

Charity Begins at Home: Domestic Political Economy of Chinese Foreign Aid *

Sibo Liu[†]

Dong Zhang[‡]

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[†]Associate Professor, Department of Accountancy, Economics and Finance, Hong Kong Baptist University. E-mail: siboliu@hkbu.edu.hk.

[‡]Assistant Professor, Division of Social Science, the Hong Kong University of Science and Technology. E-mail: dongzhang@ust.hk.

Abstract

How does an authoritarian donor's domestic political economy shape its aid practices? We probe into the case of China, the largest authoritarian donor in the world, and contend that the logic of regime survival drives China's aid policies to prioritize commercial interests and sustain the state capitalism model. By leveraging multiple data sources, we employ a difference-in-differences design and conduct our analysis at the country, industry, firm, and product levels. We empirically document that Chinese aid projects lead to a substantial surge of Chinese exports to aid recipient countries, generating large revenues primarily for Chinese state-owned enterprises (SOEs). In particular, the aid-induced trade benefits are concentrated among SOEs with low performance and large employment. Our analysis also rules out decreased trade costs, favorable trade terms, and the product price difference between SOEs and private firms as alternative explanations.

Keywords: foreign aid, authoritarian regimes, international trade, state capitalism

1 Introduction

China's astonishing economic rise is reshaping the world's economic landscape. One of the manifestations of China's expanding global influence is the explosive growth of Chinese aid around the globe. China's foreign aid spending amounted to US\$354.4 billion from 2000 to 2014, while the United States spent US\$394.6 billion on foreign aid during the same period.¹ China is poised to surpass the United States to become the world's largest donor. Despite a voluminous literature on the motives and consequences of foreign aid from democratic donors, relatively less is known about to what extent authoritarian donors like China strategically advance their own interests through foreign aid and how the inner workings of authoritarian politics shape foreign aid practices. Answers to these questions have important implications for understanding the political logic of authoritarian donors' aid practices, for informing domestic political economy approaches to studying foreign aid and, to a certain extent, for envisioning the future international economic order.

Much of the scholarly work on foreign aid treats donor countries as unitary actors and views aid as a foreign policy instrument of a unitary donor country to help achieve its national interests.² A growing body of literature is devoted to understanding how domestic actors of donor countries influence aid allocations (Carcelli 2023, 2024; Dreher et al. 2015; Dietrich 2016; Fleck & Kilby 2001; Z. D. Greene & Licht 2018; McLean 2015; Noël & Thérien 1995; Thérien & Noel 2000; Tingley 2010). Given that the logic of aid allocation and its effects may vary considerably over time and across donors (Bermeo 2016; Schraeder et al. 1998), however, we still know very little about how the domestic politics of authoritarian regimes — the power structures of which are often opaque and murky — influence foreign aid policies, or about the distributive effects of these

¹*The Washington Post*, October 10, 2017, "China Treats Its Foreign Aid Like a State Secret. New Research Aims to Reveal It," <https://www.washingtonpost.com/news/worldviews/wp/2017/10/11/china-treats-its-foreign-aid-like-a-state-secret-new-research-aims-to-reveal-it/> (last accessed on February 27, 2025). The data in this news report comes from AidData compiled by Dreher et al. (2021).

²Donor countries allocate a disproportionate amount of aid for the political purposes of securing geopolitical interests (Fleck & Kilby 2010) and garnering support in the General Assembly or Security Council of the United Nations (e.g., Alesina & Dollar 2000; Dreher et al. 2008; Kuziemko & Werker 2006; Vreeland & Dreher 2014). Economically, aid helps donor countries to promote trade, secure raw material supplies, and dispose of domestic production surpluses (e.g., Girod 2012; McKinlay & Little 1977, 1978; Nunn & Qian 2014; Schraeder et al. 1998).

policies on domestic groups in authoritarian states.

In this article, we delve into China’s aid practices by unpacking the “black box” of Chinese domestic politics and examines the empirical implications of these domestic dynamics by estimating the relationship between China’s foreign aid allocations and its exports to recipient countries during 2000–2014. We focus on how the imperative of authoritarian regime survival shapes China’s aid practices, and further explore the distributional consequences for domestic economic groups. In the post-Mao era, the Chinese leadership have pursued performance legitimacy by focusing on economic development to perpetuate and strengthen authoritarian rule (H. Yang & Zhao 2015). Accordingly, commercial interests, under the guiding principle of economic diplomacy, constitute the primary concern in China’s foreign aid policy-making. In China’s foreign aid system, the Ministry of Commerce (MOFCOM), tasked with promoting China’s commercial interests, wields more influence than other bureaucratic agencies (e.g., Varrall 2016; Zhang & Smith 2017). As a result, Chinese aid projects help open the market of aid recipient countries and facilitate Chinese exports. Among domestic economic groups, state-owned enterprises (SOEs) are of great importance for authoritarian regime survival because they allow the ruling regime to maintain a resource advantage over potential challengers in society (e.g., Arriola 2013; Boone 1990; K. F. Greene 2007), deploy economic resources to achieve political goals (e.g., Shleifer 1998), and hire excessive labor to ensure political stability (e.g., Berkowitz et al. 2017; Steinfeld 1998). Given that aid-induced trade is in essence a form of protectionist policy, SOEs, especially those that are low-performing and labor-intensive, are more likely to reap benefits from opening the market of aid recipient countries.

Empirically, we have assembled the most comprehensive dataset from multiple data sources including AidData compiled by Dreher et al. (2021), the industrial census of manufacturing firms in China provided by the Chinese Industrial Enterprise Database (CIED), and product-level trade transaction data from the China Customs Database. We conduct our analysis at the country, industry, firm, and product levels. Using a difference-in-differences (DID) design, we empirically document that Chinese aid projects lead to a substantial increase of Chinese exports to aid recipient countries. More specifically, the announcement of a recipient country’s first aid project from

China increases China’s exports to that market by more than 30%, compared to countries that do not receive Chinese aid. A battery of robustness checks using alternative samples and model specifications yield quantitatively similar results. The results remain robust when we follow [Dreher et al. \(2021\)](#) and employ an instrumental variable approach in fixed effects models with lagged aid volumes. Our results are also robust to the new methods in the econometrics literature that correct the potential “negative weights” problem that arise in dynamic treatment effects ([Sun & Abraham 2021](#)) or relax the parallel trends assumption in the DID estimator ([Arkhangelsky et al. 2021](#)).

We use industry-level data to construct [Balassa’s \(1965\)](#) measure of revealed comparative advantage (RCA) and show that the products China exported to aid recipient countries are not those for which China has greater comparative advantage, suggesting that the increased trade between China and aid recipient countries is unlikely to reduce transaction costs or increase economic efficiency. We draw on disaggregated firm-level data sets and construct a number of measures to tease out the heterogeneous effects. We find that compared with private firms, SOEs tend to export more products following the announcement of Chinese aid in recipient countries, with an SOE expected to export approximately 25% more than a private firm. More importantly, among SOEs, it is those that are economically under-performing and politically important in terms of local employment that benefit disproportionately from the opening of the markets of aid recipient countries.

Our study contributes to the understanding of China’s aid practices. Most empirical studies on China’s foreign aid focus on the association between state-level variables — such as voting alignment with China in the United Nations General Assembly (UNGA) and position on the “One-China Policy” (e.g., [Dreher & Fuchs 2015](#); [Dreher et al. 2018](#)) — and the volumes of China’s aid. Recent studies have explored the effects of Chinese aid on economic development, political accountability, government legitimacy, favoritism, local corruption, and ethnic identities in recipient countries (e.g., [Blair & Roessler 2021](#); [Dreher et al. 2019, 2021](#); [Isaksson & Kotsadam 2018a,b](#); [Isaksson 2020](#); [Marchesi et al. 2021](#); [Martorano et al. 2020](#); [Ping et al. 2022](#)). Although some studies delve into Chinese domestic politics for understanding China’s aid policies (e.g., [Corkin 2011](#); [Varrall 2016](#); [Zhang & Smith 2017](#)), these are largely descriptive and rarely conduct a systematic

test of empirical implications. Our research examines how foreign aid fits into the political economy of regime survival in China and investigates the effects of Chinese aid on domestic economic groups. Empirically, we assemble a multitude of comprehensive and granular data sets and use quasi-experimental designs to establish the linkage between foreign aid and trade. Moreover, we use firm-level trade transaction records and firm characteristics to explore the domestic political economy incentives and draw on the product-level data to rule out alternative explanations.

More generally, while an emerging body of literature examines the aid policies of democratic donors from a domestic political economy perspective ([Carcelli 2023, 2024](#); [Dreher et al. 2015](#); [Dietrich 2016](#); [Fleck & Kilby 2001](#); [Z. D. Greene & Licht 2018](#); [McLean 2015](#); [Noël & Thérien 1995](#); [Thérien & Noel 2000](#); [Tingley 2010](#)), we reveal the political logic of an authoritarian regime’s aid practices and the distributional effects on domestic economic groups. Moreover, we enrich the broad literature on authoritarian politics by showing how the imperative of authoritarian regime survival drives foreign aid policies and by exploring how the state capitalism model helps sustain authoritarian rule and influences the distributional consequences of aid policies. Finally, we also advance the literature on the political economy of international trade (e.g., [Berger et al. 2013](#); [Mansfield & Bronson 1997](#); [Mansfield et al. 2000](#)). In particular, we document the distributional effects of aid-induced trade on Chinese firms and thus shed light on the linkage between politics and international trade (for a review, see [Kim & Osgood 2019](#)).

2 Domestic Political Economy of Foreign Aid under Authoritarian Rule

An emerging body of literature explores how the domestic political economy of advanced democratic donors influences aid allocations. The ideological orientation of governing parties in democratic governments, such as their position on the liberal-conservative (or left-right) spectrum, is largely associated with certain aid allocation patterns ([Dreher et al. 2015](#); [Z. D. Greene & Licht 2018](#); [Noël & Thérien 1995](#); [Thérien & Noel 2000](#); [Tingley 2010](#)). Moreover, a country’s national orientation toward the role of the state ([Dietrich 2016](#)) and the competitiveness of domestic economic groups ([McLean 2015](#)) have a profound impact on foreign aid policy-making.

Beyond these state-level factors, scholars also delve into the role of ideology and interests of political leaders, legislators, and bureaucrats in shaping foreign aid policies. In the US Congress, liberal–conservative ideology plays a crucial role in shaping legislators’ stances on foreign aid (Fleck & Kilby 2001; Milner & Tingley 2010). Carcelli (2023) reveals that the fragmentation of aid authority, which often leads to inefficiencies and tied aid, is a consequence of distributive politics, where leaders delegate to non-traditional agencies to gain legislative support for specific interests. Similarly, Carcelli (2024) illustrates how congressional vote-buying practices contribute to aid fragmentation across multiple bureaucracies, through leaders’ “side payments” to moderate legislators via agency-specific allocations. Heinrich & Peterson (2020) contend that foreign aid, particularly tied aid, functions as a form of pork-barrel politics and provide evidence that U.S. citizens’ support for aid depends on local economic benefits, with legislators securing such benefits enjoying higher approval ratings.³

In authoritarian states like China, political leaders, while not facing re-election pressures, strive to maintain their hold on power by neutralizing potential challenges. The overarching goal of autocrats is to safeguard political survival, that is, to prolong the longevity of authoritarian rule (e.g., Bueno de Mesquita et al. 2003; Svolik 2012). During China’s reform era, the top leadership has relied on performance legitimacy to garner popular support and consolidate authoritarian rule (H. Yang & Zhao 2015; D. L. Yang 2016). As a result, economic diplomacy has become the guiding principle of China’s foreign policy, with foreign aid being strategically employed to boost Chinese exports, especially following the initiation of the “going global” strategy in 2000. Moreover, like democratic donors (Carcelli 2023, 2024), China’s bureaucratic politics is characterized by “fragmented authoritarianism” (Lieberthal & Oksenberg 1988). Nevertheless, agencies prioritizing commercial interests have played a leading role in China’s aid system (M. Chen 2020; Corkin 2011; Varrall 2016; Zhang & Smith 2017), reinforcing the link between aid and Chinese exports. To maintain authoritarian rule, authoritarian regimes must rely on support coalitions (Pepinsky 2009).

³There is a growing body of literature examining donor countries’ public opinion toward foreign aid, which emphasizes the importance of domestic audiences in shaping donor governments’ aid policies (e.g., Heinrich et al. 2018; Heinrich & Kobayashi 2020).

State-owned enterprises (SOEs) and other state-owned entities provide the ruling regime with a resource advantage over potential domestic challengers, effectively tilting the political playing field (e.g., [Arriola 2013](#); [Boone 1990](#); [K. F. Greene 2007](#)). As crucial components of the authoritarian regime's support coalition ([Ye 2020](#)), SOEs are positioned to reap greater benefits from aid-induced trade. These points will be further elaborated in subsequent sections.

2.1 Regime Survival and Economic Diplomacy

A booming literature on authoritarian politics over the last two decades highlights the role of quasi-democratic institutions — including elections, legislatures, and political parties — in sustaining authoritarian rule (e.g., [Brownlee 2007](#); [Gandhi 2008](#); [Magaloni 2006](#); [Malesky & Schuler 2010](#)). Recent scholarly work places emphasis on the importance of information control in authoritarian regime survival (e.g., [Guriev & Treisman 2020](#); [Roberts 2018](#)). Apart from these insights, some authoritarian regimes, such as developmental states in East Asia, rely on performance legitimacy to boost the prospects of regime survival. A regime's legitimacy hinges on its capacity to “engender and maintain the belief that the existing political institutions are the most appropriate ones for the society” ([Lipset 1960](#), 77). Performance legitimacy means that the regime establishes public acceptance and gains public support on the basis of its performance, particularly economic performance. China is a salient case of “developmental authoritarianism” which pursues performance legitimacy to maintain authoritarian rule ([D. L. Yang 2016](#)). In China, the communist regime's ideological legitimacy faded away in the aftermath of the Cultural Revolution (1966–1976). In the post-Mao era, the Chinese leadership have resorted to performance legitimacy, by promoting economic modernization and improving the livelihoods of Chinese people, to ensure regime survival ([H. Yang & Zhao 2015](#)). ⁴

Since the leadership shifted to performance legitimacy in the reform era, economic diplomacy has become a guiding principle of foreign policy, with a profound impact on China's foreign aid

⁴China's economic development in the reform era produces performance legitimacy in the sense that people who are satisfied with their economic status or have experienced rising income levels tend to support the political status quo (e.g., [J. Chen & Dickson 2010](#); [Dickson 2016](#); [Wright 2010](#)).

practices. Economic diplomacy places emphasis on mutual benefits in bilateral relations and aims to advance China's economic development by exploring international markets for Chinese products and securing China's resource supply. In the 1980s and 1990s, China's diplomacy served domestic economic development by improving bilateral relations with Western industrialized countries and Japan to bring in advanced technology, managerial expertise, and capital. Chinese leaders focused on developing and maintaining a peaceful and stable international environment for domestic development through foreign policy. As the then minister of Foreign Affairs Tang Jiaxuan pointed out in 1999, the priority of the Ministry of Foreign Affairs (MFA) was the economy because the top leadership regarded economic construction as the central task ([Heath 2016](#)).

Since the 2000s, China's economic diplomacy has shifted its attention to developing countries. The Chinese government initiated the "going global" strategy in 2000, which prompted Chinese firms to engage in global competition for resources, trade, and investment. At a national work conference on economic diplomacy held by the State Council in 2004, Vice Premier Wu Yi stressed the importance of using diplomacy to increase trade and investment with developing countries and called for "expanding the scope of import and export trade with the developing countries" ([Heath 2016](#), 167). It thus comes as no surprise that diplomatic activities of Chinese leaders such as summit visits often include "the announcement of Chinese aid commitments, investment deals, and signing of various political and economic agreements" ([Kastner & Saunders 2012](#), 165).

As China's economic growth model became increasingly imbalanced, the problems of weak domestic consumption and over-reliance on capital investment loomed large. Chinese leaders sought to expand export markets to sustain economic growth. In particular, in the aftermath of the global financial crisis of the late 2000s, China's export markets plummeted, and the overcapacity became a serious problem ([Overholt 2010](#)). To mitigate these economic problems, the Chinese government was pressured to use economic diplomacy to boost trade. For instance, Zhu Hongjie, Vice President of China's Export-Import Bank (Eximbank), a government-sponsored policy bank for providing concessional loans, emphasized the necessity of foreign aid in promoting trade in 2012. He proposed to "promote South-South trade cooperation and resolve the difficulties brought to de-

veloping countries by the drop of exports” and “make the best use of concessionary loans to promote Chinese exports” (Johnston & Rudyak 2017, 442). In 2013, the Chinese government launched the “One Belt One Road” initiative, which could be a major solution to China’s chronic overcapacity problem in heavy industries, alongside political and strategic considerations (Ye 2020).

To understand how the principle of economic diplomacy translates into aid practices on the ground, it behooves us to examine the bureaucratic politics of aid policies. In China’s foreign aid system, the Ministry of Commerce (MOFCOM), the Ministry of Foreign Affairs (MFA), and the Ministry of Finance (MOF) are the principal actors for implementing China’s foreign economic assistance policies. Although the MFA has veto power over whether aid projects are consistent with China’s foreign policy interests, the MOFCOM nevertheless plays a leading role in China’s aid policies.⁵

The Department of Foreign Aid (DFA) within the MOFCOM drafts the aid budget and aid regulations, manages the vast majority of the bilateral aid funding, such as the zero-interest loans and grants allocated by the MOF, and coordinates Eximbank grants of concessional loans to developing countries, which is an important form of China’s foreign aid (Brautigam 2011, 109). The MOFCOM sends staff to the Economic and Commercial Counselor’s Office (ECCO) of Chinese Embassies in aid recipient countries to coordinate and manage foreign aid projects. While Chinese embassies report directly to the MFA, the ECCO is subject to the administrative control of the MOFCOM. To please their superiors in the MOFCOM, ECCO staff have a strong incentive to promote China’s trade and investment (Zhang & Smith 2017). Because the MOFCOM underscores the principle of mutual benefit and is particularly concerned about securing China’s commercial interests, it “sees aid as a means by which Chinese goods and services can gain more access to new markets” (Varrall 2016, 26). More crucially, the MOFCOM has formed close relationships with Chinese companies and is thus prepared for safeguarding their economic interests (Zhang & Smith 2017).

⁵In March 2018, China established the China International Development Cooperation Agency (CIDCA) to coordinate foreign aid policies. Before that, China did not have a central aid agency like the United States Agency for International Development (USAID) in the United States.

Although the MOF is the sole shareholder of Eximbank, the MOFCOM has a greater influence in concessional loan processes. To some extent, the MOFCOM and Eximbank have formed a de facto alliance in pursuing commercial interests in foreign aid projects (Corkin 2011). Eximbank is less concerned about diplomatic goals than whether its loans will be repaid (Varrall 2016). In consultation with Eximbank, the MOFCOM assesses applications for concessional loans that have been recommended by the ECCO in foreign countries, and formulates the budget. Most often, the MOF endorses project proposals, signs off on the budget, and covers the gap between the commercial and concessional interest rates. Notably, the concessional loans disbursed by Eximbank place more weight on the commercial interests of Chinese companies. For instance, Eximbank requires that Chinese contractors are granted the infrastructure contract financed by the concessional loans and, perhaps more importantly, “in principle no less than 50 percent of the contract’s procurement in terms of equipment, materials, technology or services must come from China” (Corkin 2011, 69). To promote bilateral trade, Eximbank also provides short-term preferential credit to either importers in borrowing countries or exporters in China (Mattlin & Nojonen 2015; Varrall 2016).

Overall, the principle of economic diplomacy rooted in regime survival imperatives fosters a business-first culture and economy-first mentality in foreign policy-making. Accordingly, the strategic focus of China’s foreign aid policy is “of a more trade-centred nature” and the slogan “‘economics in the service of diplomacy’ would be more apt in China if reversed” (Corkin 2011, 67). The MOFCOM, in alliance with Eximbank, plays a vital role in China’s aid policies, whereas the influence of the MFA and MOF is relatively limited. While the MFA prioritizes political interests (e.g., foreign relations and national security) and advocates for using aid to maintain diplomatic ties and uphold the “One-China” Policy, China’s aid practices are largely driven by economic interests promoted by the MOFCOM, China’s policy banks, and Chinese companies (Zhang & Smith 2017). As a result, it is unlikely that China’s aid policies primarily serve foreign policy objectives at the expense of economic interests (M. Chen 2020). ⁶ Unlike OECD countries that gradually

⁶In 2008, to enhance inter-agency cooperation, the MOFCOM, MFA, and MOF established China’s foreign aid inter-agency liaison mechanism. In 2011, this liaison mechanism was upgraded into an inter-agency coordination mechanism involving more than 30 agencies. Within this framework, the MOFCOM assumed a leading role as the

restricted tied aid to lower-income countries in the 2000s, China was evolving from aid recipient to donor during this period. As a developing country grappling with its own economic challenges, such as overcapacity, China has viewed the pursuit of economic interests through aid policies as a strategy for tackling its domestic issues. Given China's economic diplomacy and the MOFCOM's commercial mandate, China's aid projects are likely to promote trade with aid recipient countries, particularly the export of Chinese products.

It is crucial to recognize that China's development finance includes both official development assistance (ODA) and other official flows (OOF). ODA comprises grants, interest-free loans, and other concessional loans, whereas OOF largely consists of non-concessional loans (M. Chen 2020). It is worth noting that China rarely provides cash aid to recipient countries (Brautigam 2011, p.124). In 2013, Lu Feng, the then Director of the Department of Foreign Aid at the MOFCOM, pointed out, "Our foreign aid is not directly giving money to the recipient countries. For example, if we provide 100 million yuan in aid, it does not mean we are giving 100 million yuan in cash for you to spend. It does not work that way. Instead, the recipient country proposes an aid project worth 100 million yuan, and we send our companies to complete the project or provide materials. After the project is finished, we hand it over to the recipient country as a gift. The actual funds are allocated to our enterprises, which use them to complete the project, and then give it to the recipient country's government."⁷ China's ODA, especially grants, typically finances turn-key projects like bridges, stadiums, and government-run factories, all of which are executed by Chinese companies primarily using predominantly Chinese materials. As noted earlier, Eximbank's concessional loans mandate the use of Chinese contractors for infrastructure projects, with a requirement that at least 50% of goods and services be sourced from China. As a result, ODA—grants and concessional loans in particular—establishes stronger, more direct linkages between aid and trade, which likely has a greater impact on Chinese exports. While non-concessional loans under OOF may still include

director member, while the MFA and MOF served as deputy-director members. This organizational arrangement further underscores the MOFCOM's dominant position in shaping aid policies.

⁷Sina.com, July 25, 2013. "Online Lecture Series: The History and Future of China's Foreign Aid(wangshang dajiangtang: Zhongguo duiwai yuanzhu de lishi yu weilai)," <https://blog.sina.com.cn/lm/c/2013-07-25/273467.shtml> (last accessed on February 27, 2025).

provisions favoring Chinese firms, they impose less stringent procurement requirements compared to grants and concessional loans. Therefore, we hypothesize that ODA has a greater effect on Chinese exports than OOF, and that grants have a larger effect than loans.

2.2 Distributive Politics under the State Capitalism Model

As noted earlier, economic development produces performance legitimacy, which helps to sustain authoritarian rule. However, the second-order effect of economic development also presents a challenge to authoritarian regimes. Rising prosperity may undermine the political and social structure of traditional societies, thereby generating pressure for democratization (e.g., [Boix & Stokes 2003](#); [Lipset 1960](#)). [Moore's \(1966\)](#) “no bourgeoisie, no democracy” thesis stresses the importance of an independent economic base in forming opposition to authoritarian regimes. To dampen such challenges, some authoritarian regimes resort to a state capitalism model to tighten their control over economic resources. State capitalism can be understood broadly as a variant of capitalism in which the state directly engages in the economy through state-owned enterprises (SOEs) or other state-controlled entities, and channels economic resources through government investments.⁸

SOEs, state-owned banks, and sovereign wealth funds are economic entities that control a variety of assets — both tangible and intangible — and thus can be seen as economic resources at the regime’s disposal. The control of SOEs and other state-owned entities enables the ruling party to maintain a resource advantage over potential domestic challengers, thereby tilting the political playing field (e.g., [Arriola 2013](#); [Boone 1990](#); [K. F. Greene 2007](#)). As [K. F. Greene \(2007, 6\)](#) notes in the case of Mexico before democratization:

...the magnitude of the incumbent’s resource advantages rises and falls with the degree of state ownership over the economy. In this context, SOEs are particularly important because they are prone to politicization. Their often-secretive budgets and lack of third-party oversight yield manifold opportunities to blur the line between public and

⁸The extent of the state’s control over the economy varies across countries. For example, the state can own majority or minority equity positions in firms ([Musacchio 2014](#)).

partisan resources.

For authoritarian rulers, vast economic resources controlled by SOEs can be deployed to reward loyal supporters within the ruling bloc (e.g., [Bueno de Mesquita et al. 2003](#); [Svolik 2012](#)) or co-opt potential opponents in society (e.g., [Gandhi & Przeworski 2006](#); [Gandhi 2008](#)). SOEs also allow political leaders to seek rents and deliver benefits to crucial constituencies (e.g., [Shleifer 1998](#); [Shleifer & Vishny 1994](#)).

One of the hallmarks of the Chinese economy is its state capitalism model (e.g., [Naughton & Tsai 2015](#); [Williamson 2012](#)). At the core of the Chinese state capitalism model lies in the dominance of the political logic of regime survival over the economic logic of private capital accumulation ([M. Liu & Tsai 2021](#); [Pearson et al. 2022](#)). In the early reform period, Chinese SOEs, as legacies of a centrally planned economy, performed poorly in the face of the competition from private, collective, and foreign firms ([Naughton 1996](#)). Nevertheless, the Chinese government decided to retain control over SOEs in “commanding heights” industries and thus reconstructed the SOE sector in the 1990s by adopting the “grasping the big, letting go of the small” policy, which entailed privatizing small and medium-sized SOEs while consolidating control over large SOEs in strategic industries ([Eaton 2016](#)). In 2003, the establishment of the State-Owned Assets Supervision and Administration Commission (SASAC) placed large SOE business groups under ownership control ([Naughton 2015](#)). The SOE sector has become even more entrenched since Xi Jinping assumed leadership in 2012. Given the crucial role of SOEs in supporting authoritarian regimes, the Chinese Communist Party (CCP) has imposed tight political control over Chinese SOEs. The CCP’s Department of Organization controls the appointment of top executives of large SOEs under the SASAC so that these leaders are not only business elites but also politicians in the *nomenklatura* system ([Brødsgaard 2012](#)). Ultimately, the Department of Organization’s personnel appointment must be endorsed by the CCP’s top leadership. As a result, SOE leaders are ready to answer political calls and fulfill political mandates.

Indeed, SOEs and authoritarian regimes are mutually dependent for their survival ([Ye 2020](#)). Because of their political importance, SOEs tend to receive favorable policies and treatment from

the Chinese government and state-controlled financial system. Private firms face barriers to entry into capital-intensive and upstream sectors, such as resources, energy, petrochemicals, and telecommunications, so that SOEs monopolize the rents in these “commanding heights” sectors (Naughton 2017). Chinese SOEs have privileged access to cheap credit in the financial system. Compared with private firms, SOEs tend to receive much more loans for investment from the banking system, especially from the state-owned banks (e.g., Brandt & Li 2003; Z. Lu et al. 2012; Song et al. 2011). Moreover, the stock market and debt markets are heavily tilted towards SOEs (e.g., Li et al. 2009). Overall, SOEs are systematically favored over other firms in China. ⁹

In the international arena, Chinese SOEs are powerful players of China’s economic statecraft. The Chinese state directs SOEs to deploy outward foreign direct investment to favored countries (Stone et al. 2022). To strengthen China’s economic and security interests, Chinese SOEs not only enter the market of some “rogue states” such as Iran and Sudan, but are also engaged in mergers and acquisitions in developed countries (Norris 2016). Meanwhile, they secure natural resources and build infrastructure projects in the developing world (Brautigam 2011). In the event of political tensions with trade partners, SOEs can impose economic sanctions by reducing imports from disfavored countries (Davis et al. 2019). In relation to China’s foreign aid, SOEs are involved in numerous aid projects across the globe. They maintain close relations with Chinese government agencies, such as the MOFCOM and MOF, and have preferential access to cheap loans from China’s policy banks, such as China Development Bank and Eximbank (Zhang & Smith 2017). Aid project bidding typically takes one of three forms: open bidding (available to all qualified firms), limited invitation bidding (restricted to selected firms), and negotiated bidding (involving direct negotiations with a chosen contractor). In any case, the process remains susceptible to manipulation, allowing the government to direct contracts towards favored firms. Once selected, contractors negotiate with recipient countries and often seek concessional loans or export credits from state-owned policy banks. These contractors may implement projects directly or act as exporters. Given

⁹We acknowledge that the Chinese government’s control over SOEs may not be as strict as commonly assumed (Lee 2017). With this in mind, we emphasize the preferential treatment received by SOEs through favorable government policies.

their strategic importance to the authoritarian regime, as previously discussed, SOEs have an advantage over non-SOEs in securing these opportunities. Thus, we hypothesize that SOEs export more products to aid recipient countries than non-SOEs following the announcement of aid projects.

With trade liberalization, highly productive firms are able to increase exports and generate profits, whereas low-productivity firms are likely to lose and exit the market because of the intensified competition ([Melitz 2003](#)). As such, donor governments are less concerned about relatively productive SOEs that can export and make profits without aid-induced trade. On the other hand, they tend to favor less productive SOEs to sustain their state capitalism model and maintain regime survival. In China, both the national government and the local governments prioritize supporting struggling and loss-making SOEs, seeking to keep them afloat through outbound investment or aid policies ([Ye 2020](#)). On the demand side, uncompetitive firms typically have a greater incentive to lobby for protectionist policies ([Baldwin & Robert-Nicoud 2007](#)). These firms, with their limited ability to generate profits through markets, are more motivated to secure their profits by lobbying for protectionist policies ([Damania 2002](#)). In contrast, competitive firms face higher opportunity costs when lobbying, as they can earn substantial profits in the market. The rents they might secure through lobbying could potentially be lower than their market profits. Notably, it is estimated that in the 2000s, China's aid projects yielded only 1–2% profit margins for Chinese companies, a stark contrast to the 10–15% margins generated by commercial projects ([Brautigam 2011](#), p.148). For these reasons, low-performing SOEs are expected to export more products to aid recipient countries than those high-performing ones.

Likewise, to sustain the SOE sector and uphold authoritarian rule, authoritarian governments are motivated to provide preferential policies to large SOEs that have more employees. SOEs can hire excess labor to help the regime maintain social stability (e.g., [Berkowitz et al. 2017](#); [Steinfeld 1998](#)). The dependency on state sector employment diminishes people's tendency to participate in protests and support democracy ([Rosenfeld 2017, 2020](#)). Economic grievances caused by mass unemployment are likely to pose a formidable threat to political stability in authoritarian countries (e.g., [Lee 2007](#)), which compels authoritarian governments to pay close attention to the interests

of large SOEs. As a result, large SOEs in terms of employment are more likely to benefit from aid-induced trade.

3 Research Design and Empirical Results

3.1 Data

To examine the trade impact of Chinese outbound aid to recipient countries and the resultant effects on Chinese domestic firms, we construct samples that combine data from multiple sources including granular level data of trade transactions and product categories matched to Chinese manufacturing firms. First, the data on Chinese aid projects is drawn from AidData’s Global Chinese Official Finance Dataset, which tracks more than 4,300 officially financed Chinese projects in approximately 140 countries from 2000 to 2014 (Dreher et al. 2021).¹⁰ The project-level data are generated by the Tracking Underreported Financial Flows (TUFF) method, which involves extensive searches through official sources and media reports, the triangulation of publicly accessible information, and systematic quality assurance procedures (Strange et al. 2017). In our research design, except for some model specifications, we largely exploit the information on whether an aid project was announced or reported in a country in a given year rather than the more detailed but less reliable information on the volume, specific location, and funding agencies of aid projects. This alleviates concerns over measurement errors and misreporting. The country-level and geocoded data generated from AidData have already been used in a number of notable studies (e.g., Dreher et al. 2018, 2019, 2021; Eichenauer et al. 2021; Isaksson & Kotsadam 2018a,b; Isaksson 2020; Martorano et al. 2020; Ping et al. 2022). Figure A1 of the Online Appendix depicts Chinese aid projects over time.

Second, we source trade data from the China Customs Database, which tracks the firm-level foreign trade activities of Chinese firms. This database covers all Chinese firms that engage in international trade, with information on the destination country, product category, goods quan-

¹⁰While we are aware that the Chinese development finance data has been updated through 2017, it should be noted that the firm-level data in our analysis is only available up to 2014, as discussed subsequently.

tity, transaction value, etc. The China Customs Database is constructed based on shipping bills and invoices filed with Chinese customs and is aggregated at the firm-country-product level. In 2013, the database contained 15.6 million records. It has been used in existing studies of international trade (e.g., [Q. Liu & Qiu 2016](#); [Y. Lu et al. 2013](#)). We acquire data for the 2000–2014 period and manually match it with the financial variables of Chinese manufacturing firms using firm names. We construct the samples at multiple levels for different research purposes. For example, the country-firm-year sample is used to test the heterogeneous beneficial trade effect by firm traits. Particularly, the product-level information in the country-firm-product-year sample enables us to test the changes in product price after the implementation of foreign aid projects.

Third, the Chinese Industrial Enterprise Database (CIED), released by the National Bureau of Statistics (NBS), provides firm-level financial data from 1998 through 2013. Following [Geng et al. \(2022\)](#), we supplement the CIED with administrative data from the Ministry of Finance’s Annual Tax Survey (ATS), which provides comprehensive financial data for the surveyed firms from 2007 to 2011.

Fourth, to measure China’s comparative advantages against other countries across different industries, we turn to the United Nations (UN) Comtrade database, which contains annual bilateral international trade statistics data for commodities/service categories and partner countries. We rely on this data to construct an industry-level measure for revealed comparative advantage (RCA), with the industry based on the International Standard Industrial Classification (ISIC).

Finally, the control variables for country-level analysis take into account the recipient countries’ economic growth prospects and levels of economic openness, such as GDP growth rate, GDP per capita, the ratio of exports to GDP, and the ratio of imports to GDP, net FDI inflows as percentage of GDP in recipient countries. These variables are derived from the Penn World Table and the World Development Indicators (WDI) dataset constructed by the World Bank. We also control for Polity2 score, developed by the Center for Systemic Peace, to consider the level of democracy in recipient countries.

Appendix A summarizes the sample construction procedures. The data sources for the afore-

mentioned variables are reported in Appendix B. Table A1 of the Online Appendix presents the descriptive statistics of variables in the samples at four different levels. Panel A is based on a country-year panel, which consists of 147 countries with essential economic statistics in the sample over the period between 2000 and 2014. Although we investigate the impact of Chinese aid on China’s trade relationship with the recipient countries, we rely on the variation in trade variables of non-recipient countries as control in our difference-in-differences design based on the staggered implementation of Chinese aid projects. Around 50.9% country-year observations are treated. Specifically, among the 147 countries in our sample, there are 97 countries that received Chinese aid during the sample period, while 50 countries were never treated.

As shown in Panel B, we further construct a country-industry-year sample to analyze the underlying mechanisms for the projected changes in the trade relationship induced by Chinese aid. The sample is based on 237 industries defined by 3-digit Standard International Trade Classification (SITC). Additionally, a country-firm-year sample is constructed to understand the heterogeneity in firms’ responses. The summary statistics of this sample is presented in Panel C. We identify 144,546 distinct firms that have engaged in international trade activities before and after China’s aid projects. On average, a firm has trade partners from 38 distinct countries over the sample period and has 7.5 sample years. Panel D shows the descriptive statistics for variables in a country-firm-product-year sample, which is constructed to rule out the potential alternative explanations. The product is defined using 6-digit Harmonized System (HS) code.

3.2 Empirical Strategy and Findings

3.2.1 Chinese Aid and Trade Benefits

We first estimate the overall trade impact of Chinese outbound aid on trade activities based on a difference-in-differences (DID) regression model. We utilize the three samples at the country-year level, the country-industry-year level, and the country-firm-year level. The country-year level model is as follows:

$$y_{c,t} = \beta Treat_{c,t} + \gamma X_{c,t} + \delta_c + \theta_t + \epsilon_{c,t} \quad (1)$$

where c indexes each country and t indexes each time period. The outcome of interest, denoted as $y_{c,t}$, is the volume of Chinese imports or exports in country c during year t . The treatment in our research design is the announcement of any aid projects in a country. $Treat_{c,t}$ is an indicator variable that equals “1” for years after the first year that a given country announced at least one aid project from China. $X_{c,t}$ includes country-level control variables; δ_c are country fixed effects and allow us to control for unobservable time-invariant (or slow-changing) features at the country level; θ_t are year fixed effects to control for common shocks; and $\epsilon_{c,t}$ is an idiosyncratic error term. β captures the average treatment effect on the treated (ATT). In what follows, we also conduct the analysis at the industry, firm, and product levels. The corresponding model specifications are introduced accordingly.

Panel A of Table 1 presents the baseline results based on Equation (1) using the country-year level sample. In columns (1) and (2), the outcome variable is the volume of bilateral trade including both exports and imports with China (logged). In column (1), we see that the treatment effect is statistically significant at the 1% level. Column (2) controls for several economic variables that may confound the estimated results, including GDP growth rate, Polity2 score (a measure of the level of democracy), the ratio of exports to GDP, and the ratio of imports to GDP, net FDI inflows as percentage of GDP in aid recipient countries. With these variables controlled, the estimated results remain robust, although the magnitude of the treatment effect drops to 0.247, suggesting that receiving aid from China can boost bilateral trade with China by approximately 28% ($e^{0.247} - 1$) relative to countries without Chinese aid.

In columns (3) and (4), we show the effect of received aid projects on the volume of China’s exports. The results suggest that China’s exports to aid recipient countries increase by more than 36% ($e^{0.310} - 1$) after the announcement of the first aid project in our sample relative to countries without Chinese aid. Columns (5) and (6) report the effect on the volume of China’s imports. The estimated effects are positive but not statistically significant at conventional levels. Taken together, the results in Table 1 provide evidence that China’s aid projects lead to a substantial increase in its trade with, and especially exports to, recipient countries. Given that the results concerning bilateral

trade are largely driven by the variation in China's exports, we focus on exports in the subsequent analysis.

Table 1: Chinese Aid and Exports to Aid Recipient Countries

<i>Panel A. Country-Level Analysis</i>						
	(1)	(2)	(3)	(4)	(5)	(6)
	Ln(Trade)		Ln(Exports)		Ln(Imports)	
Treat	0.300*** (0.069)	0.247*** (0.064)	0.392*** (0.068)	0.310*** (0.059)	0.179 (0.247)	0.198 (0.237)
Observations	1,985	1,985	1,985	1,985	1,985	1,985
Adj. R-squared	0.975	0.979	0.972	0.977	0.880	0.881
Controls	No	Yes	No	Yes	No	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
<i>Panel B. Industry-Level and Firm-Level Analysis</i>						
	(1)		(2)		(3)	(4)
			Ln(Exports)			
	Industry-level Analysis		Firm-level Analysis			
Treat	0.246*** (0.075)	0.218*** (0.068)	0.087*** (0.023)	0.081*** (0.024)		
Observations	363,961	363,961	5,012,185	5,012,185		
R-squared	0.644	0.674	0.300	0.301		
Country Controls	Yes	Yes	Yes	Yes		
Country FE	Yes	Yes	Yes	Yes		
Industry FE	Yes	No	No	No		
Firm Controls	No	No	Yes	Yes		
Year FE	Yes	No	Yes	No		
Industry-Year FE	No	Yes	No	Yes		

Notes: This table presents the baseline results using the country-year level, country-industry-year level, and country-firm-year level samples. Standard errors clustered at the country level are reported in the parentheses. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

We next present the results using a country-industry-year level sample based on a variant of Equation (1):

$$y_{c,k,t} = \beta Treat_{c,t} + \gamma X_{c,t} + \delta_c + \varphi_{k,t} + \epsilon_{c,k,t} \quad (2)$$

where $y_{c,k,t}$ is the log value of exports from China to country c in industry k in year t . Industry k is defined by the 3-digit Standard International Trade Classification (SITC). We include the industry-by-year fixed effects, $\psi_{k,t}$, to absorb any time-variant industry shocks. Columns (1) and (2) of Panel

B show the results based on Equation (2). Column (1) only controls for country, year and industry fixed effects and country-level covariates, whereas industry-year fixed effects are considered in column (2). The estimation results are consistent with the country-level analysis shown in Panel A.

We further explore the trade impact of Chinese aid at the firm level based on the information of Chinese manufacturing firms. The following econometric model is estimated.

$$y_{c,i,t} = \beta Treat_{c,t} + \gamma X_{c,t} + \rho Z_{i,t} + \delta_c + \tau_i + \theta_{k,t} + \epsilon_{c,i,t} \quad (3)$$

where $y_{c,i,t}$ is firm i 's exports to country c in year t . $Z_{i,t}$ are the firm-level control variables, including firm size (Size), leverage, and profitability (ROA). τ_i are firm fixed effects to absorb any firm-level time-invariant effects. $\theta_{k,t}$ are industry-by-year fixed effects to absorb any time-varying changes across industries. The industry is defined using the classification from the National Bureau of Statistics (NBS). This model is estimated using a country-firm-year sample, which consists of 144,546 firms that have foreign trade activities before and after the announcement of China's first aid project in a specific country, identified in the China Customs Database. While the analysis at the country and industry levels examines both extensive and intensive margins, the firm-level analysis only looks at the intensive margin. We drop the firms that did not have any export record to a specific country before it received Chinese aid projects. As a result, the estimates of the firm-level analysis are fairly conservative. Columns (3) and (4) of Panel B show the results, which reveal similar patterns with smaller estimated effects (8–9%).

AidData's dataset includes both Official Development Assistance (ODA) and Other Official Flows (OOF) based on OECD criteria.¹¹ While ODA is highly concessional and is intended for development assistance, OOF is less concessional with higher interest rates and lower grant elements. Exploring the effects of different types of aid projects, we find that the effect of grants is larger than that of loans. ODA projects have greater effects on Chinese exports than non-ODA projects. The

¹¹Because the information on interest rates is missing in many entries of the database, the distinction between ODA and OOF may not be accurate.

detailed results are reported in Table A2 of the Online Appendix.

We conduct a range of additional tests to assess the robustness of our baseline results. In columns (1)–(2) of Table A3 in the Online Appendix, we use a generalized DID design in which the treatment variable is a continuous variable that measures the specific value of aid projects in a country and year. In columns (3)–(4), we use fixed-effects models with the lagged value of aid as the independent variable. In columns (5)–(6), we also use the synthetic difference-in-differences estimator (SDID) developed by Arkhangelsky et al. (2021), which has attractive robustness properties and relaxes the parallel trends assumption in the DID. The results are consistent with our main results in Table 1.

Table 2: Instrumental Variable Regression Results

	(1)	(2)	(3)	(4)	(5)
	Ln(Aid Value), t-1	Ln(Exports)			
	First Stage	Second Stage	Control Function Approach		
P_CHN × Reserve	1.354*** (0.185)				
Predicted Ln(Aid Value), t-1		0.076*** (0.019)	0.047*** (0.017)		
Ln(Aid Value), t-1				0.076*** (0.019)	0.048*** (0.017)
Residual in the first stage				-0.070*** (0.019)	-0.042** (0.017)
Observations	1,985	1,985	1,985	1,983	1,983
Adj. R-squared	0.490	0.972	0.976	0.972	0.976
F-Statistics	53.33				
Country Controls	No	No	Yes	No	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Notes: This table presents the results using an instrumental variable regression approach. Column (1) shows the first stage of the regression. The results in the second stage are reported in columns (2) and (3). We report results for control function approach in Columns (4) and (5). The instrumental variable is the net change in China’s currency reserves interacted with recipient countries’ probability to receive aid during the 2000–2014 sample period. The probability of receiving Chinese aid is calculated as: $p_i = \frac{1}{15} \sum_{y=1}^{15} p_{i,y}$, where $p_{i,y}$ is a dummy variable that equals “1” when country i receives at least one aid project from China in year y . ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

In columns (1)–(3) of Table 2, we follow [Dreher et al. \(2021\)](#) and employ an instrumental variable in fixed effects models with lagged aid volumes: the net change in China’s currency reserves interacted with recipient countries’ probability to receive aid during the 2000–2014 sample period.¹² In columns (4)–(5), we also include the predicted residuals from the first stage in a control function approach ([Wooldridge 2015](#)). Reassuringly, our results are fairly robust when we use an instrumental variable approach or a control function approach.

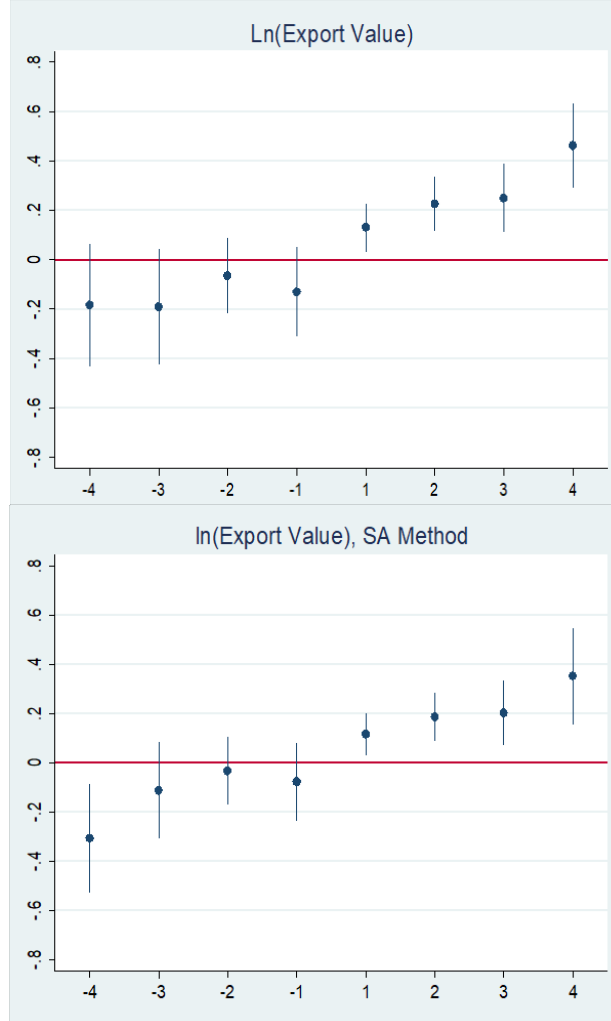
We conduct our analysis on several alternative samples. In column (1) of Table A4 in the Online Appendix, we exclude countries receiving aid during 2000–2002, the first three years of our sample. This analysis to some extent can alleviate the concern of data truncation, that is, only selecting first aid project in the post-2000 period as treatment variable.¹³ For alternative model specifications, we only consider the aid projects with values in the top 25 percentile to construct the treatment variable in column (2) or use the inverse hyperbolic sine (IHS) transformation proposed by [Burbidge et al. \(1988\)](#) to handle the extreme values of the dependent variable in column (5). We also control for income-level cutoffs by year fixed effects in column (3) or country-specific time trends in column (4). We redefine the treatment period as the first three years after receiving Chinese aid. The results are reported in Table A5 of the Online Appendix. We exclude high-income countries from our sample and present the results in Table A6 of the Online Appendix. The estimation results in all alternative samples or model specifications remain robust and statistically significant.

The above analysis estimates the average treatment effect of Chinese aid on the volume of bilateral trade or Chinese exports. We further explore the treatment effects over time. The upper figure of Figure 1 visualizes the dynamic treatment effects using two-way fixed effects models. Before the

¹²One concern is that the instrument may violate the exclusion restriction because the probability of receiving Chinese aid may affect the imports of Chinese products in recipient countries through other channels. This concern can be alleviated by including recipient-country- and year-fixed effects in model specifications to control for the effects of the probability of receiving Chinese aid as well as the levels of reserves ([Dreher et al. 2021](#)). The identifying assumption is that imports from China in countries with different probabilities of receiving Chinese aid will not be affected differently by changes in China’s foreign reserves, other than through the impact of Chinese aid. The demand of Chinese products in aid recipient countries is unlikely to be directly affected by the changes in China’s foreign reserves.

¹³As discussed previously, China’s economic diplomacy began to shift its focus from bringing in technology and capital from developed countries to exporting goods to developing countries after the “going global” strategy in 1999. Thus, Chinese aid was unlikely to be used to promote trade in the 1990s.

Figure 1: Dynamic Effects



Notes: The upper figure presents the results using two-way fixed effects models; the lower figure displays the results using the new DID method proposed by [Sun & Abraham \(2021\)](#). The solid dot represents the magnitude of the estimated average treatment effect over years. The vertical lines show the 95% confidence interval.

treatment, we do not see significant differences between the treatment and control groups. Thus, the parallel trends assumption is likely to hold. After the treatment, the treatment effect on the treated units (ATT) becomes increasingly large and reaches approximately 40% in the fourth year of the treatment period. The estimated results are largely consistent with the DID results in Table 1. The Two-Way Fixed Effects (TWFE) model has notable drawbacks in staggered settings where treatment periods vary across units (for recent reviews, see [de Chaisemartin & D’Haultfoeuille 2023](#);

[Roth et al. 2023](#)). TWFE assumes homogeneous treatment effects, which can lead to bias as treatment impacts often vary over time and across units. Additionally, TWFE can produce negative weights, especially when earlier-treated units serve as controls for later-treated units, potentially yielding biased estimates that may even contradict the true effect direction ([Goodman-Bacon 2021](#)). TWFE model also faces challenges with the parallel trends assumption as units treated at different times may follow different pre-treatment trends, which can lead to inappropriate comparisons and biased results. Furthermore, TWFE’s reliance on a single coefficient estimate fails to capture dynamic treatment effects, which may result in over- or underestimation of the intervention’s impact over time ([Borusyak et al. 2024](#); [de Chaisemartin & D’Haultfoeuille 2020](#); [Sun & Abraham 2021](#)). To correct the potential “negative weights” problem that arise in dynamic treatment effects, we follow [Sun & Abraham \(2021\)](#) and use countries never treated in our sample period as the control group. As shown in the lower figure of Figure 1, the results are quantitatively similar (Figure A2 of the Online Appendix displays the results using the sample without high-income countries).

3.2.2 *Comparative Advantage*

We next examine which industries experienced a substantial rise of Chinese imports after the announcement of aid projects. Trade theories suggest the bilateral trade is determined by the country’s comparative advantages in specific industries or products. In a study examining the effect of CIA interventions on a country’s exports to the US, [Berger et al. \(2013\)](#) find the effect is concentrated in industries where the US has comparative disadvantages, suggesting economic distortions at play. In our case, it is therefore worth examining to what extent China’s comparative advantages matter for the surge in imports from China following the aid projects. Specifically, if aid projects “grease the wheels of commerce” by increasing trade openness and reducing transaction costs between China and recipient countries, we can more confidently refute the claim that Chinese aid is essentially “rogue aid.” Alternatively, aid projects may result in economic distortions and in turn hinder long-term economic development.

Following [Berger et al. \(2013\)](#), we use [Balassa’s \(1965\)](#) measure of revealed comparative ad-

vantage (RCA) using the detailed bilateral trade data. For each period t , we define China's RCA in sector k as follows.

$$RCA_{k,t} = \frac{\frac{X_{k,t}}{\sum_{j \in P} X_{j,t}}}{\frac{W_{k,t}}{\sum_{j \in P} W_{j,t}}}$$

where P is the set of all sectors (with $k \in P$). $X_{k,t}$ is China's exports of the sector k in period t . $W_{k,t}$ is the world's exports of the sector k in period t . $\sum_{j \in P} X_{j,t}$ is China's total exports (of all sectors j in P), and $\sum_{j \in P} W_{j,t}$ is the world's total export (of all sectors j in P) in t .

We thus examine in regression analysis whether exported Chinese products increase most in industries with a comparative advantage. If China exports products for which it has greater comparative advantage, then China's aid is likely to enhance trade integration and facilitate economic development. Otherwise, aid projects are unlikely to increase economic efficiency and benefit recipient countries. We estimate a variant of Equation (2) with interaction terms as follows.

$$y_{c,k,t} = \beta Treat_{c,t} + \lambda Treat_{c,t} \times RCA_{k,t} + \gamma X_{c,t} + \delta_c + \varphi_{k,t} + \epsilon_{c,k,t} \quad (4)$$

where $y_{c,k,t}$ is the log value of exports from China to country c in industry k in year t . Industry k is defined by the 3-digit SITC. $RCA_{k,t}$ is the measure for RCA estimated using data from the UN Comtrade database. Consistent with Balassa's (1965), we use RCAs calculated at the 3-digit or 2-digit SITC level to show the robustness of the results. $\psi_{k,t}$ denotes the industry-by-year fixed effects to absorb any time-variant industry shocks, including the stand alone RCA measures.

Table 3 reports the estimated results. Across a set of model specifications in columns (1)–(4), we see that the estimated coefficient of the interaction term between the treatment and RCA is negative and statistically significant at the 1% level. The results suggest that the products China exported to aid recipient countries were not those for which China had a greater comparative advantage. Instead, China tended to export less competitive products that were difficult to sell without the intervention of aid to targeted countries. Substantially, a one standard deviation increase in the RCA using the 3-digit SITC is associated with approximately 33% less exports. The results are similar

when we exclude high-income countries from the sample (see Table A7 of the Online Appendix).

Table 3: Heterogeneous Effects by Industry Revealed Comparative Advantage

	(1)	(2)	(3)	(4)
	Ln(Exports)			
Treat	0.500*** (0.087)	0.543*** (0.079)	0.551*** (0.091)	0.602*** (0.084)
Treat × RCA (3-digit)	-0.207*** (0.040)	-0.265*** (0.044)		
RCA (3-digit)	0.709*** (0.026)			
Treat × RCA (2-digit)			-0.275*** (0.049)	-0.347*** (0.054)
RCA (2-digit)			0.796*** (0.031)	
Observations	363,961	363,961	363,961	363,961
Adj. R-squared	0.649	0.675	0.647	0.675
Country Controls	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	No	Yes	No
Year FE	Yes	No	Yes	No
Industry-Year FE	No	Yes	No	Yes

Notes: Standard errors clustered at the country level are in the parentheses. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

To gain some insights into the difference between China and the U.S. in terms of aid practices, we conduct a similar analysis of the U.S. foreign aid. We find that receiving U.S. aid, overall, is not statistically associated with the U.S. exports to aid recipient countries. In our model specifications, we include the lagged value of U.S. aid, the RCA, and the interaction term between the lagged value of U.S. aid and the RCA. The results are reported in Table A8 of the Online Appendix. We see that the estimated coefficient of the interaction term is not statistically significant at conventional levels.

¹⁴Future work could further examine the differences between authoritarian and democratic donors.

¹⁴While the vast majority of China’s foreign aid consists of Other Official Flows (OOF) such as non-concessional loans, rather than Official Development Assistance (ODA) (e.g., M. Chen 2020; Bräutigam 2011), the predominant form of US aid is ODA as defined by the OECD. Our study demonstrates that China’s ODA, particularly grants, has a greater impact on Chinese exports to recipient countries than other types of aid. Therefore, assuming the underlying mechanism of aid-induced trade is the same, analyzing the relationship between US aid — primarily composed of ODA — and US exports represents a “most likely case.” The absence of a statistically significant relationship in this “easy” test based on a most likely case provides strong evidence against the hypothesis that US aid is strategically used to boost US exports.

3.2.3 State Capitalism and Aid-Induced Trade

Using financial information and trade records of Chinese manufacturing firms, we further examine what types of Chinese firms benefit from China's aid projects by exporting more products to recipient countries. We are particularly interested in whether SOEs benefit disproportionately from the opening of recipient countries' markets. We estimate a variant of Equation (3) with interaction terms, as follows:

$$y_{c,i,t} = \beta Treat_{c,t} + \lambda Treat_{c,t} \times SOE_{i,t} + \omega SOE_{i,t} + \gamma X_{c,t} + \rho Z_{i,t} + \delta_c + \tau_i + \theta_{k,t} + \epsilon_{c,i,t} \quad (5)$$

where $y_{c,i,t}$ is firm i 's exports to country c in year t . $SOE_{i,t}$ is an indicator variable which is set to "1" if a firm is state-owned according to the CIED and the ATS. Other model specifications follow the convention in Equation (3).

Table 4: Heterogeneous Effects by Firm Traits: State Ownership

	(1)	(2)	(3)	(4)
	Ln(Exports)			
Treat	0.097*** (0.029)	0.095*** (0.029)	0.067*** (0.024)	0.062*** (0.024)
Treat $\times$ SOE	0.225*** (0.039)	0.232*** (0.039)	0.245*** (0.042)	0.236*** (0.041)
Observations	5,012,185	5,012,185	5,012,185	5,012,185
Adj. R-squared	0.299	0.300	0.301	0.301
Firm Controls	No	Yes	Yes	Yes
Country Controls	No	No	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	No
Industry-Year FE	No	No	No	Yes

Notes: Standard errors clustered at the country level are in the parentheses. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

Table 4 presents the results of heterogeneous effects by firm ownership. In column (1), we only control for firm, country, and year fixed effects. In column (2), we add firm-level control

variables. In column (3), we also add country-level control variables. In column (4), we control for industry-by-year fixed effects to account for unobserved industry-wide shocks for each year. Across different model specifications in columns (1)–(4), we interact state ownership with the treatment variable. In all specifications, the estimated coefficients of all interaction terms are positive and statistically significant at the 1% level. Strikingly, the results suggest that a SOE is expected to export 25%–28% more than a private firm following the announcement of Chinese aid projects. Like the country-level analysis, we use the same instrumental variable approach to estimate the effects and find that the results remain robust (see Table A9 of the Online Appendix). The results are also robust to additional robustness checks that control for province-by-year fixed effects to account for province-level shocks in a specific year in China or use a balanced panel data set (see Table A10 of the Online Appendix). The results are consistent when excluding high-income countries from the sample (see Table A11 of the Online Appendix). Taken together, there is clear evidence that SOEs have substantial advantages over private firms in exporting their products to aid recipient countries.

If China’s aid enables relatively efficient SOEs to gain access to foreign markets, this practice may benefit the SOE sector economically in the long term, albeit with a loss for private firms. Otherwise, the SOE sector is likely to suffer efficiency loss. Table 5 presents the results of heterogeneous effects by SOE performance. In Panel A, we use returns on assets (ROA) in the previous year to measure firm performance. ROA, calculated as a firm’s net income divided by total assets, reflects how much profit a firm is generating from its assets. Across different model specifications in column (1)–(4) of Panel A, the estimated coefficients of the triple interaction term of treatment, state ownership, and ROA are negative and statistically significant at the 1% level. Among SOEs, a one standard deviation increase in ROA is associated with approximately 4% drop in exports. Alternatively, we also use lagged return on equity (ROE) to measure firm’s ability to turn equity investments into profits (Hou et al. 2015). The estimated results are reported in Panel B of Table 5. We find that the estimated coefficients of the triple interaction term of treatment, state ownership, and ROE are also negative and statistically significant across different model specifications at the

Table 5: Heterogeneous Effects by Firm Traits: Performance

Panel A	(1)	(2)	(3)	(4)
	Ln(Exports)			
Treat	0.085*** (0.030)	0.083*** (0.029)	0.058** (0.026)	0.053** (0.025)
Treat $\times$ SOE	0.256*** (0.042)	0.262*** (0.042)	0.275*** (0.045)	0.266*** (0.044)
Treat $\times$ SOE $\times$ ROA (lag)	-0.237** (0.092)	-0.262*** (0.092)	-0.270*** (0.092)	-0.260*** (0.092)
SOE $\times$ ROA (lag)	0.114* (0.059)	0.109* (0.059)	0.114* (0.059)	0.106* (0.058)
Treat $\times$ ROA (lag)	0.158*** (0.042)	0.149*** (0.042)	0.130*** (0.040)	0.129*** (0.039)
ROA (lag)	0.068*** (0.021)	0.036* (0.019)	0.042** (0.018)	0.039** (0.017)
Observations	4,178,697	4,178,697	4,178,697	4,178,697
Adj. R-squared	0.298	0.299	0.299	0.300
Firm Controls	No	Yes	Yes	Yes
Country Controls	No	No	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	No
Industry-Year FE	No	No	No	Yes
Panel B	(1)	(2)	(3)	(4)
	Ln(Exports)			
Treat	0.088*** (0.029)	0.086*** (0.028)	0.060** (0.024)	0.055** (0.024)
Treat $\times$ SOE	0.257*** (0.042)	0.263*** (0.042)	0.276*** (0.044)	0.267*** (0.044)
Treat $\times$ SOE $\times$ ROE (lag)	-0.098*** (0.025)	-0.105*** (0.025)	-0.104*** (0.025)	-0.103*** (0.025)
SOE $\times$ ROE (lag)	0.012 (0.012)	0.017 (0.012)	0.017 (0.012)	0.014 (0.012)
Treat $\times$ ROE (lag)	0.046*** (0.010)	0.044*** (0.010)	0.040*** (0.009)	0.040*** (0.009)
ROE (lag)	0.011** (0.004)	0.006 (0.004)	0.008* (0.004)	0.007* (0.004)
Observations	4,172,595	4,172,595	4,172,595	4,172,595
Adj. R-squared	0.298	0.299	0.299	0.300
Firm Controls	No	Yes	Yes	Yes
Country Controls	No	No	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	No
Industry-Year FE	No	No	No	Yes

Notes: Standard errors clustered at the country level are in the parentheses. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

1% level. Among SOEs, a one standard deviation increase of ROE leads to 5% drop in exports. These results suggest that SOEs with relatively lower performance tend to export more products following the announcement of aid projects.¹⁵

We further look at the heterogeneous effects by SOE employment size. We interact treatment, state ownership, and the number of employees (logged) in the previous year. The results in Panel A of Table 6 reveal that the estimated coefficients of the triple interaction term are negative and statistically significant at the 1% level, suggesting that large SOEs are more likely to benefit from aid-induced trade deals, because their success can help the Chinese government sustain the SOE sector and maintain social stability. Alternatively, we use the lagged number of employees scaled by total assets to measure employment size. The results in Panel B of Table 6 are consistent with those in Panel A.

We also explore the robustness of the results using the sample of Chinese listed firms. We find that firms with higher percentage of shares owned by the state export more goods to aid recipient countries. In addition, we use Tobin's q to measure a firm's growth potential (e.g., [Lang et al. 1989](#); [Lang & Stulz 1994](#)) and find that SOEs with relatively lower Tobin's q export more goods to aid recipient countries. The results on the heterogeneous effects by SOEs' ROA and employment are consistent with those in Tables 5 and 6. The results are available upon request.

Finally, we explore the heterogeneous treatment effects by SOE industries. We interact treatment, state ownership, and each industry indicator variable. The results suggest that the effects are more pronounced in some industries such as textile, chemical fiber, and transportation (railways, shipbuilding, etc.), as shown in Figure 2.

In summary, firms that are state-owned and in industries with relatively less comparative advantage benefit more from the opening of the market in aid recipient countries. Among SOEs, those with relatively low performance and large employment size tend to export more goods to aid recipient countries.

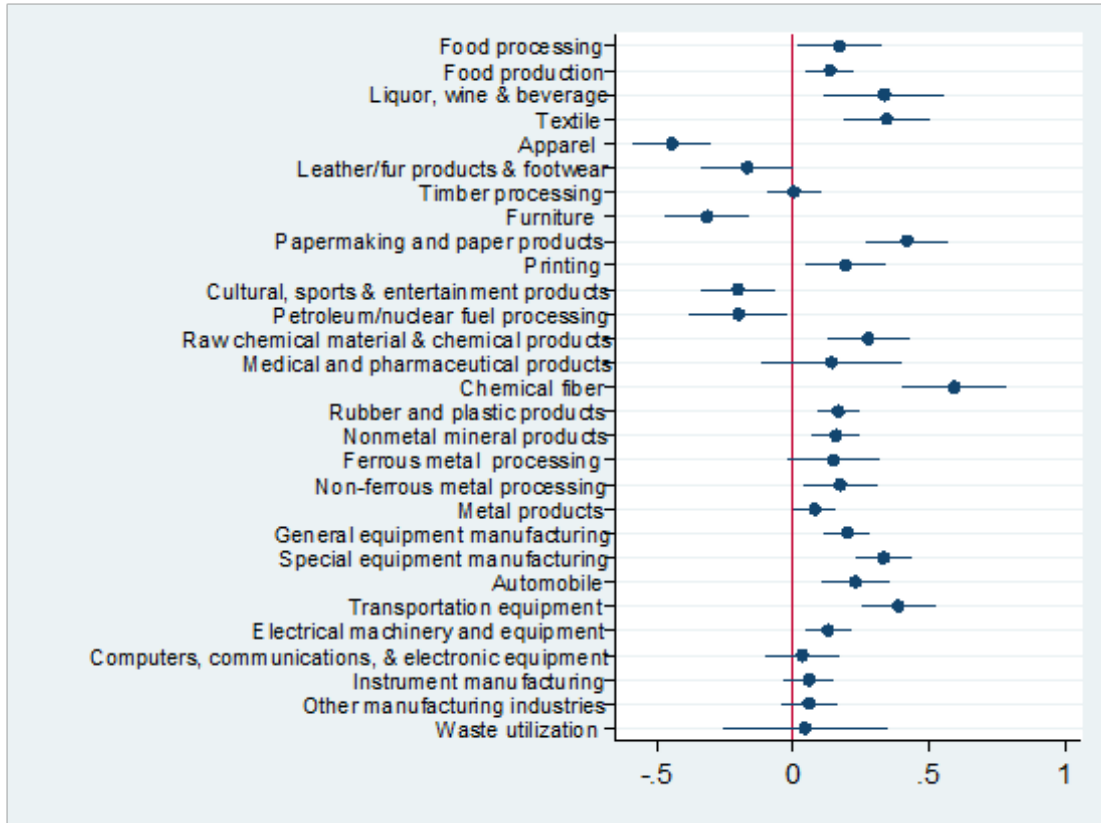
¹⁵When we use lagged sales growth as an alternative measure, the number of observations drops by about 30%, leading to insignificant results (see Table A12 of the Online Appendix).

Table 6: Heterogeneous Effects by Firm Traits: Employment

Panel A	(1)	(2)	(3)	(4)
	Ln(Exports)			
Treat	0.736*** (0.183)	0.723*** (0.183)	0.709*** (0.179)	0.695*** (0.180)
Treat $\times$ SOE	-0.646*** (0.150)	-0.663*** (0.151)	-0.671*** (0.151)	-0.655*** (0.151)
Treat $\times$ SOE $\times$ Ln(Employees) (lag)	0.152*** (0.029)	0.155*** (0.029)	0.158*** (0.029)	0.154*** (0.029)
SOE $\times$ Ln(Employees) (lag)	-0.114*** (0.015)	-0.109*** (0.015)	-0.110*** (0.015)	-0.102*** (0.015)
Treat $\times$ Ln(Employees) (lag)	-0.113*** (0.031)	-0.111*** (0.031)	-0.113*** (0.031)	-0.112*** (0.031)
Ln(Employees) (lag)	0.151*** (0.015)	0.116*** (0.013)	0.116*** (0.013)	0.113*** (0.013)
Observations	4,242,180	4,242,180	4,242,180	4,242,180
Adj. R-squared	0.300	0.301	0.301	0.302
Firm Controls	No	Yes	Yes	Yes
Country Controls	No	No	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	No
Industry-Year FE	No	No	No	Yes
Panel B	(1)	(2)	(3)	(4)
	Ln(Exports)			
Treat	-0.545*** (0.125)	-0.548*** (0.125)	-0.545*** (0.123)	-0.533*** (0.122)
Treat $\times$ SOE	0.469*** (0.109)	0.459*** (0.108)	0.495*** (0.111)	0.502*** (0.111)
Treat $\times$ SOE $\times$ Ln(Employees/Assets) (lag)	0.049*** (0.017)	0.047*** (0.017)	0.051*** (0.017)	0.053*** (0.017)
SOE $\times$ Ln(Employees/Assets) (lag)	-0.027** (0.011)	-0.043*** (0.011)	-0.041*** (0.011)	-0.025** (0.010)
Treat $\times$ Ln(Employees/Assets) (lag)	-0.120*** (0.022)	-0.121*** (0.022)	-0.115*** (0.022)	-0.112*** (0.022)
Ln(Employees/Assets) (lag)	0.029** (0.012)	0.064*** (0.012)	0.062*** (0.011)	0.059*** (0.011)
Observations	4,180,798	4,180,798	4,180,798	4,180,798
Adj. R-squared	0.299	0.300	0.300	0.301
Firm Controls	No	Yes	Yes	Yes
Country Controls	No	No	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	No
Industry-Year FE	No	No	No	Yes

Notes: Standard errors clustered at the country level are in the parentheses. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

Figure 2: Heterogeneous Effects by Industries



Notes: The industry is defined using the classification from the National Bureau of Statistics (NBS). The horizontal bars indicate the 95% confidence interval.

3.2.4 Alternative Explanations

The results presented above establish a pattern of SOEs tending to reap greater gains from exports to aid recipient countries following the first announcement of Chinese aid programs. However, there are alternative explanations for the observed relationships. The first alternative explanation is that the Chinese government may direct the SOEs to lower the price of exports accompanying aid programs in exchange for other political benefits. The lowered price might also arise from the motivation to occupy the market of the recipient countries through a dumping strategy. The second alternative explanation is that the fundamental differences in price level of products manufactured by SOEs and private firms might confound our findings. When customers or firms in the recipient

countries start to purchase from China, they might choose products with low prices that happen to be mostly manufactured by SOEs.

We exploit the product-level information in the China Customs Database and infer the prices of products exported by Chinese firms. Specifically, we construct a country-firm-product-year sample and estimate the following regression model.

$$y_{c,i,p,t} = \beta Treat_{c,t} + \lambda Treat_{c,t} \times SOE_{i,t} + \omega SOE_{i,t} + \gamma X_{c,t} + \rho Z_{i,t} + \delta_c + \tau_i + \omega_{p,t} + \epsilon_{c,i,p,t} \quad (6)$$

where $y_{c,i,p,t}$ is the average price for products in p category exported by firm i with respect to country c in year t . The product is defined using 6-digit Harmonized System codes. $\omega_{p,t}$ are product-year fixed effects to capture the trends in product prices.

Table 7: Chinese Aid and Product Prices

	(1)	(2)	(3)	(4)
	Ln(Price)			
Treat	0.007*	0.006	0.008**	
	(0.004)	(0.004)	(0.004)	
Treat $\times$ SOE	-0.009	-0.009	-0.005	0.004
	(0.008)	(0.007)	(0.008)	(0.008)
Observations	11,693,741	11,693,741	11,693,741	11,693,741
Adj. R-squared	0.820	0.820	0.832	0.839
Firm Controls	No	Yes	Yes	Yes
Country Controls	No	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	No	No
Product FE	Yes	Yes	No	No
Product-Year FE	No	No	Yes	No
Country-Product-Year FE	No	No	No	Yes

Notes: Standard errors clustered at the country level are in the parentheses. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

Notably, the results in Table 7 suggest that across different model specifications, there is no statistically significant difference in the average prices between products exported by SOEs and those by private firms before and after the treatment. Thus, we fail to find supportive evidence for

the two alternative explanations.

4 Concluding Remarks

According to [Milner's \(1997, 14\)](#) insight into the study of foreign policy formation, “the key to understanding policy making is to realize how the game between the domestic actors is played.” In this article, we have examined how authoritarian domestic politics influences foreign aid policies in China from the regime survival perspective. Like some developmental states in East Asia, China has focused primarily on economic development to boost its performance legitimacy and maintain authoritarian rule in the reform era. As such, China’s foreign policies operate under pragmatic principles, particularly based on economic diplomacy. Economic diplomacy, which prioritizes China’s commercial interests, underpins the motives of China’s foreign aid practices. The Chinese government, especially the MOFCOM, vigorously promotes Chinese exports through aid policies. We have provided evidence that following the announcement of China’s aid projects, China’s exports to aid recipient countries increase by more than 30%, compared to countries not receiving Chinese aid.

To safeguard regime survival, the Chinese government retains control over SOEs, which provide authoritarian rulers with economic resources at their disposal to fulfill various political objectives. Accordingly, SOEs tend to receive favorable treatment from the Chinese government. When aid recipient countries make concessions by opening their domestic markets to Chinese products, SOEs benefit disproportionately from such aid-induced trade by exporting more goods and services than private firms.

More importantly, we have provided clear evidence that the increased trade between China and aid recipient countries serves neither to reduce transaction costs nor to increase economic efficiency. Consequently, China’s aid practices are likely to further distort its domestic economy in the sense that favorable policies have been used to sustain less efficient industries and firms. As the Chinese economy slows down and economic distortions become increasingly serious, it is doubtful that China’s aid model in general, and its ambitious debt-financed “One Belt One Road” infrastructure

project in particular, will be sustainable in the long term.

China's aid policies often fuel domestic criticism that it is wasteful and unwise to give huge amounts of money to foreign countries while fighting a war on poverty domestically. Our results suggest that China's economic assistance enables Chinese firms to increase export to aid recipient countries and thus reap economic benefits. At the country level, China and aid recipient countries seem to achieve "mutual benefits." However, the distributive consequences at the domestic level deserve particular attention. Aid policies primarily benefit entrenched interests, especially less competitive SOEs, rather than people in need.

The analytical framework of authoritarian domestic politics and aid practices in our study may be fruitful for understanding other authoritarian donors such as certain Arab countries and Russia. For instance, Saudi Arabia amended the Saudi Fund's charter in 1999 to include the promotion of non-crude-oil exports alongside its original goal of financing development in developing countries, a strategic move to diversify the economy and mitigate oil dependence ([Villanger 2007](#)). Around the same time, other Arab donors began leveraging their aid programs to support their own commercial interests and broaden their domestic industrial base. The Russian government's development aid strategy, formalized in 2008 through *The Concept for Long-Term Social and Economic Development to 2020*, leveraged development aid and tied loans to promote Russian products — notably in agriculture and transportation sectors — in developing countries ([Djankov 2015](#); [Larionova et al. 2014](#)). These authoritarian donors' economies are also characterized by a state-capitalism model wherein state-owned companies form the regime's crucial support coalition and play a pivotal role in the economic landscape (e.g., [Djankov 2015](#); [Hertog 2010](#)). Future research should delve into the precise mechanisms by which SOEs in these donor countries influence aid policies to further their economic interests. In general, identifying support coalitions of authoritarian regimes ([Pepinsky 2009](#)) and exploring the dynamics of regime survival is essential for unpacking the "black box" of policy making and policy response in authoritarian politics.

- **Data availability statement:** Replication materials and codes can be found at [S. Liu & Zhang \(2025\)](#). Due to the proprietary nature of the data, the firm-level data from the Chinese Industrial Enterprise Database (CIED), the China Customs Database, and the Ministry of Finance's Annual Tax Survey (ATS) cannot be made publicly accessible. To ensure transparency, we provide the log files for all analyses at [S. Liu & Zhang \(2025\)](#).
- **Disclosure statement:** The authors report there are no competing interests to declare.

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SUPPLEMENTARY MATERIAL

Online Appendix

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Online Appendix

Appendix A: Sample Constructions

1. The country-year level sample

The sample at the country-year level consists of 1,985 observations with essential information on variables used in the study across 147 countries in the period between 2000 and 2014.

2. The country-industry-year level sample

The country-industry-year level sample is constructed using country-year sample above and 3-digit industry classification. The sample consists of 363,961 observations with essential information on variables used in the study. The sample is based on 237 industries defined by 3-digit Standard International Trade Classification (SITC).

3. The country-firm-year level sample

The country-firm-year sample consists of 5,012,185 observations with 144,546 distinct firms that have engaged in international trade activities before and after China's aid projects. Following [Geng et al. \(2022\)](#), we construct a firm-by-year panel data set by using the Chinese Industrial Enterprise Database (CIED) and the Annual Tax Survey (ATS). We then merge it with the China Customs Database through extensive firm name-matching. On average, a firm has trade partners from 38 distinct countries over the sample period and has 7.5 sample years. For meaningful comparison, we restrict the sample to firms with exporting activities interacted with their countries of destinations before and after China's aid projects.

4. The country-firm-product-year level sample

The country-firm-product-year sample is based on the above constructed country-firm-year sample in combination with product categories defined using 6-digit Harmonized System (HS) code.

Appendix B: Definitions of Variables

Variables	Definitions
Ln(Trade)	The country-year level measure. Log value of total trade between a given country and China in a year; Source: China Customs Database
Ln(Exports)	The country-year level measure. Log value of China's exports to a given country and China in a year. This measure is also defined in the industry level and firm level in our analysis. At the firm level, the measure is defined as log value of one plus the total value of exports to include the observations of firms without exports to a given country; Source: China Customs Database
Ln(Imports)	The country-year level measure. Log value of China's imports from a given country and China in a year; Source: China Customs Database
Ln(Price)	The country-firm-product-year level measure. Log value of the average product price of Chinese firm i 's exports to a given country in a product category in a year. The product is at 6-digit HS level; Source: China Customs Database
Treat	An indicator set to "1" for a given country in years after receiving the first aid project identified in the sample; Source: Global Chinese Official Finance Dataset
RCA	The industry level measure for relative comparative advantage for industry k in year t ; Source: UN Comtrade
GDP Growth	GDP growth for a given country from year $t-1$ to t ; Source: WDI Dataset
Ln(GDP per Capita)	The log value of GDP per capita for a given country in a given year; Source: WDI Dataset
Export/GDP	Total exports as percentage of GDP for a given country in a given year; Source: WDI Dataset
Import/GDP	Total imports as percentage of GDP for a given country in a given year; Source: WDI Dataset
FDI	Foreign direct investment, net inflows in percentage of GDP in a given year; Source: WDI Dataset
Polity2	An overall score ranging from -10 (pure autocracy) to +10 (pure democracy); Source: Polity IV Dataset

(To be continued)

Variables	Definitions
SOE	An indicator set to “1” if a firm is state-owned; Source: CIED-ATS
Size	Log value of total assets; Source: CIED-ATS
Leverage	Total liabilities over total assets; Source: CIED-ATS
ROA	Net profits over total assets; Source: CIED-ATS
ROE	Net profits over total equity; Source: CIED-ATS
Ln(Employees)	Log value of total number of employees; Source: CIED-ATS
Ln(Employees/Assets)	Log value of total number of employee over assets; Source: CIED-ATS

Appendix C: Tables

Table A1: Summary Statistics

Variables	N	Mean	Median	SD
<i>A. Country-Year Sample</i>				
Ln(Trade)	1,985	21.065	21.095	2.368
Ln(Exports)	1,985	20.510	20.627	2.320
Ln(Imports)	1,985	19.207	19.413	3.809
Treat	1,985	0.512	1.000	0.500
GDP Growth	1,985	4.005	4.000	5.255
Ln(GDP per capita)	1,985	8.547	8.513	1.516
Export/GDP	1,985	42.317	36.891	26.756
Import/GDP	1,985	45.696	39.699	25.098
Polity2	1,985	4.732	7.000	5.890
FDI	1,985	5.064	2.999	10.646
<i>B. Country-Industry-Year Sample</i>				
Ln(Exports)	363,961	13.012	13.648	4.260
Treat	363,961	0.499	0.000	0.500
RCA (3-digit)	363,961	1.227	0.781	1.283
RCA (2-digit)	363,961	1.109	0.736	1.049
<i>C. Country-Firm-Year Sample</i>				
Ln(Exports)	5,012,185	11.001	10.963	2.195
Treat	5,012,185	0.355	0.000	0.479
SOE	5,012,185	0.071	0.000	0.256
Size	5,012,185	10.961	10.819	1.562
Leverage	5,012,185	0.576	0.593	0.260
ROA	5,012,185	0.082	0.040	0.152
ROE (lag)	4,172,595	0.215	0.114	0.466
Ln(Employees) (lag)	4,242,180	5.654	5.617	1.163
Ln(Employees/Assets) (lag)	4,180,798	-5.277	-5.219	1.131
<i>D. Country-Firm-Product-Year Sample</i>				
Ln(Price)	11,693,741	1.997	1.635	2.208
Treat	11,693,741	0.311	0.000	0.463
SOE	11,693,741	0.081	0.000	0.274

Notes: This table presents the summary statistics for the country-year level sample (Panel A), country-industry-year level sample (Panel B), country-firm-year level sample (Panel C), and country-firm-product-year sample (Panel D), respectively.

Table A2: Country-Year Level Analysis by Aid Types

	(1)	(2)	(3)	(4)
	Ln(Exports)			
Treat (Grant)	0.541*** (0.102)	0.402*** (0.087)		
Treat (Loan)	0.252** (0.098)	0.266*** (0.088)		
Treat (Other)	0.128 (0.149)	0.123 (0.136)		
Treat (ODA)			0.510*** (0.089)	0.398*** (0.075)
Treat (non-ODA)			0.217** (0.095)	0.183** (0.089)
Observations	1,985	1,985	1,985	1,985
Adj. R-squared	0.972	0.977	0.972	0.977
Controls	No	Yes	No	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: This table presents the results based on the treatment defined by breaking down the types of aid from China. Treat (Grant) is set to “1” if the first aid project received is labeled as grant. Treat (Loan) indicates the first aid project is labeled as loan. Treat (Tech) denotes free-standing technical assistance (very small and automatically dropped in the estimation). Other types of projects are denoted by Treat (Other). Treat (ODA) and Treat (non-ODA) indicate whether a project is an Official Development Assistance (ODA) or not. Other model specifications follow the convention in Panel A of Table 1.

Table A3: Robustness Checks with Alternative Designs

	(1)	(2)	(3)	(4)	(5)	(6)
	Ln(Exports)		Ln(Exports)		Ln(Exports)	
	Generalized DID		Lagged Aid Value		Synthetic DID	
Ln(Aid Value) $\times$ Post	0.022*** (0.004)	0.018*** (0.003)				
Ln(Aid Value), t-1			0.008*** (0.002)	0.007*** (0.002)		
Treat					0.417*** (0.109)	0.435*** (0.113)
Observations	1,985	1,985	1,985	1,985	1,500	1,500
Adj. R-squared	0.972	0.976	0.971	0.976		
Country Controls	No	Yes	No	Yes	No	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows two alternative empirical designs. Columns (1) and (2) present the results using the generalized difference-in-differences design. Ln(Aid Value) is the logarithmic value of the first aid project identified in the sample. Post is set to “1” for years following the first aid project. Columns (3) and (4) present the results using the lagged value aid as independent variable. Columns (5) and (6) present the results using the synthetic difference-in-differences estimator (SDID) and a balanced panel data. Standard errors clustered at the country level are in the parentheses. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

Table A4: Robustness Checks with Alternative Samples and Specifications

	(1)	(2)	(3)	(4)	(5)
	Ln (Exports)				
	Excluding countries with the initial aid in first three years of the sample	Aid with value in the top 25 percentile	Income- cutoff by year fixed effects	Country linear trends	IHS trans- formation
Treat	0.425*** (0.077)	0.167** (0.068)	0.234*** (0.065)	0.108** (0.049)	0.310*** (0.059)
Observations	1,163	1,985	1,959	1,985	1,985
Adj. R-squared	0.981	0.976	0.978	0.987	0.977
Country Controls	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes

Notes: This table presents results using alternative samples and specifications. Column (1) presents the results based on a sample excluding countries that received aid from China in the first three years of our sample to mitigate the data truncation concern. Column (2) considers aid projects with values in the top 25 percentile. Column (3) presents the results based on country income cutoffs by year fixed effects. Column (4) controls for country-specific linear trends. Column (5) uses the inverse hyperbolic sine (IHS) transformation proposed by [Burbidge et al. \(1988\)](#) to handle extreme values of the dependent variable. Standard errors clustered at the country level are in the parentheses. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

Table A5: Baseline Results (Redefining Treatment)

	(1)	(2)	(3)	(4)
	Ln(Trade)		Ln(Exports)	
Treat	0.174*** (0.056)	0.128** (0.054)	0.279*** (0.053)	0.215*** (0.051)
Observations	1,191	1,191	1,191	1,191
Adj. R-squared	0.980	0.983	0.981	0.984
Controls	No	Yes	No	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: This table presents the results when redefining the treatment. Countries are considered as “treated” only for the first three years after receiving Chinese aid. Treatment is set to “1” for the first three years of receiving aid from China. Observations after the third year are dropped. Standard errors clustered at the country level are reported in the parentheses. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

Table A6: Baseline Results (Excluding High-Income Countries)

<i>Panel A. Country-Level Analysis</i>						
	(1)	(2)	(3)	(4)	(5)	(6)
	Ln(Trade)		Ln(Exports)		Ln(Imports)	
Treat	0.184** (0.075)	0.201*** (0.068)	0.277*** (0.072)	0.273*** (0.062)	-0.161 (0.292)	-0.089 (0.282)
Observations	1,560	1,560	1,560	1,560	1,560	1,560
Adj. R-squared	0.971	0.975	0.968	0.973	0.857	0.859
Controls	No	Yes	No	Yes	No	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
<i>Panel B. Industry-Level and Firm-Level Analysis</i>						
	(1)		(2)		(3)	(4)
			Ln(Exports)			
	Industry-level Analysis		Firm-level Analysis			
Treat	0.162** (0.076)	0.178** (0.070)	0.077*** (0.028)	0.064*** (0.021)		
Observations	273,324	273,324	2,537,716	2,537,716		
Adj. R-squared	0.630	0.658	0.336	0.338		
Country Controls	Yes	Yes	Yes	Yes		
Country FE	Yes	Yes	Yes	Yes		
Industry FE	Yes	No	No	No		
Firm Controls	No	No	Yes	Yes		
Firm FE	No	No	Yes	Yes		
Year FE	Yes	No	Yes	No		
Industry-Year FE	No	Yes	No	Yes		

Notes: This table presents the baseline results using the country-year level, country-industry-year level, and country-firm-year level samples excluding high-income countries. Standard errors clustered at the country level are reported in the parentheses. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

**Table A7: Heterogeneous Effects by Industry Revealed Comparative Advantage
(Excluding High-Income Countries)**

	(1)	(2)	(3)	(4)
	Ln(Exports)			
Treat	0.307*** (0.093)	0.455*** (0.094)	0.325*** (0.100)	0.489*** (0.103)
Treat × RCA (3-digit)	-0.115*** (0.042)	-0.220*** (0.051)		
RCA (3-digit)	0.625*** (0.032)			
Treat × RCA (2-digit)			-0.145*** (0.054)	-0.277*** (0.066)
RCA (2-digit)			0.691*** (0.038)	
Observations	273,324	273,324	273,324	273,324
Adj. R-squared	0.634	0.659	0.632	0.659
Country Controls	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	No	Yes	No
Year FE	Yes	No	Yes	No
Industry-Year FE	No	Yes	No	Yes

Notes: This tables presents the heterogeneous effects of China aid by China's industry-level revealed comparative advantage (RCA). The sample is at the country-industry-year level and excludes high-income countries. We define RCA using 3-digit and 2-digit SITC industry classifications. Standard errors clustered at the country level are in the parentheses. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

Table A8: The U.S. Foreign Aid and Exports

	(1)	(2)	(3)	(4)
	Ln(Exports)			
Ln(Aid Value), $t - 1$	0.004 (0.006)	0.004 (0.006)	0.000 (0.006)	0.001 (0.006)
Ln(Aid Value), $t - 1 \times$ RCA (3-digit)			0.004 (0.004)	0.004 (0.004)
RCA (3-digit)			0.406*** (0.062)	
Observations	383,918	383,918	383,918	383,918
Adj. R-squared	0.614	0.621	0.615	0.621
Country Controls	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	No	Yes	No
Year FE	Yes	No	Yes	No
Industry-Year FE	No	Yes	No	Yes

Notes: This table presents the effect of U.S. aid on its exports to recipient countries. Following [Berger et al. \(2013\)](#), the sample is at the country-industry-year level. Ln(Aid Value), $t - 1$ is the log value of aid from the U.S. to a given country in year $t - 1$. RCA (3-digit) is the revealed comparative advantage of a U.S. industry. Standard errors are clustered at the country level and reported in the parentheses. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

Table A9: Instrumental Variable Regression Results (Firm-Level Analysis)

	(1)	(2)	(3)	(4)
	Ln(Exports)			
Predicted Ln(Aid Value), t-1	0.023*** (0.009)	0.021** (0.008)	-0.001 (0.010)	-0.003 (0.009)
Predicted Ln(Aid Value), t-1 $\times$ SOE	0.048*** (0.008)	0.052*** (0.008)	0.053*** (0.008)	0.049*** (0.008)
Observations	5,012,185	5,012,185	5,012,185	5,012,185
Adj. R-squared	0.299	0.300	0.300	0.301
Firm Controls	No	Yes	Yes	Yes
Country Controls	No	No	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	No
Industry-Year FE	No	No	No	Yes

Notes: This table presents instrumental variable regression results using the firm-country-year sample. The instrumental variable is the net change in China's currency reserves interacted with recipient countries' probability to receive aid during the 2000-2014 sample period. The probability of receiving Chinese aid is calculated as: $p_i = \frac{1}{15} \sum_{y=1}^{15} p_{i,y}$, where $p_{i,y}$ is a dummy variable that equals "1" when country i receives at least one aid project from China in year y . Column (1) controls for country, firm, and year fixed effects. Column (2) adds firm-level control variables and column (3) adds both country-level and firm-level control variables. Column (4) controls for industry-by-year fixed effects. Standard errors clustered at the country level are in the parentheses. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

Table A10: Robustness Checks for the Firm-Level Analysis

	(1)	(2)	(3)	(4)
	Ln(Exports)			
	Province-Year FE		Balanced Panel	
Treat	0.061*** (0.023)		0.073* (0.039)	
Treat $\times$ SOE	0.233*** (0.041)		0.493*** (0.079)	
Predicted Ln(Aid Value), t-1		-0.003 (0.009)		0.004 (0.015)
Predicted Ln(Aid Value), t-1 $\times$ SOE		0.048*** (0.008)		0.102*** (0.018)
Observations	5,012,185	5,012,185	226,389	226,389
Adj. R-squared	0.301	0.301	0.325	0.325
Firm Controls	Yes	Yes	Yes	Yes
Country Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	Yes
Industry-Year FE	Yes	Yes	No	No
Province-Year FE	Yes	Yes	No	No

Notes: This table presents the results of robustness checks for the firm-level analysis. Columns (1) and (2) control for province-by-year fixed effects to account for province-level shocks in a specific year in China. Columns (3) and (4) report the results from a balanced panel dataset. Columns (2) and (4) report the results using an instrumental variable approach. Standard errors clustered at the country level are in the parentheses. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

Table A11: Heterogeneous Effects by Firm Traits: State Ownership (Excluding High-Income Countries)

	(1)	(2)	(3)	(4)
	Ln(Exports)			
Treat	0.062* (0.031)	0.062** (0.031)	0.055** (0.025)	0.049** (0.024)
Treat $\times$ SOE	0.134** (0.053)	0.142*** (0.053)	0.149*** (0.052)	0.141*** (0.053)
Observations	2,537,716	2,537,716	2,537,716	2,537,716
Adj. R-squared	0.336	0.336	0.337	0.338
Firm Controls	No	Yes	Yes	Yes
Country Controls	No	No	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	No
Industry-Year FE	No	No	No	Yes

Notes: This table presents the effect of China aid on trade by firm's state ownership. The results are based on the country-firm-year level sample excluding high-income countries. $SOE_{i,t}$ is an indicator variable which is set to "1" if a firm is state-owned according to the CIED and the ATS. Standard errors clustered at the country level are in the parentheses. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

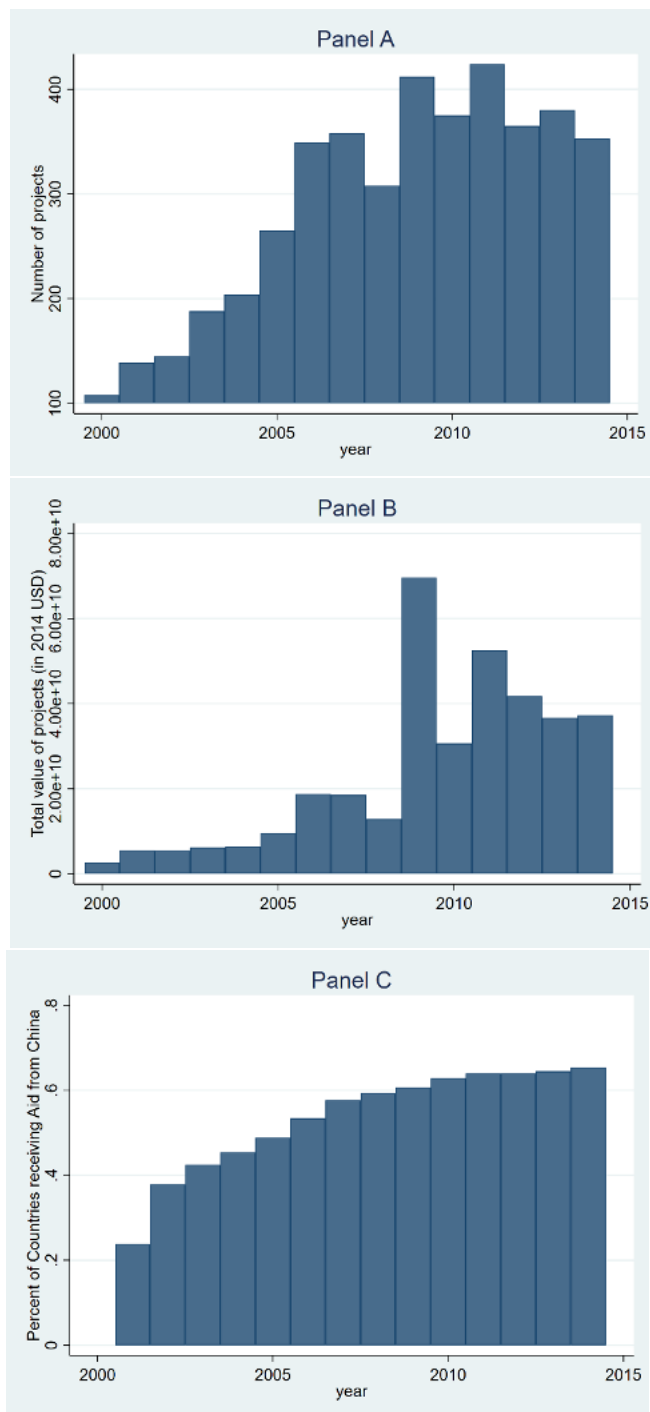
Table A12: Heterogeneous Effects by Firm Traits: Sales Growth

	(1)	(2)	(3)	(4)
	Ln(Exports)			
Treat	0.087*** (0.028)	0.085*** (0.028)	0.060** (0.025)	0.055** (0.024)
Treat $\times$ SOE	0.250*** (0.040)	0.255*** (0.040)	0.268*** (0.042)	0.259*** (0.042)
Treat $\times$ SOE $\times$ Sales Growth (lag)	0.012 (0.016)	0.007 (0.016)	0.005 (0.016)	0.007 (0.016)
SOE $\times$ Sales Growth (lag)	0.002 (0.011)	-0.001 (0.011)	0.001 (0.011)	-0.004 (0.012)
Treat $\times$ Sales Growth (lag)	0.012 (0.008)	0.010 (0.008)	0.017* (0.009)	0.017* (0.009)
Sales Growth (lag)	0.038*** (0.006)	0.030*** (0.005)	0.028*** (0.006)	0.025*** (0.006)
Observations	3,490,702	3,490,702	3,490,702	3,490,702
Adj. R-squared	0.300	0.301	0.301	0.302
Firm Controls	No	Yes	Yes	Yes
Country Controls	No	No	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	No
Industry-Year FE	No	No	No	Yes

Notes: This table presents the effect of China aid on trade by firm's state ownership. The results are based on the country-firm-year level sample excluding high-income countries. $SOE_{i,t}$ is an indicator variable which is set to "1" if a firm is state-owned according to the CIED and the ATS. Standard errors clustered at the country level are in the parentheses. ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

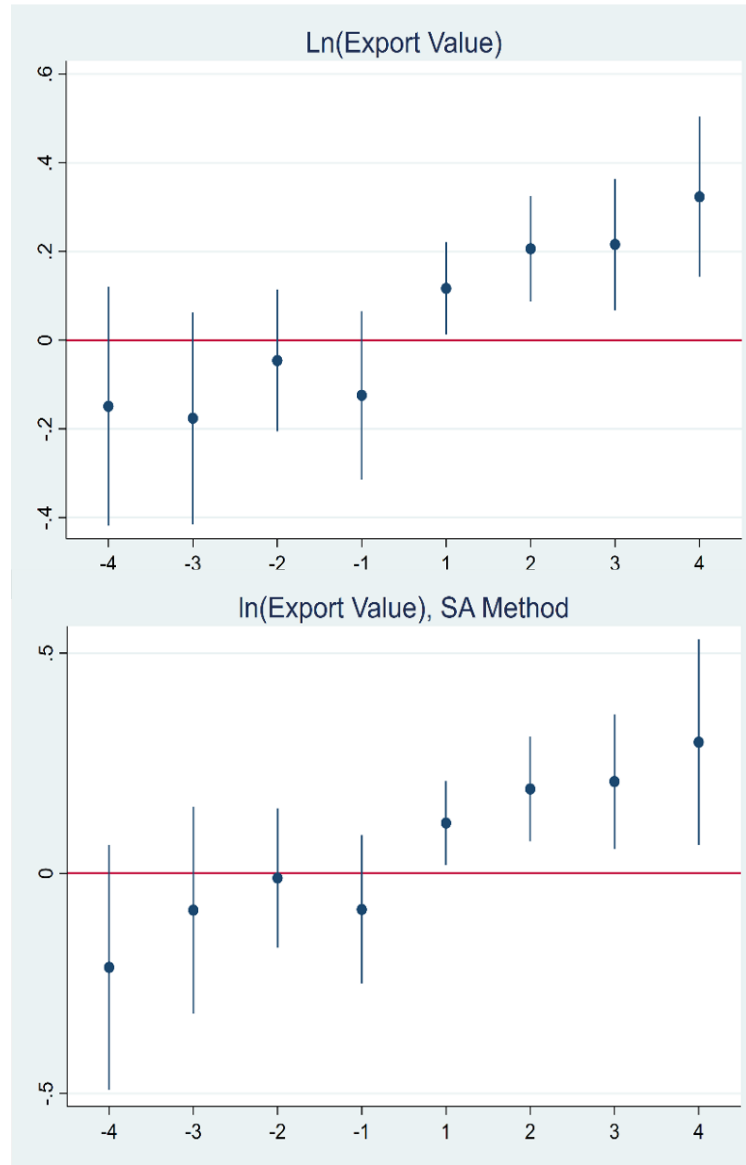
Appendix D: Figures

Figure A1: Chinese Aid Projects Over Time



Notes: Panel A presents the number of Chinese aid projects over years. The total value of projects by year is presented in Panel B. Panel C shows the percentage of countries that receive aid from China over the years.

Figure A2: Dynamic Effects (Excluding High-Income Countries)



Notes: The sample excludes high-income countries. The upper figure presents the results using two-way fixed effects models; the lower figure displays the results using the new DID method proposed by [Sun & Abraham \(2021\)](#). The solid dot represents the magnitude of the estimated average treatment effect over years. The vertical lines show the 95% confidence interval.