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Compete or Retreat? Evidence from Aid Competition between China and Western Donor Countries

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Abstract

How Western donors respond to China's expanding development finance remains contested, with competing hypotheses and limited systematic evidence. This study estimates the effect of Chinese aid on bilateral official development assistance (ODA) provided by donors in the OECD Development Assistance Committee (OECD-DAC). Using a Poisson pseudo-maximum likelihood estimator on a four-dimensional panel covering 31 donors, 130 recipients, and 13 sectors from 2001 to 2019, the analysis exploits within-recipient-sector-year variation in Chinese aid shocks and incorporates an extensive set of multi-way fixed effects to address endogeneity concerns. While no average competitive response is detected across all donors, we find consistent evidence that Japan systematically increased its ODA commitments in reaction to Chinese engagement, amounting to an estimated US$ 5.4 billion, or 2.5% of Japan's total ODA commitments in our sample during the study period. Japan's competitive responses are concentrated in geographically proximate and more democratic recipients, consistent with its geopolitical and normative priorities. No comparable response is detected for other major OECD-DAC donors, including the United States, Germany, France, and the United Kingdom. Taken together, the results show that Japan's behaviour illustrates how a traditional donor can strategically deploy ODA as part of a broader foreign policy and industrial strategy, but the scale of its response remains modest. Combined with the muted reactions of other donors, this suggests that the OECD-DAC system is more resilient to China's emergence as a major donor than often assumed.

Keywords: Aid competition, official development assistance, China, Japan
JEL codes: F35, P45

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1. Introduction

China's ascent as a major provider of development finance has reshaped the strategic landscape in which traditional donors operate. Between 2000 and 2021, China committed approximately 12,700 official development assistance (ODA)-equivalent projects across 133 countries, amounting to roughly US$ 178 billion, placing it behind only the United States (US), Japan and Germany among Organisation for Economic Co-operation and Development–Development Assistance Committee (OECD-DAC) donors in scale. China's model, characterized by streamlined procedures, emphasis on large-scale infrastructure, and a policy of non-interference, offers recipient governments an appealing alternative to OECD-DAC norms (Dreher et al., 2022). Limited coordination between Chinese and Western agencies further expands recipients' outside options, heightening the potential for competitive dynamics. These developments have sparked a central policy debate: How do Western donors respond to China's rise? The answer carries significant implications for the future of the OECD-DAC architecture, the evolving division of labour in global development finance, and the capacity of Western donors to maintain influence in an increasingly multipolar aid environment.

Theoretically, the direction of Western responses is ambiguous. On one hand, donors may scale up aid to signal continued engagement, preserve policy leverage, or counter China's growing influence, especially in regions where geopolitical stakes are high. On the other hand, China's large-scale financing may crowd out Western projects, either by saturating absorptive capacity or by enabling donors to shift toward sectors where they hold comparative advantage. Whether China induces competitive escalation, strategic reallocation, or disengagement remains an open empirical question.

Despite the far-reaching policy implications, systematic evidence on Western donors' responses to Chinese ODA or broader development finance, including other official finance (OOF), remains limited. Existing studies focus primarily on Africa, omit sector-level variation, or examine specific institutions such as the World Bank (Kilama, 2016; Hernandez, 2017; Michaelowa, 2019; Zeitz, 2021; Watkins, 2022). To address these limitations, this paper addresses analyses a four-dimensional panel dataset covering 31 donors, 130 recipients, and 13 sectors from 2001 to 2019, enabling a comprehensive, sector-disaggregated assessment of how the full set of OECD-DAC donors respond to Chinese engagement.

This study estimates an elasticity of OECD-DAC donors' ODA commitments with respect

to Chinese ODA, employing a Poisson pseudo-maximum likelihood (PPML) estimator. To isolate the effect of Chinese aid, our empirical specification incorporates an extensive set of multi-way fixed effects: donor-recipient, donor-sector, recipient-sector, donor-year, recipient-year, and sector-year. Introducing these fixed effects substantially mitigates concerns about omitted variables and reverse causality, thereby strengthening the credibility of our identification strategy. We also examine heterogeneous responses to Chinese ODA across donors, recipients, and sectors.

Three findings stand out. First, we detect no systematic competitive or retrenchment response among OECD-DAC donors as a whole. Second, Japan emerges as the only donor that consistently increases its ODA in reaction to Chinese engagement, likely reflecting the similar sectoral allocation patterns of Japanese and Chinese aid. The estimated elasticity of 0.02 implies that Chinese ODA induced approximately US$ 5.4 billion in additional Japanese commitments, representing 2.5% of Japan's total ODA in our sample during the study period. Japan's competitive responses are concentrated in geographically proximate and more democratic recipients, consistent with its geopolitical and normative priorities. Third, no comparable responses are observed for the US, Germany, France, or the United Kingdom (UK).

Taken together, the results show that China's rise does not uniformly reshape Western aid behaviour. Japan demonstrates how a traditional donor can strategically deploy ODA as part of a broader foreign policy and industrial strategy, but the scale of its response remains modest. Combined with the muted reactions of other donors, this suggests that the OECD-DAC system is more resilient to China's emergence as a major donor than often assumed.

This study makes contributions to two strands of the literature. The first examines how Chinese development finance shapes the behaviour of traditional donors, and this paper is closely related to Kilama (2016) and Humphrey and Michaelowa (2019). Using a three-dimensional panel covering the Group of Seven (G7) donors and 52 African countries from 2000 to 2011, Kilama (2016) finds that the G7 donors decreased their ODA commitments in response to Chinese ODA. Humphrey and Michaelowa (2019), drawing on data for 44 African countries from 2000 to 2014, find no evidence that Chinese development finance influenced OECD-DAC donors' aid commitments. However, these studies face several important limitations. First, their empirical strategies do not adequately account for time-varying confounders across recipients, raising concerns

about the credibility of causal interpretation. Second, they do not examine heterogeneous responses across donors, recipients, or sectors, potentially obscuring meaningful variation in competitive dynamics. This study addresses these shortcomings by exploiting a four-dimensional donor–recipient–sector–year dataset, which enables the inclusion of an extensive set of multi-way fixed effects and supports a more systematic and nuanced assessment of how OECD-DAC donors respond to Chinese engagement.

The second strand pertains to the broader aid allocation literature.[1] Foundational studies show that foreign aid reflects not only recipient needs and development priorities but also donors' geopolitical, commercial, and historical interests, while later work incorporates domestic political incentives, multilateral pressures, and strategic considerations such as United Nations voting alignment. Within this tradition, a parallel strand examines aid competition among donors, documenting how traditional OECD-DAC donors adjust their allocations in response to one another's activities (Fuchs et al., 2015; Steinwand, 2015; Davies and Klasen, 2019). Yet this literature has focused almost entirely on competition within the DAC system. Much less is known about how traditional donors behave when the competitor is an emerging donor that operates outside DAC norms and advances a distinct model of development cooperation. By analysing how OECD-DAC donors respond to Chinese ODA, this study extends the aid competition literature beyond intra-DAC dynamics and provides one of the first systematic assessments of competitive interactions between traditional and emerging donors.

The remainder of the paper is organized as follows. Section 2 provides an overview of Chinese foreign aid and develops conceptual frameworks for how OECD-DAC donors may respond to Chinese engagement. Section 3 outlines the empirical strategy, including the data, model specifications, and identification assumptions. Section 4 presents the baseline estimates and documents heterogeneous responses to Chinese ODA. Section 5 assesses the robustness of Japan's competitive responses and investigates the underlying mechanisms. Section 6 concludes.

2. Chinese aid and conceptual framework

2.1. Chinese foreign aid

China began providing external assistance in 1950, shortly after the founding of the People's Republic. In its early years, aid was directed mainly toward socialist countries and newly independent states in Asia and Africa, exemplified by technical cooperation

[1] See Dreher et al (2024) for a comprehensive review.

with Mongolia in 1956 and the dispatch of medical teams to Algeria in 1963. Following the launch of the Reform and Opening policy in 1978, China's aid took on a more explicitly economic character. By the 1990s, the establishment of the Export–Import Bank of China (EIBC) and the China Development Bank (CDB) institutionalized concessional lending and facilitated a shift toward "economic cooperation–oriented aid," with a strong emphasis on infrastructure development and industrial promotion. After the introduction of the Belt and Road Initiative (BRI) in 2013, foreign aid became increasingly integrated into China's broader diplomatic and security strategy and was positioned as a key instrument for enhancing regional connectivity.

China's aid activities span material assistance, project-type aid, human resource and capacity-building programs, technical cooperation, medical and humanitarian support, volunteer-based grassroots initiatives, and debt relief. China's aid instruments consist of three categories: grants, interest-free loans, and concessional loans, which together constitute what this study defines as Chinese ODA. The Ministry of Commerce oversees planning, implementation, and management, although local governments also operate their own external assistance programs independently.[2]

Figure 1 presents the trend in Chinese ODA from 2000 to 2021 across 130 recipient countries and 13 sectors in our dataset. Despite some fluctuations, China's aid continued to expand until 2017, when it reached approximately US$ 14 billion annually. This growth was driven by the rapid accumulation of foreign exchange reserves following China's accession to the World Trade Organization in 2001 and its export-led development model. Policy banks such as the EIBC and CDB expanded infrastructure financing through low-interest concessional loans, which combined with the EPC (Engineering, Procurement, and Construction) model, supported the overseas expansion of Chinese state-owned enterprises (Dreher et al., 2022). China also pledged to scale up assistance through multilateral platforms such as the Forum on China–Africa Cooperation, contributing to rapid increases in aid flows to Africa and Asia (Dreher et al., 2022). This period overlapped with the full-scale rollout of the BRI, which featured major infrastructure projects including Kenya's Standard Gauge Railway, the China–Pakistan Economic Corridor, and high-speed rail initiatives in Southeast Asia (Todo et al., 2025).

[2] In 2018, China restructured its aid governance system by creating the China International Development Cooperation Agency, transferring high-level policy formulation and strategic coordination from the Ministry of Commerce to a new State Council–level body. This reform was intended to centralize decision-making, enhance coherence across China's diverse aid instruments, and align development cooperation more closely with broader foreign policy objectives (Kitano and Miyabayashi, 2023).

However, Chinese ODA declined sharply after 2017, falling to one-fourth of its peak by 2021. This contraction reflects multiple factors: the global outbreak of COVID-19, heightened criticism of "debt-trap diplomacy," and China's slowing economic growth, all of which constrained the scale and composition of its overseas development finance.

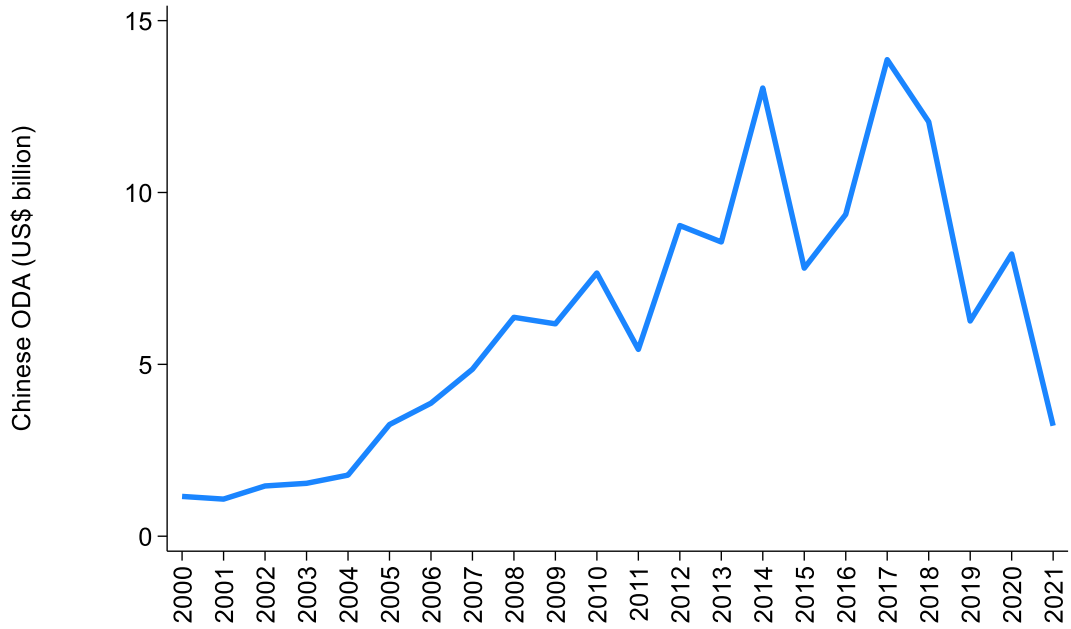

Figure 1. Trends of Chinese ODA, 2000-2021

Notes: The figure shows the aggregated amount of Chinese ODA across 130 recipient countries and 13 sectors in our sample.

Table 1 reports aggregated bilateral ODA commitments from 2000 to 2021 for China, all 31 OECD-DAC donors, and the five largest individual donors, allowing us to characterize the distinctive features of Chinese ODA. First, Chinese ODA is large in scale: China committed approximately US$ 136 billion globally during this period, a level comparable to Germany. Appendix 1 further shows that Chinese ODA exceeded that of the five largest donors in 2014 and 2017 (except the US). Second, loans constitute the dominant form of Chinese ODA, in contrast to the grant-based approach typical of major OECD-DAC donors such as the US and the UK. Japan is a notable exception, as it also relies heavily on loan-type ODA. Third, Chinese ODA is concentrated in economic infrastructure and services, particularly transport (39%) and energy (16%), a pattern that differs from most OECD-DAC donors but closely resembles Japan's sectoral profile. Fourth, nearly half of China's ODA is allocated to Sub-Saharan Africa (42%), making it the primary regional destination. Finally, ODA represents only a relatively small share of China's broader

development finance portfolio, whereas ODA plays a central role in the development finance strategies of OECD-DAC donors.

It is important to note that China's aid model diverges markedly from that of traditional donors (Dreher et al., 2022): it emphasizes non-interference, equality, and mutual benefit, and eschews the governance or policy conditionality commonly attached to Western aid. Operationally, Chinese projects tend to be delivered more rapidly, supported by tied financing to Chinese contractors, streamlined feasibility assessments, and comparatively lenient environmental and social safeguards.

Table 1. Aid allocations for China, OECD-DAC total, and five largest donors

	China	OECD-DAC total	Five largest donors				
			US	Japan	Germany	France	UK
Total, US$ billion	136	971	265	221	130	91	46
Loans in ODA, %	79	31	0	78	39	58	0
By sector, %							
Education	3	13	6	4	22	26	18
Health	3	8	8	4	4	5	15
Population	0	8	25	0	2	1	12
Water	5	9	4	13	12	14	4
Government	6	18	27	3	15	6	30
Other social sectors	6	5	7	2	5	7	6
Transport	39	15	4	44	4	15	3
Communications	7	1	0	1	0	0	0
Energy	16	11	6	18	21	13	2
Banking	0	2	1	0	8	3	2
Business	0	2	3	0	2	0	2
Agriculture	3	7	6	7	5	6	4
Industry	10	2	2	3	1	3	2
By region, %							
East Asia & Pacific	22	17	5	34	10	9	4
Europe & Central Asia	10	7	6	6	15	7	3
Latin America & Caribbean	8	9	11	4	11	13	2
Middle East & North Africa	4	16	22	9	21	28	9
South Asia	14	21	18	37	20	6	33
Sub-Saharan Africa	42	30	38	10	22	37	49
Share in development finance, %	11	57	82	78	67	61	48

Notes: This table reports aggregated bilateral ODA commitment flows during 2000–2021. Development finance includes both ODA and OOF.

2.2. Conceptual framework

OECD-DAC donors may increase their ODA commitments when Chinese aid expands because they perceive China's growing presence as a strategic challenge. Foreign aid functions not only as a development instrument but also as a means of maintaining geopolitical influence, defending established aid norms, and supporting commercial interests. As China finances large, visible projects and deepens political ties with recipient governments, OECD-DAC donors may respond by scaling up their own commitments to

signal continued engagement, preserve policy leverage, and counterbalance China's influence. Because our empirical analyses operate at the recipient-sector-year level, a competitive response is reflected in a positive, time-varying association between Chinese ODA and OECD-DAC donors' allocations within the same recipient-sector, for example, transport in Cambodia. By contrast, adjustments that occur across sectors or across recipients fall outside the scope of what we classify as competitive responses.

Japan provides some of the clearest examples of this competitive response. As rapid economic growth and urbanization in developing countries generated substantial infrastructure demand, China aggressively expanded its presence in the infrastructure market through concessional loans, rapid decision-making, and large-scale financing. These developments prompted Japan to recognize that its traditional ODA model was no longer sufficient to maintain influence. In May 2013, the Japanese government introduced the Infrastructure System Overseas Promotion Strategy (ISOPS), which aimed to support Japanese firms in securing overseas infrastructure projects worth 30 trillion yen (approximately US$ 300 billion) by 2020. Under the ISOPS framework, ODA became a central policy instrument, complemented by high-level political advocacy by the prime minister and cabinet ministers (Nishitateno, 2024a; Nishitateno, 2024b).

Anecdotal evidence illustrates how Japan deployed ODA competitively under the ISOPS in response to China's expanding development footprint. After Indonesia awarded the Jakarta–Bandung high-speed rail project to China in September 2015, Japan quickly redirected its efforts toward other major infrastructure projects, committing large-scale yen loans for port modernization, urban transit, and disaster-resilient infrastructure. Notable examples include the Jakarta Mass Rapid Transit system and Patimban Port. Similarly, as China advanced the China–Laos Railway, Japan expanded its ODA to Laos by financing National Road No. 9, bridges along the East–West Economic Corridor, and urban infrastructure in Vientiane.

Conversely, China's expanding development footprint may reduce OECD-DAC donors' ODA commitments within the same recipient-sector. One pathway involves strategic reallocation across sectors or recipients: as China provides large-scale financing, particularly in infrastructure and energy, its resources partially substitute for OECD-DAC aid, enabling Western donors to shift toward sectors where they hold comparative advantage or to redirect funds to countries with greater unmet needs. This response reflects considerations of burden-sharing and efficient aid allocation rather than

geopolitical retreat. A second pathway involves displacement within the same recipient-sector. When recipient governments face limited absorptive capacity for multiple large-scale investments, additional Chinese financing can crowd out OECD-DAC projects, leading to a reduction in Western donors' ODA commitments.

Several donors have exhibited these patterns in practice. In East and Southern Africa, for example, the UK scaled back its involvement in large infrastructure projects as China became the dominant financier of transport and energy corridors in countries such as Ethiopia, Kenya, and Zambia. UK officials noted that China was "covering the big-ticket items," which allowed the UK to reorient its aid toward governance, health, and education—sectors requiring smaller financial commitments. Germany followed a similar trajectory in Tanzania and Kenya, where China's growing presence in energy and transport infrastructure prompted German development agencies to shift toward governance, vocational training, and renewable-energy regulation. These cases highlight that the overall impact of Chinese ODA on OECD-DAC donors' commitments is theoretically ambiguous and remains an empirical question.

3. Empirical approach

3.1. Data

We obtained data on bilateral ODA from the creditor reporting system (CRS) compiled by the OECD. The CRS records annual flows of ODA from donor to recipient at the item level, allowing identification of any bilateral ODA by sector, flow type, channel, and aid type. We aggregated gross ODA commitments at the donor-recipient-sector-year level and use it as an outcome variable in this study. We focus on commitments rather than disbursements because commitments more accurately capture donor policy decisions; donors exercise full discretion over commitments, whereas disbursements depend partly on recipient-side willingness and administrative capacity to draw down funds (Kilama, 2016). A further practical reason is that, as discussed below, information on Chinese official financing is available only in commitment terms. Using the CRS, we also construct OECD-DAC donors' OOF, multilateral aid including both ODA and OOF commitments, and aggregate ODA from all other OECD-DAC donors at the recipient-sector-year level, which we include as additional covariates in robustness analyses.

Data on Chinese official financing come from the Global Chinese Development Finance Dataset (Version 3.0) compiled by Custer et al. (2023). Based on the Tracking Underreported Financial Flows methodology, this dataset documents 20,985 projects

across 165 countries supported by 791 Chinese official-sector institutions between 2000 and 2021. A key feature of the dataset is its classification of Chinese official financing into ODA-like and OOF-like categories, following OECD definitions, and its sectoral coding, which allows direct comparability with CRS data. Using this dataset, we measure Chinese ODA by aggregating the commitment values of all ODA-like projects at the recipient–sector–year level; Chinese OOF is constructed analogously.[3] Following the existing literature, we lag Chinese ODA and OOF by one year to account for the adjustment process through which OECD-DAC donors respond to Chinese financing.

The Chinese ODA variables contain missing project values that are unlikely to be at random, raising concerns about potential bias in value-based estimations. Missingness is particularly concentrated in social infrastructure and service sectors, most notably education and health, because many Chinese ODA activities in these areas take the form of training programs, scholarships, expert or volunteer deployments, and in-kind donations. These modalities often lack clearly stated monetary values in Chinese government communications and are frequently too small to be systematically reported by recipient governments or implementing agencies. To retain the full sample while addressing the skew introduced by zero or missing values, we add a constant (US$ 1) to the Chinese ODA variables prior to logarithmic transformation and include a dummy variable indicating observations with zero reported ODA.[4] As an additional robustness check, we re-estimate the specification using Chinese ODA project counts.

Using the information described above, we construct a four-dimensional panel dataset covering 31 donors (Appendix 2), 130 recipients (Appendix 3), and 13 sectors (Appendix 4) from 2001 to 2019, yielding 172,172 observations. The sample is restricted to observations recorded in the CRS, resulting in an unbalanced panel. The 31 donors correspond to all OECD-DAC members as of 2019. China and 18 recipients that receive no Chinese ODA during the sample period are excluded from the set of recipients.[5] The sectoral coverage is limited to social infrastructure and services, economic infrastructure and services, and production sectors, as both OECD and Chinese ODA are highly concentrated in these categories and because these sectors are more likely to be subject

[3] To avoid double counting, we excluded Chinese projects that fall under umbrella agreements. See Custer et al. (2023) for details.
[4] The proposed approach aligns with Cali and Velde (2011), Lee and Ries (2016), and Nishitateno and Umetani (2023).
[5] The excluded recipients are Bahrain, Belize, Bhutan, Croatia, Eswatini, Guatemala, Honduras, Malta, Marshall Islands, Nicaragua, Oman, Palau, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Saudi Arabia, Slovenia, Turks and Caicos Islands, and Tuvalu.

to intense aid competition (Zeitz, 2021). The sample period begins in 2001 because Chinese aid data are available only from 2000 and our Chinese ODA (and OOF) variables enter the model with a one-year lag. We exclude 2020 and 2021 to avoid the confounding effects of the Covid-19 pandemic.

Table 2 reports summary statistics for all variables used in the estimations. The mean bilateral ODA provided by individual OECD-DAC donors is US$ 4.7 million, slightly larger than the mean Chinese ODA (US$ 4.3 million). Missing observations account for 87% of the Chinese ODA variable, which explains the relatively small average number of Chinese ODA projects (0.14). The mean Chinese OOF (US$ 29.5 million) is substantially larger than the mean Chinese ODA. In contrast, the mean OECD-DAC donors' OOF (US$ 3 million) is smaller than the mean OECD-DAC ODA. The mean values of multilateral aid and aggregate ODA from all other OECD-DAC donors are US$ 16 million and US$ 50 million, respectively.

Table 2. Summary statistics

	Mean	S.D.	Min	Max
OECD-DAC donors' ODA, US$ million	4.7	37.4	0	5,200
One-year lagged Chinese ODA, US$ million	4.3	46.0	0	3,580
One-year lagged Chinese ODA projects, count	0.14	0.36	0	2
One-year lagged zero Chinese ODA dummy	0.87	0.34	0	1
One-year lagged Chinese OOF, US$ million	29.5	348	0	32,000
One-year lagged OECD-DAC donors' OOF, US$ million	3	44.3	0	2,680
One-year lagged multilateral aid, US$ million	16.6	79.6	0	3,750
One-year lagged aggregate ODA from all other OECD-DAC donors, US million	50.1	140	0	5,210

Notes: This table presents summary statistics for the study's sample, based on donor-recipient-sector-year panel data (31 donors, 130 recipients, and 13 sectors from 2001 to 2019). The number of observations is 172,172.

3.2. Baseline specification and estimation technique

Adopting the PPML estimator, we estimate the following multi-way fixed effects model in the exponential function as a baseline specification:

$$WODA_{d,r,s,y} = \exp\left[\beta_1 \ln CODA_{r,s,y-1} + \beta_2 ZeroCODA_{r,s,y-1} + \beta_3 \ln COOF_{r,s,y-1} + F_{d,r} + F_{d,s} + F_{r,s} + F_{d,y} + F_{r,y} + F_{s,y}\right] \times \varepsilon_{d,r,s,y} \quad (1)$$

where subscript *d* is the donor, *r* is the recipient, *s* is the sector, and *y* represents year. The ln denotes the natural logarithm. *WODA* is ODA flow from the OECD-DAC donor to the recipient in the sector for each year. *CODA* denotes one-year lagged Chinese ODA flows. *ZeroCODA* indicates a dummy taking the value of one if the one-year lagged Chinese

ODA flows is zero. *COOF* denotes one-year lagged Chinese OOF flows. The model includes various multi-way fixed effects: donor-recipient ($F_{d,r}$), donor-sector ($F_{d,s}$), recipient-sector ($F_{r,s}$), donor-year ($F_{d,y}$), recipient-year ($F_{r,y}$), and sector-year ($F_{s,y}$). ε is an error term.

Our parameter of interest is β_1, which captures the elasticity of OECD-DAC donors' ODA commitments with respect to one-year-lagged Chinese ODA (Silva and Tenreyro, 2006). This estimate reflects only a partial effect, as specification (1) does not account for cross-sector or cross-country spillovers, nor for dynamic adjustments beyond the one-year horizon. Moreover, it does not capture potential responses of OECD-DAC donors to Chinese ODA that operate through multilateral development banks (Vadlamannati et al., 2025).

A key identification assumption underlying our approach is that Chinese ODA is uncorrelated with the error term after conditioning on the included covariates and fixed effects. This requires that (i) no omitted variables jointly influence Chinese and OECD-DAC donors' decision on ODA commitments, (ii) OECD-DAC donors' ODA commitments do not affect Chinese ODA commitments, and (iii) measurement error in Chinese ODA is not systematically correlated with the outcome. Violations of any of these conditions would undermine the exogeneity of Chinese ODA and raise concerns about the credibility of the estimated effects.

We argue that the multi-way fixed effects included in specification (1) help satisfy conditions (i)–(iii) above. Regarding condition (i), donor–recipient fixed effects ($F_{d,r}$) absorb persistent bilateral ties rooted in history (e.g., colonial relationships or war reparations) and geographical distance. Donor–sector fixed effects ($F_{d,s}$) account for long-run donor specialization across sectors, such as the historical concentration of Japanese ODA in transport and energy. Recipient–sector fixed effects ($F_{r,s}$) capture persistent sector-specific needs on the recipient side. Donor–year fixed effects ($F_{d,y}$) sweep out donor-specific annual shocks such as budget cycles or domestic political changes,[6] while recipient–year fixed effects ($F_{r,y}$) absorb recipient-specific annual shocks including economic needs, institutional quality, conflict, or voting behaviour in the United Nation General Assembly (UNGA).[7] Finally, sector–year fixed effects ($F_{s,y}$)

[6] For example, Lskavyan (2014) finds that left-wing recipient governments receive 0.4% more US aid under a left-wing US administration than under a right-wing administration.
[7] For development needs, prior evidence suggests that donors take recipients' economic and

control for global sectoral shocks such as pandemics or climate-related initiatives. Taken together, this rich set of fixed effects removes broad confounding factors, leaving within–recipient–sector–year variation across donors in exposure to Chinese aid shocks that is plausibly closer to as-good-as random.

We acknowledge that within–recipient–sector–year confounding factors may threaten condition (i). A key potential confounder is Chinese OOF, which is often deployed alongside ODA as part of integrated financing packages (Dreher et al., 2022). Specification (1) addresses this concern by controlling for one-year-lagged Chinese OOF (*COOF*). In the robustness analyses, we also estimate a specification that includes OECD-DAC donors' OOF, multilateral aid, and aggregate ODA from all other OECD-DAC donors,[8] measured at the recipient–sector–year level. Furthermore, we estimate a specification with donor–recipient–year fixed effects to account for time-varying bilateral relations, such as trade, migration, and diplomatic engagement, that may indirectly influence both OECD-DAC and Chinese ODA commitment decisions. Similarly, we also estimate a specification with donor–sector–year fixed effects. Overall, the results confirm that our main findings are robust to these empirical concerns (see Section 4.3 for details).[9]

Regarding condition (ii), Appendix 5 demonstrates that specification (1) adequately addresses potential reverse causality between OECD-DAC donors' and Chinese ODA commitments through the inclusion of the multi-way fixed effects. The table reports PPML estimation results based on specification (1), using one-year lead Chinese ODA in

human development into account. For example, Bermeo (2017) finds that a 1% decrease in GDP per capita is associated with a 0.55% increase in aid allocations. Regarding institutional quality, existing studies show that donors tend to reward better governance with higher aid, particularly in the post–Cold War period, although the evidence on human rights and corruption is more mixed (see Alesina and Weder 2002; Hoeffler and Outram 2011; Winters and Martinez 2015). For conflict-affected contexts, prior research indicates that donors condition aid on conflict and peace dynamics and adjust their aid strategies in countries experiencing ongoing armed conflict (e.g., Balla and Reinhardt 2008; Fleck and Kilby 2010). For voting behavior in the UNGA, prior evidence suggests that donors use foreign aid as a tool of statecraft to advance their foreign policy goals. For instance, Alesina and Dollar (2000) find that a one-standard-deviation increase in the frequency of voting with the donor in the UNGA is associated with a 78% increase in US aid.

[8] For example, the aggregate ODA from all other OECD-DAC donors capture "hearding" effects (Davis and Klasen, 2019) that could influence China's aid allocation.

[9] Another approach to addressing potential omitted-variable bias is to use an instrumental variable for Chinese ODA, such as the interaction between China's domestic industrial production and the predicted probability of receiving Chinese development finance (Dreher et al., 2021; Zeitz, 2021). We do not adopt this strategy because the instrument is only weakly correlated with our Chinese ODA measure. This weak first stage likely reflects the fact that Chinese ODA is more strongly driven by political and diplomatic considerations than by macroeconomic conditions in China, and that our extensive set of multi-way fixed effects absorbs much of the remaining variation in Chinese ODA.

Columns 1 and 2 and two-year lead variables in Columns 3 and 4, instead of the lagged ODA. Columns 1 and 3 show that current OECD-DAC donors' ODA are positively associated with future Chinese ODA flows. In contrast, Columns 2 and 4 show that this association disappears once the full set of multi-way fixed effects is introduced. Additional specifications further support the conclusion that reverse causality is unlikely to be a major concern (See Column 7 of Table 5).

Regarding condition (iii), the multi-way fixed effects isolate variation in OECD-DAC donors' ODA commitments within donor–recipient–sector cells over time, which is less susceptible to measurement error that is typically cross-sectional (across recipients or sectors).

We employ the PPML estimator for several reasons. First, OECD-DAC donors' bilateral ODA flows contain many zeros (approximately 18% in our sample), and PPML accommodates zero outcomes without requiring log-transformation of the dependent variable. Second, PPML is robust to heteroskedasticity, which is pervasive in our data. Third, modern PPML routines efficiently absorb the high-dimensional fixed effects required in our specification. Finally, PPML has become the standard estimator in recent aid competition studies (e.g., Humphrey and Michaelowa (2019)), making it well suited for our empirical setting.

The four-dimensional panel dataset introduces the possibility of serial correlation in model errors over time. Ignoring within-cluster dependence can lead to underestimated standard errors and overstated statistical significance. To address this concern, we report robust standard errors clustered at the donor–recipient–sector level throughout the analysis. For robustness, we also examine clustering at alternative higher-dimensional levels, such as donor–recipient, donor–sector, and recipient–sector, which allow for arbitrary correlation in the error term within these units over time.

3.3. Heterogeneous responses across donors, recipients, and sectors

To examine heterogenous responses to Chinese ODA across donors, recipients, and sectors, we augment our baseline specification (1) with interaction terms. Specification (2) estimates separate elasticities for the five largest OECD-DAC donors, allowing us to assess whether their reactions to Chinese ODA differ systematically:

$$WODA_{d,r,s,y} = \exp\Bigg[\beta_1 \ln CODA_{r,s,y-1} + \sum_{j=US}^{UK} \omega^j \left(\ln CODA_{r,s,y-1} \times \rho_d^j\right) + \beta_2 ZeroCODA_{r,s,y-1} + \beta_3 \ln COOF_{r,s,y-1} + F_{d,r} + F_{d,s} + F_{r,s} + F_{d,y} + F_{r,y} + F_{s,y}\Bigg] \times \varepsilon_{d,r,s,y} \quad (2)$$

where ρ_d^j are top donor dummies: $\rho_d^{US} = 1$ if the donor is the US (and zero otherwise), $\rho_d^{Japan} = 1$ if the donor is Japan, $\rho_d^{Germany} = 1$ if the donor is Germany, $\rho_d^{France} = 1$ if the donor is France, and $\rho_d^{UK} = 1$ if the donor is the UK. Here, β_1 can be interpreted as the mean elasticity for all the donors other than the five largest OECD-DAC donors (we call this "benchmark" elasticity). ω^j measures the different slopes of elasticities relative to the benchmark elasticity for each top donor. Thus, $(\beta_1 + \omega^j)$ represents the individual elasticities for the US, Japan, Germany, France, and the UK, respectively.

Similarly, specifications (3) and (4) examine heterogeneity in OECD-DAC donors' responses to Chinese ODA across recipient regions and sectors, respectively. In specification (3), the omitted (benchmark) region is South Asia, and in specification (4), the omitted sector is education:

$$WODA_{d,r,s,y} = \exp\Bigg[\beta_1 \ln CODA_{r,s,y-1} + \sum_{j=Europe}^{East\ Asia} \omega^j \left(\ln CODA_{r,s,y-1} \times \rho_r^j\right) + \beta_2 ZeroCODA_{r,s,y-1} + \beta_3 \ln COOF_{r,s,y-1} + F_{d,r} + F_{d,s} + F_{r,s} + F_{d,y} + F_{r,y} + F_{s,y}\Bigg] \times \varepsilon_{d,r,s,y} \quad (3)$$

$$WODA_{d,r,s,y} = \exp\Bigg[\beta_1 \ln CODA_{r,s,y-1} + \sum_{j=Health}^{Industry} \omega^j \left(\ln CODA_{r,s,y-1} \times \rho_s^j\right) + \beta_2 ZeroCODA_{r,s,y-1} + \beta_3 \ln COOF_{r,s,y-1} + F_{d,r} + F_{d,s} + F_{r,s} + F_{d,y} + F_{r,y} + F_{s,y}\Bigg] \times \varepsilon_{d,r,s,y} \quad (4)$$

4. Results

4.1. Baseline estimates

Table 3 reports the baseline estimates obtained using the PPML estimator, based on specification (1). All regressions rely on the same donor-recipient-sector-year panel dataset covering 31 donors, 130 recipients, and 13 sectors from 2001 to 2019, comprising 172,172 observations. Column 4 presents our preferred specification, which includes the full set of multi-way fixed effects. The high Pseudo-R^2 indicates a satisfactory overall fit of the model. The estimates imply that a 1% increase in Chinese ODA in the previous year is associated with a 0.01% increase in OECD-DAC donors' ODA commitments in the current year within the same recipient–sector across 31 donors on average. However, the 95% confidence interval ranges from –0.006 to 0.032, so we cannot reject the null hypothesis at the 10% significance level. Columns 1–3 indicate that the estimated effects of Chinese ODA are overstated when the covariates and relevant fixed effects are omitted.

Table 3. Baseline estimates

Dependent variable: ODA commitments by OECD-DAC donors, US$				
	(1)	(2)	(3)	(4)
Ln one-year lagged Chinese ODA	0.020***	0.080***	0.028*	0.013
	(0.006)	(0.025)	(0.015)	(0.010)
Zero one-year lagged Chinese ODA dummy		0.969**	0.300	0.184
		(0.411)	(0.207)	(0.139)
Ln one-year lagged Chinese OOF		0.030***	0.011***	–0.002
		(0.007)	(0.004)	(0.003)
Pseudo R^2	0.002	0.007	0.660	0.731
Donor-recipient dummies	No	No	Yes	Yes
Donor-sector dummies	No	No	Yes	Yes
Recipient-sector dummies	No	No	Yes	Yes
Donor-year dummies	No	No	No	Yes
Recipient-year dummies	No	No	No	Yes
Sector-year dummies	No	No	No	Yes
Donor	31			
Recipient	130			
Sector	13			
Year	2001–2019			
Observation	172,172			

Notes: The table reports the PPML estimation results, based on specification (1). We cluster the standard errors at the donor-recipient-sector levels. Column 1 shows the specification without any covariates and fixed effects. Column 2 adds covariates to the model. Column 3 introduces donor-recipient, donor-sector, and recipient-sector fixed effects. Column 4 further adds donor-year, recipient-year, and sector-year fixed effects.
***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

4.2. Estimated heterogeneous responses

Panel A of Table 4 reports how the elasticity of ODA commitments with respect to Chinese ODA varies across the five largest OECD-DAC donors, relative to the benchmark elasticity for all other OECD-DAC donors, based on specification (2). The benchmark elasticity is –0.004, which is not statistically different from zero. A notable

finding is that Japan's elasticity is 0.021 percentage points higher than the benchmark at the 1% significance level, with a 95% confidence interval of 0.011 to 0.031. This implies that the elasticity of Japanese ODA with respect to Chinese ODA is approximately 0.017 (≈–0.004 + 0.021), and statistically distinguishable from zero. Using the mean levels of Japanese and Chinese ODA commitments from 2001 to 2019, this elasticity indicates that an additional US$ 1 of Chinese ODA induces roughly US$ 0.04 of Japanese ODA, on average. Aggregated over the period, the implied response amounts to US$ 5.4 billion, equivalent to 2.5% of Japan's total ODA commitments in our sample during the period from 2001 to 2019.

Table 4. Heterogeneous responses across donors, recipients, and sectors

Dependent variable: ODA commitments by OECD-DAC donors, US$		
	Coefficient	Standard error
Panel A. Across the five largest OECD-DAC donors		
Ln one-year lagged Chinese ODA (CODA)	–0.004	(0.009)
Ln CODA × US	–0.006	(0.005)
Ln CODA × Japan	0.021***	(0.005)
Ln CODA × Germany	–0.000	(0.005)
Ln CODA × France	–0.002	(0.007)
Ln CODA × UK	0.007	(0.007)
Panel B. Across recipient regions		
Ln CODA	0.014	(0.010)
Ln CODA × Europe	–0.008	(0.009)
Ln CODA × Sub-Saharan Africa	–0.008	(0.006)
Ln CODA × Latin America	–0.005	(0.012)
Ln CODA × Middle East	–0.014	(0.010)
Ln CODA × East Asia	0.001	(0.007)
Panel C. Across sectors		
Ln CODA	0.007	(0.009)
Ln CODA × Health	0.001	(0.005)
Ln CODA × Population	0.021	(0.018)
Ln CODA × Water	0.006	(0.009)
Ln CODA × Government	–0.011**	(0.005)
Ln CODA × Other social sectors	–0.002	(0.007)
Ln CODA × Transport	0.006	(0.007)
Ln CODA × Communications	–0.021	(0.020)
Ln CODA × Energy	0.004	(0.008)
Ln CODA × Banking	–0.035	(0.039)
Ln CODA × Business	0.049	(0.033)
Ln CODA × Agriculture	–0.007	(0.005)
Ln CODA × Industry	–0.021	(0.016)

Notes: The table reports PPML estimation results examining heterogeneous responses to Chinese ODA across donors, recipients, and sectors. All regressions use the same donor–recipient–sector–year panel dataset covering 31 donors, 130 recipients, and 13 sectors from 2001 to 2019 (172,172 observations). Standard errors are clustered at the donor–recipient–sector level. Panel A presents heterogeneity across the five largest OECD-DAC donors based on specification (2). Panel B reports regional heterogeneity across recipient regions based on specification (3). Panel C shows sectoral heterogeneity based on specification (4).
***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A of Table 4 also shows that the positive effect observed for Japan appears to be

unique among the largest OECD-DAC donors. For the US, Germany, and France, the estimated elasticities with respect to Chinese ODA are –0.010, –0.004, and –0.006, respectively. Although none of these coefficients is statistically significant, their negative signs suggest potential retrenchment responses. The elasticity for the UK (0.003) is both statistically and economically negligible. That only Japan exhibits a competitive response to Chinese ODA may reflect the similar sectoral allocation patterns of Japanese and Chinese aid, as shown in Table 1, which could heighten competitive pressure.

Panel B of Table 4 reports how the elasticity of OECD-DAC donors' ODA commitments with respect to Chinese ODA varies across recipient regions, based on specification (3). The benchmark elasticity for South Asia is 0.014. In contrast, the estimated elasticities for Europe, Sub-Saharan Africa, Latin America, and the Middle East are not statistically significant and economically meaningful. The elasticity for East Asia is 0.015, close in magnitude to South Asia's estimate, but it is statistically distinguishable from zero only at the 15% level, which limits confidence in the estimate. Overall, the evidence suggests potential competitive responses to Chinese ODA in some Asian regions, although the results remain inconclusive.

Panel C of Table 4 reports how the elasticity of OECD-DAC donors' ODA commitments with respect to Chinese ODA varies across sectors, based on specification (4). The results are substantially mixed. The benchmark elasticity for the education sector is 0.007. The estimates indicate potential competitive responses in the business (0.056), population (0.028), and transport (0.013) sectors, and potential retrenchment responses in the banking (–0.028) and communication (–0.014) sectors. However, similar to the regional heterogeneity observed in Panel B, none of these sector-specific elasticities are statistically significant at the 10% level, rendering the sectoral evidence inconclusive.

5. Exploring Japan's competitive responses

5.1. Robustness

Empirical evidence from the heterogeneous analyses above indicates that Japan competed with Chinese ODA by increasing its own ODA commitments. Table 5 assesses the robustness of this key finding using specification (2). Columns 1–3 address different sources of potential omitted variable bias. Column 1 adds OECD-DAC donors' OOF, multilateral aid, and aggregate ODA from all other OECD-DAC donors that may be jointly determined with both OECD-DAC and Chinese ODA commitments. Column 2 introduces donor–recipient–year fixed effects to account for time-varying bilateral

relations that could indirectly generate omitted variable bias. Column 3 further incorporates donor–sector–year fixed effects to capture time-varying, donor-specific sectoral factors. Across all specifications, the coefficients on the interaction term (ln CODA × Japan) remain stable in magnitude and significance, suggesting that omitted variables are unlikely to drive the main result.

Columns 4–6 assess whether our statistical inference is affected by underestimated standard errors under the baseline clustering at the donor–recipient–sector level. We therefore re-estimate specification (2) using alternative clustering schemes at the donor–recipient, donor–sector, and recipient–sector levels. Across these adjustments, the resulting standard errors for the interaction term (ln CODA × Japan) remain similar in magnitude, ranging from 0.004 to 0.006, compared with the baseline estimate of 0.005.

Column 7 reports the results of a placebo test that replaces the current one-year lagged Chinese ODA with its one-year lead. Under this specification, Japan's heterogeneous responses become economically and statistically insignificant, reinforcing the conclusion that reverse causality is unlikely to be a major concern.

Column 8 replaces the monetary value of Chinese ODA with the count of one-year lagged Chinese ODA projects (without log). The results indicate that Japan's current response to an additional Chinese ODA project in the previous year is approximately 31 percentage points larger than the benchmark estimate, and this effect is statistically significant at the 1% level. This implies that one additional Chinese ODA project increases Japan's ODA commitments by roughly 21% ($\approx (-0.098 + 0.309) \times 100$). These findings substantially alleviate concerns regarding the measurement issue in the Chinese ODA variable.

Finally, Column 9 reports the specification estimated using data disaggregated into 24 OECD-DAC sectors, all of which fall within the OECD-DAC sectoral classification scheme. The results continue to support the robustness of Japan's competitive responses, although the estimated elasticity (0.012) is smaller and not statistically significant at the 10% level. This weaker evidence likely reflects the inclusion of sectors where China–Japan aid competition is minimal. For instance, humanitarian and disaster-related sectors exhibit very limited competition because China's engagement is episodic, politically selective, and institutionally thin, whereas Japan is a major, institutionalized humanitarian donor embedded in multilateral norms and systems.

Table 5. Robustness checks

	Additional covariates	Donor-recipient-year fixed effects	Donor-sector-year fixed effects	Clustering levels: Donor-recipient	Clustering levels: Donor-sector	Clustering levels: Recipient-sector	Lead Chinese ODA	Count of Chinese projects	All sectors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ln one-year lagged Chinese	–0.001	–0.004	–0.005	–0.004	–0.004	–0.004	0.010	–0.098	–0.003
ODA (CODA)	(0.009)	(0.008)	(0.009)	(0.009)	(0.008)	(0.010)	(0.010)	(0.124)	(0.008)
Ln CODA × US	–0.006	–0.006	–0.004	–0.006	–0.006	–0.006	–0.008*	–0.077	0.004
	(0.005)	(0.005)	(0.004)	(0.005)	(0.004)	(0.006)	(0.004)	(0.066)	(0.004)
Ln CODA × Japan	0.022***	0.023***	0.023***	0.021***	0.021***	0.021***	0.004	0.309***	0.015***
	(0.005)	(0.006)	(0.005)	(0.006)	(0.004)	(0.005)	(0.005)	(0.074)	(0.005)
Ln CODA × Germany	0.000	0.005	–0.000	–0.000	–0.000	–0.000	–0.004	0.025	0.009*
	(0.005)	(0.005)	(0.005)	(0.006)	(0.004)	(0.005)	(0.005)	(0.075)	(0.005)
Ln CODA × France	–0.001	–0.006	0.001	–0.002	–0.002	–0.002	0.005	–0.031	0.002
	(0.007)	(0.007)	(0.007)	(0.006)	(0.005)	(0.008)	(0.007)	(0.109)	(0.006)
Ln CODA × UK	0.007	0.011*	0.010	0.007	0.007	0.007	0.010	0.123	0.000
	(0.007)	(0.007)	(0.007)	(0.007)	(0.009)	(0.007)	(0.013)	(0.103)	(0.006)
Pseudo R^2	0.725	0.782	0.745	0.719	0.719	0.719	0.725	0.831	0.731
Observation	172,165	160,877	171,288	172,172	172,172	172,172	172,251	172,172	253,341
Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Donor-recipient dummies	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Donor-sector dummies	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Recipient-sector dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Donor-year dummies	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Recipient-year dummies	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector-year dummies	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Donor-recipient-year dummies	No	Yes	No	No	No	No	No	No	No
Donor-sector-year dummies	No	No	Yes	No	No	No	No	No	No

Notes: The table reports the PPML estimation results based on specification (2) using the same donor–recipient–sector–year panel dataset sample. Covariates include zero one-year lagged Chinese ODA dummy and the log one-year lagged Chinese OOF. Column 1 presents a specification that includes OECD-DAC donors' OOF, multilateral aid, and aggregate ODA from all other OECD-DAC donors. Columns 2 and 3 include donor–recipient–year and donor–sector–year fixed effects, respectively. Columns 4–6 report results with standard errors clustered at the donor–recipient–sector, donor–sector, and recipient–sector levels, respectively. Column 7 introduces one-year lead Chinese ODA variable. Column 8 uses the count of one-year lagged Chinese ODA projects (without log). Column 9 presents the specification estimated using data covering 24 sectors, all of which fall within the OECD-DAC sectoral classification framework.
***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

5.2. Mechanisms

We examine three potential mechanisms underlying Japan's competitive responses. First, Japan's reactions may be strongest in geographically proximate countries because these states constitute the core arena of Sino-Japanese geopolitical and economic rivalry. China's expanding infrastructure presence in nearby countries directly threatens Japan's strategic interests, prompting Tokyo to scale up ODA more aggressively in its immediate neighbourhood. Second, Japan's competitive responses may be stronger in countries that supply Japan with key natural resources. Given its limited domestic resource endowments, Japan has long engaged in resource diplomacy to secure stable energy and mineral supplies, which could create incentives to counter Chinese ODA in resource-exporting states. Third, Japan's competitive responses may be stronger in more democratic countries because democratic institutions align with Japan's long-standing ODA principles emphasizing governance, rule of law, and political stability. Democracies represent more reliable and strategically aligned partners for Japan, making China's growing influence in these countries more costly.

To evaluate these hypotheses, we constructed cross-sectional dummy variables identifying the top 20th percentile of recipient countries in our sample based on (1) geographic proximity to Japan ("geographically proximate recipients"), (2) aggregated export values of oil, gas, coal, and related products to Japan during 2001–2019 ("large resource exporters"), and (3) mean democracy levels ("democratic recipients").[10] We then interacted each dummy with the one-year lagged Chinese ODA variable. Because our focus is on Japan, we restricted the donor sample to Japan, resulting in a recipient–sector–year panel dataset with 18,400 observations. All regressions control for zero one-year lagged Chinese ODA dummy and the log of one-year lagged Chinese OOF, and include recipient–sector, recipient–year, and sector–year fixed effects.

Table 6 reports the results. Column 1 shows Japan's baseline competitive response to Chinese ODA, with an elasticity of 0.047. Column 2 indicates that the elasticity for geographically proximate recipients is 0.022 percentage points higher than for distant ones, significant at the 5% level. Column 3 shows no evidence that Japan's competitive behaviour is stronger in resource-exporting countries, likely reflecting the fact that Japan's major resource suppliers, primarily Middle Eastern oil exporters such as Saudi

[10] Data on geographical distance, trade, and the democracy index were obtained from the CEPII gravity database, the UN Comtrade, and the V-Dem dataset compiled by the Varieties of Democracy Institute, respectively.

Arabia, the United Arab Emirates, Kuwait, Qatar, and Oman, do not overlap with China's major ODA recipients (see Table 1). Column 4 shows that the elasticity for more democratic recipients is 0.028 percentage points higher than for less democratic ones, also significant at the 5% level. Overall, the findings indicate that Japan's competitive behaviour is driven less by material dependence and more by strategic geography and political affinity.

Table 6. Mechanisms of Japan's Competitive Responses

Dependent variable: Japanese ODA commitments, US$				
	(1)	(2)	(3)	(4)
Ln one-year lagged Chinese ODA (CODA)	0.047**	0.025	0.047**	0.043**
	(0.021)	(0.024)	(0.021)	(0.021)
CODA × Geographically proximate recipients		0.022**		
		(0.010)		
CODA × Large resource exporters			–0.000	
			(0.011)	
CODA × Democratic recipients				0.028**
				(0.014)
Pseudo R^2	0.884	0.885	0.884	0.884
Recipient-sector dummies	Yes	Yes	Yes	Yes
Recipient-year dummies	Yes	Yes	Yes	Yes
Sector-year dummies	Yes	Yes	Yes	Yes
Recipient	128			
Sector	13			
Year	2001–2019			
Observation	18,400			

Notes: The table reports PPML estimation results using a donor sample restricted to Japan and a recipient–sector–year panel dataset with the 18,400 observations. "Geographically proximate recipients", "large resource exporters", and "democratic recipients" refer to dummy variables for the top 20th percentile of all recipient countries on the basis of their geographical distance to Japan, their aggregated export values of oil, gas, coal, and their related products to Japan during 2001-2019, and their mean democracy levels, respectively. All regressions control for zero one-year lagged Chinese ODA dummy and the log of one-year-lagged Chinese OOF, and include recipient–sector, recipient–year, and sector–year fixed effects. Standard errors are clustered at the recipient–sector level.
***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

6. Conclusion

Since its establishment in 1961, the DAC has served as the central coordinating body for traditional donors, defining ODA standards, promoting transparency, and shaping the norms of development cooperation. For decades, this regime operated within a relatively stable donor landscape dominated by the US, Japan, and major European donors. The rise of emerging donors, most prominently China, has introduced a profound shift in this architecture. China's large-scale, infrastructure-focused, and non-conditional financing model offers an alternative to DAC norms and expands recipients' bargaining power.

Our results suggest that the implications of emerging donors for the OECD-DAC regime are more limited and selective than often assumed. Japan's competitive responses,

concentrated in geographically proximate and more democratic recipients, demonstrate that some traditional donors recalibrate their strategies when their geopolitical interests and sectoral priorities directly overlap with China's. Yet these responses are modest in scale. Combined with the absence of comparable reactions from the US, Germany, France, or the UK, this pattern implies that China's rise is unlikely to be a systemic game-changer that triggers a coordinated Western counter-response or fundamentally destabilizes the broader DAC architecture.

Several avenues for future research follow from this analysis. First, while this study focuses on bilateral ODA commitments, China's growing presence may also influence the terms of finance, conditionality, and implementation modalities adopted by traditional donors (Hernandez, 2017). Second, recipient governments may strategically leverage competition between China and OECD-DAC donors; understanding how such dynamics affect project selection, negotiation outcomes, and development effectiveness remains an open empirical question. Finally, as additional emerging donors, including India, Gulf states, and regional development banks, expand their roles, the competitive equilibrium in global development finance is likely to evolve further. Examining these multipolar dynamics will be essential for understanding how geopolitical competition shapes development outcomes in the coming decades (Asmus-Bluhm et al., 2025).

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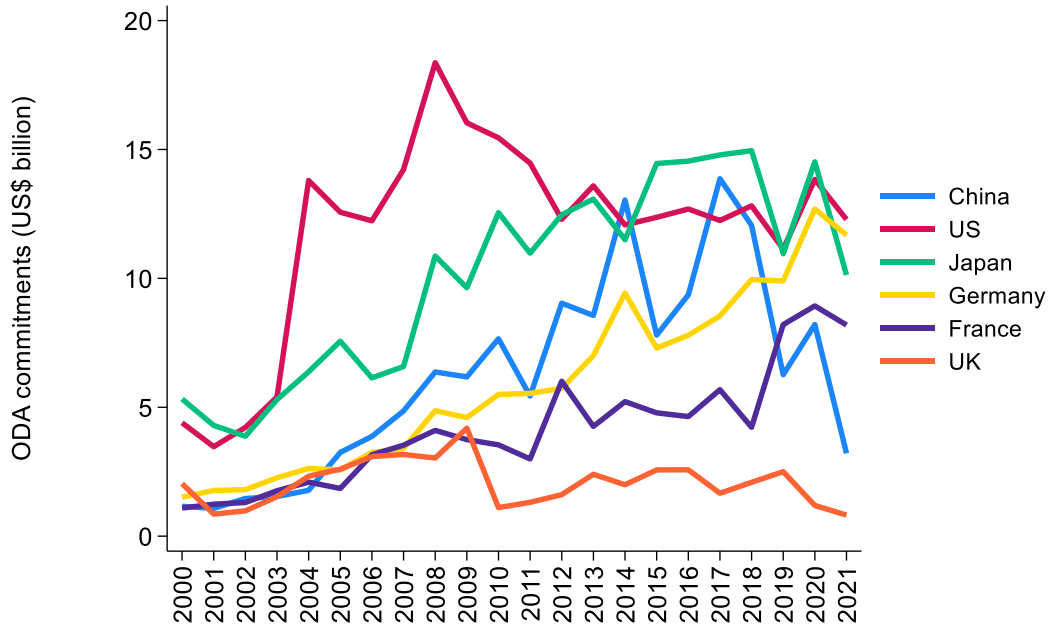
Appendix 1. Trends of ODA commitment flows for China and the largest OECD-DAC donors



Appendix 2. Donors

Australia	Greece	Norway	United States
Austria	Hungary	Poland	
Belgium	Iceland	Portugal	
Canada	Ireland	Slovak Republic	
Czechia	Italy	Slovenia	
Denmark	Japan	South Korea	
Estonia	Lithuania	Spain	
Finland	Luxembourg	Sweden	
France	Netherlands	Switzerland	
Germany	New Zealand	United Kingdom	

Appendix 3. Recipients

East Asia (20)	Europe (17)	Latin America (26)		Middle East (13)	South Asia (7)	Sub-Saharan Africa (47)	
Cambodia	Albania	Antigua and Barbuda	Peru	Algeria	Afghanistan	Angola	Mauritania
Fiji	Armenia	Argentina	St. Lucia	Djibouti	Bangladesh	Burundi	Mauritius
Indonesia	Azerbaijan	Barbados	Suriname	Egypt	India	Benin	Malawi
Kiribati	Belarus	Bolivia	Trinidad and Tobago	Iran	Maldives	Burkina Faso	Namibia
Laos	Bosnia	Brazil	Uruguay	Iraq	Nepal	Botswana	Niger
Malaysia	Georgia	Chile	Venezuela	Jordan	Pakistan	Central African Republic	Nigeria
Micronesia	Kazakhstan	Colombia		Lebanon	Sri Lanka	Côte d'Ivoire	Rwanda
Mongolia	Kyrgyzstan	Costa Rica		Libya		Cameroon	Sudan
Myanmar	Moldova	Cuba		Morocco		DR Congo	Senegal
Nauru	Montenegro	Dominica		Syria		Comoros	Sierra Leone
North Korea	North Macedonia	Dominican Republic		Tunisia		Cabo Verde	Somalia
Papua New Guinea	Serbia	Ecuador		West Bank		Eritrea	South Sudan
Philippines	Tajikistan	El Salvador		Yemen		Ethiopia	Sao Tome and Principe
Samoa	Türkiye	Grenada				Ghana	Seychelles
Solomon Islands	Turkmenistan	Guyana				Guinea	Chad
Thailand	Ukraine	Haiti				Gambia	Togo
Timor-Leste	Uzbekistan	Jamaica				Guinea-Bissau	Tanzania
Tonga		Mexico				Equatorial Guinea	Uganda
Vanuatu		Panama				Kenya	South Africa
Viet Nam		Paraguay				Liberia	Zambia
						Lesotho	Zimbabwe
						Madagascar	Congo
						Mali	Gabon
						Mozambique	

Appendix 4. Sectors

Social infrastructure and services	Education Health Population Policies/Programmes & Reproductive Health Water Supply & Sanitation Government & Civil Society Other Social Infrastructure & Services
Economic infrastructure and services	Transport & Storage Communications Energy Banking & Financial Services Business & Other Services
Production sectors	Agriculture, Forestry, Fishing Industry, Mining, Construction

Appendix 5. Lead effects

Dependent variable: ODA commitments by OECD-DAC donors, US$				
	(1)	(2)	(3)	(4)
Ln one-year lead Chinese ODA	0.067***	0.013		
	(0.024)	(0.009)		
Zero one-year lead Chinese ODA dummy	0.837**	0.193		
	(0.391)	(0.127)		
Ln one-year lead Chinese OOF	0.029***	0.002		
	(0.006)	(0.003)		
Ln two-year lead Chinese ODA			0.050***	–0.015
			(0.019)	(0.010)
Zero two-year lead Chinese ODA dummy			0.650**	–0.219
			(0.331)	(0.145)
Ln two-year lead Chinese OOF			0.032***	0.005
			(0.006)	(0.003)
Pseudo R^2	0.006	0.725	0.006	0.723
Donor-Recipient dummies	No	Yes	No	Yes
Donor-sector dummies	No	Yes	No	Yes
Recipient-sector dummies	No	Yes	No	Yes
Donor-year dummies	No	Yes	No	Yes
Recipient-year dummies	No	Yes	No	Yes
Sector-year dummies	No	Yes	No	Yes
Donor	31	31	31	31
Recipient	130	130	130	130
Sector	13	13	13	13
Year	2000–2018	2000–2018	2000–2017	2000–2017
Observation	172,251	172,251	154,126	153,902

Notes: The table reports the PPML estimation results based on specification (1), using one-year lead Chinese ODA variables in Columns 1 and 2 and two-year lead Chinese ODA variables in Columns 3 and 4, instead of the lagged ODA variables. Columns 1 and 3 show the specification without multi-way fixed effects. Columns 2 and 4 introduce the full set of multi-way fixed effects. Standard errors are clustered at the donor–recipient–sector level.
***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.