China's Aid and Trade Diplomacy: A Zero-Sum Game?

By Youssef Ait Benasser *

China's active economic diplomacy has revived debates on new mercantilism as a form of government intervention in shaping a globalized world. In this paper, I investigate one of the main grievances against these policies: their ability to divert existing trade relationships, thus creating a zero-sum competition environment. Using data on development aid, official loans, trade and investment deals, and focusing on Africa, I quantify the trade creation and diversion effects of China's economic diplomacy tools. I find that official finance, and chiefly development aid, positively affects exports to China and third-party countries, especially in the manufacturing sector. A similar effect is observed with trade agreements. Of the considered tools, none displays strong diversion effects. When it comes to international trade, China's aid and trade diplomacy is not a zero-sum game.

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In 125 BC, Zhang Qian returned to the Han Imperial capital of Chang'an from a 13-year long trip, bearing news of lands "rich in unusual products whose people cultivated the land and made their living in much the same way as the Chinese" (Sima (1993)). Zhang Qian was China's first government-mandated diplomat. Through successive missions to western China and Central Asia, his travel diplomacy facilitated the establishment of the Han empire's silk road, for long the world's largest trade network. Today, China's *capitalism with Chinese characteristics* continues to rely on diplomacy in the conduct of international business. Active Chinese diplomacy continues to support business expansion into new markets.

The ongoing attempt to recreate a 21st-century silk road, embodied in the Popular Republic of China (PRC)'s Belt and Road Initiative, is only the latest example of this practice. Since the 2000s, China has also increased its contributions to development aid and official lending and multiplied its trade agreements with partners across the globe.

China's African strategy is a good example. From 2000-to 2017, China initiated over 5800 development aid projects on the continent. It extended over USD 153.4 billion in loans to African countries and canceled at least 1.9 billion in outstanding debt. Today China is the largest bilateral lender in the continent. Since 2005, over 30 African countries have received zero-tariff treatment on exports. The Belt and Road Initiative, China's effort to place itself at the center of a modern trade network, now covers over 40 African economies.

As official aid, loans, and agreements multiplied, so did the volumes of Sino-African economic flows. Between 2003 and 2019, Chinese foreign direct investment in Nigeria, Egypt, South Africa, and Algeria, the continent's top four economies, grew by 67, 75, 136, and 310, respectively. Over the same period, Chinese imports from these markets grew between 7 and 12 folds. Chinese exports to all African countries increased by a staggering 1,016%. Imports increased by 964%. For comparison, U.S. exports to the region grew by 146% over the same period, whereas imports increased by 94%.

The use of state resources to benefit business internationalization and the securing of supply chains by China has been the focus of several studies. They emphasize the role of government policies in shaping global supply chains in key sectors such as mining (Humphreys (2013)), energy (Lind and Press (2018)), and agriculture (Belesky and Lawrence (2019)). In all of these sectors, a solid state-business relationship allows political-diplomatic action and firm operations to move in lockstep to achieve power and profit's combined political and economic goals. In

the West, some have decried Chinese mercantilist tendencies for their illiberal nature (Mawdsley (2008)). In Africa, others point to the neocolonial nature of China's interventions (Asongu, Nwachukwu and Aminkeng (2018)). These critics perceive the PRC's aid and trade diplomacy as a zero-sum game: for China's western rivals, it carries the threat of displacement and the targeted economies of dependence.

This paper evaluates this premise. From the perspective of China's African partners, it asks: does Chinese commercial diplomacy have export diversion effects? In other words, does China's commercial diplomacy rearrange the export network of targeted economies to the exclusive benefit of China, or does it increase their export capabilities across the board?

Whereas the literature on the growth and trade effects of China's aid and trade diplomacy has made significant progress in recent years; it has so far overlooked the question of diversion. This paper aims to fill this gap. It identifies associations between China's aid and trade interventions and recipient countries' exports to third-party countries. In the process, it also contributes a more disaggregated analysis of the trade creation effects. I look at four tools of Chinese commercial diplomacy: trade agreements, development aid, government loans, and the Belt and Road Initiative, arguably the crown jewel of Chinese commercial diplomacy. The choice of these tools is dictated by data availability, though several other instruments could also be essential to study. For each of these policy instruments, I measure the trade diversion effects from the angle of the target country. The analysis covers the period between 2000 and 2017.

The results suggest that China's aid and trade interventions do not systematically displace existing export flows and have net positive effects. China's official development assistance finance and preferential tariff treatments are associated with an increase in African countries' manufacturing exports. The Belt and Road Initiative, though a recent phenomenon on the continent, does not present any signs of export diversion.

The rest of the paper is structured as follows: Section 2 discusses the literature on aid and trade diplomacy and trade diversion in more length. Section 3 introduces the data, section 4 presents the methodology, and section 5 discusses the results.

I. Literature Review

This paper evaluates the export creation and export diversion effects of China's aid and trade diplomacy in Africa. To do so, it considers two main types of treatments.

On the one hand, official finance (OF) comprises foreign aid and other forms of concessional and non-concessional state financing. In a 2006 policy paper titled "China's African Policy," the country pledged more efforts to increase trade and investment and provide economic assistance (Copper (2015)). The paper emphasized that "in light of its own financial capability and economic situation, China will do its best to provide and gradually increase assistance to African nations with no political strings attached." The PRC's OF takes different forms, spanning technical assistance and training programs, concessional and non-concessional lending, debt relief, grants, and scholarships.

On the other hand, the second class of treatments relates to trade and investment agreements. China is linked to over 30 African countries by preferential trade agreements and has concluded over 40 memoranda of agreements under its flagship infrastructure investment project: the Belt and Road Initiative.

The growth effect of China's OF has been recently studied in Dreher et al. (2017). Using the same treatment data as this paper but with a broader geographic focus, the authors identify a positive effect of Chinese official financing on growth. They estimate that one additional Chinese official development assistance (ODA) project produces 0.7 percentage points increase in economic growth two years after the pledge.

Two recent papers have studied the trade creation effects of China's official finance interventions in Africa. Liu and Tang (2018) investigate the impact of the US and China's foreign aid to countries on the continent on trade flows between donor and recipient countries. They find that China's development aid increases African exports to China, whereas the same is not true of the US. Savin, Marson and Sutormina (2020) corroborate this result. These papers echo findings from previous research with broader geographic scope. For instance, **?** shows that bilateral aid is not only positively correlated with donor exports but also positively associated with recipient exports to donors and that recipient exports of strategic materials display a stronger association with bilateral aid. These findings challenge the prior theoretical work that emphasized the negative impact of aid on recipient countries' exports due to exchange rate appreciation.

Due to China's timid participation in trade deal-making, few studies look at the country's trade agreements' effects. Two studies have looked at the trade effects of China's preferential tariff policies in Africa. Sun and Omoruyi (2021) find that zero-tariff treatment in favor of African partners significantly promoted export diversification from the manufacturing industry. An older policy paper by Berhelemy (2011) analyzes the response of African countries' China imports in the early phase of the zero-tariff policy and finds that they increase alongside imports from other partners.

To the exception of Berhelemy (2011) who tangentially brings up the question of import diversion, the existing literature has overlooked the trade diversion effects

of China's OF and trade agreements.

Yet, an old finding in the trade literature is that asymmetric trade policy can cause trade diversion. First suggested by Viner (2014) in his research on customs unions, trade diversion can often be a corollary to trade creation. The original theoretical framework that motivates trade diversion reduces to a Cournot competition framework. Country A allocates import decisions between countries B and C. If country A enters into a zero-tariff trade agreement with country B, country B's marginal cost of production for exports to country A decreases. As a result, exports from B to A increase, all else equal. Additionally, B receives a competitive advantage over C due to the asymmetric tariff treatment. Thus, on the international trade network, part of the increased trade on the A $\longrightarrow$ B edge is diverted away from the C $\longrightarrow$ A edge.

The empirical evidence on trade diversion varies on a case-by-case basis. In a highly aggregated study, Dai, Yotov and Zylkin (2014) looks at the trade diversion effects of free trade agreements using manufacturing export data from 1990 to 2002 for a total of 41 trading partners. The results confirm that FTAs divert trade away from non-member countries. Furthermore, Trade diversion is stronger for internal trade than external trade and imports than exports. These aggregated results appear to hide discrepant dynamics at less aggregated scales. In an econometric analysis of trade diversion under NAFTA, Fukao, Okubo and Stern (2003) find that evidence of US import diversion in specific industries. Out of 60 HS 2-digit manufacturing lines, only 15, mainly textile and apparel products, experience significant import diversion due to the entry into force of the regional liberalization agreement. Contrastingly, a study on the trade diversion effects of the ASEAN-China free-trade agreement finds no evidence of trade diversion (Yang and Martinez-Zarzoso (2014)). Instead, it identifies pure trade creation effects in exports and imports, both for countries within and outside the trading bloc. This heterogeneity reveals the need for further empirical localized studies of trade diversion dynamics, such as this one.

Trade diversion is not specific to trade agreements. Potentially any asymmetrical policy intervention can also divert existing flows. Such is the case of anti-dumping (AD) and countervailing (CV) measure actions. Prusa (2019) studies the trade impacts of 428 anti-dumping petitions filed between 1980 and 1988. The results show that in the year following the filing of the petition, imports from non-named countries increase by 22%. This growth in imports from non-named countries exceeds the reduction that affects the named country during the investigation or after duties are levied. Bown and Crowley (2007) document the causal nature of this dynamic, using the low-intensity US trade war with Japan in the 1990s. The authors show that Japanese exports are 'deflected' to third countries in response to remedial measures. The average anti-dumping duty on Japanese exports leads to a 5–7% increase in Japanese exports of the same product to the average third-country market. However, here too, sectoral heterogeneity is substantial. While

manufacturing flows appear to be reallocated in response to "trade remedies," agricultural flows do not (Carter and Gunning-Trant (2010)), likely resulting from their less liberalized nature. Besides AD and CV actions, voluntary export restrictions (VER) have also been documented to reallocate trade flows (Hamilton (1985)).

Like AD and CV actions, or bilateral liberalization policies, China's OF actions and trade agreements, and investment deals under the BRI, are an asymmetric trade policy instrument targeting specific countries, with possible diversion effects. In fact, this distortionary effect is often assumed to be true. In an analysis of China's energy mercantilism, Lind and Press (2018) argues that market considerations heavily inform China's use of political and diplomatic clout. Political resources are deployed to gain control or influence over key suppliers, diversify products, suppliers, and transport routes, create inventories, and provide security to protect vulnerable assets. This mercantilist logic extends to other non-energy markets where the Chinese government seeks a stronger presence. The use of these instruments and the ensuing reinforcement of China's economic presence in target countries has been portrayed in Western media as exclusive and antagonistic to the interests of such third-party partners like the European Union and the United States (Mawdsley (2008)). The depiction of economic diplomacy interventions as a zero-sum game implicitly presumes a distortionary diverting effect. The goal of this paper is to evaluate these effects econometrically.

Whereas it has not provided a quantitative evaluation of the role of economic diplomacy in restructuring trade networks, the previously described literature offers helpful pointers to guide our work. A first takeaway is that it is essential to adopt a disaggregated approach to allow for sectoral heterogeneity. Furthermore, different policy instruments must be studied separately, even if seemingly similar (**?**). Lastly, the literature provides some candidate econometric models for this study. The gravity model of trade, as adapted by Baier and Bergstrand (2007), can be readily used to estimate both creation and diversion effects as in Dai, Yotov and Zylkin (2014) and Yang and Martinez-Zarzoso (2014). However, data structure and variation will impede the implementation of a standard gravity model à la Baier and Bergstrand (2007). In such cases, I will use alternative specifications such as diff-in-diff (Nitsch (2007)) or cross-sectional approaches (Rose (2007)). The estimation equations chosen for this paper are discussed further in the methodology section.

II. Data & Stylized Facts

I analyze the trade creation and diversion effects of two broad classes of treatments: official financing, trade agreements, and an investment agreement: the BRI. This section describes the data on these different tools and provides some stylized facts on their structure.

A. *Trade and Investment agreements*

Trade agreements are the quintessential trade diplomacy instrument. Governments entering into these arrangements seek to foster trade between their countries, possibly to the detriment of third-party countries. Data on trade agreements is derived primarily from the NSF-Kellogg Institute Database on Economic Integration Agreements (EIA). The latest release of the EIA covers all country pairs from 1953 to 2014. To ensure that the study is as current as possible, I supplement the EIA data with three additional years of observations using the World Trade Organization's (WTO) database on regional trade agreements. Thus, the panel's time dimension runs through 2017. Due to inaccuracies in the EIA's China trade regimes [1], I make corrections to the dataset using Sun and Omoruyi (2021)'s China's customs data. Table 1 presents the profiles and counts of trade agreements binding China with third-party countries.

China's free-trade strategy has until recently been cautious. The country is part of a limited number of free-trade agreements, the largest of which are ASEAN-China and the Asia-Pacific Trade Agreement. Indeed, China's most significant FTAs center around its immediate geographic environment. China signed its first African trade agreement with Mauritius in 2019, and it entered into force in January 2021 and is thus outside of the time scope of this study. The China-Mauritius trade agreement remains the last one of its kind in Africa to date.

Table 1—China's Trade Agreement Diplomacy

	All Countries				African Countries			
Year	No Agreement	Asymmetric	Preferential	FTA	No Agreement	Asymmetric	Preferential	FTA
2000	192	0	0	0	51	0	0	
2001	187	0	5	0	51	0	0	
2002	187	0	5	0	51	0	0	
2003	187	0	5	0	51	0	0	
2004	186	0	5	1	51	0	0	
2005	162	24	5	1	27	24	0	
2006	153	24	4	11	27	24	0	
2007	149	26	4	13	25	26	0	
2008	146	28	4	14	23	28	0	
2009	145	28	4	15	23	28	0	
2010	141	29	5	17	22	29	0	
2011	135	35	6	16	21	30	0	
2012	136	34	6	16	22	29	0	
2013	137	33	6	16	23	28	0	
2014	137	33	6	16	23	28	0	
2015	137	33	5	17	23	28	0	
2016	137	33	5	17	23	28	0	
2017	135	35	5	17	21	30	0	

[1]The EIA database considers a trade cooperation agreement between Egypt and China as a preferential system - even though it lacks tariff measures. Additionally, it only incorporates zero-tariff treatments under the Forum on China-Africa Cooperation (FOCAC) from 2011 - once registered with the WTO.

China has more heavily relied on asymmetric preferences to facilitate trade. Under the FOCAC, China extended zero-tariff treatment to thirty least-developed countries (LDCs) in Africa in 2005. The roll-out has been progressive. As of July 1st, 2010, 30 countries [2] in Africa benefited from zero tariffs on 95% of products under China's Duty-free treatment for LDCs.

In addition to trade agreements, I also look at investment agreements signed under the Belt and Road Initiative (BRI), a cornerstone instrument of China's trade diplomacy. The BRI envisions the emergence of a China-centric trade network in the process. "The Silk Road Economic Belt focuses on bringing together China, Central Asia, Russia, and Europe (the Baltic); linking China with the Persian Gulf and the Mediterranean Sea through Central Asia and West Asia; and connecting China with Southeast Asia, South Asia, and the Indian Ocean. The 21st-Century Maritime Silk Road is designed to go from China's coast to Europe through the South China Sea and the Indian Ocean in one route, and from China's coast through the South China Sea to the South Pacific in the other".

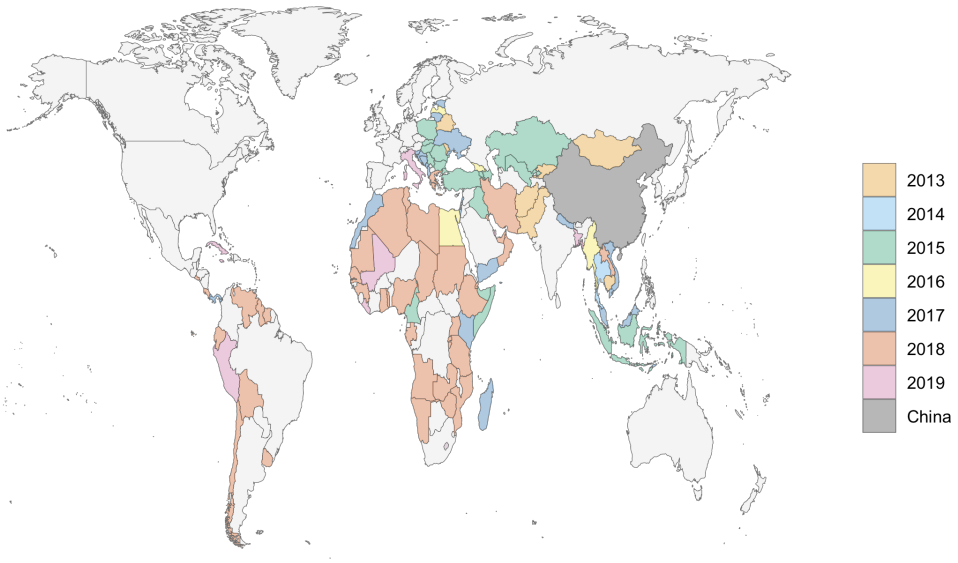

Figure 1. Belt and Road Initiative Members, and Entry Years

By 2019, 38 African countries had signed MoUs under the Belt and Road Initia-

[2]Ethiopia, Angola, Benin, Burundi, Equatorial Guinea, Togo, Eritrea, Cape Verde, Democratic Republic of the Congo (DRC), Djibouti, Guinea, Guinea-Bissau, Comoros, Lesotho, Liberia, Rwanda, Madagascar, Mali, Mauritania, Mozambique, Niger, Sierra Leone, Senegal, Sudan, Somalia, Tanzania, Uganda, Zambia, Chad, and the Central African Republic. Note that the analysis excludes Sudan and South Sudan due to the 2012 partition.

tive, including the continent's largest economies of Nigeria, Egypt, South Africa, and African LDCs (see figure 1). As a result of the peripheral location of most African countries relative to the Belt and Road, the level of scheduled and disbursed investments varies significantly from one country to the other. In the absence of cross-continental projects like Eurasia's China-Mongolia-Russia or Bangladesh-China-India-Myanmar Economic Corridor, the roll-out of the BRI in Africa is at the bilateral level.

Total BRI engagements in Sub-Saharan Africa towered at over 25 billion USD in 2019, second only to investment commitments in East Asia (Green Finance and Development Center). These engagements are unevenly distributed across countries, with some seeing significant investments (Nigeria, Egypt, Ethiopia), while others have yet to identify a joint project. Data on investment engagements and project construction under the BRI is not centrally collected, and ad-hoc sources can be discrepant, with some reports failing to disentangle investments within the BRI framework from other general flows. Therefore, I use MoU signing as the treatment proxy. Therefore, the results cannot be interpreted on the intensive margin but only on the extensive margin. Additionally, over half of the African members joined in 2018 means that the data will not reveal long-term dynamics and will only provide treatment response to a one-year horizon.

B. Financial Aid Data

Despite contributing billions of dollars in aid annually and being the world's top bilateral creditor (Horn, Reinhart and Trebesch (2021)), China does not participate in existing global reporting systems, such as the OECD's Creditor Reporting System (CRS) and the International Aid Transparency Initiative (IATI). As a result, there is a significant gap in the availability of internationally comparable statistics on Chinese official financing.

This paper uses William & Mary's AidData research lab **Global Chinese Official Finance Dataset, Version 2.0** (Custer and Zhang (2021)). The dataset records the known universe of projects supported by official financial and in-kind commitments (or pledges) from China from 2000 to 2017. It does so by synthesizing and standardizing vast amounts of unstructured, open-source, project-level information published by governments, intergovernmental organizations, companies, non-governmental organizations, journalists, and research institutions. The database includes official development assistance (ODA) and other official flows (OOF)s. The distinction follows the OECD rules. Under these rules, ODAs must be concessional (i.e., grants and soft loans) and administered to promote the economic development and welfare of developing countries as the main objective. OOFs are official sector transactions that do not meet the concessionality criterion.

The dataset reveals that China has spent $843 billion on financial aid between 2000 and 2017. This sum is roughly equivalent to the amount spent by the

US, the world's largest donor of foreign aid. This volume breaks into 13,427 Chinese development 'projects' officially pledged, committed, in implementation, or completed between 2000 and 2021. The dataset identifies different official finance flow types: grants, free-standing technical assistance, scholarships and training, loans, debt relief, and export credit.

For analysis, the data is restricted geographically to African recipients and economically to projects that have at least been officially committed to. Once this filtering is applied, the data consists of 5,152 projects. Table 2 provides summary statistics on allocations, and figure 2 shows the disaggregated composition. It is worth noting that virtually all African countries are receiving some form of development aid from China by the end of the period. Correspondingly, the number of new development projects increased fivefold from 79 in 2000 to 502 in 2017.

Table 2—China's Development Assistance Flows To Africa (all categories)

	Development Assistance	
Commitment Year	Number of Recipients	Number of Projects
2000	36	79
2001	37	105
2002	42	126
2003	41	140
2004	41	145
2005	45	199
2006	45	270
2007	47	333
2008	47	276
2009	49	327
2010	47	289
2011	48	385
2012	47	349
2013	47	343
2014	49	350
2015	49	415
2016	50	481
2017	51	502

Table 3 provides a yearly breakdown of new loan and debt relief flows. In terms of volumes, China issued countries in Africa over 153 billion USD in new official loans. Over the same period, 49 African countries received at least one loan, with the yearly number of recipients oscillating between 12 and 27. Over the same period, China restructured *at least* 2 billion USD in existing debt to benefit a total of 40 countries. These figures highlight the scope of China's aid and trade activism in Africa, and explain the media attention and suspicion that it fuels in the West (Mawdsley (2008)).

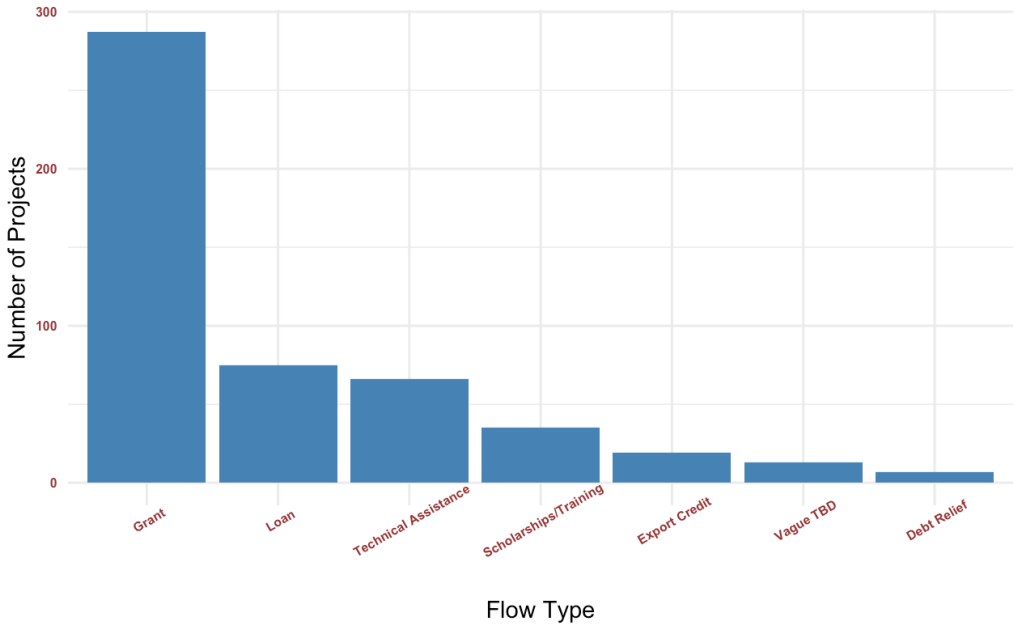

FIGURE 2. COMPOSITION OF CHINA'S DEVELOPMENT ASSISTANCE TO AFRICA (2017)

TABLE 3—OFFICIAL CHINESE LOANS TO AFRICAN COUNTRIES (EXCLUDING TRADE FINANCE)

	New Loans		Debt Cancellation	
Year	Num. Recipients	Total Volume (Million USD)	Num. Beneficiaries	Total Volume (Million USD)
2000	12	99.49	1	*Not Available*
2001	13	152.64	24	798.11
2002	13	231.12	6	124.42
2003	10	922.99	4	2.44
2004	12	642.32	3	*Not Available*
2005	16	803.91	3	51.0
2006	22	2,329.25	5	60.77
2007	23	1,760.84	28	619.02
2008	22	5,282.04	1	*Not Available*
2009	23	4,162.77	2	2.54
2010	25	5,809.31	5	10.34
2011	26	5,608.60	7	98.98
2012	27	10,600.94	3	44.65
2013	27	11,015.16	0	0
2014	21	9835.87	0	0
2015	24	5,250.71	0	0
2016	23	2,5347.16	7	57.19
2017	23	1,3199.05	6	83.07

III. Methodology

A. Official Financing (OF) Treatments

To evaluate the trade creation and diversion effects of official financing, I estimate a gravity equation augmented with an official finance treatment variable. The use of gravity equation to estimate the trade impact of financial flows has so far been the standard approach in the literature (Pettersson and Johansson (2013), Savin, Marson and Sutormina (2020), Liu and Tang (2018)). The log linear version of the model has the following form:

(1)
$$\begin{aligned} log(X_{ijt}) = &\alpha_0 + \alpha_1 log(gdp_{it}) + \alpha_2 log(gdp_{jt}) + \alpha_3 log(pop_{it}) + \alpha_4 log(pop_{jt}) \\ &+ \alpha_6 \text{RTA}_{ijt} + \beta_1 \text{treatment}_{it} + \beta_2 (\text{treatment}_{it} \times \text{NotChina}_j) + \eta_t + \eta_i + \eta_j \\ &+ \eta_{ij} + \varepsilon_{ijt} \end{aligned}$$

Where $X_{ij,t}$ is the value of exports from country i to country j in year t. Gross domestic products (gdp) and populations (pop) are explicitly included as predictors, whereas time-invariant bilateral gravity variables are absorbed in γ_{ij}, which also captures multilateral resistance. The model also includes individual and time fixed effects, which allows controlling for the possibility that there is selection over country attributes. Time fixed effects absorb variations over the time dimension. The treatment variable will take value 1 if country i has received official financing from China in year t and 0 otherwise. Because I seek to check for differential response to treatment of exports to China and exports to third party countries, I interact the treatment variable with a dummy variable $NotChina$ that takes value 1 when the importer is not China, and 0 otherwise.

In this specification, β_1 measures the increase in export flows to China for countries that receive financial aid. $\beta_1 + \beta_2$ measures the response of export flows of recipient countries to third-party trading partners. Thus, values of the parameters such that $\beta_2 + \beta_1 < 0$ would point at an export diversion effect of China's OF.

Equation (1) can suffer from simultaneity bias if a feedback exists between export flows and OF allocations, and from reverse causality. To address this concern, I specify the following preferred model:

(2)
$$\begin{aligned} log(X_{ijt}) = &\alpha_0 + \alpha_1 log(gdp_{it}) + \alpha_2 log(gdp_{jt}) + \alpha_3 log(pop_{it}) + \alpha_4 log(pop_{jt}) \\ &+ \alpha_6 \text{RTA}_{ijt} + \beta_3 \text{treatment}_{i,t_{1-3}} + \gamma_3 (\text{treatment}_{i,t1-3} \times \text{NotChina}_j) \\ &+ \eta_t + \eta_i + \eta_j + \eta_{ij} + \varepsilon_{ijt} \end{aligned}$$

I estimate this specification using two different definitions of treatment. Following Savin, Marson and Sutormina (2020), I define treatment as a binary variable that takes value 1 exporter i has been a recipient of China's official financing (OF) between years -1 and -3, and 0 otherwise. I will refer to this as the extensive margin of treatment. In a second estimation, I define treatment as the number of OF flows received; the intensive margin of treatment. In this latter case, the specification is augmented with additional dummy variables on recipient status. This allows me to evaluate the impact of treatment intensity conditional on treatment.

Equations 1 and 2 are estimated for aggregate exports, as well as for three broad sectors: manufacturing, raw materials, and agriculture. The differential response to economic diplomacy treatments across industries is established in the literature (Moons and Bergeijk (2017)). Additionally, in subsequent estimations, the treatments are disaggregated into categories and types, following the literature on aid and growth which finds significant differences in growth effects across flow types (Pettersson and Johansson (2013)).

B. *Trade Agreements*

The export creation and diversion effects of China's preferential treatments for African countries are estimated separately, via two equations:

$$log(X_{ij,t}) = \alpha_0 + \beta_1 \times ATA_{ij,t} + \beta_2 \times ATA^C \eta_{ij,t} + \eta_{it} + \eta_{jt} + \varepsilon_{ij,t} \tag{3}$$

$$log(X_{i,t}^{RoW}) = \alpha_0 + \gamma_1 ATA_{i,t}^C + \delta_1 pop_{i,t} + \delta_2 gdp_{i,t} + \delta_3 wto_{i,t} + \eta_i + \eta_t + \varepsilon_{i,t} \tag{4}$$

Equation 3 follows the literature on the effects of trade agreements initial proposed in (Baier and Bergstrand (2007)) seminal paper. Export flows are a function of a series of interacted fixed effects and of the trade regime captured in the dummy ATA which stands for *asymmetric trade agreement* and takes value 1 if the flow from $i \rightarrow j$ benefits from preferential treatment, and 0 otherwise. For estimation, the data is restricted to country pairs that have no trade agreements, or that share an asymmetric preferential agreement. Dropping deeper agreements (PTAs, FTAs, etc.) allows me to compare the performance of China's asymmetric treatments against a control groups of pairs that do not have any agreement. In this context, γ_1 measures the average performance of asymmetric preferential treatments extended by importer countries to African exporters. γ_2 captures the additional effect of preferential treatments by China. A positive γ_2 would mean that China's preferential treatment is better at supporting African exports to China than are other systems of preferences.

Equation 5 estimates the diversion effects of China's zero-tariff policies. The outcome variable is total export flows to the rest of the world (RoW). Because China's preferential tariff program is tied to LDC status, which is defined based on income per capita, $GDP_{i,t}$ and $POP_{i,t}$ are added into the equation to control for selection into treatment. Furthermore, the regression controls for the exports World Trade Organization membership status. Individual and time fixed effects control for other sources of variation.

My approach to the estimation of the trade diversion effect deviates from the existing literature. In a study of the trade-diversion effects of free trade agreements Dai, Yotov and Zylkin (2014) use a gravity specification similar to equation (4), augmented with two dummies that take value 1 when the exporter or importer have trade agreements with other countries, respectively. Their specification captures the export and import diversion effects of the agreements - which they find to be significant. Adapting this approach to the isolated case of Chinese agreements is not possible due to limited variations that do not allow for the inclusion of a full set of fixed effects.

C. Investment Agreements

To be able to exploit variations in trade dynamics, analysis of the impact of BRI membership is confined to countries that have joined in 2015: South Africa, Cameroon. While Somalia also joined in 2015, its trade flows are generally unstable and hard to predict given the country's perpetual instability, and very small economic size, which makes it a bad candidate for a comparative estimation approach. Most other members jointed the initiative in 2018 - which is outside the time span of this study.

Given the short treatment period and low number of treated units, which limit the applicability of a panel data, I rely on a synthetic controls approach. In this method, the export flows of each treated country post-treatment are compared to those of a synthetic counterfactual that is specific to each treated unit. The synthetic counterfactual is a weighted sum of comparable, non-treated, African economies. The weights are constructed to match the pre-treatment trends as closely as possible. This addresses concerns of selection into treatment, and relaxes the parallel trend assumptions (Abadie, Diamond and Hainmueller (2010)).

To build the synthetic controls, I use the Generalized Synthetic Control Method developed by Xu (2017). This method allows me to mach units on pre-treatment observables while also including unobserved time-varying heterogeneities using interactive fixed effects. The matching is performed over the outcome only (export flows), to avoid bias. Using a relatively long pre-treatment period (2000-2014) additionally allows me to get a better pre-treatment fit.

IV. Results

A. Official Financing Results

Table 4—Trade Creation and Diversion Effects of Official Finance (OF)

	Dependent variable:			
	All exports	Manufacturing	Agriculture	Raw materials
Control: Importer's GDP	0.589***	0.813***	0.705***	0.533***
	(0.0345)	(0.0401)	(0.0455)	(0.0505)
Control: Importer's Population	0.940***	0.796***	0.391**	0.599***
	(0.0921)	(0.114)	(0.122)	(0.142)
Control: Exporter's GDP	0.391***	0.212***	0.319***	0.485***
	(0.0324)	(0.0379)	(0.0436)	(0.0470)
Control: Exporter's Population	-0.955***	-1.069***	-1.708***	-1.552***
	(0.134)	(0.167)	(0.209)	(0.219)
Control: RTA (yes/no)	0.328***	0.158**	0.437***	0.337***
	(0.0448)	(0.0512)	(0.0542)	(0.0641)
Treatment: OF received (yes/no)	0.954***	0.976***	0.981**	1.291***
	(0.271)	(0.293)	(0.334)	(0.312)
Treatment: OF received × Not China	-0.997***	-0.991***	-0.948**	-1.178***
	(0.272)	(0.295)	(0.336)	(0.314)
Constant	-4.424**	-4.795**	6.317**	3.188
	(1.440)	(1.775)	(2.170)	(2.366)
Observations	88329	71037	49506	52805
Fixed-Effects	T, EX×IM	T, EX×IM	T, EX×IM	T, EX×IM
Joint significant P-value	0.13	0.64	0.35	0.0051

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4 presents results from the estimation of equation 1. The evidence suggests that receiving official financing from China is significantly associated with higher exports to China, and this effect is particularly large for raw materials. However, this increased trade does not appear to happen at the expense of existing flows with third-party partners, as reflected by the diversion coefficient's lower magnitude and the combined effects' statistical insignificance.

Equation one imposes contemporaneity on the treatment and exports' response and is likely prone to simultaneity and reverse causality biases. Using lagged treatment, equation (2) addresses this concern. The summary results from the estimation are in table 5. Official Finance does not appear to associate significantly with exports to China or third-party countries in this setup.

Table 5—Trade Creation and Diversion Effects of Official Finance (OF) - Lagged Treatment (Extensive)

	Dependent variable:			
	All Exports	Manufacturing	Agriculture	Raw Materials
Control: Importer's GDP	0.653***	0.869***	0.807***	0.541***
	(0.0421)	(0.0496)	(0.0557)	(0.0619)
Control: Importer's Population	0.441***	0.449**	0.174	0.571**
	(0.121)	(0.154)	(0.163)	(0.193)
Control: Exporter's GDP	0.316***	0.0838	0.299***	0.419***
	(0.0394)	(0.0476)	(0.0529)	(0.0585)
Control: Exporter's Population	-0.443**	-0.338	-0.966***	-1.462***
	(0.156)	(0.202)	(0.260)	(0.264)
Control: RTA	0.260***	0.0381	0.353***	0.0896
	(0.0576)	(0.0664)	(0.0677)	(0.0820)
Treatment: OF Received (dummy)	0.688	1.120	1.727*	-0.275
	(0.560)	(0.633)	(0.799)	(0.786)
Treatment: OF Received (dummy) x Not China	-0.871	-1.467*	-1.825*	0.123
	(0.564)	(0.638)	(0.803)	(0.793)
Constant	-4.165*	-6.767**	0.148	4.127
	(1.767)	(2.232)	(2.732)	(2.989)
Observations	71702	56616	38684	41282
Fixed-Effects	T, EX×IM	T, EX×IM	T, EX×IM	T, EX×IM
Joint significant P-value	0.0062	0.0001	0.255	0.17

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Using specification (2) but adjusting treatment variables to the number of OF flows received, I can look at the intensive margin of treatment effects. Results in Table 6 suggest that the intensive treatment margin is more relevant to export response than the extensive margin. Countries targeted with a higher number of assistance projects can experience more significant changes in their export flow structures. Thus, an additional project is associated with a 2% increase in exports to China that concerns all sectors. More importantly, there is no evidence of trade diversion on the intensive margin. Indeed, overall exports and manufacturing and raw material exports experience a significant but marginal increase of less than a percentage point. The results in table 6 are robust to conditioning whether a country receives financing from China.

TABLE 6—TRADE CREATION AND DIVERSION EFFECTS OF OFFICIAL FINANCE (OF) - LAGGED TREATMENT (INTENSIVE)

	Dependent variable:			
	All Exports	Manufacturing	Agriculture	Raw Materials
Control: Importer GDP	0.634***	0.766***	0.728***	0.481***
	(0.0439)	(0.0489)	(0.0557)	(0.0616)
Control: Importer GDP	0.412**	0.623***	0.209	0.477**
	(0.130)	(0.148)	(0.158)	(0.185)
Control: Exporter GDP	0.268***	0.0244	0.280***	0.441***
	(0.0406)	(0.0474)	(0.0526)	(0.0583)
Control: Importer GDP	-0.597***	-0.682***	-1.152***	-1.755***
	(0.162)	(0.201)	(0.261)	(0.264)
RTA (yes/no)	0.200***	0.0776	0.389***	0.143
	(0.0585)	(0.0649)	(0.0679)	(0.0806)
Treatment: Cumulative OF	0.0229**	0.0512***	0.0381***	0.0415***
	(0.00733)	(0.00866)	(0.0113)	(0.00941)
Treatment: Cumulative OF x Not China	-0.0200**	-0.0439***	-0.0366**	-0.0360***
	(0.00735)	(0.00866)	(0.0113)	(0.00942)
Constant	-1.363	-2.918	3.041	8.085**
	(1.881)	(2.213)	(2.746)	(2.963)
Observations	66452	60008	41402	44293
Fixed-Effects	T, EX×IM	T, EX×IM	T, EX×IM	T, EX×IM
Joint significant P-value	0.0069	0.0000	0.3031	0.0006

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Disaggregating OF into flow categories, model 2 yields the results presented in tables 7 and 8. The data consists of 3 broad categories: Official Development Aid (ODA) flows, which have a significant concessional component, and Other Official Financing (OOF) that do not. In addition, the dataset contains some financing flows that are ambiguous or not yet clearly determined. Being a recipient of ODA flows appear to have little bearing on export volumes. However, conditional on

being a recipient, the intensity of ODA treatments, measured by the number of projects received over three years, does associate with higher exports to China. One additional ODA project increases total exports to China by an average of 3% and reduces exports to other countries by an average of 0.7% (significant at 1% confidence level). This effect is driven mainly by the manufacturing sector. Contrastingly, receiving other official finance flows is associated with a net increase in exports, but the impact does not fluctuate by treatment intensity.

Table 7—Effects of Official Finance (OF) By Category - Lagged Treatment (Extensive)

	Dependent variable:			
	All Exports	Manufacturing	Agriculture	Raw Materials
Control: Importer GDP	0.635***	0.882***	0.768***	0.556***
	(0.0437)	(0.0526)	(0.0578)	(0.0656)
Control: Importer Population	0.401**	0.504**	0.225	0.560**
	(0.129)	(0.172)	(0.174)	(0.215)
Control: Exporter GDP	0.284***	0.0500	0.240***	0.435***
	(0.0400)	(0.0489)	(0.0531)	(0.0597)
[1em] Control: Exporter Population	-0.482**	-0.292	-0.896***	-1.667***
	(0.160)	(0.212)	(0.271)	(0.277)
RTA (dummy)	0.202***	-0.0180	0.294***	0.0477
	(0.0586)	(0.0698)	(0.0686)	(0.0857)
Treatment: Other Official Finance (dummy)	0.328*	0.439*	0.311	0.519**
	(0.162)	(0.177)	(0.212)	(0.190)
Treatment: OOF x Not China	-0.276	-0.366*	-0.215	-0.409*
	(0.163)	(0.178)	(0.213)	(0.192)
Treatment: Official Development Aid (dummy)	0.392	0.576	0.951	-0.581
	(0.508)	(0.562)	(0.639)	(0.672)
Treatment: ODA (dummy) x Not China	-0.546	-0.842	-0.996	0.509
	(0.511)	(0.566)	(0.642)	(0.676)
Treatment: Ambiguous (dummy)	0.279	0.556**	0.461*	0.398
	(0.184)	(0.198)	(0.218)	(0.209)
Treatment: Ambiguous (dummy) x Not China	-0.140	-0.473*	-0.372	-0.316
	(0.185)	(0.199)	(0.219)	(0.210)
Constant	-2.476	-7.406**	0.856	5.775
	(1.849)	(2.400)	(2.876)	(3.210)
Observations	66753	51250	34902	37254
Fixed-Effects	T, EX×IM	T, EX×IM	T, EX×IM	T, EX×IM
Joint significant P-value : OOF	0.0081	0.0014	0.0001	0.0002
Joint significant P-value : ODA	0.0060	0.0001	0.4821	0.3769
Joint significant P-value : AMB	0.0000	0.0005	0.0005	0.0049

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Disaggregating by type, loans stand out as the most effective tool in impacting export volumes to China but do not divert existing flows. Borrowing from China is associated with a 77% increase in exports to China and a 3% increase in exports to third-party partners. On the intensive margin, one additional loan increases manufacturing exports to China by 13%. Other types of financing, including export credit, debt relief, and technical assistance, do not significantly correlate with variations in exports to China or third-party partners.

TABLE 8—EFFECTS OF OFFICIAL FINANCE (OF) BY CATEGORY - LAGGED TREATMENT (INTENSIVE)

	Dependent variable:			
	All Exports	Manufacturing	Agriculture	Raw Materials
Control: Importer's GDP	0.622***	0.855***	0.755***	0.539***
	(0.0440)	(0.0531)	(0.0583)	(0.0662)
Control: Importer's Population	0.409**	0.550**	0.241	0.618**
	(0.130)	(0.173)	(0.175)	(0.216)
Control: Exporter's GDP	0.247***	0.00775	0.296***	0.387***
	(0.0407)	(0.0504)	(0.0546)	(0.0613)
Control: Exporter's Population	-0.810***	-1.056***	-0.835**	-1.923***
	(0.170)	(0.228)	(0.288)	(0.297)
Control: RTA (dummy)	0.200***	-0.0315	0.277***	0.0257
	(0.0586)	(0.0700)	(0.0685)	(0.0857)
Conditioning var: OOF (dummy)	0.185	0.259	0.185	0.396
	(0.175)	(0.191)	(0.238)	(0.207)
Conditioning var: OOF (dummy) x Not China	-0.119	-0.165	-0.0618	-0.262
	(0.176)	(0.192)	(0.239)	(0.209)
Treatment: Cumulative OOF	0.00472	0.0355	0.0513	0.0101
	(0.0153)	(0.0189)	(0.0350)	(0.0200)
Treatment: Cumulative OOF x Not China	0.00719	-0.0275	-0.0666	0.00528
	(0.0154)	(0.0190)	(0.0351)	(0.0203)
Conditioning var: ODA (dummy)	0.0704	0.314	0.961	-0.767
	(0.528)	(0.584)	(0.663)	(0.687)
Conditioning var: ODA (dummy) x Not China	-0.135	-0.541	-0.970	0.803
	(0.531)	(0.588)	(0.666)	(0.692)
Treatment: Cumulative ODA	0.0276*	0.0298*	-0.000428	0.0197
	(0.0122)	(0.0139)	(0.0175)	(0.0150)
Treatment: Cumulative ODA x Not China	-0.0344**	-0.0295*	-0.00351	-0.0322*
	(0.0123)	(0.0140)	(0.0176)	(0.0151)
Conditioning var: Cumulative AMB	0.235	0.311	0.430	0.311
	(0.206)	(0.222)	(0.363)	(0.233)
Conditioning var: Cumulative AMB x Not China	-0.166	-0.332	-0.306	-0.324
	(0.207)	(0.224)	(0.364)	(0.235)
Treatment: Cumulative AMB	-0.0258	0.0732	-0.0442	0.00842
	(0.0477)	(0.0503)	(0.185)	(0.0536)
Treatment: Cumulative AMB x Not China	0.0659	-0.00936	0.0324	0.0485
	(0.0479)	(0.0507)	(0.185)	(0.0542)
Constant	1.247	0.347	-0.509	8.760**
	(1.938)	(2.537)	(3.006)	(3.357)
Observations	66452	50965	34664	36911

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE 9—EFFECTS OF OFFICIAL FINANCE (OF) BY FLOW TYPE - LAGGED TREATMENT (EXTENSIVE)

	Dependent variable:			
	All Exports	Manufacturing	Agriculture	Raw Materials
Control: Importer's GDP	0.634***	0.888***	0.762***	0.565***
	(0.0438)	(0.0528)	(0.0579)	(0.0657)
Control: Importer's Population	0.396**	0.474**	0.256	0.550*
	(0.130)	(0.173)	(0.175)	(0.215)
Control: Exporter's GDP	0.253***	0.0330	0.216***	0.381***
	(0.0412)	(0.0503)	(0.0540)	(0.0615)
Control: Importer's Population	-0.601***	-0.432*	-1.231***	-1.797***
	(0.162)	(0.214)	(0.276)	(0.280)
Control: RTA (dummy)	0.202***	-0.0205	0.278***	0.0389
	(0.0586)	(0.0700)	(0.0685)	(0.0855)
Treatment: Export Credit (dummy)	0.0676	0.180	0.497*	0.225
	(0.187)	(0.203)	(0.227)	(0.213)
Treatment: Ex. Credit (dummy) x Not China	0.0181	-0.0836	-0.425	-0.144
	(0.187)	(0.204)	(0.228)	(0.215)
Treatment: Debt Relief (dummy)	-0.170	-0.0579	-0.0371	-0.328
	(0.163)	(0.177)	(0.212)	(0.189)
Treatment: Debt Relief (dummy) x Not China	0.212	0.0181	-0.0192	0.335
	(0.164)	(0.178)	(0.213)	(0.190)
Treatment: Technical Assistance (dummy)	0.176	-0.0259	0.154	-0.0843
	(0.260)	(0.272)	(0.293)	(0.283)
Treatment: Tech. Ass. (dummy) x Not China	-0.119	0.000887	-0.0976	0.175
	(0.261)	(0.273)	(0.294)	(0.285)
Treatment: Loan (dummy)	0.579***	0.824***	0.577**	0.449*
	(0.168)	(0.184)	(0.218)	(0.196)
Treatment: Loan (dummy) x Not China	-0.552**	-0.802***	-0.480*	-0.402*
	(0.169)	(0.185)	(0.219)	(0.197)
Treatment: Other OF (dummy)	0.220	0.484	0.441	-0.0715
	(0.360)	(0.390)	(0.517)	(0.436)
Treatment: Other OF (dummy) x Not China	-0.270	-0.551	-0.451	0.0185
	(0.362)	(0.393)	(0.519)	(0.439)
Constant	-0.942	-5.770*	4.214	7.784*
	(1.894)	(2.463)	(2.964)	(3.279)
Observations	66522	51039	34720	36986
Fixed-Effects	T, EX×IM	T, EX×IM	T, EX×IM	T, EX×IM
Joint significant P-value : Ex. Credit	0.0001	0.0001	0.0100	0.0095
Joint significant P-value : Debt Relief	0.383	0.0891	0.0290	0.8138
Joint significant P-value : Tech. Ass.	0.0377	0.42	0.0716	0.0157
Joint significant P-value : Loan	0.1632	0.3221	0.0001	0.0998
Joint significant P-value : Other	0.2351	0.1627	0.8441	0.3623

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE 10—EFFECTS OF OFFICIAL FINANCE (OF) BY FLOW TYPE - LAGGED TREATMENT (INTENSIVE)

	Dependent variable:			
	All Exports	Manufacturing	Agriculture	Raw Materials
	Conditioning and control variables omitted from table			
Cumulative Export Credit (count)	0.0124	0.0247	0.0408	0.0140
	(0.0205)	(0.0207)	(0.0437)	(0.0221)
Cumulative Export Credit (count) x Not China	-0.00383	-0.0257	-0.0569	-0.00861
	(0.0207)	(0.0209)	(0.0439)	(0.0224)
Cumulative Debt Relief (count)	0.0235	-0.404	-0.123	0.111
	(0.247)	(0.253)	(0.258)	(0.279)
Cumulative Debt Relief (count) x Not China	-0.0701	0.440	0.0807	-0.172
	(0.248)	(0.255)	(0.260)	(0.281)
Cumulative Technical Assistance (count)	0.0928	0.105	-0.105	0.0411
	(0.0558)	(0.0614)	(0.0804)	(0.0667)
Cumulative Tech. Ass. (count) x Not China	-0.109	-0.116	0.108	-0.0693
	(0.0561)	(0.0619)	(0.0809)	(0.0673)
Cumulative Lending (count)	0.00676	0.118***	0.0606	0.0269
	(0.0191)	(0.0316)	(0.0487)	(0.0330)
Cumulative Lending (count) x Not China	0.00662	-0.0891**	-0.0681	-0.0154
	(0.0192)	(0.0318)	(0.0489)	(0.0333)
Cumulative Other (count)	0.0104	0.00491	-0.0111	0.0247
	(0.0151)	(0.0175)	(0.0208)	(0.0186)
Cumulative Other (count) x Not China	-0.0150	-0.00269	0.00463	-0.0301
	(0.0152)	(0.0176)	(0.0209)	(0.0188)
Constant	0.171	-1.787	3.140	6.978*
	(1.949)	(2.535)	(3.040)	(3.361)
Observations	66452	50965	34664	36911

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

B. Trade and BRI Agreements Results

Table 11—Trade Creation Effects of Preferential Tariff Treatment

	Dependent variable:			
	All Exports	Manufacturing	Agriculture	Raw Materials
Preferential Treatment (Dummy)	0.0714	-0.0912	0.249	-0.0210
	(0.392)	(0.437)	(0.259)	(0.367)
Preferential Treatment x China	1.051	1.622*	0.313	1.206*
	(0.521)	(0.605)	(0.524)	(0.554)
Constant	11.61***	10.29***	11.48***	11.93***
	(0.0615)	(0.0762)	(0.0550)	(0.0762)
Observations	31743	24333	14963	16183
Fixed-Effects	EX×T, IM×T, EX×IM	EX×T, IM×T, EX×IM	EX×T, IM×T, EX×IM	EX×T, IM×T, EX×IM
Joint significant P-value	0.203	0.0113	0.2421	0.0188

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Results in table 11 show that the export-creation effects of China's preferential treatment program for African LDCs are, on average, larger than other iterations of the Generalized System of Preferences, specifically in the manufacturing and raw materials sectors. Receiving zero-tariff treatment increases manufacturing exports to China 4-fold, whereas receiving preferential treatment from non-China importers has no significant effect on recipients' manufacturing exports. This might be a reflection of the different designs of these preferential frameworks. Indeed, the US's AGOA applies tariff reduction selectively on products, and specifically exclude import-sensitive products in the manufacturing and agriculture sector (Frazer and Biesebroeck (2010)). The discrepancy can also be due to differential utilization rate of agreements, given that preferences can be significantly underutilized by exporting countries. For instance, Brenton (2006) the EU's GSP system is particularly underutilized.

In conjunction with table 12, the results above show that China's African trade agreements are net trade creators. Indeed, there is no significant evidence of export diversion, in aggregate and across industries. Controlling for a country's gross domestic product, population, and WTO membership status, benefiting from preferential treatment by China does not significantly lower exports to the rest of the world. This is true for aggregate exports (column 1) and of industry-level flows (columns 2-4).

The net export creation effects of China's zero-tariff policies echo findings from prior literature. Sun and Omoruyi (2021) who demonstrate that these policies significantly support export diversification, especially in the manufacturing sector. An earlier working paper by Engel (2014) also find that Chinese LDC preferences favorably impact exports at both the intensive and extensive margins.

Lastly, I turn to the trade creation and diversion effects of BRI agreements. The

Table 12—Trade Diversion Effects of Preferential Tariff Treatment

	Dependent variable:			
	All Exports	Manufacturing	Agriculture	Raw Materials
Exporter's Population	0.169	0.178	-0.506	0.717
	(0.415)	(0.669)	(0.797)	(0.717)
Exporter's GDP	0.539***	0.157	-0.354*	0.498**
	(0.102)	(0.151)	(0.180)	(0.161)
Exporter's WTO	0.156	-0.637	1.237**	1.975***
	(0.214)	(0.340)	(0.404)	(0.365)
PTA with China (dummy)	-0.148	-0.0451	0.203	0.0153
	(0.0815)	(0.120)	(0.143)	(0.128)
Constant	8.735*	12.58*	25.09***	1.663
	(3.535)	(5.648)	(6.725)	(6.049)
Observations	896	847	841	847

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

estimation method uses synthetic controls, and obtains treatment effects by comparing the performance of a treated country's export flows to those of a synthetic counterfactual constructed from observed data. The results are presented in figure 3. Three countries are retained for analysis: South Africa (ZAF), Cameroon (CMR) and Somalia (SOM). These are the earliest African members in the BRI, with entry years spanning 2014-2015. For each of the three countries three outcomes are analyzed: flows to China, flows to the United States, and flows to the European Union. This yields 9 estimated treatment effects. The point estimates of the treatment effect are represented by the white circles. The segments represent the 95% confidence interval around the point estimate.

As shown on the figure, the treatment effects on trade with China, the US, and Europe, are all indistinguishable from zero. It is clear that we cannot reject the hypothesis that BRI does not divert existing trade flows with China's Western rivals. These results might however be sensitive to the recent nature of the initiative in Africa and the peripheral status of member countries in the region in the overall vision and financial commitments of the BRI. Indeed Sebastian Ibold's BRI data collection project Ibold (2022) only identifies one project that tangentially targets Cameroon consisting in the Chad-Cameroon railway, and no committed projects for South Africa or Somalia.

C. Discussion

The trade creation results are broadly in line with prior findings in the literature: receiving more Official Financing from China is associated with increases in recipients' exports to China (table 6). This relationship is primarily due to the role played by ODA. The fact that ODA flows are more beneficial to recipients' exports is supported by results from Savin, Marson and Sutormina (2020) who show that African exports to China associate positively with ODA flows, with

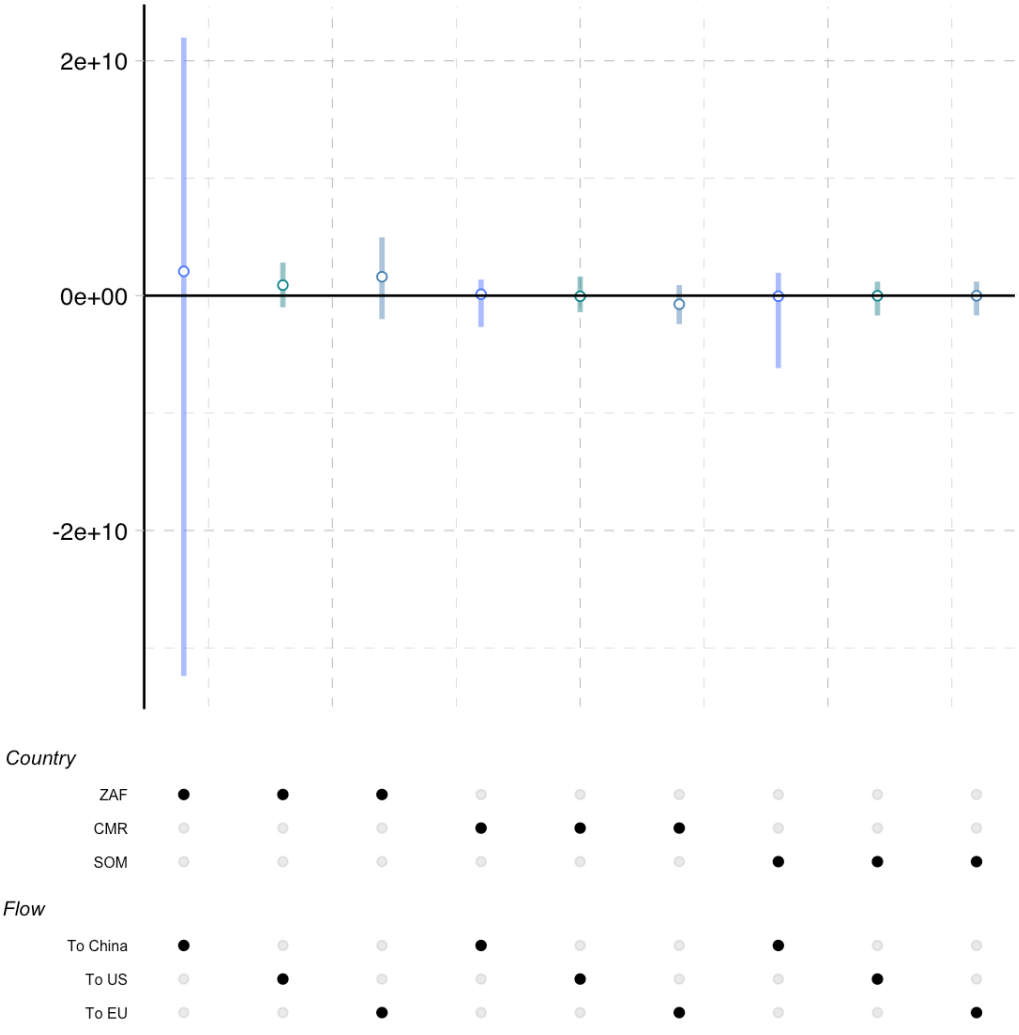

Figure 3. Belt and Road Initiative Members, and Entry Years

manufacturing industries leading the response. The finding that manufactured African exports are most sensitive to ODA is also in line with Savin, Marson and Sutormina (2020) results. Pettersson and Johansson (2013) on the other hand, points to a particularly strong link between ODA and recipient's exports of strategic material. This does not seem to materialize in the context of China's aid to Africa, as the manufacturing sector repeatedly appears as the most responsive across specifications.

This paper sheds light on which type of OF flows drives the association between official finance and trade. It shows that lending is the primary mechanism through which official finance impacts recipients' exports. This result is particularly relevant in a context where China has become the first bilateral lender to Africa.

Furthermore, the results above demonstrate that how we define treatment matters to our study of the response of African exports to China's official finance. The impact of ODA depends on its intensity, and being a recipient of official flows does not elicit significant responses from export flows. However, receiving *more* official finance, particularly more ODA, leads to a positive response of the recipient's exports. Conversely, increasing OOF flows - generally more commercially oriented - does not significantly increase trade.

On trade diversion, the hypothesis that China's OF in Africa displaces existing trade flows is not supported in the aggregate analysis (Table 6). In fact, in most cases, OF treatments coincide with a net increase in exports: to China and third-party countries. However, a closer look at disaggregated treatment reveals that ODA financing diverts raw materials exports to third-party countries. Indeed, one additional ODA flow decreases raw material exports to non-China partners by a statistically significant 2%. Due to the predominance of commodity exports in Africa, this translates into a total export diversion of 0.6%. While not large, this figure brings into focus the aid/commodity nexus in China's Africa strategy. Previous empirical work on trade creation effects saw no "there there," but trade diversion effects indicate that there might yet be a "there there."

Like much of the empirical research on China's aid and trade diplomacy, results of this paper dispel export-diversion and concentration criticism about China's approach to Africa. China's official finance, trade agreements, and investment memoranda with African countries do not appear to increase her market share in Africa at the expense of other partners. There is also no evidence of these intervention reinforcing a "dutch disease". Exports of raw materials experience increases smaller than the manufacturing sector, and where there is diversion it remains very low. These results are similar to findings in the recent literature on China's aid and trade diplomacy. Dreher et al. (2017) test the claim that significant financial support from China impairs the effectiveness of grants and loans from Western donors and lenders, and find no support for this claim. Bon and Cheng (2021) show that China's increasing involvement in debt restruc-

turing, rather than being obscure, is similar in its approach to the Paris Club. Bräutigam and Gallagher (2014) analyze China's resource-secured or commodity-backed loans, and find that contrary to many of the claims in the popular press, Chinese finance is not out of line with interest rates found in global capital markets, and does not bring windfall commodity profits to China. Dreher and Fuchs (2015) argue, after an analysis of China's aid allocation, that its patterns are comparable to Western donors' and that it appears to be independent of recipients' natural resource endowment - and conclude that denoting Chinese aid as "rogue aid" seems unjustified. Many elements that underlie the suspicion towards the "Beijing Model" do not appear to find support in empirical economic analysis.

Instead, the evidence in this paper lends support to the argument that China's African trade involvement is mutually beneficial. The net export creation effect in manufacturing shows that China's involvement can support export diversification, not only through preferential treatment, as showed in Sun and Omoruyi (2021). It can also contribute to addressing supply-side issues through ODA and ODA-adjacent financing, leading to an improvement in production capacities and competitiveness of recipient economies - which rather than a zero-sum game could be a win-win strategy.

V. Conclusion

Today, China is Africa's largest trading partner, investor, and creditor, making it an essential player in its economy. Her engagement is promoted through active aid and trade diplomacy. The absence of rigorous empirical evidence on the economic impacts of these interventions has allowed the policy debate around it to become polarized and suspicious. This paper aims to fill this gap and inform this debate by evaluating the export creation and diversion effects of China's aid and trade diplomacy in Africa.

The results show that China's economic diplomacy activism in Africa does not significantly divert exports away from existing links. In addition, it does not appear that it pushes African economies towards more specialization in natural resource exports. Instead, manufacturing industries appear to benefit from ODA flows and trade agreements, both of which generate significant net trade creation effects. Early evidence on the Belt and Road Initiative shows no sign of trade diversion. These results do not preclude the existence of potential negative economic externalities of Chinese engagement and do not presume that their welfare or distributional impacts are positive on balance.

This paper also offers methodological insights into future research on trade diplomacy effects. It suggests that the margin of treatment needs to be carefully defined, and it also shows that heterogeneity analysis must be applied systematically to explore different sub-types of treatment and to distinguish the response of different sector-level outcomes.

The paper's findings invite further empirical research into the mechanisms that account for the patterns that have been identified. A more granular approach at the geography and industry level could generate new data that isolates the causality channels. Is this a supply-side effect that improves the production capabilities of target countries? Additionally, as the implementation of the BRI advances, richer data will become available to study its trade and economic effects in Africa. Finally, as our macroeconomic understanding of the impacts of China's engagement in Africa improves, another question becomes more accessible and more urgent to address. Research into China's Africa strategy will have to turn to its welfare and distributional consequences, the actual litmus test of policy interventions.

REFERENCES

Abadie, Alberto, Alexis Diamond, and Jens Hainmueller. 2010. "Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program." *Journal of the American Statistical Association*, 105(490): 493–505.

Asongu, Simplice A, Jacinta C Nwachukwu, and Gilbert A A Aminkeng. 2018. "Lessons from a Survey of China's Economic Diplomacy." *Journal of world trade*, 52(5): 789–814.

Baier, Scott L., and Jeffrey H. Bergstrand. 2007. "Do free trade agreements actually increase members' international trade?" *Journal of international Economics*, 71(1): 72–95.

Belesky, Paul, and Geoffrey Lawrence. 2019. "Chinese state capitalism and neomercantilism in the contemporary food regime: contradictions, continuity and change." *The Journal of Peasant Studies*, 46(6): 1119–1141.

Berhelemy, Jean-Claude. 2011. "China's Engagement and Aid Effectiveness in Africa." *African Development Bank*, , (129).

Bon, Gatien, and Gong Cheng. 2021. "Understanding China's role in recent debt relief operations: A case study analysis." *International economics (Paris)*, 166: 23–41.

Bown, Chad P, and Meredith A Crowley. 2007. "Trade deflection and trade depression." *Journal of international economics*, 72(1): 176–201.

Brenton, Paul; Hoppe, Mombert. 2006. "The African Growth and Opportunity Act, Exports, and Development in Sub-Saharan Africa." , (No. 3996).

Bräutigam, Deborah, and Kevin P Gallagher. 2014. "Bartering Globalization: China's Commodity-backed Finance in Africa and Latin America." *Global policy*, 5(3): 346–352.

Carter, Colin A, and Caroline Gunning-Trant. 2010. "U.S. trade remedy law and agriculture: trade diversion and investigation effects: U.S. trade remedy law and agriculture." *The Canadian journal of economics*, 43(1): 97–126.

Copper, John F. 2015. *China's Foreign Aid and Investment Diplomacy, Volume III: Strategy Beyond Asia and Challenges to the United States and the International Order.* New York:Palgrave Macmillan.

Custer, S., Dreher A.-Elston T.B. Fuchs A. Ghose S. Lin J. Malik A. Parks B.C. Russell B. Solomon K. Strange A. Tierney M.J. Walsh K. Zaleski L., and S. Zhang. 2021. "Tracking Chinese Development Finance: An Application of AidData's TUFF 2.0 Methodology."

Dai, Mian, Yoto V Yotov, and Thomas Zylkin. 2014. "On the trade-diversion effects of free trade agreements." *Economics letters*, 122(2): 321–325.

Dreher, Axel, and Andreas Fuchs. 2015. "Rogue aid? An empirical analysis of China's aid allocation." *The Canadian journal of economics*, 48(3): 988–1023.

Dreher, Axel, Andreas Fuchs, Bradley Parks, Austin M. Strange, and Michael J. Tierney. 2017. "Aid, China, and Growth: Evidence from a New Global Development Finance Dataset." *SSRN Electronic Journal*.

Engel, Jakob; Jouanjean, Marie-Agnes. 2014. "More than a gesture? Examining the export impact of Chinese and Indian duty-free quotafree trade preferences for Least Developed Countries."

Frazer, Garth, and Johannes Van Biesebroeck. 2010. "Trade Growth Under The African Growth and Opportunity Act." *The Review of Economics and Statistics*, 92(1): 128–144.

Fukao, Kyoji, Toshihiro Okubo, and Robert M Stern. 2003. "An econometric analysis of trade diversion under NAFTA." *The North American Journal of Economics and Finance*, 14(1): 3–24.

Hamilton, Carl. 1985. "Voluntary Export Restraints and Trade Diversion." *Journal of common market studies*, 23(4): 345–355.

Horn, Sebastian, Carmen M. Reinhart, and Christoph Trebesch. 2021. "China's overseas lending." *Journal of International Economics*, 133: 103539.

Humphreys, David. 2013. "New mercantilism: A perspective on how politics is shaping world metal supply." *Resources Policy*, 38(3): 341–349.

Ibold, Christian. 2022. "BRI Projects."

Lind, Jennifer, and Daryl G Press. 2018. "Markets or Mercantilism? How China Secures Its Energy Supplies." *International Security*, 42(4): 170–204.

Liu, Ailan, and Bo Tang. 2018. "US and China aid to Africa: Impact on the donor-recipient trade relations." *China Economic Review*, 48: 46–65.

Mawdsley, Emma. 2008. "Fu Manchu versus Dr Livingstone in the Dark Continent? Representing China, Africa and the West in British broadsheet newspapers." *Political Geography*, 27(5): 509–529.

Moons, Selwyn J V, and Peter A G Bergeijk. 2017. "Does Economic Diplomacy Work? A Meta-analysis of Its Impact on Trade and Investment." *World economy*, 40(2): 336–368.

Nitsch, Volker. 2007. "State Visits and International Trade." *World economy*, 30(12): 1797–1816.

Pettersson, Jan, and Lars Johansson. 2013. "Aid, Aid for Trade, and bilateral trade: An empirical study." *Journal of International Trade and Economic Development*, 22(6): 866–894.

Prusa, Thomas J. 2019. "The Trade Effects of U.S. Antidumping Actions." In *The Effects of U.S. Trade Protection and Promotion Policies*. 191–214. Chicago:University of Chicago Press.

Rose, Andrew K. 2007. "The Foreign Service and Foreign Trade: Embassies as Export Promotion." *World economy*, 30(1): 22–38.

Savin, Ivan, Marta Marson, and Marina Sutormina. 2020. "How different aid flows affect different trade flows: Evidence from Africa and its largest donors." *Structural Change and Economic Dynamics*, 55: 119–136.

Sima, Qian. 1993. "Records of the grand historian. Qin dynasty."

Sun, Zhina, and Ehizuelen Michael Mitchell Omoruyi. 2021. "Effect of China's Zero-Tariff Treatment under Forum on China-Africa Cooperation (FOCAC) on Export Diversification in Beneficiary Countries in Africa." *Journal of African Trade*, 8: 23–32.

Viner, Jacob. 2014. *The customs union issue.* New York:Oxford University Press.

Xu, Yiqing. 2017. "Generalized Synthetic Control Method: Causal Inference with Interactive Fixed Effects Models." *Political Analysis*, 25(1): 57–76.

Yang, Shanping, and Inmaculada Martinez-Zarzoso. 2014. "A panel data analysis of trade creation and trade diversion effects: The case of ASEAN–China Free Trade Area." *China Economic Review*, 29: 138–151.