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Development Goals, commercial interest and EU Aid-for-Trade☆

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ABSTRACT

The extent to which official development assistance (ODA) conforms to internationally agreed goals and principles of aid effectiveness may be influenced by donors' national interests. Disentangling the extent to which national ODA is motivated by development goals vs. commercial self-interest is difficult. European Union (EU) member states provide external aid through EU-level institutions and independently through national aid programs. Theory suggests pooled EU-level aid facilitates satisfying development effectiveness principles while bilateral ODA is more likely to reflect national interests. We investigate this hypothesis for a subset of ODA, aid for trade (AfT), provided by donors to recipient countries between 2002 and 2018. We find a strong, statistically significant positive relationship between AfT provided by EU donors and their exports to recipient countries. In contrast, AfT provided by EU institutions and non-European states enhances merchandise imports from recipient countries.

1. Introduction

The provision of bilateral official development assistance (ODA) reflects a mix of potential motives, ranging from addressing priority needs of recipients to providing global public goods that benefit many countries (e.g., combating climate change) and pursuit of donor country foreign policy objectives (e.g., manage migration flows, sustain alliances or garner international support in the UN) and/or commercial interests. Aid donors and recipient nations may coordinate and cooperate when targeting specific problems of a global nature or to realize economies of scale in pursuing shared sector- or issue-specific priorities. An example is the provision of aid to enhance the capacity of developing countries to benefit from trade opportunities. This is the objective of the global Aid for Trade (AfT) initiative, launched at the 2005 WTO ministerial conference. It mobilizes financial and technical assistance to reduce trade costs and bolster supply capacity in developing countries (Hoekman, 2011). Significant amounts of AfT have been provided since 2005, mostly allocated to improving economic infrastructure (transport, information and communications technology, and energy) and trade facilitation (OECD and WTO, 2022).

In this paper we analyze the relationship between AfT provided by European Union (EU) donor countries, both through bilateral channels and collectively through EU institutions, and bilateral exports and imports of goods and services to/from aid receiving countries. We contrast this with AfT provided by non-EU countries, motivated by two features of the institutional setting in the EU that differentiates trade and development policy from that in non-EU donors. First, in the EU development assistance is a shared competence, meaning that aid is provided both directly by EU member states and through European institutions. As a result, EU member states channel some of their ODA contributions via EU institutions that act on their behalf, reflecting the use of ODA as an instrument to pursue EU external policy objectives.

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Second, EU members have a common commercial policy that impedes their ability to use trade policy to pursue specific market access priorities of interest to their industries.

The common commercial policy is the result of compromises among EU member states, and thus cannot fully reflect the trade preferences (interests) of each member state. Similarly, there is limited scope for EU members to use development assistance funds that are channeled through EU institutions to promote national exports. These institutional features of EU trade and development policy are hypothesized to have two potential consequences: (i) AfT delivered by EU institutions is more likely to reflect the Paris principles of aid effectiveness than bilateral AfT provided by EU member states; and (ii) bilateral AfT of EU member states is more likely to promote national commercial interests than in non-EU donor countries. This is both because resources allocated to EU-level AfT cannot be used to promote specific national commercial interests and because bilateral AfT provided by EU member states may serve in part as a surrogate for national trade policy as an instrument to support exports. As discussed in the next section, there has been extensive research on the effects of AfT, but this has not considered the potential interplay between national-level aid and assistance provided through EU institutions as a determinant of the bilateral trade effects of AfT.

Using data on AfT provided to recipient countries between 2002 and 2018, we find that bilateral AfT increases exports of EU member state donors to recipients, for both goods and services. AfT provided by EU institutions and non-EU countries shows a pattern that is more consistent with the purported purpose of AfT: to boost recipient countries' exports and facilitate trade more generally. This result is consistent with the hypothesized political economy incentives associated with the institutional framework governing EU trade and development policy.

The paper proceeds as follows. Section 2 discusses our hypotheses and related literature. Section 3 describes the data used for empirical analysis. Section 4 presents the estimation framework and methodology. Section 5 discusses the results. Section 6 concludes.

2. Related literature and hypotheses

The relationship between aid and trade has been a long-standing subject of analysis and debate. Aid may support greater net exports from recipient nations (Hühne et al., 2014), sourcing of goods and services from donor countries (Martínez-Zarzoso et al. 2014) and affect trade through induced macroeconomic effects such as an increase in productive capacity of exportables (Cali and te Velde, 2011). Conversely, it may have negative consequences for exports if it contributes to "Dutch disease" and associated overvaluation of exchange rates in recipient countries (Rajan and Subramanian, 2011).

Bilateral ODA decisions reflect a range of potential factors including donor politics/ideology (Dreher et al. 2015); foreign policy objectives (Hoeffler and Outram, 2011); a desire to target specific (types of) countries, e.g., because of historical links (Osei et al., 2004; Nelson and Silva, 2012); aid activities of other donors as well as recipient countries' priorities (Nunnenkamp et al. 2013; Davies and Klasen, 2019). Disentangling motivations is generally difficult. Younas (2008), for example, finds that more aid is provided to recipients who import capital goods, supporting an "export benefit" motive for aid, but concludes that political and strategic considerations dominate aid allocation.

While there is ambiguity regarding the major transmission channels for the trade-enhancing effects of AfT, Suwa-Eisenmann and Verdier (2007) summarize these as comprising the general effects of aid in recipient countries, the result of aid directly tied to trade, and/or effects emanating from aid reinforcing bilateral economic and political relationships. Aid can improve the export capacity of recipient countries by relaxing supply bottlenecks and reducing trade costs. AfT may increase the attractiveness of recipient country products in destination markets by enhancing the quality of the goods and by improving their price competitiveness by reducing the costs of trading (Busse et al. 2012). It can help build and consolidate mutual trust and familiarity between trading partners through customer relationships and distribution channels (Nowak-Lehmann et al. 2013). AfT can also enhance trade by improving trade policy institutions and trade-related infrastructure (Hoekman, 2011).

Until the late 1990s, a large share of ODA was linked to trade because procurement of goods and services financed by aid was tied to sourcing from donor countries.[1] Insofar as aid is associated with the procurement of goods and services in the donor country it may influence bilateral trade.[2] The 2005 Paris Declaration on Aid Effectiveness, committing donors to align aid to priorities defined by recipients (country ownership) included reductions in the share of tied aid as an indicator of aid effectiveness. After increasing from 46 to 76 percent between 2000 and 2007 (Clay et al. 2009), the average share of untied bilateral aid has hovered around 80 percent for OECD countries. In practice the share of de facto tied aid may be substantially higher as even if untied, aid may continue to be allocated to national suppliers through the procurement processes used to award contracts. Meeks and Craviotto (2021) conclude that 52 percent of all contract awards for untied aid in 2018 went to suppliers in the donor country; for nine donor countries, the share was over 80 percent.

As a category of ODA that explicitly targets trade, not surprisingly AfT has been found to be associated with greater trade. The conclusions from research investigating the AfT-trade relationship depend on the methodology used, time period, donor-recipient country coverage and unit of analysis (aggregate vs. bilateral trade; type of AfT projects considered). Abstracting from the specific channels, studies have generally found a positive relationship between AfT and export performance of both recipient and donor countries (Cali and te Velde, 2011; Vijil and Wagner, 2012; Nowak-Lehmann et al. 2013; Bearce et al. 2013; Pettersson and Johansson, 2013; Cadot et al. 2014; Nathoo et al. 2021). Recent research that controls for omitted variables, multilateral resistance and unobserved heterogeneity through dyadic, country- and time-fixed effects finds smaller effects than earlier studies or no effects (Martínez-Zarzoso et al. 2014; Hoekman and Shingal, 2020).

Although average or aggregate effects may be small or negligible overall, there is also significant heterogeneity. Trade may increase for some dyads and be associated with the characteristics of specific donors, specific types of AfT and the way bilateral programs and projects are implemented. The more general literature pointing to the importance of heterogeneity associated with donor-recipient-type of aid (Osei et al. 2004, Clist 2011) applies as well to AfT. Brazys (2013) analyzes bilateral AfT programs of 19 OECD nations using a gravity regression framework and finds significant heterogeneity in effects on exports of recipients that

[1] Tying can also occur through tied aid credits: state-supported export finance providing more favorable terms to buyers in developing countries. Procurement-tied concessional credits are ODA eligible and contribute to a donor's overall ODA performance if they have at least a 25 percent grant element (Fritz and Raza, 2017).

[2] This need not imply an effort to reduce (or result in a reduction of) the effectiveness of aid in attaining either a bilateral or globally defined objective. Gulrajani and Calleja (2021) distinguish between a "principled interest" of a donor in furthering the security, stability, and prosperity of the world even if this is associated with benefits that also accrue to the donor nation, as opposed to self-serving foreign policy or commercial interests Baydag et al. (2018) conclude that donors generally follow a mixture of development-oriented and strategic approaches in the allocation of aid.

differ across donors. He complements his analysis with four case studies (Germany, Japan, Norway and the US) that suggest differences in AfT impacts on recipient exports are likely to be associated with donor heterogeneity and differences in the type of projects funded.[3]

2.1. EU trade and development policy

The empirical literature on the trade effects of AfT, while extensive, does not consider the possible implications of EU member states having a common commercial policy and providing AfT both bilaterally (through national development assistance programs) and collectively through EU institutions. Because the EU is a common market, trade policy, nonreciprocal trade preferences and preferential trade agreements (PTAs) apply to the EU as a whole—a member state cannot condition access to its market on specific bilateral market access concessions by a partner country. The common commercial policy is the outcome of a political process and reflects compromises among EU members. Thus, EU trade policy will not (and cannot) fully reflect the preferences of each member state.

In contrast to the supranational nature of trade policy, development policy in the EU is a shared competence, meaning that the EU institutions and EU member states pursue development cooperation in parallel.[4] EU member states allocate around three-quarters of their aid bilaterally to recipients or to specialized multilateral agencies, with the remainder provided through EU institutions (mostly the European Commission and European Investment Bank). This ratio of aid provided through the EU institutions has been stable over the time period considered in this paper (around 25%).

EU member state development policies reflect differences in national comparative advantages, political preferences of governments, historical relationships and foreign policy priorities. Starting in 2005 with the European Consensus on Development calling for poverty reduction to be the core objective of external development assistance programs, there have been efforts to achieve greater coherence between national and EU-level development policy. Following the 2016 Global Strategy calling for greater alignment of development policy with EU strategic goals (Orbie 2020), EU development policy became more instrumentalized in the service of European economic and security interests (Furness et al. 2020).

Insofar as there are shared goals, EU member states have a common interest in delegating some activities to EU institutions to benefit from economies of scale and facilitate coordination with specialized international organizations with comparative advantage in a given area. Acting jointly may also increase the prospects of influencing how global initiatives are designed and implemented. In addition to providing ODA via EU-level institutions, member states also delegate to other multilateral agencies such as the World Bank or UN bodies. This involves both direct contributions to multilateral development agencies and so-called double delegation – contributions that are channeled through EU institutions. Michaelowa et al. (2017) argue that such double delegation reflects capacity constraints and lack of specific expertise at the EU level. More broadly, allocating a share of ODA to multilateral agencies reflects the types of considerations studied in the development literature why donors may prefer to use multilateral bodies, such as realizing benefits of economies of scale, burden sharing and greater perceived legitimacy insofar as recipients regard multilateral assistance to be less politicized.[5] Michaelowa et al. (2018) find that EU member state governments support transfers of aid to multilateral bodies in areas where the European Commission has weak capacity as an aid donor and where EU members have no strategic interests at stake.

Carbone and Keijzer (2016) and Keijzer and Verschaeve (2018) point to divergent development cooperation approaches across EU members and the European Commission that impede the "Europeanization" of national development policies.[6] Orbie and Carbone (2017), summarizing the findings of a set of papers investigating the subject, conclude there is only limited evidence of Europeanization of development policy in the EU, reflecting differences in national preferences and priorities. Delputte et al. (2017) point to numerous instances of failure to realize Europeanization of ODA. Brazys and Lightfoot (2017) focus in this context specifically on AfT, tracing the extent and speed of convergence of AfT programs of three EU members (Germany, Ireland and the Czech Republic) with the priorities defined by the European Commission in pursuing the global AfT initiative. They conclude there is gradual convergence but that significant heterogeneity remains.

The limited extent of Europeanization of development policy found in the literature suggests significant discretion for member states to define and implement national AfT development assistance programs. The absence of a common development cooperation policy provides EU countries with a potential mechanism to use bilateral AfT to pursue national as well as shared EU priorities. Continued tying of aid by EU member states (e.g., Meeks and Craviotto. 2021), complementing and potentially linked to the use of other instruments such as trade promotion or export credit and guarantee agencies,[7] suggests bilateral aid may in part reflect national commercial interests. For some EU states this is an explicit goal, articulated in national development assistance strategies that make export promotion an objective, in addition to supporting the development of recipient countries.[8]

The potential incentive to use AfT for national commercial interest is bolstered by the need for EU institutions to act in the interest of the Union as a whole. Although larger EU countries will have greater weight in determining EU aid policy, seeking to skew aid allocations to disproportionately benefit specific member state export interests will be constrained because of the need to balance any such export benefits across 27 member states. As mentioned in the Introduction, this constraint can be expected to support an allocation of AfT by EU institutions that conforms more to the Paris principles of aid effectiveness.[9]

[3] Martínez-Zarzoso et al. (2017) find that AfT is associated with heterogenous effects, promoting aggregate goods exports for the lower quantiles of the conditional export distribution. Hoekman and Shingal (2021) find a similar result for services trade. Nishitateno and Umetani (2022) find both Japan and France to have positive AfT elasticities with respect to merchandise exports (relative to other donors), while German and UK aid is not associated with any positive differential effects on merchandise trade in their results. Other papers finding significant heterogeneity in the impacts of aid (not AfT) across different donors include Wako (2018), focusing on growth effects, and Kikolo (2018), focusing on changes in trade policy. Research has also found that AfT directed at trade facilitation generally has stronger trade promoting effects (Cadot et al. 2014).

[4] EU level development policy is a part of the EU's Common Foreign and Security Policy, funded through the Neighborhood, Development and International Cooperation Instrument and implemented by the European Commission.

[5] E.g., Martens, et al. 2002; Neumayer, 2003; Dür, 2012; Schneider and Tobin, 2013; McLean, 2015; Findley et al. 2017.

[6] In general, Europeanization involves the transfer of policymaking from the member state level to European institutions and more generally convergence and coherence between actions at the national level with EU-level goals and policies.

[7] Detailed product-level panel data on trade promotion and export finance-related support are not available on a comparable basis for a broad cross-section of countries. Both types of activities are pursued by EU member states, but no mandate has been given to an EU institution to pursue either type of activity on behalf of the EU as a whole (see Bilal, 2021).

[8] For example, one objective of Dutch development cooperation is to support the internationalization of national businesses (Netherlands, 2013; Roodenburg, 2014). Consistent with this objective, the period after 2015 witnessed an increase in both Dutch bilateral aid and exports of goods and services to recipients.

[9] Kim and Jensen (2018) show that EU aid is most similar to the foreign aid policies of the smaller Nordic members, Ireland and the Netherlands, and that human rights are associated with EU aid flows.

The differential incentives that are expected to be observable in the relationship between AfT and trade also apply to non-EU countries, but are expected to be weaker. While any donor country may need to balance commercial interests with the pursuit of – and support for – the development objectives of recipients or global public goods, non-EU countries do not confront the need to allocate part of their development assistance to a common institution (such as the European Commission) in which they cannot earmark funds to serve narrow national interests. Moreover, non-EU countries control their trade policy, obviating incentives to use AfT as an instrument to support exports to countries receiving aid. Non-EU countries can design their trade policy to address the market access priorities of their specific industries through trade agreements. A corollary is that non-EU countries should have less incentive to use AfT as a substitute for trade policy.

A final hypothesis that guides our empirical analysis concerns the differential scope for AfT to be used as an instrument to promote exports of goods as opposed to services. As discussed below, in part AfT involves technical assistance and capacity-building services that may lend themselves more to de facto if not de jure tying of aid than procurement of goods, but the bulk of AfT goes to developing economic infrastructure or building productive capacity. This sectoral allocation of AfT is potentially associated with the comparative advantage of EU member states in infrastructure-related activities vs. productive capacity-building assistance in non-services sectors.

3. Data

Data on official development assistance committed and disbursed by donor countries in recipient countries are drawn from the OECD Secretariat Creditor Reporting System (CRS) database. This covers a large sample of countries and sectors starting in 1995. AfT is reported as a distinct category of total ODA. AfT in turn is sub-divided into three main types of projects and activities:

- Trade policy and regulation (TPR): technical assistance to strengthen trade policy institutions and trade-related regulations (e.g. helping countries to develop trade strategies or negotiate or implement trade agreements)
- Economic infrastructure (EI): trade-related infrastructure (e.g. building roads, ports, and telecommunications networks to connect domestic markets internally and to the global economy)
- Productive capacity building (PCB): activities that support the private sector in recipient countries to strengthen competitiveness on international markets and diversify their exports, including three services sectors (banking and other financial services, business and other services, and tourism).

We merge the CRS data on AfT flows with bilateral goods trade data sourced from BACI (Gaulier and Zignago, 2010) for 2002–2018.

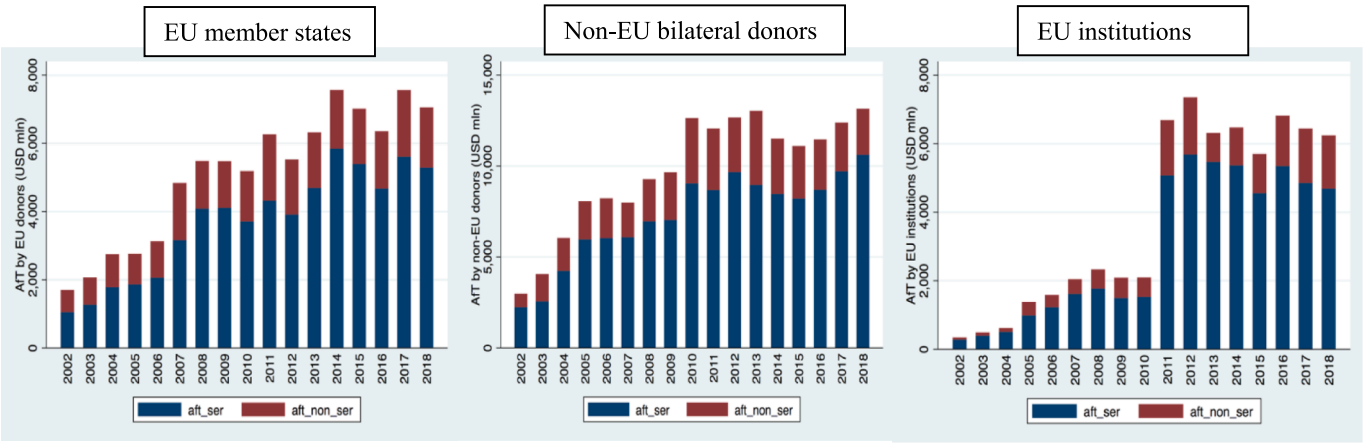

Figure 1. AfT by type: EU member states, non-EU donors and EU institutions, 2002–2018. *Source:* OECD CRS database; own calculations. *Note:* AfT allocated to services sectors vs. AfT allocated to other sectors.

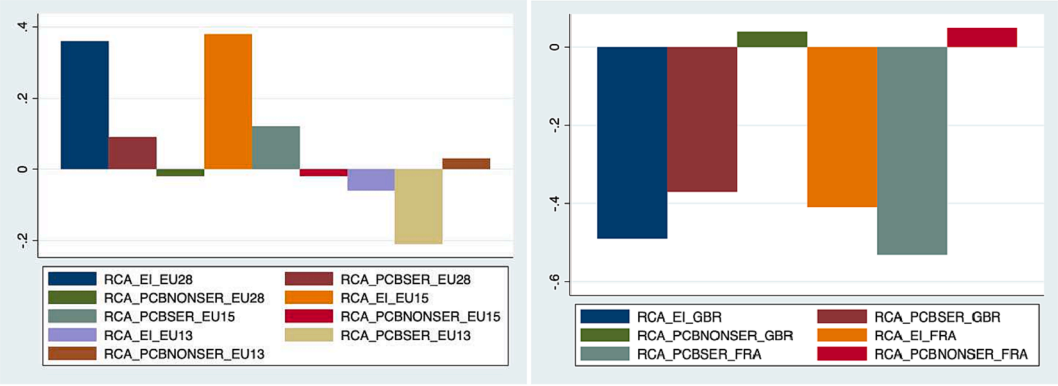

Figure 2. Normalized RCA indices across AfT-type by different EU donors (2018). *Source:* ITPDE database; own calculations. *Notes*: RCA: revealed comparative advantage. EI: economic infrastructure; PCB: productive capacity building; SER: services activities; FRA: France; GBR: United Kingdom. EU15 span EU members that joined the EU before 2004; EU 13 comprise the countries acceding to the EU after 2004.

Bilateral services trade data are taken from Francois and Pindyuck (2013) through 2010 and from OECD ITSS thereafter.[10] We determine if two countries have a preferential trade agreement (PTA) from the WTO RTA-IS database, which distinguishes between PTAs covering only merchandise trade notified under Article XXIV of the GATT (termed goods trade agreements or GTAs) and those that also include services trade as notified under Article V of the GATS (services trade agreements or STAs).

The bilateral aid sample for empirical analysis comprises 40 donors and over 150 recipients for the 2002–2018 period. The data include 25 EU member state donors. The UK is included as an EU member given that our sample period runs through 2018. The sample of donor-recipient countries is reported in Annex 1. Summary statistics are reported in Annex 2. The effective sample for regression analysis has 20,000 observations on services trade and 26,000 observations on merchandise trade in addition to the aid variables.

As mentioned, EU member states allocate about three-quarters of their aid bilaterally to recipients or to multilateral agencies, with the remainder provided through EU institutions (mostly the European Commission and European Investment Bank). These ratios are stable over the period considered in the analysis. During the sample period total ODA disbursed by EU members states was US$500 billion, with that of non-EU countries in the sample nearly 40 percent larger at US$ 690 billion. Total AfT disbursements increased from US$9 bn in 2002 to an average of US$21 bn in 2006–2008, rising to US$40 bn in 2015 and US$58 billion in 2017 (OECD and WTO, 2017). Most aid classified under AfT involves economic infrastructure projects in sectors such as transport and telecommunications networks. Asian and African countries account for around 40 percent each of global AfT disbursed since 2002. AfT accounted for 17.5 percent of total ODA for the EU member states (US$87 bn) and 24 percent for the non-EU countries (US$166 bn).

Total AfT disbursed by EU donors shows an upward trend over the sample period (Figure 1, left panel). Total AfT disbursed by non-EU donors displays an upward trend until 2010, with ups and downs thereafter and peaks in 2013 and 2018 (Figure 1, middle panel). EU and non-EU donors have a similar allocation pattern: infrastructure service sectors account for over 70 percent of total AfT. The countries receiving AfT also overlap to a great extent. The simple correlation between the sets of their recipient countries in terms of total AfT is 0.7. Germany and Japan are the largest bilateral donors among EU and non-EU countries, respectively. India was the largest recipient of AfT from both EU and non-EU donors during our sample period. Total AfT by EU institutions during the sample period comprised US$65 bn, accounting for 36.5 percent of total EU-level ODA and representing 42.7 percent of total EU AfT. EU institutions AfT more than quadrupled after 2010, averaging USD 6.5bn during 2011–2018 (Figure 1, right panel).

4. ODA, AfT and trade: Estimation strategy

We estimate the following equations in a structural gravity framework to examine the dyadic effect of aid on trade:

$$XijtG/S = exp(\alpha Aidijt + \beta PTAijt + \delta it + \delta jt + \delta ij) + \varepsilon ijt \quad (1)$$

$$MijtG/S = exp(\alpha Aidijt + \beta PTAijt + \delta it + \delta jt + \delta ij) + \varepsilon ijt \quad (2)$$

where $X_{ijt}^{G/S}$ is the value of exports of goods or services, respectively, from donor i to recipient j in year t; $M_{ijt}^{G/S}$ is the value of goods or services imports of donor i from recipient j in year t; Aid_{ijt} is the log of ODA from donor i to recipient j in year t, which we split into two parts, AfT and other types of aid (non-AfT); PTA_{ijt} is a dummy variable indicating if two countries are members of a preferential trade agreement notified to the WTO that spans either goods only or both goods and services (only the latter are used in regressions for trade in services); δ_{it}, δ_{jt} and δ_{ij} are donor-year, recipient-year and dyadic fixed effects, respectively; and ε_{ijt} is the error term. We estimate equations (1) and (2) using the Poisson pseudo maximum likelihood (PPML) estimator (Silva and Tenreyro, 2006) to account for zero values of the dependent variable and for heteroskedasticity-related concerns in estimation.

The three-way fixed effects in these specifications account for endogeneity in the AfT-trade relationship (Baier and Bergstrand, 2007; Baier et al. 2014), with the time-varying importer and exporter fixed effects also controlling for multilateral resistance and observed and unobserved time-varying importer- and exporter-specific determinants of bilateral trade. To accommodate zero AfT flows we adopt the methodology suggested by Wagner (2003) and define AfT_{ijt} as ln [max (1, AfT_{ijt})] and include a $NAfT_{ijt}$ dummy in the estimating equations, which takes the value of 1 when $AfT = 0$ and is zero otherwise. Note that the use of recipient-year fixed effects in equations (1) and (2) also controls for the effect of any third-party aid disbursed to a recipient on its bilateral trade with the donor.

We consider both AfT and non-AfT ODA; services and non-services AfT; and AfT in economic infrastructure, productive capacity building and trade policies and regulation sequentially in estimating equations (1) and (2). The disaggregated breakdown of AfT is motivated by differences in patterns of revealed comparative advantage (RCA) across countries, which may be reflected in the types of AfT provided. The RCA index[11] is used as an indicator of donor commercial interests in recipient countries. Figure 2 shows values of the normalized RCA for EU donor countries across different types of AfT over the period of analysis, differentiating between the EU28 as an aggregate, the pre-2004 EU15, the EU13 group of countries that acceded subsequently and France and the UK. These data suggest that the EU has a comparative advantage in exporting economic infrastructure and productive capacity-building-related services, that may in turn be reflected in AfT allocations. As we shall see in the results that follow, not unbundling the different components of AfT and working with more aggregate definitions mostly generates statistically insignificant trade effects.

Prima facie, we can only use data on AfT granted by EU member states in our analysis because we cannot allocate bilateral trade flows to AfT provided by EU institutions. This may be a source of bias as EU institutions accounted for more than 40 percent of total EU AfT over the 2002–2018 period. Given our hypothesis regarding the potential political economy drivers of AfT policy decisions, we need to include EU institutions-level bilateral AfT in the analysis. To do so we allocate total AfT provided by EU institutions (and its sub-types) by recipient and year to the 28 EU member states based on the share of each country in total EU general budget expenditure in that year. The "allocated" AfT is then used to examine the impact on EU member states' bilateral goods and services trade with the recipients between 2002 and 2018.

Note that the difference in the results for EU members vs. non-EU countries are of primary interest for our research question, as our conceptual framework suggests the AfT-trade relationship for EU and non-EU countries should be dissimilar, as should the relationship between AfT and trade for EU members and EU institutions. In the regression analysis we thus split the sample into EU and non-EU donors as we are not interested in comparing estimated coefficients across donor groups but in interpreting the values of the estimated trade effects in each case.

Given that we expect EU members to behave differently from non-EU donors because of the EU's common commercial policy and possibility to cooperate through EU institutions to pursue common development goals, pooling data for EU and non-EU donors when estimating

[10] Since our dependent services trade variable is aggregate services exports and imports, concerns from using different databases are likely to be minimal.

[11] The RCA index measures the importance of a country's sectoral exports in its total exports relative to the same ratio for total world exports. For cross-country and intertemporal comparison, the indices are normalized [using the formula (RCA-1)/(RCA+1)] so that the value of the index lies between −1 and +1, with positive values indicating a comparative advantage in exporting.

equations (1) and (2) would negate the hypothesis that EU members are different from other countries because they delegate a share of their aid effort to their common agent, the European Commission. In this sense, we argue that EU and non-EU aid emanate from different data generating processes. Thus, the assumption of variance homogeneity in the error term between the two groups, necessary if we were to pool the sample of EU and non-EU donors, would not hold, with associated implications for hypothesis testing (Schepers, 2015). We therefore estimate equations (1) and (2) separately for EU member states, non-EU donors and EU institutions.

5. Results and analysis

Results from estimating equations (1) and (2) using PPML are reported in Tables 1 and 2 for bilateral AfT granted by EU member states and by non-EU countries, respectively, and in Table 3 for AfT provided by EU institutions. Each table reports estimates for bilateral exports from donors to aid recipients (indicated by column label "X") and bilateral imports of donors from aid recipients (indicated by column label "M"), differentiating between services ("S"; columns 1–6 of each table), and goods ("G"; columns 7–12). In each case results are reported for AfT and for other (non-AfT) bilateral aid (the top third of each table); for AfT allocated to services and non-services sectors/activities (middle third of the tables); and for bilateral AfT disaggregated into different subcomponents – economic infrastructure, productive capacity-building in services, productive capacity building in non-services sectors, and support to improve trade policies and regulation (bottom third of each table).

For EU member states (Table 1), bilateral AfT is not associated with exports or imports of goods or services. However, we obtain a positive estimate for bilateral ODA that is not classified as AfT on services exports and merchandise imports (columns 1 and 10), both significant at the 1% level. Thus, at an aggregate level (i.e. without unbundling the different components of AfT), these results suggest that the EU's non-AfT development assistance may be more effective than AfT in promoting certain forms of bilateral trade with aid recipients, although a negative effect is observed on the EU's services imports from its recipients. The heterogeneity in these results is not surprising given that non-AfT ODA spans a broad range of sectors and activities, with impacts on trade flows, if any, that will be indirect.

AfT allocated to services activities has a positive and weakly significant (10% level) relationship with bilateral services exports to recipient countries (column 2) and a somewhat stronger (5% level) positive relationship with merchandise exports to recipients (column 8). On average, ceteris paribus, a doubling of EU donor-to-recipient AfT in services is associated with a 1.6 percent and 1.0 percent higher level of bilateral EU donor exports of services and merchandise, respectively. The positive coefficient estimate for AfT in services on exports reflects AfT allocated to economic infrastructure (columns 3 and 9). The positive effect on services exports is consistent with the revealed comparative advantage of EU member states in exporting economic infrastructure-related services to aid recipients (Figure 2, left panel). Similar results do not obtain for EU member states imports of goods or services from recipients, as reflected in insignificant coefficient estimates for AfT for economic infrastructure.[12] The existence of a PTA between an EU member state – as noted, PTAs are negotiated by the European Commission and apply to all EU member countries once implemented – and AfT recipients has a positive and strongly significant relationship with exports of both services (columns 1–3) and goods (columns 7–9) from EU donor countries to AfT recipient nations. A similar effect does not obtain for goods or services imports of EU donor nations from recipients. The size of the PTA coefficient estimates for EU donors' exports of goods is much smaller than for donor services exports, which may be associated with services trade commitments in EU PTAs extending beyond what was agreed in the WTO (compared to merchandise trade which is already more liberalized given successive rounds of multilateral negotiations at the WTO) and the comparative advantage of the EU in services. Overall, bilateral AfT of EU member states is associated with greater exports from the EU but not with imports from recipients.[13]

Analysis of AfT-trade relationships for the sample of non-EU countries reveals a different picture (Table 2). For non-EU donor nations, we find that bilateral AfT and its broad sub-types is not associated with greater bilateral services or merchandise exports to recipient countries (columns 1–3 and 7–9). We only observe a statistically significant positive relationship with donors' services exports for AfT allocated to trade policy and regulation (column 3). In contrast to the EU case, the coefficient estimates for PTAs are much smaller, about one half and one quarter those for the EU for merchandise and services exports, respectively. These differences may reflect the coverage of the PTAs that the EU negotiates with its trading partners, which tend to be more far-reaching than PTAs among non-EU sample countries and their aid recipients.

Non-EU AfT is similar to EU AfT in that the coefficients for imports of services from recipient countries generally lack statistical significance. However, we do not find a statistically significant positive relationship between non-EU donors' AfT and their exports of either goods or services to recipient countries in most regressions (with the exception of AfT allocated to trade policies and regulations, which is positively associated with bilateral services exports; column 3). There is a consistently strong positive relationship between non-EU AfT, for both services and non-services, and donor merchandise imports from recipients (columns 10–12). On average, ceteris paribus, a doubling of non-EU donor-to-recipient AfT is associated with a 4.4 percent increase in donor merchandise imports from recipients. The coefficient estimates are statistically significant at the 1% level for both AfT allocated to services and non-services, and their sub-types except for trade policies and regulation.[14] As with EU member states, the coefficient estimates for PTAs in the import regressions are not statistically significant, though unlike the results reported in Table 1, the non-EU PTA coefficient estimates for goods and services exports are more similar in magnitude (again reflecting the heterogeneity of PTA commitments in the non-EU sample).

These results suggest that AfT granted by non-EU member states may be more consistent with internationally agreed development objectives: enhancing the ability of developing countries to utilize export opportunities. This contrasts with the results for EU countries, where AfT appears to act more as a type of export promotion.[15]

Turning to AfT disbursed by EU institutions, we find a statistically

[12] EU AfT allocated to non-services sectors is associated with a negative impact on bilateral trade with the recipient in columns 2–3, 8–9 and 11–12 suggesting that such aid may be enhancing trade with third countries as an ergo omnes effect. From an export promotion perspective, this result also suggests that EU AfT may be better allocated towards services activities, economic infrastructure in particular, where the EU displays a strong revealed comparative advantage.

[13] One exception to this generalization is the strong positive impact of AfT allocated to trade policies and regulation on its bilateral imports of services from recipient countries; a doubling of this aid is associated with a 18.3% increase in recipients' services exports to donors, ceteris paribus and on average.

[14] Non-EU AfT allocated to productive capacity building in services sectors is associated with a negative impact on bilateral exports in columns 3 and 9 suggesting that such aid may be enhancing donors' exports to third countries at the expense of the recipient. The negative elasticities of non-EU donor bilateral exports and imports of services with respect to AfT in non-services activities and trade, policies and regulation, in columns 2 and 6 respectively, can be interpreted in the same way.

[15] All findings account for endogeneity in the AfT–trade relationship, as the estimations include three-way fixed effects. The results are qualitatively robust to allowing trade to respond to AfT with a one or two-period lag.

Table 1
Trade effects of EU member states AfT.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Variables	X^S_{ijt}			M^S_{ijt}			X^G_{ijt}			M^G_{ijt}		
STA_{ijt}	0.931**	0.948**	0.962**	−0.064	−0.066	−0.074						
	(0.365)	(0.361)	(0.357)	(0.807)	(0.807)	(0.807)						
$ln(AfT_{ijt})$	0.003			−0.001			0.006			−0.003		
	(0.011)			(0.012)			(0.005)			(0.005)		
$ln(Non\_AfT_{ijt})$	0.052***	0.047***	0.051***	−0.046***	−0.045***	−0.048***	0.000	−0.002	−0.001	0.016***	0.014**	0.013**
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.005)	(0.00)	(0.005)	(0.006)	(0.006)	(0.006)
$ln(AfT\_SER_{ijt})$		0.016*			−0.005			0.010**			−0.001	
		(0.011)			(0.011)			(0.004)			(0.004)	
$ln(AfT\_NONSER_{ijt})$		−0.036***			−0.003			−0.011*			−0.016***	
		(0.014)			(0.015)			(0.006)			(0.006)	
$ln(AfT\_EI_{ijt})$			0.048***			−0.018			0.009**			−0.005
			(0.010)			(0.012)			(0.004)			(0.004)
$ln(AfT\_PCB\_SER_{ijt})$			−0.020			0.004			0.002			0.004
			(0.016)			(0.014)			(0.005)			(0.005)
$ln(AfT\_PCB\_NONSER_{ijt})$			−0.028**			−0.007			−0.010*			−0.015***
			(0.014)			(0.015)			(0.006)			(0.006)
$ln(AfT\_TPR_{ijt})$			−0.087***			0.183***			−0.009			−0.016
			(0.028)			(0.053)			(0.012)			(0.011)
GTA_{ijt}							0.432***	0.434***	0.432***	0.099	0.102	0.101
							(0.080)	(0.081)	(0.081)	(0.091)	(0.091)	(0.091)
Observations	17,510	17,510	17,510	18,251	18,251	18,251	20,867	20,867	20,867	19,831	19,831	19,831
Pseudo R2	0.951	0.951	0.951	0.945	0.945	0.945	0.989	0.989	0.989	0.990	0.990	0.990

Note: All regressions include donor-time; recipient-time and donor-recipient fixed effects. Standard errors clustered by donor-recipient-year. The estimated coefficients of NAfT dummies are not reported. GTA = Goods trade agreements; STA = Services trade agreements. Significance: *(10%), **(5%), ***(1%).

Table 2
Trade effects of non-EU donors' AfT.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Variables	X^S_{ijt}			M^S_{ijt}			X^G_{ijt}			M^G_{ijt}		
STA_{ijt}	0.238***	0.237***	0.229***	0.126	0.115	0.130*						
	(0.079)	(0.079)	(0.077)	(0.080)	(0.079)	(0.077)						
$ln(AfT_{ijt})$	−0.005			−0.004			−0.009			0.044***		
	(0.029)			(0.026)			(0.009)			(0.009)		
$ln(Non\_AfT_{ijt})$	−0.081**	−0.067*	−0.072**	0.114***	0.104***	0.134***	0.008	0.006	0.007	0.006	−0.000	0.002
	(0.036)	(0.036)	(0.035)	(0.038)	(0.039)	(0.038)	(0.008)	(0.008)	(0.009)	(0.012)	(0.011)	(0.011)
$ln(AfT\_SER_{ijt})$		−0.014			−0.005			0.005			0.028***	
		(0.031)			(0.024)			(0.007)			(0.008)	
$ln(AfT\_NONSER_{ijt})$		−0.062*			0.046			−0.003			0.065***	
		(0.034)			(0.039)			(0.010)			(0.011)	
$ln(AfT\_EI_{ijt})$			−0.017			0.004			0.014			0.019***
			(0.029)			(0.023)			(0.007)			(0.007)
$ln(AfT\_PCB\_SER_{ijt})$			−0.064*			−0.023			−0.025*			0.036***
			(0.037)			(0.039)			(0.013)			(0.013)
$ln(AfT\_PCB\_NONSER_{ijt})$			−0.031			0.026			−0.010			0.062***
			(0.033)			(0.039)			(0.011)			(0.011)
$ln(AfT\_TPR_{ijt})$			0.362***			−0.396***			0.030			0.044
			(0.076)			(0.099)			(0.031)			(0.031)
GTA_{ijt}							0.246***	0.235***	0.232***	−0.029	−0.003	−0.008
							(0.029)	(0.029)	(0.028)	(0.033)	(0.032)	(0.032)
Observations	2,017	2,016	2,016	1,679	1,679	1,679	4,971	4,971	4,971	4,849	4,849	4,849
Pseudo R2	0.987	0.987	0.987	0.981	0.981	0.981	0.998	0.998	0.998	0.998	0.998	0.998

Note: All regressions include donor-time; recipient-time and donor-recipient fixed effects. Standard errors clustered by donor-recipient-year. The estimated coefficients of NAfT dummies are not reported. GTA = Goods trade agreements; STA = Services trade agreements. Significance: *(10%), **(5%), ***(1%).

Table 3
Trade effects of EU institutions' AfT.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Variables	X^S_{ijt}			M^S_{ijt}			X^G_{ijt}			M^G_{ijt}		
$\ln(AfT_{ijt})$	−0.029			−0.094**			−0.015*			0.036***		
	(0.033)			(0.041)			(0.009)			(0.009)		
$\ln(Non\_AfT_{ijt})$	0.021	0.034	0.015	−0.104***	−0.108***	−0.121***	−0.003	−0.002	−0.001	0.001	−0.000	−0.000
	(0.041)	(0.042)	(0.039)	(0.039)	(0.040)	(0.041)	(0.012)	(0.012)	(0.012)	(0.012)	(0.011)	(0.011)
$\ln(AfT\_SER_{ijt})$		0.008			−0.063			−0.019*			0.029***	
		(0.032)			(0.040)			(0.010)			(0.010)	
$\ln(AfT\_NONSER_{ijt})$		−0.144***			−0.008			−0.000			0.027**	
		(0.050)			(0.059)			(0.013)			(0.011)	
$\ln(AfT\_EI_{ijt})$			−0.016			−0.079*			−0.014			0.029***
			(0.034)			(0.043)			(0.011)			(0.011)
$\ln(AfT\_PCB\_SER_{ijt})$			0.017			0.056			−0.018			0.003
			(0.038)			(0.052)			(0.013)			(0.014)
$\ln(AfT\_PCB\_NONSER_{ijt})$			−0.116**			−0.001			0.002			0.026**
			(0.054)			(0.060)			(0.014)			(0.011)
$\ln(AfT\_TPR_{ijt})$			−0.175			−0.184			0.006			0.184***
			(0.142)			(0.157)			(0.047)			(0.054)
Observations	15,335	15,335	15,335	16,003	16,003	16,003	82,431	82,431	82,431	73,771	73,771	73,771
Pseudo R2	0.950	0.951	0.951	0.945	0.945	0.945	0.996	0.996	0.996	0.994	0.994	0.994

Note: All regressions include donor-time; recipient-time and donor-recipient fixed effects. Standard errors clustered by donor-recipient-year. The estimated coefficients of NAfT and PTA dummies are not reported. GTA = Goods trade agreements; STA = Services trade agreements. Significance: *(10%), **(5%), ***(1%).

significant positive coefficient estimate for merchandise imports by the EU from recipient countries (Table 3, column 10). On average a doubling of EU institutions-to-recipient AfT is associated with a 3.6 percent increase in donors' merchandise imports from recipients. This is driven by AfT in both services and non-services sectors (column 11), as well as AfT allocated to economic infrastructure, productive capacity building in non-services and trade policies and regulation (column 12). There is no statistically significant positive relationship between EU institutions AfT or its sub-types and recipients' services trade or merchandise imports. Thus, much like in the case of non-EU donors, EU institutions AfT facilitates merchandise exports of recipient countries.

5.1. Additional analysis

The findings in the literature regarding the importance of donor heterogeneity suggests there may be differences in the sectoral allocation of AfT across EU members and/or in the choice of recipients. For instance, EU-level AfT allocations may be designed in part to compensate for historical relationships that may govern the choice of aid recipients for countries such as France and the UK with former colonies. We therefore re-run the analysis for the UK and France separately, aggregating the other 26 EU countries into one group. In a similar vein, we decompose EU AfT into aid provided by the set of countries that were members as of 1995 (the EU15) and more recently acceded (post-2004) member states (the EU13). The latter have less of a history in providing development assistance and have different priorities or objectives that motivate aid allocations than the EU15, which encompasses long-standing providers of ODA. These sub-regressions are also motivated by differences in comparative advantage between the EU15 and the EU13 across types of AfT sectors (Figure 2, left panel). While the EU15 has a revealed comparative advantage in exporting services underlying economic infrastructure and productive capacity building to aid recipients, the EU13 has a comparative advantage in merchandise exports.

Results, reported in Table 4, suggest that the relationship between EU member states' AfT and exports is driven by France and the UK. This is not surprising in the case of goods, given the revealed comparative advantage that both countries enjoy in exporting merchandise to their aid recipients (Figure 2, right panel). At the same time, French and UK AfT allocated to productive capacity building in services is associated with greater bilateral services imports from AfT recipients, a result not observed for the other EU member states. This result is also consistent with the lack of revealed comparative advantage of both countries in economic infrastructure and productive capacity building-related services (Figure 2, right panel). In contrast to the findings on average AfT by EU member states overall, British and French AfT for trade policies and regulation also (weakly) enhances their merchandise imports from recipients.

Both EU15 and British and French AfT allocated to trade policies and regulation is associated with services imports from recipients, a finding also observed for the full sample of EU bilateral donors. Moreover, AfT allocated to productive capacity building in non-services by the EU13 is associated positively with their imports of services from and merchandise exports to AfT recipients,[16] which is consistent with their revealed comparative advantage in exporting manufactured goods and disadvantage in economic infrastructure and productive capacity building-related services (Figure 2). These findings illustrate that unbundling services AfT into sub-types is important for examining the trade effects of AfT and to recognize there is heterogeneity across individual EU member states. While this heterogeneity is to be expected, it suggests that examining whether EU member states are more likely to use AfT as an instrument to support commercial interests than the EU institutions

[16] For the UK and France, a similar finding with respect to bilateral services imports is obtained for AfT allocated to productive capacity building in services and AfT for trade policies and regulation.

Table 4
Additional analysis.

	United Kingdom & France				EU15				EU13			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Variables	X^S_{ijt}	M^S_{ijt}	X^G_{ijt}	M^G_{ijt}	X^S_{ijt}	M^S_{ijt}	X^G_{ijt}	M^G_{ijt}	X^S_{ijt}	M^S_{ijt}	X^G_{ijt}	M^G_{ijt}
ln(AfT_EI$_{ijt}$)	0.095***	−0.095***	0.033***	0.006	0.038***	−0.021*	0.009*	−0.008*	−0.674*	−0.145	−1.429***	−0.628***
	(0.013)	(0.012)	(0.008)	(0.005)	(0.011)	(0.012)	(0.005)	(0.004)	(0.399)	(0.486)	(0.212)	(0.206)
ln(AfT_PCB_SER$_{ijt}$)	−0.039*	0.037**	0.008	0.014	−0.030	0.023	−0.010*	−0.001				
	(0.021)	(0.016)	(0.009)	(0.009)	(0.018)	(0.017)	(0.006)	(0.005)				
ln(AfT_PCB_NONSER$_{ijt}$)	−0.015	0.001	−0.028**	−0.022**	−0.014	−0.016	−0.002	−0.011*	−0.098	0.318**	0.165*	−0.028
	(0.019)	(0.017)	(0.011)	(0.010)	(0.015)	(0.016)	(0.007)	(0.006)	(0.138)	(0.145)	(0.091)	(0.062)
ln(AfT_TPR$_{ijt}$)	−0.036	0.172**	−0.089**	0.048*	−0.119***	0.211***	−0.015	−0.016				
	(0.052)	(0.080)	(0.035)	(0.026)	(0.028)	(0.065)	(0.012)	(0.010)				
Observations	2,130	2,396	2,600	2,568	14,673	15,334	16,884	16,061	2,396	2,429	3,764	3,528
Pseudo R2	0.980	0.977	0.992	0.995	0.950	0.942	0.989	0.990	0.957	0.951	0.979	0.991

Note: The table reports the results of the most disaggregated regressions for different EU donor sub-samples. All regressions include donor-time; recipient-time and donor-recipient fixed effects. Standard errors clustered by donor-recipient-year. The estimated coefficients of ln(Non_AfT$_{ijt}$), NAfT and the GTA/STA dummies are not reported. Significance: *(10%), **(5%), ***(1%).

and non-EU donor countries merits country-specific analysis. Such analysis can consider the idiosyncrasies of the domestic political economy drivers of aid allocation in a way that is not possible in a cross-country panel setting.

To further substantiate this argument, we consider the Nordic countries, whose aid disbursement is generally held to be most closely aligned with the Paris principles and should be less likely to use aid to further commercial interests in recipient countries. The patterns of bilateral AfT and Nordic exports of both goods and services after 2015 display substantial co-movement (Figure 3), providing suggestive evidence for our hypothesis even for these countries. This assessment is corroborated by a comparison of coefficient estimates for the pre- and post-2015 period in Figure 4. AfT allocated to economic infrastructure services in particular is associated with greater Nordic countries' exports of goods and services to recipient countries after 2015.[17]

6. Conclusion

EU member states provide external aid through EU-level institutions and independently through national aid programs. In this paper we assess whether pooled EU-level aid is more likely to conform with internationally agreed aid effectiveness principles than bilateral AfT of EU member states, motivated by the hypothesis that the existence of a common commercial policy and the ability to allocate a share of national ODA for disbursement by EU institutions creates policy space to allocate AfT to support national commercial interests. Consistent with the hypothesis, we find a statistically significant positive relationship between AfT provided by EU donors and exports to recipient countries. Such a relationship is not observed for AfT provided by EU institutions and bilateral AfT provided by non-European states. For the latter set of donors, AfT enhances merchandise imports from the recipient countries.

The hypothesis and empirical analysis pertain to EU donor states as a group because all EU member states apply a common commercial policy while sharing competence for development policy with EU institutions. Our research question is whether on average the institutional setting that governs trade and development policy and that differentiates EU countries from other bilateral donor states is reflected in the design of national AFT programs. Clearly, national preferences and political economy dynamics will differ across individual EU countries, thus potentially affecting the type and magnitude of AfT provided to recipient countries. This raises a corollary question regarding the extent to which country-specific heterogeneous preferences influence AfT allocations by donor states. We make an initial attempt to explore such heterogeneity by distinguishing between the EU15 and the EU13, and between France and the UK (the two countries with the greatest number of former colonies) and other EU member states, focusing on disaggregated types of AfT and the revealed comparative advantage of donor states in goods and services associated with sub-categories of AfT. While this exercise does not relate directly to the main hypothesis that motivates the empirical analysis, the results are suggestive that broad patterns of specialization across sectors (a proxy for commercial interests) for the EU15, EU13 and France/UK are reflected in allocations of different types (categories) of AfT. This assessment is also supported by the event study-type analysis of Nordic countries' AfT. While only illustrative, these results suggest comparative research into the political economy drivers of AfT (and ODA) should consider the role played by the institutional setting for trade and development policy.

CRediT authorship contribution statement

Bernard Hoekman: Conceptualization, Methodology, Investigation,

[17] Although weakly significant at the 10% level, point estimates suggest a similar finding related to the effect of Nordic AfT allocated to productive capacity building in services on services exports.

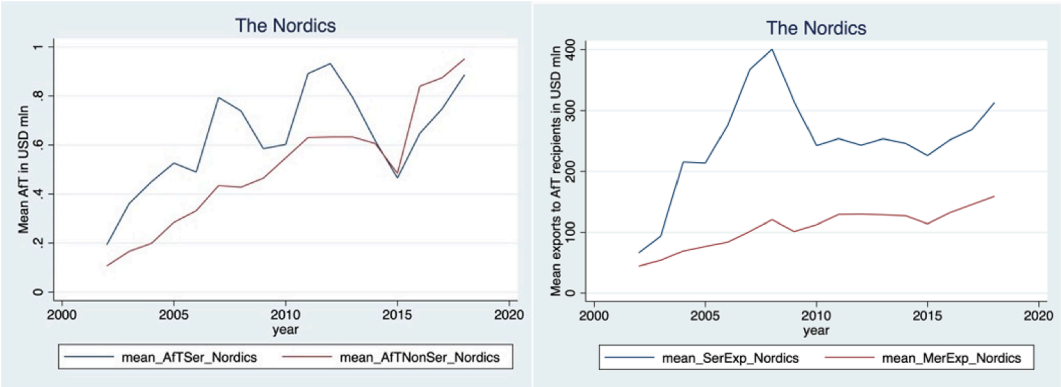

Figure 3. Bilateral AfT and exports of the Nordic countries, 2002–2018. Source: OECD CRS, BACI, Francois and Pindyuck (2013) and OECD ITSS databases; own calculations.

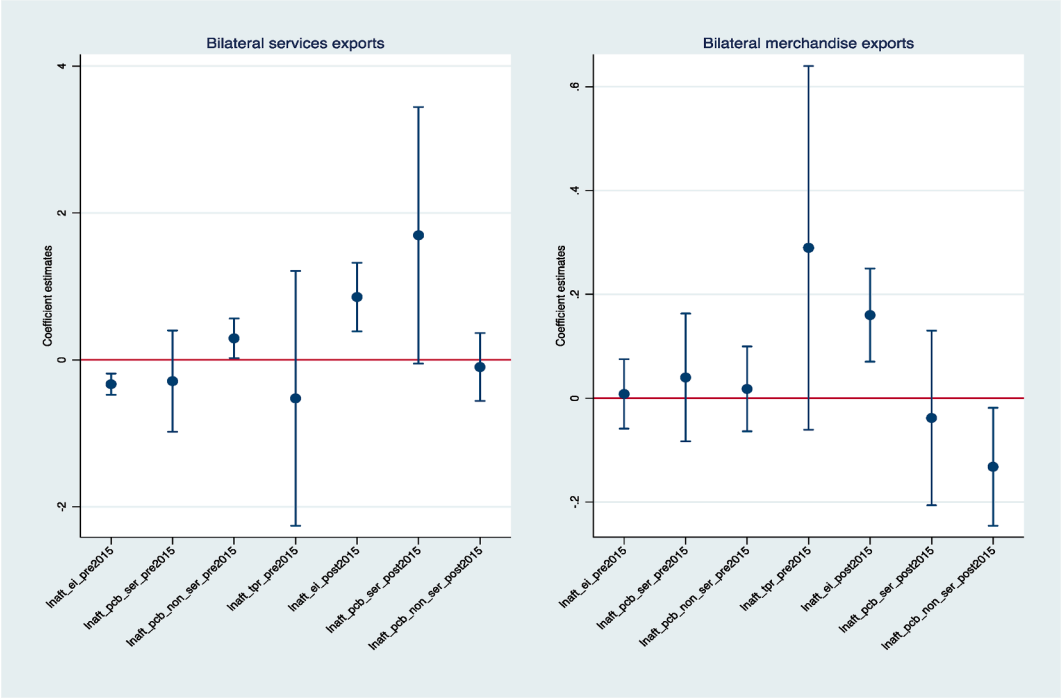

Figure 4. Trade effects of aid disbursed by the Nordic countries (pre- vs post-2015). Source: OECD CRS, BACI, Francois and Pindyuck (2013) and OECD ITSS databases; own calculations. Note: The figure presents the estimation results for equation (1) for the Nordic countries, with all AfT variables interacted with a binary dummy that takes the value one for all years after 2015. The dots represent the point estimates; the vertical bands are the 95% confidence intervals. The interaction term for lnaft_tpr was dropped in the regression output and hence is not shown in the figure.

Resources, Visualization, Funding acquisition. **Anirudh Shingal:** Conceptualization, Methodology, Software, Formal analysis, Data curation, Resources.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Annex 1. Sample countries

Services

Donors (EU): Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, and United Kingdom.

Donors (Non-EU): Australia, Canada, Iceland, Japan, New Zealand, Norway, Russia, South Korea, Switzerland, and United States.

Recipients: Afghanistan, Albania, Algeria, Angola, Anguilla, Antigua and Barbuda, Argentina, Armenia, Aruba, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, British Virgin Islands, Brunei-Darussalam, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Cayman Islands, Central African Republic, Chad, Chile, China, Colombia, Comoros, Congo, Cook Islands, Costa Rica, Croatia, Cuba, Cyprus, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Fiji, French Polynesia, Gabon, Gambia, Georgia, Ghana, Gibraltar, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, India, Indonesia, Iran, Iraq, Israel, Jamaica, Jordan, Kazakhstan, Kenya, Kuwait, Kyrgyzstan, Laos, Lebanon, Lesotho, Liberia, Libya, Macao, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Mauritania, Mauritius, Mexico, Micronesia, Moldova, Mongolia, Montenegro, Montserrat, Morocco, Mozambique, Myanmar, Namibia, Nepal, Netherlands Antilles, New Caledonia, Nicaragua, Niger, Nigeria, North Korea, Northern Mariana Islands, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Qatar, Rwanda, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, Solomon Islands, Somalia, South Africa, South Sudan, Sri Lanka, St. Helena, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Sudan, Suriname, Syria, Tajikistan, Tanzania, Thailand, Timor-Leste, Togo, Tokelau, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Turks and Caicos Islands, Tuvalu, Uganda, Ukraine, United Arab Emirates, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, West Bank and Gaza, Yemen, Zambia, and Zimbabwe.

Non-Services

Donors (EU): Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, South Korea, Spain, Sweden, and United Kingdom.

Donors (Non-EU): Australia, Canada, Iceland, Israel, Japan, Kazakhstan, Kuwait, New Zealand, Norway, Russia, Saudi Arabia, South Korea, Switzerland, Thailand, Turkey, United Arab Emirates, and United States.

Recipients: Afghanistan, Albania, Algeria, Angola, Anguilla, Argentina, Armenia, Aruba, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia, and Herzegovina, Brazil, British Virgin Islands, Brunei-Darussalam, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Cayman Islands, Central African Republic, Chad, Chile, China, Colombia, Comoros, Congo, Cook Islands, Costa Rica, Croatia, Cuba, Cyprus, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Ethiopia, Fiji, French Polynesia, Gabon, Gambia, Georgia, Ghana, Gibraltar, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, India, Indonesia, Iran, Iraq, Israel, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Lebanon, Liberia, Libya, Macao, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Mauritania, Mauritius, Mexico, Micronesia, Moldova, Mongolia, Montenegro, Montserrat, Morocco, Mozambique, Myanmar, Nauru, Nepal, Netherlands Antilles, New Caledonia, Nicaragua, Niger, Nigeria, Niue, North Korea, Northern Mariana Islands, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Qatar, Rwanda, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, Solomon Islands, Somalia, South Africa, South Sudan, Sri Lanka, St. Helena, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Sudan, Suriname, Syria, Tajikistan, Tanzania, Thailand, Timor-Leste, Togo, Tokelau, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Turks and Caicos Islands, Tuvalu, Uganda, Ukraine, United Arab Emirates, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Wallis and Futuna, West Bank and Gaza, Yemen, Zambia, and Zimbabwe.

Annex 2. Summary statistics

	SERVICES					NON-SERVICES				
Variable	**Obs.**	**Mean**	**Std. dev.**	**Min**	**Max**	**Obs.**	**Mean**	**Std. dev.**	**Min**	**Max**
ODA_{ijt}	4,833	24.0	98.3	0.00	2376.1	8,094	26.1	143.9	0.0	7246.8
AfT_{ijt}	7,704	10.1	60.1	0.00	1956.3	10,090	10.0	55.6	0.0	1956.3
Non_AfT_{ijt}	12,929	20.5	85.6	0.00	3171.0	17,271	21.1	110.3	0.0	7246.8
AfT_SER_{ijt}	5,868	10.2	61.6	0.00	1887.4	7,756	9.9	56.6	0.0	1887.4
AfT_NONSER_{ijt}	6,126	3.0	11.0	0.00	267.0	8,058	3.0	10.9	0.0	267.0
AfT_EI_{ijt}	4,013	12.3	71.9	0.00	1886.6	5,590	11.4	64.4	0.0	1886.6
AfT_PCB_{ijt}	7,058	3.9	13.8	0.00	281.9	9,132	3.9	13.4	0.0	281.9
$AfT\_PCB\_SER_{ijt}$	4,136	2.4	10.3	0.00	198.3	5,304	2.3	9.7	0.0	198.3
$AfT\_PCB\_NON\_SER_{ijt}$	6,028	2.9	11.0	0.00	266.9	7,949	3.0	10.9	0.0	266.9
AfT_TPR_{ijt}	445	1.7	15.5	0.00	236.0	997	1.0	10.5	0.0	236.0
X^S_{ijt}	19,780	217.9	1239.5	0.00	57140.0	21,954	188.8	1186.4	0.0	57140.0
M^S_{ijt}	19,011	220.7	1045.9	0.00	29586.0	21,221	197.4	1003.7	0.0	29586.0
X^G_{ijt}	17,628	900.1	5818.6	0.00	209607.5	26,012	722.1	5337.4	0.0	209607.5
M^G_{ijt}	17,891	1229.6	10733.5	0.00	555770.4	24,988	986.5	9307.3	0.0	555770.4
GTA_{ijt}	19,780	0.2	0.4	0.00	1.0	26,012	0.2	0.4	0.0	1.0
STA_{ijt}	19,780	0.1	0.3	0.00	1.0	26,012	0.1	0.3	0.0	1.0

Source: OECD CRS, BACI, Francois and Pindyuck (2013), OECD ITSS, and WTO RTA-IS databases.
Note: For all variables except GTA_{ijt} and STA_{ijt}, the values are in USD million.

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