00
Costa Rica	6.80	0.16	1.33	0.94	0.35	4.19	0.83
Cuba	80.77	1.93	7.13	15.93	1.12	4.43	8.36
Dominica	8.02	0.19	111.39	2.80	0.11	1.44	1.76
Dominican Republic	46.67	1.12	4.30	3.60	2.31	6.98	0.86
Ecuador	17.16	0.41	0.97	7.73	2.50	0.34	7.42
El Salvador	25.97	0.62	4.00	5.43	0.14	0.78	10.26
Grenada	7.39	0.18	65.65	0.29	0.02	2.10	0.20
Guatemala	0.04	0.00	0.00	0.03	0.04	0.04	0.00
Guyana	8.02	0.19	10.20	4.71	0.02	0.04	0.59
Haiti	0.24	0.01	0.02	0.23	0.24	0.24	0.00
Honduras	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Table B.2 – Chinese Total Aid Exports by Recipient Country, 2017–2021 (continued)

Region/Country	Total aid	Share (%)	Per capita	Medical aid	Unofficial aid	Mask diplm. period	Vaccine diplm. period
Jamaica	9.99	0.24	3.37	0.91	0.05	0.24	0.50
Mexico	4.25	0.10	0.03	2.24	2.17	2.65	0.01
Nicaragua	3.80	0.09	0.57	3.80	0.00	0.00	3.80
Panama	24.08	0.58	5.58	10.21	8.30	8.56	0.00
Paraguay	0.06	0.00	0.01	0.04	0.00	0.06	0.00
Peru	13.59	0.33	0.41	6.08	0.58	1.41	4.85
St. Kitts & Nevis	0.00	0.00	0.00	0.00	0.00	0.00	0.00
St. Lucia	0.00	0.00	0.00	0.00	0.00	0.00	0.00
St. Vincent & Grenadines	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Suriname	8.96	0.21	15.27	1.71	0.03	0.06	1.02
Trinidad & Tobago	2.03	0.05	1.45	2.01	0.08	0.07	1.84
Uruguay	7.29	0.17	2.10	0.22	0.31	0.33	0.02
Venezuela	12.97	0.31	0.46	11.79	1.73	3.17	1.35
<b>Middle East &amp; North Africa</b>							
Algeria	8.41	0.20	0.19	7.48	2.43	5.12	3.10
Bahrain	0.06	0.00	0.04	0.06	0.06	0.06	0.00
Djibouti	64.48	1.54	65.26	9.60	0.34	1.36	31.44
Egypt	39.60	0.95	0.39	28.06	2.21	10.69	25.45
Iran	6.82	0.16	0.08	2.24	1.00	3.25	0.23
Iraq	29.93	0.72	0.74	15.71	2.75	5.53	10.55
Israel	0.76	0.02	0.08	0.58	0.76	0.76	0.00
Jordan	20.09	0.48	1.97	15.50	0.70	1.59	3.37
Kuwait	0.07	0.00	0.02	0.07	0.07	0.07	0.00
Lebanon	12.28	0.29	1.80	4.21	0.93	1.43	5.36
Libya	5.60	0.13	0.81	5.35	0.03	0.47	0.00
Malta	0.44	0.01	0.85	0.41	0.08	0.13	0.10
Morocco	15.00	0.36	0.41	13.75	0.86	1.39	0.53
Oman	1.56	0.04	0.31	1.48	0.05	0.16	1.40
Palestinian Territories	4.10	0.10	0.85	2.58	0.35	2.07	1.47
Qatar	0.06	0.00	0.02	0.06	0.06	0.06	0.00
Saudi Arabia	7.19	0.17	0.21	4.30	1.50	7.19	0.00
Syria	56.45	1.35	3.23	26.94	0.84	1.73	12.75
Tunisia	35.00	0.84	2.96	9.71	1.89	5.05	10.66
United Arab Emirates	2.92	0.07	0.29	2.44	2.92	2.91	0.01
Yemen	12.63	0.30	0.42	2.56	0.25	3.25	0.00
<b>North America</b>							
Canada	4.52	0.11	0.12	3.13	1.41	4.52	0.00
United States	16.84	0.40	0.05	16.02	16.61	16.62	0.00
<b>South Asia</b>							
Afghanistan	71.69	1.72	1.84	21.25	3.37	14.93	24.11
Bangladesh	93.99	2.25	0.57	42.10	5.06	11.15	39.05
Bhutan	1.91	0.05	2.48	1.71	0.81	0.95	0.97
India	6.29	0.15	0.00	3.66	6.29	5.36	0.93
Maldives	45.48	1.09	84.14	4.17	0.21	1.32	7.49
Nepal	67.49	1.62	2.32	39.19	5.28	5.76	38.84
Pakistan	165.97	3.97	0.75	97.32	16.51	37.27	104.79
Sri Lanka	93.15	2.23	4.25	34.30	0.68	14.88	30.03
<b>Sub-Saharan Africa</b>							
Angola	14.06	0.34	0.43	3.85	0.11	0.60	5.29
Benin	21.09	0.50	1.74	3.85	0.64	2.17	2.01
Botswana	5.17	0.12	2.20	3.03	0.13	0.76	3.09

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Table B.2 – Chinese Total Aid Exports by Recipient Country, 2017–2021 (continued)

Region/Country	Total aid	Share (%)	Per capita	Medical aid	Unofficial aid	Mask diplm. period	Vaccine diplm. period
Burkina Faso	10.73	0.26	0.51	3.93	0.62	1.27	4.07
Burundi	51.36	1.23	4.32	4.46	0.28	4.95	19.15
Cameroon	23.79	0.57	0.90	13.21	1.49	5.98	10.66
Cape Verde	37.96	0.91	68.27	16.94	0.20	3.77	8.65
Central African Republic	23.02	0.55	4.77	6.92	0.27	1.85	15.15
Chad	21.48	0.51	1.31	5.49	0.57	2.49	4.71
Comoros	14.40	0.34	16.56	5.22	0.79	1.81	4.22
Congo - Brazzaville	29.56	0.71	5.36	6.93	0.08	5.47	5.25
Congo - Kinshasa	25.80	0.62	0.29	4.69	0.61	3.75	6.05
Côte d'Ivoire	56.96	1.36	2.16	2.33	0.18	1.16	0.99
Equatorial Guinea	14.95	0.36	10.65	5.58	0.16	1.83	6.13
Eritrea	5.09	0.12	NA	1.48	0.07	0.26	0.77
Eswatini	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ethiopia	126.77	3.03	1.10	42.38	42.93	58.36	39.52
Gabon	13.20	0.32	5.93	5.34	0.19	3.27	4.66
Gambia	40.13	0.96	16.61	6.89	0.16	1.75	2.36
Ghana	24.98	0.60	0.80	14.46	0.34	1.08	5.06
Guinea	30.53	0.73	2.32	11.41	1.40	5.46	6.63
Guinea-Bissau	12.95	0.31	6.58	2.51	0.19	0.74	2.00
Kenya	49.03	1.17	0.91	12.53	0.42	1.67	2.38
Lesotho	10.21	0.24	4.77	1.60	0.24	0.95	3.87
Liberia	21.05	0.50	4.16	0.70	0.00	0.38	0.17
Madagascar	16.71	0.40	0.60	3.35	0.23	2.52	1.98
Malawi	19.46	0.47	1.02	2.24	0.44	2.13	2.23
Mali	29.86	0.71	1.47	2.37	0.83	2.88	5.24
Mauritania	48.94	1.17	10.53	23.63	0.31	0.79	19.22
Mauritius	4.64	0.11	3.67	1.93	0.03	0.31	1.37
Mozambique	85.60	2.05	2.74	10.52	0.34	16.44	18.68
Namibia	11.62	0.28	4.57	2.19	1.63	0.41	1.61
Niger	39.67	0.95	1.64	10.56	0.92	6.98	8.90
Nigeria	14.80	0.35	0.07	2.16	1.39	3.50	1.01
Rwanda	15.28	0.37	1.18	3.06	0.33	1.62	3.64
São Tomé & Príncipe	5.18	0.12	23.65	2.05	0.21	1.03	1.33
Senegal	26.54	0.64	1.58	8.61	0.14	0.92	6.93
Seychelles	2.40	0.06	24.35	0.41	0.04	0.56	0.16
Sierra Leone	27.16	0.65	3.40	7.46	0.09	1.74	9.31
Somalia	12.81	0.31	0.81	5.67	0.00	0.32	7.21
South Africa	4.45	0.11	0.08	3.34	1.76	3.39	1.05
South Sudan	46.87	1.12	4.19	5.82	0.55	5.31	6.31
Sudan	28.55	0.68	0.65	14.55	0.27	0.69	2.57
Tanzania	42.69	1.02	0.71	14.81	0.32	2.74	4.72
Togo	33.31	0.80	4.02	12.06	0.22	1.29	4.95
Uganda	48.27	1.16	1.06	23.53	0.65	1.78	10.47
Zambia	60.74	1.45	3.30	5.60	0.22	6.28	20.30
Zimbabwe	72.62	1.74	4.89	16.48	2.55	13.31	28.87

*Notes:* The table shows the full list of 184 independent countries importing Chinese aid goods between January 2017 and December 2021. “Total aid,” “Medical aid,” “Unofficial aid,” and aid during the “Mask diplomacy period” and the “Vaccine diplomacy period” are measured in million US\$. “Share” refers to each country’s share in China’s global aid exports. “Per capita” aid is measured in US dollars. “Medical aid” is identified according to the list provided by [Helble \(2012\)](#) and [WTO \(2020\)](#). “Unofficial aid” denotes aid exports under the customs regime “12,” i.e., aid provided by non-government sources.

The “Mask diplomacy period” covers total aid in the period from March to December 2020. The “Vaccine diplomacy period” covers total aid in the period from January to December 2021. Export data come from [GACC \(2022\)](#); population data (2020 values) originate from [World Bank \(2021\)](#).

**Table B.3** – Top 15 Aid Export Products (Million US\$, HS2 level), 2017–2021

HS2	Description	Value
30	Pharmaceutical products	806.1
90	Optical, photographic, cinematographic, measuring, checking, medical or surgical instruments and apparatus; parts and accessories	543.0
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers; television image and sound recorders and reproducers, parts and accessories of such articles	423.3
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	339.8
87	Vehicles other than railway or tramway rolling stock, parts and accessories thereof	284.2
10	Cereals	261.9
63	Other made-up textiles and articles; sets; worn clothing and worn textile articles; rags	241.9
73	Iron or steel articles	237.4
72	Iron and steel	189.0
62	Apparel and clothing accessories; not knitted or crocheted	128.8
38	Miscellaneous chemical products	123.3
94	Furniture; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; lamps and lighting fittings, not else classified; illuminated signs, illuminated name-plates and the like; prefabricated buildings	103.0
31	Fertilizers	91.0
39	Plastics and articles thereof	62.0
76	Aluminium and articles thereof	61.0

*Note:* Export values are in million US\$. Data from [GACC \(2022\)](#).

**Table B.4** – Classification of medical goods

HS code	Helble (2012)	WTO	Description
220710		yes	Undenatured ethyl alcohol; of an alcoholic strength by volume of 80% vol. or higher
284210	yes		Salts of inorganic acids or peroxyacids, double or complex silicates, including aluminosilicates, whether or not chemically defined, excluding azides
284290	yes		Salts; of inorganic acids or peroxyacids, other than double or complex silicates, including aluminosilicates, whether or not chemically, excluding azides
284700		yes	Hydrogen peroxide; whether or not solidified with urea
285290	yes		Inorganic or organic compounds of mercury; excluding amalgams, not chemically defined,
290290	yes		Cyclic hydrocarbons; n.e.c. in heading no. 2902
290371	yes		Halogenated derivatives of acyclic hydrocarbons containing two or more different halogens; chlorodifluoromethane
290393	yes		Halogenated derivatives of aromatic hydrocarbons; pentachlorobenzene (ISO)
290410	yes		Derivatives of hydrocarbons; containing only sulpho groups, their salts and ethyl esters, whether or not halogenated
290431	yes		Derivatives of hydrocarbons; perfluorooctane sulphonic acid, whether or not halogenated
290522	yes		Alcohols; unsaturated monohydric, acyclic terpene alcohols
290529	yes		Alcohols; acyclic, unsaturated monohydric, (other than acyclic terpene alcohols)
290619	yes		Alcohols; cyclanic, cyclenic or cycloterpenic and derivatives, n.e.c. in item no. 2906.1
290629	yes		Alcohols; aromatic and derivatives, other than benzyl alcohol
290729	yes		Phenol-alcohols and polyphenols n.e.c. in item number 2907.2
290919	yes		Ethers; acyclic, and their halogenated, sulphonated, nitrated or nitrosated derivatives, other than diethyl ether
290930	yes		Ethers; aromatic, and their halogenated, sulphonated, nitrated or nitrosated derivatives
290949	yes		Ether-alcohols and their halogenated, sulphonated, nitrated or nitrosated derivatives; n.e.c. in item no. 2909.4
290950	yes		Ether-phenols, ether-alcohol-phenols and their halogenated, sulphonated, nitrated or nitrosated derivatives
291229	yes		Aldehydes; cyclic, without other oxygen function, other than benzaldehyde
291249	yes		Aldehyde-alcohols, aldehyde-ethers, aldehyde-phenols and aldehydes with other oxygen function; other than vanillin (4-hydroxy-3-methoxybenzaldehyde) and ethylvanillin (3-ethoxy-4-hydroxybenzaldehyde)
291419	yes		Ketones; acyclic, without other oxygen function, n.e.c. in item no. 2914.1
291440	yes		Ketone-alcohols and ketone-aldehydes
291462	yes		Quinones; coenzyme Q10 (ubidecarenone (INN))
291539	yes		Acids; saturated acyclic monocarboxylic acids; esters of acetic acid n.e.c. in item no. 2915.3
291550	yes		Acids; saturated acyclic monocarboxylic acids; propionic acid, its salts and esters
291590	yes		Acids; saturated acyclic monocarboxylic acids; anhydrides, halides, peroxides, peroxyacids and halogenated, sulphonated, nitrated or nitrosated derivatives, n.e.c. in heading no. 2915
291619	yes		Acids; unsaturated acyclic monocarboxylic, cyclic monocarboxylic, their anhydrides, halides, peroxides and peroxyacids; their halogenated, sulphonated, nitrated or nitrosated derivatives, n.e.c. in item no. 2916.1
291620	yes		Acids; cyclanic, cyclenic or cycloterpenic monocarboxylic acids, their anhydrides, halides, peroxides, peroxyacids and their derivatives
291639	yes		Acids; aromatic monocarboxylic acids, and their anhydrides, halides, peroxides, peroxyacids and their derivatives, other than benzoic acid, its salts and esters, benzoyl peroxide and benzoyl chloride, phenylacetic acid and its salts
291713	yes		Acids; acyclic polycarboxylic acids; azelaic acid, sebacic acid, their salts and esters
291719	yes		Acids; acyclic polycarboxylic acids; n.e.c. in item no. 2917.1

291734	yes	Acids; aromatic polycarboxylic acids; other esters of orthophthalic acids
291739	yes	Acids; aromatic polycarboxylic acids; n.e.c. in item no. 2917.3
291811	yes	Acids; carboxylic acids, (with alcohol function but without other oxygen function), lactic acid, its salts and esters
291813	yes	Acids; carboxylic acids, (with alcohol function but without other oxygen function); salts and esters of tartaric acid
291816	yes	Acids; carboxylic acids, (with alcohol function but without other oxygen function), gluconic acid, its salts and esters
291817	yes	Acids; carboxylic acids, (with alcohol function but without other oxygen function), 2,2-Diphenyl-2-hydroxyacetic acid (benzilic acid)
291822	yes	Acids; carboxylic acids, (with phenol function but without other oxygen function), o-acetylsalicylic acid, its salts and esters
291823	yes	Acids; carboxylic acids, (with phenol function but without other oxygen function), other esters of salicylic acid and its salts n.e.c. in item no. 2918.2
291829	yes	Acids; carboxylic acids, (with phenol function but without other oxygen function), their anhydrides, halides, peroxides, peroxyacids and their derivatives, n.e.c. in item no. 2918.2
291830	yes	Acids; carboxylic acids, (with aldehyde or ketone function but without other oxygen function), their anhydrides, halides, peroxides, peroxyacids and their derivatives
292021	yes	Esters; phosphite esters and their salts; their halogenated, sulphonated, nitrated or nitrosated derivatives, dimethyl phosphite
292112	yes	Amine-function compounds; acyclic monoamines and their derivatives, and salts thereof, 2-(N,N-Dimethylamino)ethylchloride hydrochloride
292129	yes	Amine-function compounds; acyclic polyamines and their derivatives, and salts thereof, n.e.c. in item no. 2921.2
292130	yes	Amine-function compounds; cyclanic, cyclenic or cycloterpenic mono- or polyamines and their derivatives; salts thereof
292142	yes	Amine-function-compounds; aromatic monoamines and their derivatives, aniline derivatives and their salts
292149	yes	Amine-function compounds; aromatic monoamines and their derivatives; salts thereof; n.e.c. in item no. 2921.4
292159	yes	Amine-function compounds; aromatic polyamines and their derivatives, other than item no. 2921.51
292211	yes	Amino-alcohols, other than those containing more than one kind of oxygen function; their ethers and esters; salts thereof, monoethanolamine and its salts
292216	yes	Amino-alcohols, other than those containing more than one kind of oxygen function; their ethers and esters; salts thereof, Diethanolammonium perfluorooctane sulphonate
292229	yes	Amino-naphthols and other amino-phenols, other than those containing more than one kind of oxygen function, their ethers and esters; salts thereof n.e.c. in item no. 2922.2
292241	yes	Amino-acids, other than those containing more than one kind of oxygen function, and their esters; lysine and its esters; salts thereof
292249	yes	Amino-acids, other than those containing more than one kind of oxygen function, their esters; salts thereof, excluding lysine, glutamic acid, anthranalic acid and tilidine, their esters and salts thereof
292250	yes	Amino-alcohol-phenols, amino-acid-phenols and other amino-compounds with oxygen function
292310	yes	Quaternary ammonium salts and hydroxides; choline and its salts, whether or not chemically defined
292330	yes	Quaternary ammonium salts and hydroxides; tetraethylammonium perfluorooctane sulphonate, whether or not chemically defined
292425	yes	Cyclic amides (including cyclic carbamates) and their derivatives; alachlor (ISO) and its salts
292519	yes	Imides and their derivatives; other than saccharin and glutethimide (INN)
292640	yes	Nitrile-function compounds; alpha-phenylacetoacetonitrile
292700	yes	Diazo-, azo- or azoxy compounds
292800	yes	Organic derivatives of hydrazine or of hydroxylamine
292990	yes	Nitrogen-function compounds; n.e.c. in chapter 29, excluding isocyanates

293060	yes	Organo-sulphur compounds; 2-(N,N-Diethylamino)ethanethiol
293110	yes	Organo-inorganic compounds; tetramethyl lead and tetraethyl lead
293299	yes	Heterocyclic compounds; with oxygen hetero-atom(s) only, no lactones or unfused furan rings (hydrogenated or not) in the structure, other than isosafrole, 1-(1,3-benzodioxol-5-yl) propan-2-one, piperonal, safrole, tetrahydrocannabinols (all isomers)
293311	yes	Heterocyclic compounds; with nitrogen hetero-atom(s) only, containing an unfused pyrazole ring (whether or not hydrogenated) in the structure, phenazone (antipyrin) and its derivatives
293321	yes	Heterocyclic compounds; with nitrogen hetero-atom(s) only, containing an unfused imidazole ring (whether or not hydrogenated) in the structure, hydantoin and its derivatives
293329	yes	Heterocyclic compounds; with nitrogen hetero-atom(s) only, containing an unfused imidazole ring (whether or not hydrogenated) in the structure, other than hydantoin and its derivatives
293359	yes	Heterocyclic compounds; containing a pyrimidine ring (whether or not hydrogenated) or piperazine ring in the structure, (other than malonylurea and its derivatives, loprazolam, mecloqualone, methaqualone, zipeprol, and salts thereof) n.e.c. in 2933.5
293369	yes	Heterocyclic compounds; containing an unfused triazine ring (whether or not hydrogenated) in the structure, others excluding melamine
293621	yes	Vitamins; vitamins A and their derivatives, unmixed
293622	yes	Vitamins; vitamin B1 and its derivatives, unmixed
293623	yes	Vitamins; vitamin B2 and its derivatives, unmixed
293624	yes	Vitamins; D- or DL-pantothenic acid (vitamin B3 or vitamin B5) and its derivatives, unmixed
293625	yes	Vitamins; vitamin B6 and its derivatives, unmixed
293626	yes	Vitamins; vitamin B12 and its derivatives, unmixed
293627	yes	Vitamins; vitamin C and its derivatives, unmixed
293628	yes	Vitamins; vitamin E and its derivatives, unmixed
293629	yes	Vitamins; n.e.c. in item no. 2936.2, and their derivatives, unmixed
293690	yes	Vitamins; n.e.c. in heading no. 2936, including natural concentrates
293711	yes	Polypeptide hormones, protein hormones and glycoprotein hormones, their derivatives and structural analogues; somatotropin, its derivatives and structural analogues
293712	yes	Polypeptide hormones, protein hormones and glycoprotein hormones, their derivatives and structural analogues; insulin and its salts
293719	yes	Polypeptide hormones, protein hormones and glycoprotein hormones, their derivatives and structural analogues; other than somatotropin, (its derivatives and structural analogues) and insulin and its salts
293721	yes	Steroidal hormones, their derivatives and structural analogues; cortisone, hydrocortisone, prednisone (dehydrocortisone) and prednisolone (dehydrohydrocortisone)
293722	yes	Steroidal hormones, their derivatives and structural analogues; halogenated derivatives of corticosteroidal hormones
293723	yes	Steroidal hormones, their derivatives and structural analogues; oestrogens and progestogens
293729	yes	Steroidal hormones, their derivatives and structural analogues; other than cortisone, hydrocortisone, prednisone (dehydrocortisone), prednisolone (dehydrohydrocortisone), halogenated derivatives of corticosteroidal hormones, oestrogen and progestogens
293750	yes	Prostaglandins, thromboxanes and leukotrienes, their derivatives and structural analogues
293790	yes	Hormones, prostaglandins, thromboxanes and leukotrienes, natural or reproduced by synthesis; derivatives and structural analogues thereof, including chain modified polypeptides, used primarily as hormones, n.e.c. in heading 2937
293810	yes	Glycosides; rutoside (rutin) and its derivatives
293890	yes	Glycosides; natural or reproduced by synthesis, other than rutoside (rutin) and its derivatives
293911	yes	Alkaloids; of opium and their derivatives; salts thereof

293919	yes		Alkaloids; of opium and their derivatives; other than in 2939.11, salts thereof
293920	yes		Alkaloids; of cinchona and their derivatives; salts thereof
293930	yes		Alkaloids; caffeine and its salts
293941	yes		Alkaloids; ephedrine and its salts
293942	yes		Alkaloids; pseudoephedrine (INN) and its salts
293943	yes		Alkaloids; cathine (INN) and its salts
293944	yes		Alkaloids; norephedrine and its salts
293951	yes		Alkaloids; theophylline and aminophylline (theophylline-ethylenediamine) and their derivatives; salts thereof, fenetylline (INN) and its salts
293959	yes		Alkaloids; theophylline and aminophylline (theophylline-ethylenediamine) and their derivatives; salts thereof, other than fenetylline
293961	yes		Alkaloids; of rye ergot and their derivatives, ergometrine (INN) and its salts
293962	yes		Alkaloids; of rye ergot and their derivatives, ergotamine (INN) and its salts
293963	yes		Alkaloids; of rye ergot and their derivatives, lysergic acid and its salts
293969	yes		Alkaloids; of rye ergot and their derivatives, salts thereof, n.e.c. in item no. 2939.6
293971	yes		Alkaloids; of vegetal origin, cocaine, ecgonine, levometamfetamine, metamfetamine (INN), metamfetamine racemate; salts, esters and other derivatives thereof
293979	yes		Alkaloids; of vegetal origin, other than cocaine, ecgonine, levometamfetamine, metamfetamine (INN), metamfetamine racemate; salts, esters and other derivatives; n.e.c. in heading no. 2939
294000	yes		Sugars, chemically pure, other than sucrose, lactose, maltose, glucose and fructose; sugar ethers, sugar acetals and sugar esters, and their salts, other than the products of heading 29.37, 29.38, or 29.39
294110	yes		Antibiotics; penicillins and their derivatives with a penicillanic acid structure; salts thereof
294120	yes		Antibiotics; streptomycins and their derivatives; salts thereof
294130	yes		Antibiotics; tetracyclines and their derivatives; salts thereof
294140	yes		Antibiotics; chloramphenicol and its derivatives; salts thereof
294150	yes		Antibiotics; erythromycin and its derivatives; salts thereof
294190	yes		Antibiotics; n.e.c. in heading no. 2941
294200	yes		Organic compounds; n.e.c. in chapter 29
300120	yes	yes	Glands and other organs; extracts of glands or other organs or of their secretions, for organo-therapeutic uses
300190	yes	yes	Glands and other organs; heparin and its salts; other human or animal substances prepared for therapeutic or prophylactic uses, n.e.c. in heading 3001
300211	yes		Blood, human or animal, antisera, other blood fractions and immunological products; malaria diagnostic test kits
300212		yes	Blood, human or animal, antisera, other blood fractions and immunological products; antisera and other blood fractions
300213		yes	Blood, human or animal, antisera, other blood fractions and immunological products; immunological products, unmixed, not put up in measured doses or in forms or packings for retail sale
300214		yes	Blood, human or animal, antisera, other blood fractions and immunological products; immunological products, mixed, put up in measured doses or in forms or packings for retail sale
300215		yes	Blood, human or animal, antisera, other blood fractions and immunological products; immunological products, put up in measured doses or in forms or packings for retail sale
300219		yes	Blood, human or animal, antisera, other blood fractions and immunological products; n.e.c. in heading 3002.1
300220	yes	yes	Vaccines; for human medicine
300290		yes	Toxins, cultures of micro-organisms (excluding yeasts) and similar products
300310	yes	yes	Medicaments; containing penicillins, streptomycins or their derivatives, for therapeutic or prophylactic uses, (not in measured doses, not packaged for retail sale)



300320	yes	yes	Medicaments; containing antibiotics other than penicillins, streptomycins and their derivatives, for therapeutic or prophylactic uses, (not in measured doses, not packaged for retail sale)
300331	yes	yes	Medicaments; containing insulin, for therapeutic or prophylactic uses, not packaged for retail sale
300339	yes	yes	Medicaments; containing hormones (excluding insulin), (but not containing antibiotics), for therapeutic or prophylactic uses, not packaged for retail sale
300341	yes	yes	Medicaments; containing alkaloids or their derivatives, containing ephedrine or its salts, for therapeutic or prophylactic uses, (not packaged for retail sale)
300342		yes	Medicaments; containing alkaloids or their derivatives, containing pseudoephedrine (INN) or its salts, for therapeutic or prophylactic uses, (not packaged for retail sale)
300343		yes	Medicaments; containing alkaloids or their derivatives, containing norephedrine or its salts, for therapeutic or prophylactic uses, (not packaged for retail sale)
300349		yes	Medicaments; containing alkaloids or their derivatives; other than ephedrine, pseudoephedrine (INN) or norephedrine or their salts; for therapeutic or prophylactic uses, (not packaged for retail sale)
300360	yes	yes	Medicaments; containing antimalarial active principles described in subheading note 2 to this chapter, for therapeutic or prophylactic uses, (not packaged for retail sale)
300390		yes	Medicaments; (not containing antibiotics, hormones, alkaloids or their derivatives), for therapeutic or prophylactic uses, (not packaged for retail sale)
300410	yes	yes	Medicaments; containing penicillins, streptomycins or their derivatives, for therapeutic or prophylactic uses, packaged for retail sale
300420	yes	yes	Medicaments; containing antibiotics (other than penicillins, streptomycins or their derivatives), for therapeutic or prophylactic uses, packaged for retail sale
300431	yes	yes	Medicaments; containing insulin, for therapeutic or prophylactic uses, packaged for retail sale
300432	yes	yes	Medicaments; containing corticosteroid hormones, their derivatives or structural analogues (but not containing antibiotics), for therapeutic or prophylactic uses, packaged for retail sale
300439	yes	yes	Medicaments; containing hormones (but not insulin), adrenal cortex hormones or antibiotics, for therapeutic or prophylactic uses, packaged for retail sale
300441	yes	yes	Medicaments; containing alkaloids or their derivatives, containing ephedrine or its salts, for therapeutic or prophylactic uses, packaged for retail sale
300442		yes	Medicaments; containing alkaloids or their derivatives, containing pseudoephedrine (INN) or its salts, for therapeutic or prophylactic uses, packaged for retail sale
300443		yes	Medicaments; containing alkaloids or their derivatives, containing norephedrine or its salts, for therapeutic or prophylactic uses, packaged for retail sale
300449		yes	Medicaments; containing alkaloids or their derivatives; other than ephedrine, pseudoephedrine (INN) or norephedrine or their salts; for therapeutic or prophylactic uses, packaged for retail sale
300450	yes	yes	Medicaments; containing vitamins or their derivatives, for therapeutic or prophylactic use, packaged for retail sale
300460	yes	yes	Medicaments; containing antimalarial active principles described in Subheading Note 2 to this Chapter, for therapeutic or prophylactic uses, packaged for retail sale
300490		yes	Medicaments; consisting of mixed or unmixed products n.e.c. in heading no. 3004, for therapeutic or prophylactic uses, packaged for retail sale
300510	yes	yes	Dressings, adhesive; and other articles having an adhesive layer, packed for retail sale for medical, surgical, dental or veterinary purposes
300590	yes	yes	Wadding, gauze, bandages and similar articles; (excluding adhesive dressings), impregnated or coated with pharmaceutical substances, packaged for retail sale
300610	yes	yes	Pharmaceutical goods; sterile surgical catgut, suture materials, tissue adhesives, laminaria, laminaria tents, absorbable surgical or dental haemostatics, and surgical or dental adhesion barriers
300620	yes	yes	Pharmaceutical goods; blood-grouping reagents
300630	yes	yes	Pharmaceutical goods; opacifying preparations for x-ray examinations, diagnostic reagents designed to be administered to the patient

300640	yes		Pharmaceutical goods; dental cements and other dental fillings, bone reconstruction cements
300650	yes	yes	Pharmaceutical goods; first aid boxes and kits
300660	yes		Pharmaceutical goods; chemical contraceptive preparations based on hormones, on other products of heading 2937 or on spermicides
300670	yes	yes	Pharmaceutical goods; Gel preparations designed to be used in human or veterinary medicine as a lubricant for parts of the body for surgical operations or physical examinations or as a coupling agent between the body and medical instruments
300691	yes		Pharmaceutical goods; appliances identifiable for ostomy use
300692	yes		Pharmaceutical goods; waste pharmaceuticals
320300	yes		Colouring matter of vegetable or animal origin, including dyeing extracts not animal black, whether or not chemically defined; preparations based on colouring matter of vegetable or animal origin
320419	yes		Dyes; n.e.c., including mixtures of colouring matter of two or more of those from item no. 3204.11 to 3204.19
340111		yes	Soap and organic surface-active products; in the form of bars, cakes, moulded shapes, and paper, wadding, felt and nonwovens, impregnated, coated or covered with soap or detergent, for toilet use (including medicated products)
340130		yes	Organic surface-active products and preparations for washing the skin, in the form of liquid or cream and put up for retail sale, whether or not containing soap
340212		yes	Organic surface-active agents; cationic (other than soap), whether or not put up for retail sale
340213		yes	Organic surface-active agents; non-ionic (other than soap), whether or not put up for retail sale
340220		yes	Washing and cleaning preparations; surface-active, whether or not containing soap (excluding those of heading no. 3401), put up for retail sale
350400		yes	Peptones and their derivatives; other protein substances and their derivatives n.e.c. or included, hide powder, whether or not chromed
350790	yes	yes	Enzymes and prepared enzymes; other than rennet and concentrates thereof
370110		yes	Photographic plates and film; for x-ray, in the flat, sensitised, unexposed, of any material other than paper, paperboard or textiles
370210		yes	Photographic film; for x-rays, in rolls, sensitised and unexposed (other than of paper, paperboard or textiles)
380894		yes	Disinfectants; other than containing goods specified in Subheading Note 1 in this Chapter; put up in forms or packings for retail sale or as preparations or articles
382100		yes	Prepared culture media for the development or maintenance of micro-organisms (including viruses and the like) or of plant, human or animal cells
382200	yes	yes	Reagents; diagnostic or laboratory reagents on a backing and prepared diagnostic or laboratory reagents whether or not on a backing, other than those of heading no. 3002 or 3006; certified reference material
382499		yes	Chemical products, mixtures and preparations; n.e.c. heading 3824
392620		yes	Plastics; articles of apparel and clothing accessories (including gloves, mittens and mitts)
392690		yes	Plastics; other articles n.e.c. in chapter 39
401490	yes	yes	Rubber; vulcanised (other than hard rubber), hygienic or pharmaceutical articles (excluding sheath contraceptives), with or without fittings of hard rubber
401511	yes	yes	Rubber; vulcanised (other than hard rubber), surgical gloves
401519		yes	Rubber; vulcanised (other than hard rubber), gloves, mittens and mitts other than surgical gloves
630790		yes	Textiles; made up articles (including dress patterns), n.e.c. in chapter 63, n.e.c. in heading no. 6307
701710	yes	yes	Glassware; laboratory, hygienic or pharmaceutical, whether or not graduated or calibrated, of fused quartz or other fused silica
701720	yes	yes	Glassware; laboratory, hygienic or pharmaceutical, whether or not graduated or calibrated, having a linear co-efficient of expansion not over $5 \times 10^{-6}$ (to the minus 6), (or 0.000005) per Kelvin with a temperature of 0-300 degrees C

701790	yes	yes	Glassware; laboratory, hygienic or pharmaceutical, whether or not graduated or calibrated, of glass n.e.c. in heading no. 7017
841920	yes	yes	Sterilizers; for medical, surgical or laboratory use, not used for domestic purposes
871310	yes		Carriages for disabled persons; not mechanically propelled
871390	yes		Carriages for disabled persons; mechanically propelled
900490		yes	Spectacles, goggles and the like; (other than sunglasses) corrective, protective or other
900630	yes		Cameras, photographic (excluding cinematographic); specially designed for underwater use, aerial survey, medical or surgical examination of internal organs; comparison cameras for forensic or criminological use
901050		yes	Photographic laboratory apparatus and equipment; n.e.c. in item no. 9010.10, for photographic (including cinematographic) laboratories; negatoscopes
901110		yes	Microscopes, compound optical; stereoscopic microscopes
901180		yes	Microscopes, compound optical; (other than stereoscopic and microscopes for photomicrography, cinephotomicrography or microprojection)
901811	yes	yes	Medical, surgical instruments and appliances; electro-cardiographs
901812	yes	yes	Medical, surgical instruments and appliances; ultrasonic scanning apparatus
901813	yes	yes	Medical, surgical instruments and appliances; magnetic resonance imaging apparatus
901814	yes	yes	Medical, surgical instruments and appliances; scintigraphic apparatus
901819	yes	yes	Medical, surgical instruments and appliances; electro-diagnostic apparatus (including apparatus for functional exploratory examination or for checking physiological parameters), n.e.c. in item no. 9018.1
901820	yes	yes	Medical, surgical instruments and appliances; ultra-violet or infra-red ray apparatus
901831	yes	yes	Medical, surgical instruments and appliances; syringes, with or without needles
901832	yes	yes	Medical, surgical instruments and appliances; tubular metal needles and needles for sutures
901839	yes	yes	Medical, surgical instruments and appliances; catheters, cannulae and the like
901841	yes		Dental instruments and appliances; dental drill engines, whether or not combined on a single base with other dental equipment
901849	yes		Dental instruments and appliances; other than dental drill engines
901850	yes		Ophthalmic instruments and appliances
901890	yes	yes	Medical, surgical or dental instruments and appliances; n.e.c. in heading no. 9018
901920	yes	yes	Therapeutic respiration apparatus; ozone, oxygen, aerosol therapy apparatus; artificial respiration or other therapeutic respiration apparatus
902000		yes	Breathing appliances and gas masks; excluding protective masks having neither mechanical parts nor replaceable filters and excluding apparatus of item no. 9019.20
902110	yes		Orthopaedic or fracture appliances
902121	yes		Dental fittings; artificial teeth
902129	yes		Dental fittings; other than artificial teeth
902131	yes		Artificial parts of the body
902139	yes		Artificial parts of the body; excluding artificial joints
902140	yes		Hearing aids (excluding parts and accessories)
902150	yes	yes	Pacemakers; for stimulating heart muscles (excluding parts and accessories)
902190	yes		Appliances; worn, carried or implanted in the body, to compensate for a defect or disability
902212	yes	yes	Apparatus based on the use of x-rays; including radiography or radiotherapy apparatus, whether or not for medical, surgical, dental or veterinary uses, computed tomography apparatus
902213	yes		Apparatus based on the use of x-rays; including radiography or radiotherapy apparatus, for dental uses, excluding computed tomography apparatus
902214	yes	yes	Apparatus based on the use of x-rays; including radiography or radiotherapy apparatus, for medical, surgical or veterinary uses, not dental uses, excluding computed tomography apparatus
902219		yes	Apparatus based on the use of x-rays, including radiography or radiotherapy apparatus; for other than medical, surgical, dental or veterinary uses

902221	yes	yes	Apparatus based on the use of alpha, beta or gamma radiations, including radiography or radiotherapy apparatus; for medical, surgical, dental or veterinary uses
902229		yes	Apparatus based on the use of alpha, beta or gamma radiations, including radiography or radiotherapy apparatus; (for other than medical, surgical, dental or veterinary uses)
902230		yes	X-ray tubes
902290		yes	Apparatus based on use of x-rays and similar; parts and accessories (x-ray generators, tubes, high tension generators, control panels and desks, screens, examination or treatment tables, chairs and like
902511		yes	Thermometers and pyrometers; liquid filled, for direct reading, not combined with other instruments
902519		yes	Thermometers and pyrometers; (other than liquid filled, for direct reading), not combined with other instruments
902780		yes	Instruments and apparatus; for physical or chemical analysis, for measuring or checking viscosity, porosity, expansion, surface tension or quantities of heat, sound or light, n.e.c. in heading no. 9027
903020		yes	Oscilloscopes and oscillographs
940210	yes		Chairs; dentists', barbers' or similar chairs having rotating as well as both reclining and elevating movements, and parts thereof
940290	yes	yes	Furniture; for medical, surgical, veterinary use (e.g. operating tables, examination tables, hospital beds with mechanical fittings) and parts thereof

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*Notes:* To classify goods as medical goods by their HS code, we use the list of medical products from Helble (2012) and complement it with a list of medical products specific to the treatment and prevention of COVID-19 issued by WTO (2020). Helble's list contains a selection of dosified medicines, bulk medicines, inputs specific to the pharmaceutical industry, chemical inputs of general purpose, hospital and laboratory inputs, and medical technology equipment. We use all codes from Helble's Appendix 1 identifiable as HS revision 2007 codes and convert them to HS revision 2017 in order to match the Chinese aid exports data. The WTO's list of COVID-19-related medical goods can be accessed as "Annex 1 of the report on Trade in Medical Goods in the Context of Tackling COVID-19" on <https://data.wto.org/>.

**Table B.5** – Top 15 Aid Export Products (Million US\$, HS8 level), 2017–2021

HS8	Description	Value
30022000	Vaccines for human medicine	762.6
63079000	Made up articles (incl. dress patterns)	199.8
90221990	Other X-ray apparatus	181.0
10063010	Semi-milled or wholly milled rice (long grain)	122.8
10063020	Semi-milled or wholly milled rice (short grain)	122.4
62101030	Garments, felt or non-woven, of man-made fibre	119.9
90221200	Computed tomography scanners (CT)	115.3
73089000	Other structures and parts of iron or steel; plates, shapes, tubes etc. prepared for use in structures	93.5
72142000	Other bars, rods, ribs and grooves containing indentations; ribs, grooves or other deformations produced during the rolling process	91.1
90192000	Ozone therapy, oxygen therapy, aerosol therapy, artificial respiration or other therapeutic respiration apparatus	85.5
31021000	Urea	83.1
38220090	Prepared diagnostic or laboratory reagents	81.8
87021091	Buses with combustion engine (diesel or hybrid), with 30 seats or more	50.2
72283090	Other bars and rods of alloy or steel, not further worked than hot-rolled, hot-drawn or extruded	41.2
87059040	Mobile clinics	40.2

*Notes:* Export values are in million US\$. Medical products as classified by [Helble \(2012\)](#) and [WTO \(2020\)](#) are printed in *italics*. Data from [GACC \(2022\)](#).

**Table B.6** – Correlates of China’s Aid Exports, Before and After COVID-19

	Pre-Pandemic		Mask Diplomacy		Vaccine Diplomacy	
	Med. (1)	Non-Med. (2)	Med. (3)	Non-Med. (4)	Med. (5)	Non-Med. (6)
<i>asinh</i> GDP per capita	-3.28*** (0.710)	-3.96*** (0.745)	-0.109 (0.218)	-1.34** (0.550)	-3.60*** (0.680)	-3.79*** (0.603)
<i>asinh</i> COVID-19 deaths			-0.152 (0.197)	-0.459 (0.372)	0.830 (0.536)	-1.17** (0.554)
Taiwan recognition	-8.81*** (0.850)	-11.0*** (0.820)	-7.07*** (1.93)	-7.39*** (1.54)	-11.5*** (0.737)	-8.53*** (1.07)
UNGA Ideal point distance	-1.10** (0.452)	-2.01*** (0.475)	-0.227 (0.163)	-0.388 (0.313)	-2.17*** (0.436)	-1.38*** (0.456)
Number of sister linkages	0.344 (0.289)	0.778 (0.564)	0.243** (0.110)	0.398** (0.182)	0.225 (0.349)	0.177 (0.313)
<i>asinh</i> Trade with China	0.182 (1.04)	1.61 (1.02)	0.432 (0.279)	0.689 (0.457)	1.09 (0.728)	0.666 (0.751)
Natural resources rents (% GDP)	-0.501 (0.313)	-0.629* (0.330)	-0.207* (0.119)	-0.346 (0.320)	-0.436 (0.378)	-0.517 (0.342)
Liberal democracy index	-0.561 (0.461)	-0.681 (0.477)	-0.209 (0.145)	0.117 (0.354)	-0.326 (0.481)	-0.003 (0.521)
<i>asinh</i> Population	-1.69 (1.03)	-1.57 (1.09)	0.942*** (0.325)	1.06* (0.564)	-1.85** (0.934)	-0.321 (0.890)
Observations	166	166	165	165	165	165
R <sup>2</sup>	0.551	0.646	0.571	0.412	0.593	0.608
Adjusted R <sup>2</sup>	0.529	0.628	0.546	0.377	0.570	0.585

*Note:* Results are based on a cross-sectional OLS regression of China’s average monthly medical and non-medical aid flows (transformed using inverse hyperbolic sine) in each period on the reported measures of need, economic interests, and bilateral political ties. The pre-pandemic period includes the months from January 2017 to November 2019. The period of mask diplomacy includes March to December 2020. The period of vaccine diplomacy includes the months from January to December 2021. The values of the explanatory variables are the three-year averages from 2014 to 2016 (preceding the coverage by Chinese Customs). Exceptions are COVID-19 deaths (computed as the sum of deaths in each period), the Taiwan recognition indicator (one if a country recognized the Republic of China and had diplomatic relations with it throughout the respective period), and the number of sister linkages (counted in 2015, the last year included in [Liu and Hu \(2018\)](#)). All variables prefixed with *asinh* have been transformed using inverse hyperbolic sine. All coefficient estimates are scaled to show the effect of a one-standard-deviation change with the exception of Taiwan recognition, which is a binary variable. Results are robust to using the 3-year period from 2017 to 2019 for the averages of explanatory variables (Table C.1), splitting trade with China into exports and imports (Table C.2), and adding the number of deaths from disasters as an explanatory variable (Table C.3). When exports to China are included, they enter significantly and negatively in the period of mask diplomacy. Considering only official aid results in coefficients on GDP per capita, Taiwan recognition, and UNGA ideal point distance in the period of mask diplomacy that are more in line with the coefficients in the other two periods. Heteroskedasticity-robust standard-errors are reported in parentheses. \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01.

**Table B.7** – Correlates of China’s Mask and Vaccine Aid Exports

	Surgical Masks (1)	Human Vaccines (2)
<i>asinh</i> GDP per capita	-0.061 (0.200)	-4.07*** (0.879)
<i>asinh</i> COVID-19 deaths	-0.133 (0.185)	0.547 (0.654)
Taiwan recognition	-6.68*** (1.79)	-9.89*** (0.987)
UNGA ideal point distance	-0.191 (0.157)	-1.46*** (0.550)
Number of sister linkages	0.311*** (0.099)	0.313 (0.367)
<i>asinh</i> Trade with China	0.399 (0.268)	1.27 (1.05)
Natural resources rents (% GDP)	-0.124 (0.103)	-0.493 (0.453)
Liberal democracy index	-0.138 (0.137)	-0.615 (0.620)
<i>asinh</i> Population	0.785** (0.310)	-2.78** (1.33)
Observations	165	165
R <sup>2</sup>	0.550	0.471
Adjusted R <sup>2</sup>	0.524	0.440

*Note:* Results are based on a cross-sectional OLS regression of China’s average monthly aid and donations of surgical masks and human vaccines (transformed using inverse hyperbolic sine) on the reported measures of need, economic interests, and bilateral political ties. The averages are calculated for the periods relevant for each aid type: the period of mask diplomacy (March to December 2020) for masks and the period of vaccine diplomacy (January to December 2021) for vaccines. The values of the explanatory variables are the three-year averages from 2014 to 2016 (preceding the coverage by China Customs). Exceptions are COVID-19 deaths (computed as the sum of deaths in each period), the Taiwan recognition indicator (one if a country recognized the Republic of China and had diplomatic relations with it throughout the respective period), and the number of sister linkages (counted in 2015, the last year included in [Liu and Hu \(2018\)](#)). All variables prefixed with *asinh* have been transformed using inverse hyperbolic sine. All coefficient estimates are scaled to show the effect of a one-standard-deviation change with the exception of Taiwan recognition, which is a binary variable. Heteroskedasticity-robust standard-errors are reported in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

## Appendix C Sensitivity Analysis

**Table C.1** – Correlates of China's Aid Exports, before and after COVID-19 (3-Year Averages)

	Pre-Pandemic		Mask Diplomacy		Vaccine Diplomacy	
	Med. (1)	Non-Med. (2)	Med. (3)	Non-Med. (4)	Med. (5)	Non-Med. (6)
<i>asinh</i> GDP per capita	-3.55*** (0.727)	-4.50*** (0.811)	-0.084 (0.246)	-1.24* (0.636)	-3.97*** (0.694)	-4.03*** (0.633)
<i>asinh</i> COVID-19 deaths			-0.153 (0.198)	-0.437 (0.381)	0.955* (0.522)	-0.955* (0.535)
Taiwan recognition	-8.49*** (0.840)	-10.4*** (0.803)	-7.03*** (1.93)	-7.34*** (1.51)	-11.2*** (0.697)	-8.33*** (1.00)
UNGA Ideal point distance	-1.13*** (0.429)	-1.89*** (0.456)	-0.223 (0.160)	-0.365 (0.298)	-1.97*** (0.425)	-1.21*** (0.438)
Number of sister linkages	0.450 (0.287)	0.817 (0.562)	0.250** (0.110)	0.428** (0.182)	0.252 (0.351)	0.217 (0.308)
<i>asinh</i> Trade with China	0.302 (1.07)	2.03* (1.07)	0.402 (0.304)	0.496 (0.510)	1.15 (0.791)	0.694 (0.831)
Natural resources rents (% GDP)	-0.488 (0.340)	-0.576* (0.318)	-0.203* (0.107)	-0.306 (0.293)	-0.457 (0.405)	-0.496 (0.341)
Liberal democracy index	-0.357 (0.450)	-0.370 (0.509)	-0.197 (0.160)	0.098 (0.381)	-0.169 (0.501)	0.057 (0.538)
<i>asinh</i> Population	-1.98* (1.04)	-2.07* (1.12)	0.960*** (0.345)	1.19* (0.678)	-2.14** (0.915)	-0.645 (0.904)
Observations	164	164	163	163	163	163
R <sup>2</sup>	0.572	0.653	0.567	0.407	0.588	0.602
Adjusted R <sup>2</sup>	0.550	0.635	0.542	0.372	0.564	0.578

*Note:* These regression results differ from those in Table B.6 in that the explanatory variables that are calculated as 3-year averages are calculated as averages of the years 2017 to 2019 (instead of 2014 to 2016). These variables are *asinh* GDP per capita, UNGA Ideal point distance, the Liberal democracy index, *asinh* Trade with China, Natural resources rents (% GDP), and *asinh* Population.



**Table C.2** – Correlates of China’s Aid Exports, before and after COVID-19 (Exports and Imports)

	Pre-Pandemic		Mask Diplomacy		Vaccine Diplomacy	
	Med. (1)	Non-Med. (2)	Med. (3)	Non-Med. (4)	Med. (5)	Non-Med. (6)
<i>asinh</i> GDP per capita	-3.26*** (0.702)	-3.77*** (0.723)	0.046 (0.213)	-0.939* (0.537)	-3.23*** (0.675)	-3.28*** (0.617)
<i>asinh</i> COVID-19 deaths			-0.193 (0.196)	-0.547 (0.367)	0.802 (0.547)	-1.26** (0.577)
Taiwan recognition	-8.90*** (0.820)	-11.2*** (0.803)	-7.21*** (1.90)	-7.64*** (1.48)	-11.7*** (0.736)	-8.83*** (1.08)
UNGA Ideal point distance	-1.07** (0.447)	-2.03*** (0.470)	-0.212 (0.165)	-0.384 (0.315)	-2.25*** (0.432)	-1.41*** (0.457)
Number of sister linkages	0.330 (0.282)	0.796 (0.550)	0.236** (0.108)	0.398** (0.187)	0.275 (0.353)	0.198 (0.304)
<i>asinh</i> Exports to China	-0.445 (0.733)	-0.184 (0.767)	-0.435** (0.211)	-0.662 (0.434)	0.319 (0.580)	-0.559 (0.742)
<i>asinh</i> Imports from China	0.600 (0.823)	1.58** (0.770)	0.620** (0.279)	0.669 (0.542)	0.153 (0.716)	0.337 (0.762)
Natural resources rents (% GDP)	-0.418 (0.298)	-0.475 (0.307)	-0.115 (0.096)	-0.212 (0.304)	-0.417 (0.397)	-0.409 (0.324)
Liberal democracy index	-0.581 (0.454)	-0.737 (0.478)	-0.233 (0.141)	0.072 (0.345)	-0.359 (0.480)	-0.052 (0.514)
<i>asinh</i> Population	-1.72 (1.08)	-1.45 (1.11)	1.14*** (0.350)	1.66*** (0.600)	-1.27 (0.977)	0.463 (0.920)
Observations	166	166	165	165	165	165
R <sup>2</sup>	0.553	0.647	0.580	0.416	0.590	0.608
Adjusted R <sup>2</sup>	0.528	0.626	0.552	0.378	0.564	0.583

*Note:* These regression results differ from those in Table B.6 in that trade with China is split into exports to China and imports from China.

**Table C.3** – Correlates of China’s Aid Exports, before and after COVID-19 (Disaster Deaths)

	Pre-Pandemic		Mask Diplomacy		Vaccine Diplomacy	
	Med. (1)	Non-Med. (2)	Med. (3)	Non-Med. (4)	Med. (5)	Non-Med. (6)
<i>asinh</i> GDP per capita	-2.85*** (0.795)	-3.39*** (0.796)	-0.058 (0.232)	-0.869* (0.501)	-3.37*** (0.669)	-3.52*** (0.641)
<i>asinh</i> COVID-19 deaths			-0.159 (0.201)	-0.563 (0.351)	1.03* (0.551)	-1.23** (0.584)
<i>asinh</i> Disaster deaths	0.341 (0.520)	0.822 (0.500)	-0.031 (0.159)	0.023 (0.232)	0.294 (0.401)	0.745* (0.422)
Taiwan recognition	-9.09*** (0.898)	-11.4*** (0.863)	-7.09*** (1.94)	-7.60*** (1.56)	-11.8*** (0.807)	-8.59*** (1.35)
UNGA ideal point distance	-1.21** (0.464)	-2.13*** (0.475)	-0.230 (0.168)	-0.379 (0.309)	-2.33*** (0.438)	-1.35*** (0.458)
Number of sister linkages	0.378 (0.305)	0.792 (0.574)	0.234** (0.113)	0.341* (0.176)	0.334 (0.350)	0.089 (0.296)
<i>asinh</i> Trade with China	-0.185 (1.11)	1.08 (1.10)	0.424 (0.291)	0.322 (0.417)	0.785 (0.711)	0.595 (0.779)
Natural resources rents (% GDP)	-0.484 (0.320)	-0.659* (0.361)	-0.218* (0.124)	-0.402 (0.331)	-0.506 (0.378)	-0.614* (0.336)
Liberal democracy index	-0.758 (0.466)	-0.773 (0.480)	-0.229 (0.149)	0.020 (0.318)	-0.599 (0.463)	-0.058 (0.533)
<i>asinh</i> Population	-1.71 (1.05)	-1.89* (1.14)	0.968*** (0.360)	1.35** (0.589)	-2.01** (0.983)	-0.680 (1.01)
Observations	158	158	158	158	158	158
R <sup>2</sup>	0.558	0.646	0.573	0.423	0.622	0.612
Adjusted R <sup>2</sup>	0.531	0.625	0.544	0.384	0.596	0.586

*Note:* These regression results differ from those in B.6 in that they include the number of disaster (computed as the sum of deaths in each period) deaths as an additional explanatory variable.

**Table C.4** – Correlates of China's Aid Exports, before and after COVID-19 (Official Aid)

	Pre-Pandemic		Mask Diplomacy		Vaccine Diplomacy	
	Med. (1)	Non-Med. (2)	Med. (3)	Non-Med. (4)	Med. (5)	Non-Med. (6)
<i>asinh</i> GDP per capita	-3.38*** (0.732)	-4.13*** (0.753)	-2.52*** (0.620)	-3.40*** (0.788)	-4.68*** (0.681)	-4.02*** (0.672)
<i>asinh</i> COVID-19 deaths			0.705* (0.358)	0.469 (0.502)	0.296 (0.554)	-1.79*** (0.569)
Taiwan recognition	-8.80*** (0.850)	-11.0*** (0.848)	-9.44*** (1.77)	-9.41*** (1.69)	-10.6*** (0.951)	-7.64*** (1.20)
UNGA ideal point distance	-1.10** (0.452)	-1.69*** (0.504)	-1.21*** (0.381)	-1.21*** (0.420)	-1.36*** (0.505)	-1.05** (0.456)
Number of sister linkages	0.330 (0.277)	0.408 (0.612)	1.25*** (0.251)	0.816** (0.368)	0.243 (0.339)	0.403 (0.292)
<i>asinh</i> Trade with China	0.186 (1.07)	1.15 (1.12)	0.741 (0.588)	1.33 (0.952)	1.40* (0.810)	0.503 (0.875)
Natural resources rents (% GDP)	-0.488 (0.305)	-0.493 (0.309)	-0.554** (0.251)	-0.340 (0.314)	-0.506 (0.380)	-0.498 (0.333)
Liberal democracy index	-0.560 (0.461)	-0.644 (0.483)	-0.992** (0.412)	-0.550 (0.450)	-0.523 (0.523)	0.028 (0.520)
<i>asinh</i> Population	-1.87 (1.14)	-1.39 (1.20)	-1.01 (0.977)	-1.32 (1.26)	-3.13*** (1.15)	-0.575 (1.11)
Observations	166	166	165	165	165	165
R <sup>2</sup>	0.551	0.631	0.506	0.518	0.590	0.597
Adjusted R <sup>2</sup>	0.528	0.612	0.477	0.490	0.566	0.574

*Note:* This regression differs from the one in Table B.6 in that the dependent variables represent only official aid.

**Table C.5** – Correlates of China’s Mask and Vaccine Aid Exports (Official Aid)

	Surgical Masks (1)	Human Vaccines (2)
<i>asinh</i> GDP per capita	-2.75*** (0.667)	-4.09*** (0.900)
<i>asinh</i> COVID-19 deaths	0.794* (0.440)	0.395 (0.653)
Taiwan recognition	-7.75*** (1.72)	-9.84*** (1.04)
UNGA ideal point distance	-1.07*** (0.372)	-1.22** (0.542)
Number of sister linkages	1.23*** (0.242)	0.344 (0.342)
<i>asinh</i> Trade with China	1.25 (0.788)	1.01 (1.07)
Natural resources rents (% GDP)	-0.456* (0.252)	-0.495 (0.446)
Liberal democracy index	-0.587 (0.404)	-0.890 (0.613)
<i>asinh</i> Population	-1.24 (1.07)	-2.80* (1.45)
Observations	165	165
R <sup>2</sup>	0.455	0.476
Adjusted R <sup>2</sup>	0.424	0.446

*Note:* This regression differs from the one in Table B.7 in that the dependent variables represent only official aid.

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