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Abstract

The empirical literature on aid for trade (AfT) mainly considers its effects on merchandise trade and investment. In this paper we examine the relationship between AfT and trade in services as well as trade in goods over 2002-2015 in both aggregate and bilateral analysis. We observe complementarities between services AfT and merchandise trade, reflecting the fact that most AfT is aid allocated to services sectors that are important inputs into production and trade in goods. The analysis suggests that most categories of AfT are not associated with greater trade in services. Only AfT directed towards economic infrastructure, notably transport and energy, is robustly associated with higher volumes of services trade. Given the importance of services for many low-income countries and the growing potential to harness new technologies to expand services trade, the results suggest a greater focus on disaggregated analysis of different categories of AfT to better understand how AfT can do more to support trade in services. Of particular note is that AfT to bolster productive capacity is strongly associated with greater merchandise trade whereas no such relationship is observed for services trade, suggesting AfT efforts do more to target capacity weaknesses that constrain growth in services trade.

Keywords

Aid for trade, services trade, goods trade, complementarities, infrastructure.

J**EL Classification:** F10, F14, F35

1 Introduction

Trade in services is important for many low-income countries, especially small economies which often derive a significant share of their foreign exchange revenues from services exports. During the 2000s, the group of least developed countries (LDCs) taken together expanded their services exports more rapidly than the world as a whole. LDCs increased their share of global trade in services from 0.4 percent in 2005 to 0.8 percent in 2015, with commercial services exports growing by 14 percent over this period, more than twice the rate of other countries (WTO, 2016). A number of developing economies have demonstrated the potential that exists, reflected in a revealed comparative advantage in specific services. This is the case for example for Ethiopia, Kenya, Madagascar, Nepal, Senegal, Tanzania and Uganda (ITC, 2013; Fiorini and Hoekman, 2017a).

Services matter not just because they are a potentially important source of foreign exchange revenue and associated employment and household income. Many services are important for economic growth and development by virtue of their role as inputs into production in all sectors of economic activity. Services also figure centrally if a human development perspective is taken. Realization of many of the sustainable development goals (SDGs) depends on the performance of a range of specific services sectors (Fiorini and Hoekman, 2017b). Eliminating poverty and hunger, improving health and educational outcomes, or reducing regional inequalities by improving connectivity all revolve in part around bolstering access to services and increasing the productivity of services activities such as transport, distribution, logistics, ICT, education, medical services and so forth.

Financial services intermediaries are critical in providing funds to firms that have been generated by households seeking to invest their savings. Health and education services are key 'inputs' that help determine the skills and quality of life of workers. Other services are the backbone of connectivity, 'facilitating' the physical movement of goods and people (transport services) and the exchange of knowledge and information (communications services). Business services such as accounting, engineering, consulting and legal services reduce transaction costs associated with the operation of markets and are a channel through which process innovations are transmitted across firms. A large number of services inputs jointly determine the ability of firms to participate in international value chains or to sell products directly to clients through B2B or B2C e-commerce platforms.

The quality, price and availability of services inputs is determined by a mix of factors, including infrastructure connectivity network investments, the restrictiveness of trade and

investment policies for goods and services, and the investment climate/business environment. There is substantial empirical evidence that services trade and FDI in services fosters productivity growth by inducing greater competition in domestic markets and providing firms access to higher-quality, more varied, and cheaper services inputs (Mattoo and Payton, 2007; Cali et al. 2008; World Bank, 2010 and 2015; Balchin et al. 2016; Dihel and Goswami, 2016). This benefits both producers of goods and producers of services. The implication for policy is that a focus on reducing services trade costs may have high payoffs. Trade costs for services are higher than trade costs for goods, and the rate of decline that has been observed in services trade costs since the early 2000s has been much less than for trade costs for goods (Miroudot and Shepherd, 2016).

High trade costs reduce services trade volumes by compromising the ability of firms to exploit potential competitive advantages in world markets. One consequence of high services trade costs is that many services tend to be traded indirectly. Recent initiatives such as the OECD and WTO project to measure trade in value added (TiVA) have illustrated that a significant share of the value added embedded in traded goods originates in services sectors. Services therefore play a larger role in international exchange than is indicated by the share of direct exports of services in a nation's balance of payments (BOP). At least 50 per cent of global trade on a value added basis comprises services: the sum of the value of services output that is traded directly and is captured in BOP statistics (some 20 to 25 per cent of total exports), plus the value of services that is embedded in traded goods (another 25 to 35 per cent) (Francois and Hoekman, 2010; OECD, 2013).

The launch of the Aid for Trade (AfT) initiative at the 2005 WTO Ministerial Conference in Hong Kong reflected a recognition that negotiations to lower trade barriers would benefit developing countries more fully if complemented with development assistance targeted at improving the supply side of the economy (Hoekman, 2011). Aid for trade resources provided by the international development community since the early 2000s have been significant (OECD and WTO, 2017). Much of this assistance has been allocated to improving the quality of economic infrastructure and productive capacities of firms and efforts to lower trade costs through trade facilitation projects. The focus of most of the global AfT effort has been on boosting trade in goods. Consistent with the international development community's AfT strategies, the growing literature assessing the trade effects of AfT has mostly investigated the effects on merchandise trade and on investment in developing countries. There has been little work on the effects of aggregate AfT on trade in services, or on the effects of the sectoral allocation of AfT on different types of trade (goods vs.

services).

This paper makes an initial contribution to filling this gap. We decompose AfT into different categories and analyse the effect of AfT as a whole as well sub-components of AfT on both trade in goods and trade in services. Our primary interest is to assess the relationship between AfT and trade in services. We show that some types of AfT allocated to services activities (services that are inputs into production) are positively associated with the merchandise trade of recipient countries, both when we focus on aggregate trade volumes and when we limit analysis to countries for which bilateral data are available. However, AfT that is not directed to services sectors or activities is more strongly correlated with aggregate merchandise trade performance, especially AfT for productive capacity building. Overall, AfT directed at services sectors is only weakly associated, if at all, with trade in services of recipient countries, although our more disaggregated analysis that focuses on AfT at the services sector level reveals there is substantial heterogeneity in the relationship between AfT for services and services trade.

The plan of the paper is as follows. Section 2 briefly reviews the related literature. Section 3 provides an overview of the allocation of AfT across activities and regions. Section 4 presents the empirical methodology and data used in the analysis. Section 5 discusses the results. Section 6 offers some concluding remarks.

2 Related literature

There is a rapidly expanding literature analysing AfT, some of which is surveyed in Cadot et al. (2014). Much of this involves cross-country studies. Examples include Brenton and von Uexkull 2009; Cali and te Velde, 2011; Königer et al. 2011; Skärvall 2011; Busse et al. 2012; Helble et al. 2012; Portugal-Perez and Wilson, 2012; Vijil and Wagner, 2012; Nowak-Lehmann et al. 2013; Pettersson and Johansson 2013; Ferro et al. 2014; and Hühne et al. 2014. All these studies assess the effects of AfT on (different dimensions of) merchandise trade, with a particular focus on support for trade facilitation.

Cali and te Velde (2011) investigate total merchandise trade performance for some 100 countries in the mid-2000s and conclude that AfT for economic infrastructure is associated with greater recipient-country exports, while aid for productive capacity does not appear to influence export performance.[1] In our empirical analysis we find different results in

[1]Their definitions of AfT in economic infrastructure and productive capacity building are different from

that productive capacity AfT is positively associated with greater merchandise trade. Vijil and Wagner (2012) obtain very similar results. Helble et al. (2012) focus on a longer time period and estimate a gravity model using bilateral merchandise trade flows. They conclude that AfT is positively associated with an increase in exports and imports of the countries granted the assistance. Ferro et al. (2014) is closer in spirit to the present paper in analysing the effect of AfT directed towards service sector-related projects and activities, but focus only on the effect of such AfT on merchandise exports. They find that AfT allocated to services increases exports of manufactured products. AfT targeting services activities benefits most those manufacturing sectors that use services relatively more intensively. In contrast to Ferro et al. (2014), we study the effect of AfT in both services and non-services sectors on services trade as well as trade in goods.

Most of the cross-country studies of AfT focus on the effects of AfT flows from multiple OECD donors to non-OECD recipients, though there is also work on specific OECD donors. Martínez-Zarzoso et al. (2009), for instance, study the effect of German foreign aid on German exports; Skärvall (2012) examines the impact of Swedish development assistance on its bilateral trade with the recipient countries; and Bearce et al. (2013) look at the effect of AfT originating in the US on exports of the recipient countries. A general finding of this literature is that aid for trade, especially aid that supports trade facilitation has a strongly trade-promoting effect and that return on such AfT is high in that the benefits substantially exceed the costs (Hoekman and Shepherd, 2015). Moreover, research suggests one important benefit of AfT for trade facilitation is that it can support greater diversification (Cadot et al. 2011; Beverelli et al. 2015; Persson, 2013).[2]

To the best of our knowledge there is no prior empirical work on the impact that AfT has on trade in services. This is not limited to AfT – there also appears to be little prior research assessing the relationship between ODA in general and trade in services.

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those used in this paper. They classify AfT_{INF} as aid going to transport and storage; communications; energy; banking and financial services; and business and other services, whereas AfT_{PC} is classified as aid going to agriculture, forestry and fishing; industry; mining; tourism, construction and aid for trade policy and regulations.

[2]Other research has examined the impact of AfT on investment, including Harms and Lutz, 2006; Selaya and Sunesen, 2012; Donabauer et al. 2016; and Lee and Ries, 2016. These studies generally find positive associations between measures of AfT and investment.

3 The allocation of AfT between 2002 and 2015

Data on official development assistance (ODA) committed and disbursed by donor countries in recipient countries are available from the OECD Secretariat for a large sample of countries and sectors over the 2002-2015 period. AfT is one component of total ODA. The OECD defines AfT as comprising the following categories:

• technical assistance for trade policy and regulations (e.g. helping countries to develop trade strategies, negotiate trade agreements, and implement their outcomes)

• trade-related infrastructure (e.g. building roads, ports, and telecommunications networks to connect domestic markets to the global economy)

• productive capacity building, including trade development (e.g. supporting the private sector to exploit their comparative advantages and diversify their exports)

• trade-related adjustment (e.g. helping developing countries with the costs associated with trade liberalisation, such as tariff reductions, preference erosion, or declining terms of trade)

• other trade-related needs, if identified as trade-related development priorities in partner countries' national development strategies

The OECD Creditor Reporting System (CRS) does not provide data that exactly match all of the above AfT categories. Only parts of ODA data are reported as aid going to building economic infrastructure and to the creation of "productive capacity." Infrastructure includes several services sectors – e.g., transport, storage, and information and telecommunications networks – for which data are reported separately. Aid for productive capacity spans all sectors of the economy, and thus includes services. Three services activities are split out in the CRS for this category of AfT: banking and financial services, business and other services, and tourism. It should be noted that these data are proxies at best for aid targeting trade-related infrastructure and productive capacity building, as not all of ODA reported under these headings is trade-related. This said, ODA data reported under these headings are the closest approximation of AfT that goes to services.[3]

Total AfT disbursements increased from $9.1bn in 2002 to an average of $21bn in 2006-2008 to $39.8bn in 2015 (OECD and WTO, 2017). Asian and African countries have been the major recipients of AfT disbursements, with African (Asian) nations receiving $14.1bn

[3]No data are reported regarding allocations to services sectors for other categories of AfT (technical assistance for trade policy and regulations, trade-related adjustment and other trade-related needs).

($14.9bn) in 2015, each region accounting for around 40 percent of total AfT global aid since 2002. The global distribution is qualitatively similar when we look at AfT that was allocated to services sectors. We define AfT for services to span the following categories of AfT: (1) assistance to economic infrastructure in three sectors, transport/storage; ICT and energy; and (2) assistance for productive capacity building in financial services, business services and tourism activities. We do so largely because these are six categories that are identified in the OECD data on AfT as services. Although technically energy is not regarded as a services sector in the national accounts or the BOP (e.g., electricity is a good), part of the AfT going to this sector involves distribution of energy (grids, pipelines, storage, etc.). Globally, AfT mapped to these six categories increased from $5.3bn in 2002 (59 percent of total AfT) to $23.3bn in 2015 (72.4 percent). Thus, most AfT over the period was allocated to services sectors, a feature of AfT that is generally not emphasized in AfT reporting or analysis.[4]

On average, Asian and African countries account for the largest shares of AfT for services over the post 2002 period. The Asian economies received $11.8bn in AfT in services in 2015, up from $2.6bn in 2002; the corresponding values for AfT in services received by African countries in these years were $9.2bn and $2.0bn, respectively. Relative to their GDP, African (19.9%) and Pacific (16.8%) countries have been the largest recipients. While African and Pacific economies are the largest AfT recipients on a per capita basis and as a share of GDP, this is a function of their small population and GDP

Within services, the transport and energy sectors have been the largest recipients of global ODA disbursements, accounting for 45.9% and 30.2%, respectively, of total AfT in services disbursed over 2012-2015 on average (see Figure 1). This simply reflects the greater importance of both sectors in building economic infrastructure in countries in general, though the predominance of transport and storage also reflects the cost of infrastructure projects in comparison with other types of AfT spending (ADB, 2015).

<Insert Figure 1 here>

This pattern also holds if we look at the distribution of sectoral AfT in services across geographical regions (see Table 1). The only exception to this trend is Europe where AfT targeting banking and financial services exceeds AfT for the energy sector (although the largest share still goes to transport services).

<Insert Table 1 here>

[4]Ferro et al. 2014 is an exception.

4 Empirical methodology and data

The empirical analysis that follows is conducted for aggregate (goods and services) trade of recipient countries and for bilateral (goods and services) trade between the donor and recipient countries. Since donor-specific AfT may be expected to improve the trading potential of the recipient towards all trading partners, and what matters for addressing trade capacity constraints is total AfT received, the findings from the aggregate analysis may be more reflective of the AfT-trade relationship.

4.1 Aggregate analysis for the 2002-2015 period

The methodological approach that is adopted to assess the relationship between AfT and aggregate goods and services trade is to estimate the following augmented export and import demand functions using fixed effects and GMM specifications (the latter to control for endogeneity in the AfT-trade relationship):[5]

$$x_{jt} = \alpha_0 + \alpha_1 aft_{jt-1} + \alpha_2 NAfT_{jt-1} + \Sigma\beta_k z_{kjt} + \delta_j + \delta_t + \varepsilon_{jt} \quad (1)$$

$$m_{jt} = \alpha_0 + \alpha_1 aft_{jt-1} + \alpha_2 NAfT_{jt-1} + \Sigma\beta_k z_{kjt} + \delta_j + \delta_t + \varepsilon_{jt} \quad (2)$$

where x_{jt} = log of services (goods) exports of recipient j in year t; m_{jt} = log of (goods) services imports of recipient j in year t; aft_{jt-1} = log of AfT in recipient j in year $t-1$; z_{kjt} = vector of recipient-time varying controls; δ_j = recipient fixed effects; δ_t = year fixed effects; ε_{jt} = error term. Consistent with the literature we allow trade to respond to AfT with a lag. Note that to accommodate zero AfT flows in the analysis (which are even more prevalent in the different decompositions of AfT data that we consider), following the methodology suggested by Wagner (2003), we define aft_{jt-1} as $ln(max1, AfT_{jt-1})$ and include a $NAfT_{jt-1}$ dummy in the estimating equations, which takes the value of 1 when $AfT = 0$ and is zero otherwise. Thus, the coefficient of aft_{jt-1} measures the elasticity of exports (or imports) where AfT is positive while the coefficient of $NAfT_{jt-1}$ serves as an adjustment to the constant in cases where AfT is zero. The log of trade

[5]This is consistent with other studies in the literature such as Cali and te Velde (2011) and Martínez-Zarzoso et al. (2016).

when AfT is positive exceeds the log of trade when AfT is zero by $\alpha_1 ln(AfT)$–α_2 i.e. $x_{jt}|AfT > 0 - x_{jt}|AfT = 0 = \alpha_1 ln(AfT)$–$\alpha_2$.

The control variables are the same as used by Cali and te Velde (2011). They comprise a measure of country size – (log of) population (POP); a measure of geographic distance to global markets – (log of) market penetration (MP), computed as a distance (d_{ij}) weighted measure of other countries'[6] GDP (GDP_{it}) i.e. $MP_{jt} = \sum_i \frac{GDP_{it}}{d_{ij}}$; a measure of domestic prices – (log of) the consumer price index (CPI)[7]; and a measure of government effectiveness (GE) to reflect the institutional strength of the recipient country. Each of these variables is expected to be positively correlated with exports and imports, which justifies their choice as controls in the estimating equations.

To study the trade effects by type of aid, we follow the OECD classification and decompose aggregate AfT into three broad categories – AfT in economic infrastructure, AfT in productive capacity building and AfT in trade policies and regulation – but also replace total AfT with the sum of AfT in the six aggregate services sectors defined in Section 2 to arrive at a composite measure of AfT in services (which we include in equations (1) and (2) along with the "residual" non-services AfT). We also examine the sectoral relationship between trade and AfT for seven disaggregated[8] services sectors - business, communications, computer-and-related services, energy, financial, tourism and transport services. Finally, we also consider the effect of non-AfT ODA on trade in both goods and services flows in equations (1) and (2).

The literature on the economic determinants of development assistance (e.g., Neumayer, 2003) suggests that donor countries are more likely to disburse aid to countries which are important markets for their exports. As such, the AfT-trade relationship is expected to be positive. Even if this is not the case, insofar as aid targeted at services sectors has a direct positive impact on the development of economic infrastructure, this is expected to contribute to economic growth and fuel the trading potential of the recipient countries. This again translates into an expected positive AfT-trade relationship.[9]

[6]Note that the market potential of country j at time t is calculated as the sum of the (inverse) bilateral distance weighted GDPs of all other countries and not only of all countries for which we analyse the effect of AfT on trade - which are primarily developing countries.

[7]Like Cali and te Velde (2011), we prefer using the CPI over the real effective exchange rate (REER) as this maximizes the number of observations for empirical analysis. Our overall findings are robust to using the REER.

[8]Computer-and-related services are included in the communications sector in OECD AfT data.

[9]See also Cali and te Velde (2011) for AfT in a simple export demand model.

4.2 Bilateral analysis for the 2002-2010 period

Ideally we would want to estimate equations (1) and (2) on a bilateral basis. Unfortunately the available data on services trade do not allow this. The absence of bilateral services trade data has been a long-standing challenge for economic analyses. In 2002, the OECD first published data on bilateral services trade flows for 35 exporting and 53 importing countries, largely OECD members, over 1999-2002 covering four broad categories: travel services, transportation services, other commercial services and government services. Since then, services trade data collection, compilation and reporting has improved. There are now four international sources of services trade data - the United Nations Services Database (UNSD), managed by UNComtrade; the WTO/UNCTAD/ITC Services Database (WTOSD); the OECD Trade in Services by Partner Database (TISP); and the World Bank Trade in Services Database (WBTSD). The latter provides for much better coverage in terms of the number of reporting countries (over 200), longer time periods (1985-2015) and availability of sectoral data (twelve aggregate 3-digit sector codes according to the extended balance of payments (EBOPS) classification with further breakdowns for the OECD countries).

Despite improvements in the international availability of services trade data, statistics for LDCs and LICs, the major recipients of ODA, remain weak. The most comprehensive coverage of countries is for total or aggregate services flows for trade with the world. Thus for the LDCs and many LICs we are limited to analysis of services trade patterns with the world. Even then it must be recognized that the reliability of services trade data continues to be a problem.[10] There is noticeable variability in the recorded coverage of LDC/LIC services trade across years, alongside at-times significant year-on-year variation, suggesting weaknesses in the quality of data collection and transcription/coding, though other issues such as confidentiality may also play a role (for instance see Shingal, 2015). Since services trade is measured via reported BOP transactions, asymmetries in reporting BOP transactions can lead to serious discrepancies. For instance, commercial banks use different thresholds for reporting BOP transactions to the Central Bank or National Statistical Institute; therefore significant differences in these thresholds has a bearing both on what is recorded as a services transaction and its value (Shingal, 2015).

For all of these reasons, we first focus on global instead of bilateral trade in services to

[10]Moreover, most statistics on South-North services trade flows are based on "mirror" flows between the North-South. For example, Fiji's exports of commercial services to Australia are actually Australia's reported imports of commercial services from Fiji. In the absence of "actual" data on trade in services, it is difficult to cross-check reported statistics for inconsistencies.

maximize the coverage of countries, sectors and years that is consistent with ODA data availability for the services sectors of interest. To be able to compare effects on trade in services with effects on trade in goods we similarly limit our focus initially on global merchandise trade by country. However, in additional analysis, we replicate the empirics using available bilateral trade data for goods and services, though this has much more limited country coverage for reasons discussed previously.[11]

The equations for bilateral analysis are estimated in a structural gravity framework as follows:

$$x_{ijt} = \alpha aft_{ijt-1} + \beta PTA_{ijt} + \delta_{it} + \delta_{jt} + \delta_{ij} + \varepsilon_{ijt} \tag{3}$$

$$m_{ijt} = \alpha aft_{ijt-1} + \beta PTA_{ijt} + \delta_{it} + \delta_{jt} + \delta_{ij} + \varepsilon_{ijt} \tag{4}$$

where x_{ijt} = log of (goods, services) exports of donor i to recipient j in year t; m_{ijt} = log of (goods, services) imports of donor i from recipient j in year t; aft_{ijt-1} = log of AfT from donor i to recipient j in year $t-1$; PTA_{ijt} = dummy variable indicating membership of preferential (goods, services) trade agreements notified to the WTO; δ_{it} = donor-year fixed effects; δ_{jt} = recipient-year fixed effects; δ_{ij} = dyadic fixed effects; ε_{ijt} = error term.

In addition to estimating dyadic as opposed to aggregate effects of AfT on trade, the use of three-way fixed effects in these specifications accounts for endogeneity in the AfT-trade relationship (for instance see Baier and Bergstrand, 2007; Baier et al. 2014); moreover, the time-varying importer and exporter fixed effects control for multilateral resistance.

We consider 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 (3) and (4). The incidence of zero AfT is much higher in bilateral (compared to aggregate) data; these zero flows are accommodated using Wagner's (2003) methodology as in the aggregate analysis. Note that the use of recipient-year fixed effects in equations (3) and (4) also controls for any third-party aid disbursed to the recipient that may have an effect on its bilateral trade with the donor.

[11] The BOP services trade data span three of the four GATS modes of supply, modes 1, 2 and 4: cross-border trade, consumption abroad (e.g. tourism) and temporary movement of services suppliers (natural persons). Mode 3 (commercial presence, i.e., FDI) is not captured in the BOP as sales by affiliates of foreign companies are treated as domestic activity in the BOP. While limiting the coverage of what is understood in the WTO as constituting services trade, the approach is consistent with basic national accounts measurement and ensures that our results for trade in services and trade in goods are comparable.

The incidence of zero trade flows is relatively low for the sample of bilateral partners as the donors are all OECD countries that report goods and services trade data with their developing country partners. We therefore estimate equations (3) and (4) using OLS with three-way fixed effects. This estimation strategy also circumvents the computational challenges that confront PPML (Silva and Tenreyro, 2006) estimation with three-way (high-dimensional) fixed effects.[12]

4.3 Data sources and summary statistics

The aggregate and bilateral goods and aggregate services trade data used in the analysis are sourced from UN Comtrade and correspond to the period of availability of the OECD AfT data i.e. 2002-2015; bilateral services trade data are taken from Francois and Pindyuck (2013) but are only available until 2010. The control variables are sourced as follows: population (POP) is taken from the World Development Indicators; market penetration (MP) is computed using bilateral distance data from CEPII (Head et al. 2010) and GDP data from the World Development Indicators; the consumer price index (CPI) is taken from the World Development Indicators; and government effectiveness (GE) is sourced from the World Governance Indicators (Kaufmann et al. 2011). The binary PTA variable employed in the bilateral regressions is constructed using the WTO's RTA-IS database and corresponds to goods trade agreements notified under Article XXIV of the GATT and services trade agreements notified under Article V of the GATS.

The aggregate analysis is carried out on 144 ODA recipients over 2002-2015; the sample for bilateral analysis comprises 28 donors and 176 recipients over 2002-2010. The sample of recipients and donor-recipients included in both exercises is reported in Annex 1. Summary statistics are reported in Annex 2 Tables 1 and 2, respectively, for the aggregate and bilateral datasets. The aggregate dataset has roughly 2000 observations on services trade and the aid variables and 1500 observations on goods trade. The bilateral dataset has roughly 20,000 observations on goods and services trade as well as the aid variables.

[12]We also attempted the two-step Heckman following the estimation strategy in Helpman et al. (2008) to account for any sample selection bias using the (log) cost of trading from the World Bank's Doing Business Indicators as an exclusion variable in the selection equation. However, the sample selection bias - coefficient of the inverse mills ratio calculated from the selection equation of the two-step Heckman - was found not to be statistically different from zero in all specifications for both goods and services trade. This suggests that sample selection is not a concern in our bilateral estimations, further justifying the use of OLS.

5 Results

5.1 Aggregate analysis (OLS)

Tables 2-5 report the results from estimating equations (1) and (2) on exports and imports of goods and services, respectively, for the full sample of AfT recipients in our data set. All regressions control for country (recipient) and year fixed effects; standard errors are clustered by $country * year$.

5.1.1 Impact of total AfT on trade

The first set of results reported in Table 2 use data on total AfT as well as non-AfT ODA. The only positive correlation observed in the results is between merchandise imports and total AfT (column 4). In contrast, the coefficient estimate for $ln(AfT_{jt-1})$ for services trade as well as merchandise exports is not statistically different from zero (columns 1-3). ODA that is not classified as AfT by the OECD does not have a significant impact on either trade in goods or trade in services. Most of the controls are significant and have the expected signs.

The coefficient estimate suggests that on average, a doubling of total AfT in a given period would be associated with a 2 percent rise in aggregate merchandise imports in the following period for the full sample of AfT recipient countries, ceteris paribus. This is consistent with the estimates observed in the existing literature (for instance see Hühne et al. 2013 who report an AfT elasticity of 0.0236 for aggregate merchandise imports). Moreover, the log of merchandise imports when AfT is positive exceeds the log of merchandise imports when AfT is zero by $0.02 * ln(AfT) = 0.35$ (since the coefficient of $NAfT_{jt-1}$ is not statistically different from zero).

<Insert Table 2 here>

5.1.2 AfT in services and goods and services trade

Restricting AfT to disbursements for services-related projects and activities results in a rather different picture. AfT in services has positive effects on both services exports and goods imports. The coefficient estimates reported in columns (1) and (4) of Table 3 suggest that a 100% increase in AfT in the services sectors in a given period is associated with a

2.4% rise in aggregate services exports and a 1.3% increase in merchandise imports in the following period for the full sample of AfT recipient countries. Moreover, the log of services exports when services AfT is positive exceeds the log of services exports when services AfT is zero by $0.024 * ln(AfTSer)$–0.168. Thus, the critical level of services AfT for a positive net effect of services AfT on services exports is $e^{(0.168/0.024)}$ = \$1.1 billion. In contrast, the coefficient of $ln(AfTSer_{jt-1})$ is not statistically different from zero for aggregate services imports (column 2) and merchandise exports (column 3).

<Insert Table 3 here>

The positive correlation between services AfT and merchandise imports is the first illustration of goods-services complementarities in our findings. In contrast, AfT going to non-services sectors is strongly associated with merchandise trade (at the 1 percent level), but not with services trade.

5.1.3 Trade-AfT relationships by type of AfT

Table 4 reports results for regressions where the AfT variable is disaggregated into the three major categories defined by the OECD: economic infrastructure, productive capacity building and support for trade policies and regulations. We further divide AfT for productive capacity building into projects and programs that involve service activities as opposed to aid that benefits non-services sectors.

<Insert Table 4 here>

AfT for economic infrastructure and AfT for productive capacity building that is directed towards services (AfT_PCB_Ser) does not have a significant association with either services or goods trade in these results. In contrast, AfT for PCB in non-services sectors has a positive and statistically significant relationship with imports and exports of goods but not with services trade. AfT for trade policies and regulations (AfT_TPR) is positively correlated with both services and goods exports for the full sample of AfT recipient countries, but is not significant on the imports side. The relationships are only weakly significant for services exports but strongly significant for exports of goods.

Specifically, a 100% increase in AfT_TPR in a given period is associated with a 2.8% rise in aggregate services exports and 4% increase in aggregate goods exports in the following period, ceteris paribus and on average. The log of services exports when AfT_TPR is positive

exceeds the log of services exports when AfT_TPR is zero by $0.028 * ln(AfTTPR) = 3.7$ while $ln(X^G)|AfTTPR > 0 - ln(X^G)|AfTTPR = 0 = 0.04 * ln(AfTTPR) = 0.53$, since the coefficient of $NAfTTPR_{jt-1}$ is not statistically different from zero in each case.

5.1.4 Trade-AfT relationships across AfT for different services sectors

We next report results for analysis of AfT broken down by services sector to which AfT is allocated. This breakdown combines different types of AfT – our interest here is whether there are any statistically significant "sector-specific" correlations between AfT and trade. As can be seen from Table 5, at the sector level, AfT in financial services is found to be positively correlated with aggregate services imports in the subsequent period for the full AfT recipient country sample (column 2 of Table 5). Specifically, the log of services imports when AfT in financial services is positive exceeds the log of services imports when AfT in financial services is zero by $0.014 * ln(AfTFinancial)$–0.072. Thus, the critical level of financial services AfT for a positive net effect of financial services AfT on aggregate services imports is $e^{(0.072/0.014)}$ = $1.2 million. Moreover, AfT directed towards transport and computer-related services activities is found to be positively correlated with aggregate merchandise exports and imports, respectively; the corresponding elasticities are 0.015 and 0.068. These results are suggestive that some types of AfT allocated to individual services sectors may be associated with greater goods and services trade, but that in most instances there is no relationship.

<Insert Table 5 here>

5.2 Aggregate analysis (GMM)

The OLS results discussed above may be biased as a result of endogeneity in the AfT-trade relationship. We therefore re-estimate equations (1) and (2) for all specifications reported in Tables 2-5 using both difference and system GMM.[13] The results are reported in Annex

[13]Roodman (2009) points out that when the dependent variable is close to a random-walk then the Difference GMM performs poorly while the validity of the System GMM depends on the assumption that the errors are not serially correlated. The null of the unit root in our dependent variables was found to be statistically rejected while the error terms from estimating equations (1) and (2) were found to be strongly correlated over time. These findings suggested a preference for the Difference GMM over the System GMM. However, as the measurement error of AfT variables is likely determined by both random factors and recipient-specific characteristics, the use of the System GMM allows controlling for unobserved recipient-specific effects that are potentially correlated with the explanatory variables (see Cali and te Velde, 2011 for details). We therefore report both Difference and System GMM results.

3, Tables 1-4. They confirm the importance of total AfT for exports of merchandise, and more specifically AfT for non-services-related sectors, especially productive capacity building in non-services sectors, for aggregate merchandise exports. This is a robust finding, as we observe this in both the OLS and GMM results (the Sargan test of overidentifying restrictions is statistically valid at 5 percent), and is relevant for our research question, as we do not find an analogous effect for services trade in either estimates.

While AfT overall or AfT in services has no effect on exports of services, AfT for economic infrastructure is associated with greater exports of services, which in turn appears to reflect AfT in energy. In contrast, AfT in services is found to be weakly associated with greater imports of services, a result that again reflects AfT for economic infrastructure, which in turn appears to be due to AfT in transport (and in financial services).

At the sectoral level, the GMM results point to some evidence for complementarities between AfT in communication services and aggregate merchandise imports, and AfT in transport services and aggregate goods exports. They also suggest that AfT in financial and energy services may be relevant for aggregate services trade. Against the strong evidence of the importance of AfT in productive capacity building in non-services sectors for merchandise trade, the scattered and weak evidence for positive sectoral AfT relationships with trade in services may reflect the low share and dispersed nature of productive capacity building AfT in services.

5.3 Disaggregated services sector analysis

The impact of services AfT on services trade may be more discernible at the level of the individual services sectors for which both trade and AfT data are available. To examine this proposition, we estimate equations (1) and (2) at the most disaggregated services sector level possible. The OLS estimates are reported in Annex 4, Table 1, while Annex 4 Tables 2 and 3 report the GMM results for services exports and imports, respectively. The OLS estimates for AfT in specific services sectors reveal a positive relationship with some components of services trade performance. This is the case in particular for AfT in energy, with a positive association with transport, communications, CRS and other business services (the last significant at the 1 percent level); AfT in financial services, which has a positive association with financial services exports and travel; AfT for ICT, which is relevant for CRS exports; AfT for transport – associated with transport exports; and AfT for CRS, which are associated with financial services exports. Turning to relationships

with imports of services, AfT for travel is associated with transport and financial services imports, while AfT in financial services is positively associated with greater imports of transport and travel. Transport imports are also associated with AfT for CRS.

The GMM estimations suggest that the OLS results for the relationship between AfT and services exports are mostly not robust (see the associated Sargan test statistics), although though they confirm a positive association between AfT in transport and financial services and imports of computer-related services; AfT in communications services and travel services imports; and AfT in financial services and exports of financial services. Overall, these results are broadly consistent with the findings that we obtain from the more aggregate analysis. While they indicate the relationships are weak, they are nonetheless suggestive that some types of AfT for services do matter for services trade.

5.4 Bilateral analysis

Results from the OLS estimation of equations (3) and (4) are reported in Table 6 for bilateral AfT (and its types) and bilateral goods and services trade. Columns (1)-(4) report the results for AfT and non-AfT bilateral aid; columns (5)-(8) report the results for services and non-services bilateral AfT; and columns (9)-(12) report the results for bilateral AfT disaggregated into its sub-components.

<Insert Table 6 here>

Both bilateral AfT and non-AfT aid are positively correlated with bilateral merchandise imports in these results (see column 4). In particular, a doubling of donor-to-recipient AfT is associated with a 6.5% increase in the donor's goods imports from the recipient, ceteris paribus and on average. Bilateral non-AfT aid also has a positive, albeit weakly statistically significant, effect on donor's services exports to recipients (see column 1); the associated elasticity is 0.0298.

Column (8) suggests that bilateral AfT in both services and non-services is important for donor's goods imports from recipients; column (12) suggests that this stems mainly from donor AfT directed towards productive capacity building in the recipient countries. These results also confirm the complementarities between services AfT and merchandise trade, especially imports, that we observe in aggregate analysis.

Significantly, the biggest impact in the bilateral results is observed between donor-to-recipient AfT directed towards trade policies and regulations and donor's goods exports

to recipients; a doubling of such bilateral AfT is associated with a 13.6% rise in bilateral goods exports, ceteris paribus and on average. The finding is important because it suggests that aid actually directed towards trade is effective.

6 Conclusion

The empirical literature on the effects of AfT has investigated many dimensions of the potential relationship between AfT and the subsequent trade performance of recipient economies. A common characteristic of this body of research is that it focuses on the effects of AfT on merchandise trade, and to a lesser extent, on investment flows. In contrast, there is very little work on the effects of AfT on trade in services. In this paper we have sought to begin to bridge this research gap by studying the AfT-trade relationship for the 2002-2015 period, focusing on both aggregate and bilateral trade in services as well as trade in goods and distinguishing between different components and categories of AfT.

The results suggest some evidence for complementarities between services AfT and merchandise trade. This is consistent with the role that services play as inputs into production and the fact that much (most) of AfT is actually aid allocated to services sectors. However, the extent to which such complementarities appear in the results of the analysis is rather limited. There is less evidence for complementary relationships than would be expected a priori based on the literature analysing the relationships between manufacturing sector competitiveness and the performance of domestic services sectors.

The results from both the aggregate and bilateral analysis underline the importance of AfT directed towards productive capacity building, especially in non-services sectors, for merchandise trade, with the bilateral data also suggesting a significant relationship between AfT in productive capacity building (including in the services sectors) and donor imports from the aid recipients. Thus, our empirical results suggest that there is a distinct difference in the relationship between AfT directed at productive capacity building and trade performance. In the case of goods trade, aid for productive capacity that targets non-services sectors has a statistically significant association with merchandise trade. This is found in both the OLS and GMM estimations. Such a relationship is not observed between trade in services and productive capacity building assistance that targets services sectors. These results suggest that there is value to undertaking more in-depth analysis to understand what can be learnt and emulated from the productive capacity building targeting goods trade from a perspective of supporting trade in services. Our findings suggest

that donors may want to consider changing the allocation of AfT more towards productive capacity building in services, and complement the revealed preference to date of primarily allocating AfT in services to economic infrastructure, with a greater focus on bolstering productive capacity in services.

Overall, most AfT appears to have done little to support greater trade in services. There is weak evidence that AfT in services is associated with greater imports of services in recipient countries. This appears to reflect mostly the role of AfT that is allocated to economic infrastructure, including the transport sector, though there is stronger evidence that AfT in economic inftasructure, mainly energy, is associated with more services exports. The disaggregated analysis is suggestive in revealing substantial heterogeneity in the relationships between AfT for services and trade in services at the sector level. For a number of AfT-service trade pairs there are statistically significant positive correlations. These mostly are related to AfT for infrastructure – energy, transport, communications – and to AfT for finance. Energy and financial services have the greatest number of statistically significant correlations with imports or exports of specific services. However, only some of the financial services and transport results are robust in that they also emerge from the GMM estimations.

Given the importance of services for many low-income countries and the potential that exists to harness new technologies to expand services trade, our exploratory analysis suggests there is a need for a greater focus in the design of AfT to more effectively support trade in services. It may well be that analysis of the type undertaken here is asking too much of the relatively limited data that is collected and reported on trade in services. But the fact that we find hints that there are statistically significant associations between some types of AfT for services and trade in specific categories of services suggests there is value in devoting greater attention to the design of AfT to make this a more effective mechanism to support services trade. Such efforts should start with deeper, country-level analysis, into why AfT to date appears to have done little to promote more services trade and to evaluate the robustness and implications for services AfT design of our findings regarding the relationship between AfT for non-services productive capacity building and merchandise trade performance.

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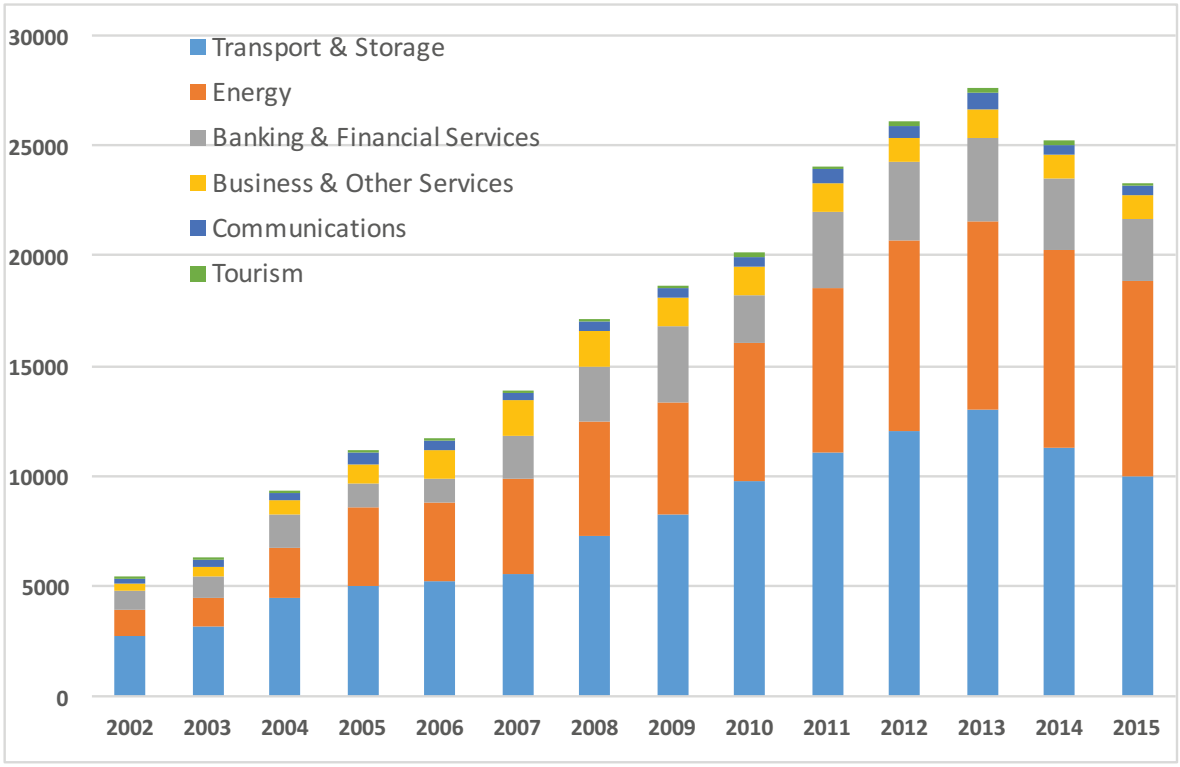
Figure 1: Sectoral distribution of global AfT in services ($mn)



Source: OECD QWIDS; own calculation

Table 1: Geographical distribution of AfT in services by sector ($mn)

AfT in services (avg. 2002-2015, $mn)	Africa	America	Asia	Europe	Pacific	Global
Transport & Storage	2942.6	474.8	3690.5	611.5	154.6	7771.3
Communications	158.9	46.6	185.0	60.1	9.1	450.6
Energy	1826.0	424.8	2780.1	393.4	36.5	5394.1
Banking & Financial	791.1	206.0	858.6	508.1	6.4	2296.1
Business & Other	376.0	89.7	498.0	144.1	12.6	1094.3
Tourism	45.5	21.5	28.2	6.6	4.3	105.0
SERVICES	**6140.2**	**1263.3**	**7718.3**	**1723.7**	**223.5**	**17111.3**

Source: OECD QWIDS; own calculation

Note: For Europe, the average is over 2002-2013 as the European countries in the sample did not receive any AfT in 2014-2015 as reported in the OECD database.

Table 2: Impact of total AfT on trade in services and trade in goods (OLS)

	(1) X^S_{jt}	(2) M^S_{jt}	(3) X^G_{jt}	(4) M^G_{jt}
$\ln(AfT_{jt-1})$	0.021	-0.002	0.025	0.020**
	(0.015)	(0.012)	(0.016)	(0.010)
$NAfT_{jt-1}$	0.018	0.079	-0.052	-0.036
	(0.236)	(0.101)	(0.080)	(0.104)
$\ln(Non\_AfT_{jt-1})$	-0.022	0.001	-0.022	0.023
	(0.021)	(0.014)	(0.022)	(0.014)
$NNon\_AfT_{jt-1}$	0.005	-0.156	-0.082	0.013
	(0.262)	(0.134)	(0.099)	(0.102)
$\ln(Pop_{jt})$	0.753***	1.014***	0.639***	0.685***
	(0.158)	(0.126)	(0.153)	(0.114)
$\ln(MP_{jt})$	0.294*	-0.043	-0.889***	-0.142
	(0.163)	(0.165)	(0.204)	(0.124)
$\ln(CPI_{jt})$	0.376***	0.290***	0.323***	0.321***
	(0.081)	(0.065)	(0.082)	(0.059)
GE_{jt}	0.235***	0.052	0.173***	0.181***
	(0.061)	(0.050)	(0.065)	(0.038)
Constant	-13.290***	-10.490**	13.416**	-2.475
	(4.686)	(4.351)	(5.533)	(3.476)
N	1622	1622	1209	1204
df_m	158	159	146	146
r2	0.981	0.977	0.988	0.992

Note: Standard errors, clustered by AfT-recipient*year, reported in parentheses. Levels of significance: * (10%), ** (5%), *** (1%). All estimations include recipient and year fixed effects.

Table 3: Impact of AfT in services on goods and services trade (OLS)

	(1) X^S_{jt}	(2) M^S_{jt}	(3) X^G_{jt}	(4) M^G_{jt}
$\ln(AfT\_Ser_{jt-1})$	0.024*	0.014	0.003	0.013*
	(0.013)	(0.010)	(0.011)	(0.008)
$NAfT\_Ser_{jt-1}$	0.168**	-0.014	0.062	0.039
	(0.081)	(0.107)	(0.104)	(0.091)
$\ln(AfT\_Non\_Ser_{jt-1})$	-0.000	-0.001	0.044***	0.033***
	(0.017)	(0.012)	(0.016)	(0.011)
$NAfT\_Non\_Ser_{jt-1}$	-0.085	-0.016	-0.139	-0.069
	(0.104)	(0.126)	(0.109)	(0.090)
$\ln(Pop_{jt})$	0.761***	1.025***	0.584***	0.679***
	(0.158)	(0.127)	(0.155)	(0.112)
$\ln(MP_{jt})$	0.312*	0.001	-0.884***	-0.102
	(0.166)	(0.168)	(0.204)	(0.126)
$\ln(CPI_{jt})$	0.368***	0.285***	0.315***	0.324***
	(0.079)	(0.064)	(0.082)	(0.059)
GE_{jt}	0.232***	0.046	0.174***	0.187***
	(0.061)	(0.048)	(0.065)	(0.038)
Constant	-13.985***	-11.730***	13.101**	-3.194
	(4.787)	(4.479)	(5.454)	(3.492)
N	1622	1622	1209	1204
df_m	158	158	148	147
r2	0.981	0.977	0.988	0.992

Note: Standard errors, clustered by AfT-recipient*year, reported in parentheses. Levels of significance: * (10%), ** (5%), *** (1%). All estimations include recipient and year fixed effects.

Table 4: Impact of AfT on trade by type of AfT (OLS)

	(1) X^S_{jt}	(2) M^S_{jt}	(3) X^G_{jt}	(4) M^G_{jt}
$\ln(AfT\_EI_{jt-1})$	0.009	0.004	-0.000	0.003
	(0.011)	(0.009)	(0.009)	(0.006)
$NAfT\_EI_{jt-1}$	0.089	-0.092	-0.034	0.001
	(0.067)	(0.075)	(0.072)	(0.054)
$\ln(AfT\_PCB\_Ser_{jt-1})$	0.018	0.011	0.009	0.010
	(0.014)	(0.011)	(0.012)	(0.008)
$NAfT\_PCB\_Ser_{jt-1}$	0.073	0.167***	0.080	0.141***
	(0.091)	(0.053)	(0.067)	(0.050)
$\ln(AfT\_PCB\_Non\_Ser_{jt-1})$	-0.008	0.003	0.034**	0.029***
	(0.016)	(0.013)	(0.015)	(0.010)
$NAfT\_PCB\_Non\_Ser_{jt-1}$	-0.062	-0.064	-0.075	-0.091
	(0.108)	(0.101)	(0.096)	(0.060)
$\ln(AfT\_TPR_{jt-1})$	0.028*	0.018	0.040***	0.018
	(0.015)	(0.011)	(0.014)	(0.011)
$NAfT\_TPR_{jt-1}$	-0.032	0.012	-0.004	-0.065**
	(0.037)	(0.030)	(0.047)	(0.031)
$\ln(Pop_{jt})$	0.757***	1.029***	0.605***	0.675***
	(0.159)	(0.124)	(0.155)	(0.111)
$\ln(MP_{jt})$	0.291*	-0.025	-0.864***	-0.114
	(0.167)	(0.169)	(0.204)	(0.124)
$\ln(CPI_{jt})$	0.354***	0.270***	0.284***	0.308***
	(0.081)	(0.063)	(0.081)	(0.059)
GE_{jt}	0.230***	0.057	0.167***	0.187***
	(0.059)	(0.047)	(0.064)	(0.038)
Constant	-13.452***	-11.205**	12.348**	-2.794
	(4.800)	(4.452)	(5.458)	(3.463)
N	1622	1622	1209	1204
df_m	162	163	151	151
r2	0.981	0.977	0.988	0.992

Note: Standard errors, clustered by AfT-recipient*year, reported in parentheses. Levels of significance: * (10%), ** (5%), *** (1%). All estimations include recipient and year fixed effects.

Table 5: Impact of services AfT by sector on aggregate trade (OLS)

	(1) X^S_{it}	(2) M^S_{it}	(3) X^G_{it}	(4) M^G_{it}
$\ln(AfT\_Transport_{jt-1})$	0.003	0.005	0.015*	0.008
	(0.009)	(0.009)	(0.009)	(0.007)
$NAfT\_Transport_{jt-1}$	-0.098*	-0.043	-0.049	-0.013
	(0.051)	(0.048)	(0.039)	(0.034)
$\ln(AfT\_Communications_{jt-1})$	-0.013	0.014	0.007	0.016
	(0.014)	(0.013)	(0.013)	(0.010)
$NAfT\_Communications_{jt-1}$	0.024	-0.056*	-0.094**	-0.042
	(0.036)	(0.030)	(0.038)	(0.028)
$\ln(AfT\_Financial_{jt-1})$	0.016	0.014*	0.014	-0.002
	(0.010)	(0.008)	(0.009)	(0.006)
$NAfT\_Financial_{jt-1}$	0.010	0.072*	0.038	-0.030
	(0.039)	(0.037)	(0.042)	(0.031)
$\ln(AfT\_Energy_{jt-1})$	0.010	-0.003	0.001	0.002
	(0.009)	(0.007)	(0.009)	(0.006)
$NAfT\_Energy_{jt-1}$	-0.032	0.022	0.070	-0.004
	(0.041)	(0.033)	(0.045)	(0.035)
$\ln(AfT\_OBS_{jt-1})$	-0.014	-0.001	0.002	0.014
	(0.016)	(0.011)	(0.013)	(0.009)
$NAfT\_OBS_{jt-1}$	0.026	0.013	0.129***	0.096***
	(0.045)	(0.093)	(0.047)	(0.033)
$\ln(AfT\_Travel_{jt-1})$	-0.016	-0.002	0.002	0.011
	(0.021)	(0.017)	(0.019)	(0.013)
$NAfT\_Travel_{jt-1}$	-0.078***	-0.054	0.008	-0.042**
	(0.028)	(0.035)	(0.030)	(0.020)
$\ln(AfT\_CRS_{jt-1})$	0.020	0.029	0.027	0.068***
	(0.028)	(0.022)	(0.020)	(0.018)
$NAfT\_CRS_{jt-1}$	0.013	-0.009	-0.085***	-0.035**
	(0.024)	(0.021)	(0.030)	(0.017)
$\ln(Pop_{jt})$	0.797***	1.028***	0.655***	0.680***
	(0.161)	(0.128)	(0.152)	(0.113)
$\ln(MP_{jt})$	0.353**	0.000	-0.855***	-0.111
	(0.160)	(0.158)	(0.203)	(0.126)
$\ln(CPI_{jt})$	0.365***	0.257***	0.280***	0.282***
	(0.082)	(0.062)	(0.082)	(0.061)
GE_{jt}	0.223***	0.038	0.156**	0.178***
	(0.059)	(0.052)	(0.064)	(0.038)
Constant	-15.347***	-11.608***	12.420**	-2.681
	(4.773)	(4.312)	(5.552)	(3.591)
N	1622	1622	1209	1204
df_m	169	168	157	157
r2	0.981	0.977	0.988	0.993

Note: Standard errors, clustered by AfT-recipient*year, reported in parentheses. Levels of significance * (10%), ** (5%), *** (1%). All estimations include recipient and year fixed effects. OBS = Other business bervices; CRS = Computer-related services

Table 6: Impact of bilateral AfT on bilateral trade in goods and services
□ernard □oe□□an and Anir□d□S□n□al

	(1) X^S_{ijt}	(2) M^S_{ijt}	(3) X^G_{ijt}	(4) M^G_{ijt}	(5) X^S_{ijt}	(6) M^S_{ijt}	(7) X^G_{ijt}	(8) M^G_{ijt}	(9) X^S_{ijt}	(10) M^S_{ijt}	(11) X^G_{ijt}	(12) M^G_{ijt}
$\ln(AfT_{ijt-1})$	0.00207	-0.0132	-0.0219**	0.0653***								
	(0.0178)	(0.0196)	(0.00987)	(0.0215)								
$NAfT_{ijt-1}$	0.0641**	0.00232	0.000402	0.00864								
	(0.0317)	(0.0320)	(0.0193)	(0.0392)								
$\ln(Non\_AfT_{ijt-1})$	0.0298*	-0.0185	-0.0116	0.0359*								
	(0.0155)	(0.0161)	(0.00968)	(0.0217)								
$NNon\_AfT_{ijt-1}$	-0.0842*	-0.0481	0.0214	0.0552								
	(0.0446)	(0.0431)	(0.0321)	(0.0629)								
$\ln(AfT\_Ser_{ijt-1})$					-3.67e-05	-0.0214	-0.0183**	0.0476**				
					(0.0179)	(0.0190)	(0.00903)	(0.0187)				
$NAfT\_Ser_{ijt-1}$					0.0366	-0.0320	0.0237	-0.0435				
					(0.0286)	(0.0291)	(0.0170)	(0.0358)				
$\ln(AfT\_Non\_Ser_{ijt-1})$					-0.000529	-0.0195	-0.0114	0.0595*				
					(0.0242)	(0.0277)	(0.0138)	(0.0333)				
$NAfT\_Non\_Ser_{ijt-1}$					-0.00990	-0.0320	-0.0136	0.0607				
					(0.0307)	(0.0329)	(0.0192)	(0.0391)				
$\ln(AfT\_EI_{ijt-1})$									0.0100	-0.00600	-0.0136	0.0301
									(0.0199)	(0.0214)	(0.00987)	(0.0210)
$NAfT\_EI_{ijt-1}$									0.0243	0.0133	0.0155	0.00597
									(0.0287)	(0.0301)	(0.0168)	(0.0351)
$\ln(AfT\_PCB\_Ser_{ijt-1})$									-0.0205	-0.0475*	-0.0207*	0.0529**
									(0.0236)	(0.0250)	(0.0116)	(0.0234)
$NAfT\_PCB\_Ser_{ijt-1}$									0.0187	-0.0807***	0.00929	-0.0434
									(0.0286)	(0.0293)	(0.0178)	(0.0378)
$\ln(AfT\_PCB\_Non\_Ser_{ijt-1})$									0.00492	-0.0142	-0.0136	0.0619*
									(0.0242)	(0.0283)	(0.0140)	(0.0344)
$NAfT\_PCB\_Non\_Ser_{ijt-1}$									0.00507	-0.00684	-0.0114	0.0526
									(0.0309)	(0.0330)	(0.0193)	(0.0386)
$\ln(AfT\_TPR_{ijt-1})$									-0.0683	-0.0197	0.136***	-0.0401
									(0.0831)	(0.0919)	(0.0450)	(0.0724)
$NAfT\_TPR_{ijt-1}$									0	0	0	0
									(0)	(0)	(0)	(0)
PTA_{ijt}	-0.357**	-0.119	0.173***	0.00386	-0.360**	-0.115	0.174***	0.00157	-0.361**	-0.122	0.178***	-0.00204
	(0.153)	(0.154)	(0.0615)	(0.125)	(0.154)	(0.154)	(0.0615)	(0.125)	(0.154)	(0.154)	(0.0616)	(0.125)
Observations	11,925	13,674	19,019	12,959	11,925	13,674	19,019	12,959	11,925	13,674	19,019	12,959
r2	0.936	0.926	0.962	0.948	0.936	0.926	0.962	0.948	0.936	0.926	0.962	0.948
Fixed effects	it, jt, ij	it, jt, ij	it, jt, ij	it, jt, ij	it, jt, ij	it, jt, ij	it, jt, ij	it, jt, ij	it, jt, ij	it, jt, ij	it, jt, ij	it, jt, ij

Note: Standard errors, clustered by AfT-donor*recipient*year, reported in parentheses. Levels of significance: * (10%), ** (5%), *** (1%). All estimations include time-varying donor and recipient, and bilateral, fixed effects.

Annex 1

Full sample of AfT recipients (aggregate analysis)

Afghanistan Albania Algeria Angola Anguilla Antigua and Barbuda Argentina Armenia Azerbaijan Bahrain Bangladesh Barbados Belarus Belize Benin Bhutan Bolivia Bosnia and Herzegovina Botswana Brazil Burkina Faso Burundi Cabo Verde Cambodia Cameroon Central African Republic Chad Chile China Colombia Comoros Congo, Dem. Rep. Congo, Rep. Costa Rica Cote d'Ivoire Croatia Cuba Djibouti Dominica Dominican Republic Ecuador Egypt, Arab Rep. El Salvador Equatorial Guinea Ethiopia Fiji Gabon Gambia, The Georgia Ghana Grenada Guatemala Guinea Guinea-Bissau Guyana Haiti Honduras India Indonesia Iran Iraq Jamaica Jordan Kazakhstan Kenya Kiribati Kyrgyzstan Laos Lebanon Lesotho Liberia Libya Macedonia Madagascar Malawi Malaysia Maldives Mali Malta Marshall Isds Mauritania Mauritius Mexico Micronesia Moldova Mongolia Montenegro Montserrat Morocco Mozambique Myanmar Namibia Nepal Nicaragua Niger Nigeria Oman Pakistan Palestine Panama Papua New Guinea Paraguay Peru Philippines Rwanda Samoa Sao Tome and Principe Saudi Arabia Senegal Serbia Seychelles Sierra Leone Slovenia Solomon Isds South Africa Sri Lanka St. Helena St. Kitts and Nevis St. Lucia St. Vincent and the Grenadines Sudan Suriname Swaziland Syria Tajikistan Tanzania Thailand Timor-Leste Togo Tonga Trinidad and Tobago Tunisia Turkey Tuvalu Uganda Ukraine Uruguay Uzbekistan Vanuatu Venezuela, RB Vietnam Yemen Zambia Zimbabwe

Full sample of AfT donors and recipients (bilateral analysis)

Donor: Australia Austria Belgium Canada Czech Republic Denmark Finland France Germany Greece Iceland Ireland Italy Japan Luxembourg Netherlands New Zealand Norway Poland Portugal Slovak Republic Slovenia South Korea Spain Sweden Switzerland United Kingdom United States
Recipient: 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 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 Lesotho Liberia Libya Macao Macedonia Madagascar Malawi Malaysia Maldives Mali Malta Marshall Islands Mauritania Mauritius Mayotte Mexico Micronesia Moldova Mongolia Montenegro Montserrat Morocco Mozambique Myanmar Namibia 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 Samoa Sao Tome and Principe Saudi Arabia Senegal Serbia Seychelles Sierra Leone Singapore Solomon Islands Somalia South Africa Sri Lanka St. Helena St. Kitts and Nevis St. Lucia St. Vincent and the Grenadines Sudan Suriname Swaziland Syria Taiwan 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 Yugoslavia Zambia Zimbabwe

Annex 2, Table 1: Summary statistics (aggregate data)

□ernard □oe□□an and Anir□d□ S□n□al

	Aggregate exports of recipient					Aggregate imports of recipient				
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
AID ($ mn)										
Total	2,119	661.0897	1148.972	0.095669	21747.91	2,119	661.0897	1148.972	0.095669	21747.91
Transportation	1,952	55.56358	126.9979	-1.688756	1621.018	1,952	55.56358	126.9979	-1.688756	1621.018
Travel	1,494	0.9422122	3.513761	-0.019474	79.24411	1,494	0.9422122	3.513761	-0.019474	79.24411
Communications	1,819	2.438257	12.4537	-8.747788	360.1552	1,819	2.438257	12.4537	-8.747788	360.1552
Comptuter-related	1,127	1.038337	2.430153	-1.5	31.6613	1,127	1.038337	2.430153	-1.5	31.6613
Energy	1,854	39.36329	103.1598	-5.792794	1475.002	1,854	39.36329	103.1598	-5.792794	1475.002
Financial	1,756	17.17677	76.48937	-2.047174	1738.172	1,756	17.17677	76.48937	-2.047174	1738.172
Business	1,798	7.491399	22.97945	-2.136141	480.6981	1,798	7.491399	22.97945	-2.136141	480.6981
Agriculture	1,981	28.06268	50.72854	0.00014	571.6846	1,981	28.06268	50.72854	0.00014	571.6846
Forestry	1,438	4.421154	14.31882	-0.413632	208.996	1,438	4.421154	14.31882	-0.413632	208.996
Fishing	1,541	1.765939	3.9492	-6.0254	78.73472	1,541	1.765939	3.9492	-6.0254	78.73472
Industry	1,849	8.391316	24.36596	-0.347324	470.8252	1,849	8.391316	24.36596	-0.347324	470.8252
Mining	1,157	6.099436	43.11883	-4.627965	957.3649	1,157	6.099436	43.11883	-4.627965	957.3649
Construction	671	0.7427091	3.262765	-1.268064	50.25599	671	0.7427091	3.262765	-1.268064	50.25599
AfT_EI	2,070	90.35993	207.3331	-0.00377	2422.776	2,070	90.35993	207.3331	-0.00377	2422.776
AfT_PCB	2,102	63.16919	133.8926	0.003527	2164.208	2,102	63.16919	133.8926	0.003527	2164.208
AfT_PCB_Services	1,997	22.55363	78.28466	-2.13614	1754.119	1,997	22.55363	78.28466	-2.13614	1754.119
AfT_PCB_Non-Services	2,082	42.14315	79.21089	0.003527	1065.419	2,082	42.14315	79.21089	0.003527	1065.419
AfT_TPR	1,766	3.440087	11.81081	-0.066788	328.35	1,766	3.440087	11.81081	-0.066788	328.35
Total AfT	2,112	154.3096	321.6611	0.003449	3162.586	2,112	154.3096	321.6611	0.003449	3162.586
Total Non_AfT	2,119	507.2899	936.3704	0.05005	19117.66	2,119	507.2899	936.3704	0.05005	19117.66
AfT_Services	2,091	110.9922	256.5237	-2.13614	2751.688	2,091	110.9922	256.5237	-2.13614	2751.688
AfT_Non-Services	2,084	45.01787	82.40597	0.003527	1072.222	2,084	45.01787	82.40597	0.003527	1072.222
TRADE ($)										
Total services	2,059	6.46E+09	1.91E+10	50890	2.11E+11	2,059	7.25E+09	2.17E+10	20695	3.83E+11
Transportation	1,922	1.60E+09	5.22E+09	11828	5.13E+10	1,937	2.33E+09	6.58E+09	11773	9.62E+10
Travel	1,935	2.25E+09	5.67E+09	57000	5.69E+10	1,914	1.82E+09	6.86E+09	8125	1.65E+11
Communications	1,425	1.66E+08	4.11E+08	9475	6.57E+09	1,418	1.20E+08	3.09E+08	-3814628	3.13E+09
Financial	1,647	3.93E+08	1.82E+09	-315000	2.47E+10	1,787	4.89E+08	1.64E+09	613	2.69E+10
Comptuter-related	1,081	7.65E+08	5.28E+09	-62000	7.26E+10	1,294	1.55E+08	5.93E+08	-4800000	1.07E+10
Business	1,639	1.56E+09	6.02E+09	-3.88E+07	6.89E+10	1,743	1.61E+09	5.14E+09	-1.10E+08	5.34E+10
Total goods	1,506	4.54E+10	1.62E+11	2344	2.34E+12	1,516	4.51E+10	1.37E+11	2.87E+07	1.81E+12
CONTROLS										
Population	1,980	3.68E+07	1.46E+08	9530	1.36E+09	1,980	3.68E+07	1.46E+08	9530	1.36E+09
CPI	1,806	93.25788	29.42978	15.34757	730.0414	1,806	93.25788	29.42978	15.34757	730.0414
REER	826	99.16473	29.47322	52.15331	827.1733	826	99.16473	29.47322	52.15331	827.1733
Government effectiveness	1,992	-0.2806175	0.7764626	-2.24773	2.43131	1,992	-0.2806175	0.7764626	-2.24773	2.43131
Market penetration	2,020	4.39E+09	4.31E+09	0	3.26E+10	2,020	4.39E+09	4.31E+09	0	3.26E+10

Annex 2. Table 2: Summary statistics (bilateral data)

	Donor exports to recipient					Donor imports from recipient				
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
AID ($ mn)										
Total	35,299	25.4548	127.927	-17.7363	11227.6	35,299	25.4548	127.927	-17.7363	11227.6
Transportation	5,684	10.82422	52.16562	-21.3097	1051.07	5,684	10.82422	52.16562	-21.3097	1051.07
Travel	3,060	0.312404	2.294057	-0.110701	79.0875	3,060	0.312404	2.294057	-0.110701	79.0875
Communications	5,726	0.553905	3.255528	-8.83258	151.276	5,726	0.553905	3.255528	-8.83258	151.276
Comptuter-related	2,120	0.3508618	1.259159	-1.83185	31.0732	2,120	0.3508618	1.259159	-1.83185	31.0732
Energy	6,962	6.350533	36.12228	-12.1588	1430.59	6,962	6.350533	36.12228	-12.1588	1430.59
Financial	6,866	2.048732	13.28517	-2.15226	580.573	6,866	2.048732	13.28517	-2.15226	580.573
Business	6,801	1.428806	9.696149	-2.1622	465.098	6,801	1.428806	9.696149	-2.1622	465.098
Agriculture	13,635	2.422132	9.170346	-0.69195	412.325	13,635	2.422132	9.170346	-0.69195	412.325
Forestry	3,769	1.181829	6.181429	-1.51446	115.837	3,769	1.181829	6.181429	-1.51446	115.837
Fishing	3,452	0.6221891	2.214204	-0.635998	69.9486	3,452	0.6221891	2.214204	-0.635998	69.9486
Industry	8,073	1.028852	5.584271	-1.636	253.643	8,073	1.028852	5.584271	-1.636	253.643
Mining	1,838	2.026778	25.46458	-0.03475	631.73	1,838	2.026778	25.46458	-0.03475	631.73
Construction	816	0.3568214	1.755665	-1.28931	32.0192	816	0.3568214	1.755665	-1.28931	32.0192
AfT_TPR	4,898	0.7455007	6.216411	-4.13743	328.344	4,898	0.7455007	6.216411	-4.13743	328.344
AfT_EI	11,700	9.308454	56.78821	-21.3097	1845.469	11,700	9.308454	56.78821	-21.3097	1845.469
AfT_PCB_Services	11,308	2.187819	13.22339	-3.92862	581.1441	11,308	2.187819	13.22339	-3.92862	581.1441
AfT_PCB_Non-Services	16,653	3.11957	14.90426	-2.045531	685.382	16,653	3.11957	14.90426	-2.045531	685.382
AfT_Services	15,964	8.371885	52.57808	-19.85748	2028.847	15,964	8.371885	52.57808	-19.85748	2028.847
AfT_PCB	19,000	4.036318	19.42683	-3.785272	868.76	19,000	4.036318	19.42683	-3.785272	868.76
Total AfT	20,913	9.049415	56.54675	-19.85748	2714.245	20,913	9.049415	56.54675	-19.85748	2714.245
Total Non_AfT	34,787	20.38919	101.3123	-17.74124	8669.558	34,787	20.38919	101.3123	-17.74124	8669.558
AfT_Non-Services	17,222	3.228525	15.3047	-4.13743	685.398	17,222	3.228525	15.3047	-4.13743	685.398
TRADE ($ mn)										
Total services	20,525	135.9329	707.3802	0	19299	20,571	165.721	842.2799	0	23852.4
Total goods	20,525	536.7715	3840.039	0	131602	20,571	601.9033	6099.034	0	252844
CONTROLS										
PTA membership (goods)	20,525	0.1343727	0.3410606	0	1	20,571	0.1348986	0.3416236	0	1
PTA membership (services)	20,525	0.0519367	0.2219046	0	1	20,571	0.0527442	0.2235277	0	1
Cost of trading ($)	12,168	2464.866	971.4198	787	9945	12,261	2297.302	834.282	810	7407

Annex 3, Table 1: Impact of total AfT on trade in services and trade in goods (GMM)

	Difference GMM				System GMM			
	(1) X^S_{jt}	(2) M^S_{it}	(3) X^G_{it}	(4) M^G_{it}	(5) X^S_{it}	(6) M^S_{it}	(7) X^G_{it}	(8) M^G_{it}
LDV	0.429***	0.069	0.183	0.385***	0.868***	0.341***	0.691***	0.944***
	(0.125)	(0.061)	(0.131)	(0.120)	(0.069)	(0.088)	(0.136)	(0.075)
$\ln(AfT_{jt-1})$	0.006	0.016	0.037**	-0.003	0.021	0.031	0.009	-0.017
	(0.012)	(0.025)	(0.018)	(0.011)	(0.015)	(0.023)	(0.027)	(0.014)
$NAfT_{jt-1}$	0.068	-0.069***	-0.206***	0.113	0.085*	0.014	-0.257***	0.349***
	(0.045)	(0.026)	(0.058)	(0.071)	(0.043)	(0.093)	(0.073)	(0.053)
$\ln(Non\_AfT_{jt-1})$	0.015	-0.008	0.013	0.007	0.005	-0.029	-0.030	0.012
	(0.016)	(0.014)	(0.023)	(0.016)	(0.017)	(0.027)	(0.042)	(0.019)
$NNon\_AfT_{jt-1}$	-0.018	0.082**	0.259**	-0.098	0.013	0.270*	0.301**	-0.395***
	(0.106)	(0.041)	(0.110)	(0.109)	(0.162)	(0.155)	(0.148)	(0.088)
$\ln(Pop_{jt})$	0.159	0.678***	0.496*	0.499**	-0.080	0.302**	0.253	-0.013
	(0.328)	(0.236)	(0.300)	(0.242)	(0.114)	(0.131)	(0.175)	(0.067)
$\ln(MP_{jt})$	-0.273	-0.719	0.356	0.115	-0.006	-0.020	0.832	0.227**
	(0.275)	(0.459)	(0.277)	(0.199)	(0.148)	(0.322)	(0.519)	(0.108)
$\ln(CPI_{jt})$	0.018	0.129	0.210	0.012	-0.050	0.144	0.235	-0.115
	(0.113)	(0.132)	(0.170)	(0.101)	(0.105)	(0.110)	(0.156)	(0.130)
GE_{jt}	0.068	-0.045	-0.050	-0.025	0.102	-0.061	0.052	-0.082
	(0.057)	(0.076)	(0.073)	(0.045)	(0.066)	(0.081)	(0.137)	(0.052)
Constant	7.609	11.706	-9.912	-4.851	2.533	0.056	-20.900*	-3.857
	(7.908)	(11.382)	(7.292)	(6.030)	(4.333)	(6.391)	(10.935)	(2.538)
N	1468	1468	964	958	1612	1612	1107	1101
df_m	21	21	21	21	21	21	21	21
r2	0.8679	0.2641	0.6592	0.7813	0.9746	0.8021	0.9178	0.9872
Sargan test statistics								
Chi2	193.0	82.2	97.6	150.3	32.3	128.0	72.8	36.9
P-value	0.000	0.3207	0.0569	0.000	0.0932	0.000	0.000	0.0335

Note: Robust standard errors reported in parentheses. Levels of significance: *(10%), ** (5%), *** (1%). All estimations include year fixed effects.
LDV = Lagged dependent variable. The Sargan test statistics of overidentifying restrictions are also reported in the table.

Annex 3, Table 2: Impact of AfT in services on goods and services trade (GMM)

Aid for Trade and International Transactions in Goods and Services

	Difference GMM				System GMM			
	(1) X^S_{it}	(2) M^S_{it}	(3) X^G_{it}	(4) M^G_{it}	(5) X^S_{it}	(6) M^S_{it}	(7) X^G_{it}	(8) M^G_{it}
LDV	0.431***	0.071	0.183	0.384***	0.868***	0.345***	0.714***	0.945***
	(0.126)	(0.062)	(0.128)	(0.120)	(0.068)	(0.090)	(0.139)	(0.071)
ln(AfT_Ser$_{jt-1}$)	0.005	0.026	0.005	-0.010	0.012	0.033**	-0.023	-0.017
	(0.012)	(0.019)	(0.014)	(0.010)	(0.017)	(0.015)	(0.024)	(0.012)
NAfT_Ser$_{jt-1}$	0.077	0.023	0.031	0.089	0.033	0.078	0.155	0.096**
	(0.081)	(0.049)	(0.105)	(0.054)	(0.083)	(0.088)	(0.154)	(0.047)
ln(AfT_Non_Ser$_{jt-1}$)	-0.002	0.008	0.048***	0.013	0.003	0.024	0.030	0.005
	(0.016)	(0.018)	(0.016)	(0.009)	(0.014)	(0.024)	(0.019)	(0.011)
NAfT_Non_Ser$_{jt-1}$	-0.059	-0.005	-0.043	-0.044	0.018	0.214	-0.099	-0.060
	(0.073)	(0.054)	(0.121)	(0.041)	(0.079)	(0.139)	(0.153)	(0.041)
ln(Pop$_{jt}$)	0.168	0.683***	0.470	0.480*	-0.074	0.254**	0.209	-0.004
	(0.323)	(0.230)	(0.304)	(0.248)	(0.115)	(0.121)	(0.163)	(0.059)
ln(MP$_{jt}$)	-0.296	-0.667	0.329	0.099	-0.008	0.014	0.842*	0.194*
	(0.276)	(0.457)	(0.275)	(0.196)	(0.147)	(0.320)	(0.511)	(0.106)
ln(CPI$_{jt}$)	0.024	0.110	0.210	0.018	-0.053	0.114	0.234	-0.107
	(0.111)	(0.120)	(0.170)	(0.101)	(0.106)	(0.101)	(0.160)	(0.129)
GE$_{jt}$	0.069	-0.051	-0.043	-0.018	0.101	-0.052	0.059	-0.073
	(0.060)	(0.076)	(0.073)	(0.045)	(0.067)	(0.082)	(0.139)	(0.050)
Constant	8.008	10.468	-8.838	-4.209	2.543	-0.001	-20.704*	-3.277
	(7.925)	(11.404)	(7.395)	(5.924)	(4.405)	(6.511)	(10.918)	(2.467)
N	1468	1468	964	958	1612	1612	1107	1101
df_m	21	21	21	21	21	21	21	21
r2	0.8727	0.2676	0.6646	0.7942	0.9748	0.7926	0.9204	0.9886
Sargan test statistics								
Chi2	192.8	82.6	96.8	146.3	32.2	130.1	71.4	34.4
P-value	0.000	0.3095	0.063	0.000	0.096	0.000	0.000	0.0597

Note: Robust standard errors reported in parentheses. Levels of significance: *(10%), ** (5%), *** (1%). All estimations include year fixed effects.

LDV = Lagged dependent variable. The Sargan test statistics of overidentifying restrictions are also reported in the table.

Annex 3, Table 3: Impact of AfT on trade by type of AfT (GMM)

□ernard □oe□□an and Anir□d□S□n□al

	Difference GMM				System GMM			
	(1) X^S_{it}	(2) M^S_{it}	(3) X^G_{it}	(4) M^G_{it}	(5) X^S_{it}	(6) M^S_{it}	(7) X^G_{it}	(8) M^G_{it}
LDV	0.431***	0.071	0.182	0.365***	0.872***	0.344***	0.715***	0.946***
	(0.131)	(0.063)	(0.127)	(0.118)	(0.069)	(0.092)	(0.138)	(0.071)
$\ln(AfT\_EI_{jt-1})$	0.008	0.018	0.004	-0.005	0.022*	0.025**	-0.007	-0.011
	(0.010)	(0.015)	(0.012)	(0.008)	(0.012)	(0.012)	(0.019)	(0.011)
$NAfT\_EI_{jt-1}$	0.072	-0.036	0.001	-0.038	0.053	-0.006	0.053	-0.033
	(0.056)	(0.025)	(0.058)	(0.033)	(0.062)	(0.028)	(0.074)	(0.039)
$\ln(AfT\_PCB\_Ser_{jt-1})$	-0.007	0.008	0.012	-0.007	-0.015	0.017	-0.001	-0.005
	(0.014)	(0.012)	(0.012)	(0.008)	(0.020)	(0.016)	(0.019)	(0.010)
$NAfT\_PCB\_Ser_{jt-1}$	0.065	0.070	0.105	0.168***	0.072	0.106	0.176	0.155***
	(0.062)	(0.044)	(0.065)	(0.051)	(0.080)	(0.071)	(0.126)	(0.053)
$\ln(AfT\_PCB\_Non\_Ser_{jt-1})$	-0.007	0.011	0.044***	0.009	-0.002	0.021	0.031	0.006
	(0.013)	(0.018)	(0.016)	(0.008)	(0.012)	(0.023)	(0.022)	(0.009)
$NAfT\_PCB\_Non\_Ser_{jt-1}$	-0.074	-0.061	-0.055	-0.051	-0.024	0.103	-0.073	-0.066*
	(0.057)	(0.048)	(0.081)	(0.040)	(0.068)	(0.101)	(0.105)	(0.036)
$\ln(AfT\_TPR_{jt-1})$	0.008	0.004	-0.009	0.004	0.010	0.014	-0.027	-0.007
	(0.017)	(0.008)	(0.014)	(0.012)	(0.021)	(0.011)	(0.018)	(0.016)
$NAfT\_TPR_{jt-1}$	-0.031	0.061	0.009	-0.059*	-0.025	0.108	0.032	-0.053
	(0.028)	(0.052)	(0.058)	(0.032)	(0.034)	(0.078)	(0.073)	(0.039)
$\ln(Pop_{jt})$	0.161	0.679***	0.459	0.536**	-0.071	0.252**	0.208	-0.007
	(0.335)	(0.224)	(0.303)	(0.243)	(0.116)	(0.120)	(0.165)	(0.060)
$\ln(MP_{jt})$	-0.319	-0.740	0.314	0.110	-0.015	0.012	0.843	0.203*
	(0.272)	(0.480)	(0.274)	(0.201)	(0.146)	(0.319)	(0.515)	(0.106)
$\ln(CPI_{jt})$	0.008	0.120	0.212	-0.006	-0.063	0.123	0.246	-0.115
	(0.117)	(0.125)	(0.172)	(0.100)	(0.108)	(0.105)	(0.166)	(0.126)
GE_{jt}	0.070	-0.044	-0.046	-0.027	0.103	-0.053	0.052	-0.075
	(0.061)	(0.073)	(0.075)	(0.047)	(0.070)	(0.081)	(0.139)	(0.052)
Constant	8.710	12.064	-8.349	-5.046	2.679	0.006	-20.861*	-3.401
	(8.045)	(11.794)	(7.329)	(6.049)	(4.395)	(6.496)	(10.964)	(2.455)
N	1468	1468	964	958	1612	1612	1107	1101
df_m	25	25	25	25	25	25	25	25
r2	0.8744	0.2548	0.6736	0.7634	0.9738	0.7950	0.9189	0.9884
Sargan test statistics								
Chi2	190.6	80.1	97.5	143.8	30.8	122.7	70.2	37.0
P-value	0.000	0.3822	0.0572	0.000	0.1275	0.000	0.000	0.0326

Note: Robust standard errors reported in parentheses. Levels of significance: *(10%), ** (5%), *** (1%). All estimations include year fixed effects. LDV = Lagged dependent variable. The Sargan test statistics of overidentifying restrictions are also reported in the table.

Annex 3, Table 4: Impact of services AfT by sector on aggregate trade (GMM)

Aid for Trade and International Transactions in Goods and Services

	Difference GMM				System GMM			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	X^S_{jt}	M^S_{jt}	X^G_{jt}	M^G_{jt}	X^S_{jt}	M^S_{jt}	X^G_{jt}	M^G_{jt}
LDV	0.436***	0.073	0.189	0.425***	0.890***	0.347***	0.708***	0.963***
	(0.124)	(0.056)	(0.128)	(0.117)	(0.068)	(0.093)	(0.135)	(0.071)
$\ln(AfT\_Transport_{jt-1})$	0.000	0.017	0.015**	0.005	0.004	0.018*	0.004	-0.001
	(0.010)	(0.017)	(0.008)	(0.006)	(0.010)	(0.010)	(0.012)	(0.006)
$NAfT\_Transport_{jt-1}$	-0.042	0.028	-0.031	0.003	-0.066	0.058	0.029	0.020
	(0.034)	(0.046)	(0.032)	(0.031)	(0.045)	(0.063)	(0.045)	(0.041)
$\ln(AfT\_Communications_{jt-1})$	-0.012	0.018	0.013	0.017*	0.000	0.036	0.023	0.022*
	(0.013)	(0.012)	(0.012)	(0.009)	(0.015)	(0.023)	(0.015)	(0.012)
$NAfT\_Communications_{jt-1}$	-0.042	-0.022	0.012	-0.038	-0.042	-0.005	0.034	-0.049
	(0.028)	(0.018)	(0.040)	(0.027)	(0.036)	(0.036)	(0.056)	(0.036)
$\ln(AfT\_Financial_{jt-1})$	0.003	0.017*	0.011	-0.010*	0.001	0.018	0.006	-0.015**
	(0.008)	(0.009)	(0.008)	(0.005)	(0.010)	(0.011)	(0.012)	(0.007)
$NAfT\_Financial_{jt-1}$	-0.015	0.067	0.019	0.022	-0.022	0.095	0.018	0.026
	(0.022)	(0.076)	(0.027)	(0.025)	(0.027)	(0.099)	(0.038)	(0.033)
$\ln(AfT\_Energy_{jt-1})$	0.014*	0.001	-0.003	-0.003	0.023**	0.010	-0.004	0.000
	(0.008)	(0.009)	(0.012)	(0.007)	(0.011)	(0.008)	(0.019)	(0.009)
$NAfT\_Energy_{jt-1}$	0.009	0.021	0.037	0.040	0.004	0.070	0.073	0.064*
	(0.024)	(0.026)	(0.046)	(0.031)	(0.038)	(0.044)	(0.061)	(0.039)
$\ln(AfT\_OBS_{jt-1})$	-0.014	-0.002	0.010	0.011	-0.023	0.016	0.003	0.020
	(0.018)	(0.013)	(0.011)	(0.012)	(0.025)	(0.014)	(0.016)	(0.014)
$NAfT\_OBS_{jt-1}$	0.013	-0.163	0.007	0.012	0.034	-0.169	0.019	-0.002
	(0.043)	(0.164)	(0.035)	(0.023)	(0.064)	(0.175)	(0.056)	(0.028)
$\ln(AfT\_Travel_{jt-1})$	-0.027	-0.007	-0.016	-0.012	-0.021	-0.018	-0.014	-0.004
	(0.018)	(0.015)	(0.015)	(0.012)	(0.021)	(0.018)	(0.020)	(0.015)
$NAfT\_Travel_{jt-1}$	-0.026	-0.003	0.069**	0.019	-0.016	0.041	0.100	0.029
	(0.023)	(0.014)	(0.033)	(0.022)	(0.029)	(0.044)	(0.064)	(0.031)
$\ln(AfT\_CRS_{jt-1})$	-0.039*	-0.024	0.016	0.023	-0.051	-0.028	0.029	0.032
	(0.021)	(0.021)	(0.018)	(0.021)	(0.036)	(0.025)	(0.023)	(0.030)
$NAfT\_CRS_{jt-1}$	0.037	0.027	0.052	0.013	0.031	0.054*	0.079	0.024
	(0.033)	(0.017)	(0.034)	(0.016)	(0.037)	(0.030)	(0.051)	(0.024)
$\ln(Pop_{jt})$	0.197	0.742***	0.422	0.448*	-0.074	0.260*	0.221	-0.020
	(0.332)	(0.229)	(0.305)	(0.237)	(0.114)	(0.137)	(0.152)	(0.056)
$\ln(MP_{jt})$	-0.276	-0.627	0.201	0.109	-0.015	-0.002	0.843*	0.177
	(0.266)	(0.437)	(0.267)	(0.193)	(0.138)	(0.326)	(0.497)	(0.109)
$\ln(CPI_{jt})$	0.029	0.150	0.230	-0.002	-0.059	0.130	0.233	-0.128
	(0.120)	(0.127)	(0.170)	(0.100)	(0.119)	(0.110)	(0.157)	(0.133)
GE_{jt}	0.061	-0.024	-0.062	-0.027	0.092	-0.005	0.035	-0.073
	(0.056)	(0.056)	(0.072)	(0.045)	(0.065)	(0.084)	(0.135)	(0.051)
Constant	7.059	8.491	-5.341	-4.224	2.618	0.242	-20.983**	-2.795
	(7.871)	(10.905)	(7.145)	(5.711)	(4.247)	(6.537)	(10.554)	(2.450)
N	1468	1468	964	958	1612	1612	1107	1101
df_m	31	31	31	31	31	31	31	31
r2	0.8517	0.2894	0.7100	0.8221	0.9760	0.7980	0.9166	0.9886
Sargan test statistics								
Chi2	186.6	81.7	97.8	139.3	32.1	131.9	63.8	32.1
P-value	0.000	0.3352	0.0546	0.000	0.0978	0.000	0.000	0.0989

Note: Robust standard errors reported in parentheses. Levels of significance: *(10%), ** (5%), *** (1%). All estimations include year fixed effects. LDV = Lagged dependent variable. OBS = Other business services; CRS = Computer-related services. The Sargan test statistics of overidentifying restrictions are also reported.

Annex 4, Table 1: Impact of services AfT by sector on disaggregated services trade (OLS)

□ernard □oe□□an and Anir□d□S□n□al

	Services exports (OLS)						Services imports (OLS)					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	$Trans_{jt}$	$Comm_{jt}$	$Finance_{jt}$	CRS_{jt}	OBS_{jt}	$Travel_{jt}$	$Trans_{jt}$	$Comm_{jt}$	$Finance_{jt}$	CRS_{jt}	OBS_{jt}	$Travel_{jt}$
$\ln(AfT\_Transport_{jt-1})$	0.031**	-0.026	0.011	-0.017	-0.040	0.018	0.009	-0.047*	0.007	0.074**	-0.023	0.007
	(0.013)	(0.028)	(0.031)	(0.044)	(0.031)	(0.016)	(0.010)	(0.026)	(0.020)	(0.033)	(0.028)	(0.014)
$NAfT\_Transport_{jt-1}$	0.065	-0.228**	-0.137	-0.136	-0.156	-0.049	-0.022	0.240	-0.131	-0.160	0.151	-0.058
	(0.050)	(0.105)	(0.133)	(0.224)	(0.170)	(0.121)	(0.050)	(0.158)	(0.117)	(0.179)	(0.143)	(0.065)
$\ln(AfT\_Communications_{jt-1})$	0.008	-0.047	0.038	0.135**	-0.007	0.001	0.020	0.006	0.016	0.064	0.040	0.033
	(0.020)	(0.036)	(0.041)	(0.060)	(0.045)	(0.019)	(0.015)	(0.036)	(0.026)	(0.051)	(0.033)	(0.027)
$NAfT\_Communications_{jt-1}$	-0.060	0.094	-0.086	0.058	-0.091	-0.001	-0.058	0.002	-0.093	-0.059	0.092	-0.084*
	(0.051)	(0.124)	(0.124)	(0.309)	(0.132)	(0.070)	(0.037)	(0.118)	(0.100)	(0.207)	(0.102)	(0.048)
$\ln(AfT\_Financial_{jt-1})$	-0.005	-0.063**	0.060*	-0.076	0.013	0.033**	0.021**	-0.076***	0.011	-0.011	0.019	0.045***
	(0.015)	(0.025)	(0.033)	(0.051)	(0.030)	(0.016)	(0.010)	(0.022)	(0.018)	(0.032)	(0.022)	(0.016)
$NAfT\_Financial_{jt-1}$	0.090	-0.090	0.295**	-0.262	-0.355***	0.133	0.164***	-0.193	0.010	0.071	-0.038	0.074
	(0.056)	(0.152)	(0.137)	(0.226)	(0.122)	(0.083)	(0.045)	(0.145)	(0.085)	(0.147)	(0.093)	(0.054)
$\ln(AfT\_Energy_{jt-1})$	0.023*	0.056*	-0.012	0.099**	0.083***	-0.032**	0.016*	0.012	0.018	0.005	-0.005	-0.023*
	(0.014)	(0.032)	(0.031)	(0.047)	(0.030)	(0.015)	(0.008)	(0.024)	(0.019)	(0.027)	(0.024)	(0.014)
$NAfT\_Energy_{jt-1}$	0.025	0.046	-0.465***	0.375	-0.178	-0.135*	0.030	-0.124	-0.024	0.040	-0.094	-0.072
	(0.049)	(0.125)	(0.120)	(0.296)	(0.116)	(0.078)	(0.038)	(0.127)	(0.093)	(0.171)	(0.109)	(0.060)
$\ln(AfT\_OBS_{jt-1})$	-0.003	0.002	0.053	-0.019	-0.051	0.019	-0.014	0.027	-0.030	-0.000	0.051	-0.004
	(0.021)	(0.049)	(0.048)	(0.071)	(0.042)	(0.028)	(0.014)	(0.031)	(0.024)	(0.046)	(0.034)	(0.019)
$NAfT\_OBS_{jt-1}$	0.000	0.209	-0.178	-0.199	0.113	0.075	-0.055	-0.443	-0.038	-0.135	-0.269	-0.010
	(0.056)	(0.128)	(0.149)	(0.346)	(0.148)	(0.076)	(0.101)	(0.335)	(0.146)	(0.377)	(0.179)	(0.128)
$\ln(AfT\_Travel_{jt-1})$	0.026	0.028	-0.155**	0.111	-0.012	-0.051*	0.050**	0.038	0.071**	0.073	-0.023	0.038
	(0.025)	(0.060)	(0.072)	(0.095)	(0.060)	(0.030)	(0.023)	(0.057)	(0.035)	(0.062)	(0.047)	(0.034)
$NAfT\_Travel_{jt-1}$	-0.085*	-0.404***	0.029	-0.340**	-0.043	0.011	-0.088**	0.029	0.012	-0.090	-0.270***	0.007
	(0.047)	(0.114)	(0.089)	(0.171)	(0.098)	(0.050)	(0.040)	(0.105)	(0.075)	(0.124)	(0.092)	(0.061)
$\ln(AfT\_CRS_{jt-1})$	0.022	0.106	0.142*	-0.166	-0.051	-0.059	0.074***	-0.143**	0.002	-0.097	0.050	-0.042*
	(0.049)	(0.086)	(0.085)	(0.196)	(0.074)	(0.043)	(0.023)	(0.065)	(0.045)	(0.061)	(0.047)	(0.025)
$NAfT\_CRS_{jt-1}$	-0.005	0.102	0.012	-0.283**	0.004	-0.032	-0.047**	-0.024	0.132**	0.133	0.044	-0.087**
	(0.041)	(0.084)	(0.087)	(0.122)	(0.073)	(0.045)	(0.023)	(0.073)	(0.063)	(0.084)	(0.063)	(0.042)
$\ln(Pop_{jt})$	0.892***	1.679***	3.494***	0.695	-1.232*	0.488	1.778***	1.460***	1.892***	1.741**	1.470**	0.871***
	(0.229)	(0.462)	(0.450)	(1.731)	(0.705)	(0.347)	(0.164)	(0.440)	(0.463)	(0.839)	(0.590)	(0.240)
$\ln(MP_{jt})$	0.030	-0.111	-0.049	0.181	0.893**	0.357	0.370*	-0.639	0.625**	0.942*	-0.028	0.020
	(0.229)	(0.583)	(0.463)	(0.809)	(0.450)	(0.264)	(0.190)	(0.404)	(0.317)	(0.517)	(0.439)	(0.289)
$\ln(CPI_{jt})$	0.441***	0.416	0.237	-0.644*	0.641**	0.445***	0.366***	0.126	0.245	0.073	0.525***	0.126
	(0.138)	(0.256)	(0.247)	(0.371)	(0.255)	(0.108)	(0.059)	(0.218)	(0.183)	(0.232)	(0.194)	(0.134)
GE_{jt}	0.161**	0.046	0.262	0.030	-0.044	0.386***	0.035	0.088	0.150	0.505**	-0.113	0.201**
	(0.081)	(0.141)	(0.191)	(0.368)	(0.186)	(0.107)	(0.059)	(0.145)	(0.142)	(0.203)	(0.176)	(0.096)
Constant	-13.128**	-23.927	-55.188***	-9.309	4.288	-13.763	-34.252***	-7.905	-42.909***	-47.606**	-22.777	-11.138
	(6.171)	(14.960)	(12.555)	(33.462)	(15.566)	(9.506)	(5.229)	(12.348)	(11.272)	(19.625)	(14.192)	(7.967)
N	1537	1133	1343	871	1332	539	1544	1135	1450	1043	1414	1532
df_m	165	147	156	129	155	166	166	147	162	141	163	166
r2	0.973	0.882	0.898	0.901	0.906	0.957	0.973	0.905	0.927	0.917	0.916	0.958

Note: Standard errors, clustered by AfT-recipient*year, reported in parentheses. Levels of significance: * (10%), ** (5%), *** (1%). All estimations include recipient and year fixed effects. OBS = Other business services; CRS = Computer related services.

Annex 4, Table 2: Impact of services AfT by sector on disaggregated services exports (GMM)

Aid for Trade and International Transactions in Goods and Services

	Services exports (Difference GMM)						Services exports (System GMM)					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	$Trans_{it}$	$Comm_{it}$	$Finance_{it}$	CRS_{it}	OBS_{it}	$Travel_{it}$	$Trans_{it}$	$Comm_{it}$	$Finance_{it}$	CRS_{it}	OBS_{it}	$Travel_{it}$
LDV	0.391***	0.265***	0.281***	0.146	0.218*	0.478***	0.901***	0.401***	0.439***	0.539***	0.512***	0.827***
	(0.140)	(0.088)	(0.094)	(0.099)	(0.116)	(0.123)	(0.068)	(0.129)	(0.080)	(0.129)	(0.086)	(0.080)
$\ln(AfT\_Transport_{jt-1})$	0.005	-0.052	0.019	0.021	-0.017	0.007	0.001	-0.049	-0.002	0.018	-0.003	0.010
	(0.015)	(0.043)	(0.040)	(0.049)	(0.024)	(0.012)	(0.017)	(0.040)	(0.045)	(0.062)	(0.029)	(0.016)
$NAfT\_Transport_{jt-1}$	0.091	-0.227*	-0.027	0.237	0.011	-0.192	0.110	-0.271*	-0.022	0.289	0.048	-0.238
	(0.089)	(0.133)	(0.160)	(0.237)	(0.093)	(0.135)	(0.114)	(0.140)	(0.189)	(0.299)	(0.118)	(0.154)
$\ln(AfT\_Communications_{jt-1})$	-0.016	0.012	0.059	0.016	-0.040	-0.006	-0.009	0.004	0.048	0.017	-0.045	0.003
	(0.018)	(0.035)	(0.049)	(0.043)	(0.045)	(0.015)	(0.027)	(0.036)	(0.053)	(0.066)	(0.052)	(0.017)
$NAfT\_Communications_{jt-1}$	-0.123**	-0.074	-0.166	0.210	-0.018	-0.047	-0.188**	-0.181	-0.048	0.306	0.015	-0.058
	(0.062)	(0.098)	(0.112)	(0.231)	(0.095)	(0.032)	(0.082)	(0.122)	(0.120)	(0.233)	(0.131)	(0.045)
$\ln(AfT\_Financial_{jt-1})$	-0.011	-0.043*	0.103**	0.019	0.035	-0.004	-0.030*	-0.038	0.077*	0.032	0.028	-0.010
	(0.012)	(0.023)	(0.044)	(0.045)	(0.026)	(0.012)	(0.016)	(0.028)	(0.044)	(0.050)	(0.031)	(0.012)
$NAfT\_Financial_{jt-1}$	-0.053	-0.052	0.153	-0.047	-0.311***	0.060	-0.038	0.082	0.109	0.030	-0.343**	0.111
	(0.054)	(0.092)	(0.094)	(0.199)	(0.101)	(0.070)	(0.066)	(0.101)	(0.116)	(0.215)	(0.139)	(0.083)
$\ln(AfT\_Energy_{jt-1})$	-0.015	-0.028	0.048	0.017	0.032	-0.027	-0.020*	-0.013	0.035	0.025	0.024	-0.009
	(0.011)	(0.043)	(0.044)	(0.045)	(0.036)	(0.017)	(0.012)	(0.034)	(0.050)	(0.051)	(0.045)	(0.019)
$NAfT\_Energy_{jt-1}$	0.001	0.130	-0.136	-0.036	-0.082	-0.038	0.007	0.244	-0.000	-0.304	-0.049	-0.048
	(0.042)	(0.127)	(0.088)	(0.342)	(0.076)	(0.043)	(0.062)	(0.173)	(0.101)	(0.393)	(0.097)	(0.062)
$\ln(AfT\_OBS_{jt-1})$	0.008	0.084	0.127	0.046	-0.087	0.024	0.014	0.058	0.150	0.031	-0.123*	0.022
	(0.017)	(0.051)	(0.093)	(0.062)	(0.063)	(0.037)	(0.024)	(0.067)	(0.101)	(0.078)	(0.065)	(0.044)
$NAfT\_OBS_{jt-1}$	-0.071	0.168	-0.135	-0.127	-0.008	-0.093	-0.053	0.186	-0.121	0.180	0.022	-0.126
	(0.075)	(0.121)	(0.200)	(0.356)	(0.121)	(0.069)	(0.094)	(0.133)	(0.209)	(0.256)	(0.131)	(0.087)
$\ln(AfT\_Travel_{jt-1})$	-0.031	0.017	0.056	-0.053	-0.037	-0.045*	-0.022	-0.088	0.057	-0.075	-0.057	-0.012
	(0.027)	(0.047)	(0.055)	(0.098)	(0.044)	(0.027)	(0.032)	(0.077)	(0.076)	(0.115)	(0.049)	(0.033)
$NAfT\_Travel_{jt-1}$	-0.039	0.045	-0.006	-0.048	-0.060	-0.042	0.001	0.091	0.052	-0.020	-0.030	-0.024
	(0.034)	(0.156)	(0.132)	(0.115)	(0.072)	(0.035)	(0.039)	(0.235)	(0.145)	(0.146)	(0.092)	(0.042)
$\ln(AfT\_CRS_{jt-1})$	-0.054**	0.028	0.129	-0.172*	-0.010	-0.075	-0.044	-0.028	0.220	-0.298**	-0.046	-0.075
	(0.026)	(0.083)	(0.150)	(0.098)	(0.080)	(0.080)	(0.033)	(0.091)	(0.184)	(0.149)	(0.093)	(0.078)
$NAfT\_CRS_{jt-1}$	0.021	0.161	0.096	0.083	0.082	0.026	0.033	0.146	0.146	0.060	0.021	0.006
	(0.043)	(0.104)	(0.092)	(0.104)	(0.077)	(0.033)	(0.051)	(0.102)	(0.099)	(0.139)	(0.096)	(0.048)
$\ln(Pop_{jt})$	0.274	2.969***	2.060**	1.861	-0.479	-0.691	0.184**	0.476**	0.305	0.422	-0.232	-0.101
	(0.367)	(1.050)	(0.978)	(2.930)	(1.078)	(0.676)	(0.082)	(0.226)	(0.315)	(0.394)	(0.244)	(0.137)
$\ln(MP_{jt})$	-1.334**	0.336	-2.354**	-0.483	-0.917	-1.095	-0.107	0.039	0.325	0.856	0.296	0.858*
	(0.602)	(1.635)	(1.185)	(1.320)	(1.063)	(0.989)	(0.221)	(1.586)	(0.788)	(0.948)	(0.754)	(0.494)
$\ln(CPI_{jt})$	0.129	0.102	-0.031	-0.930	-0.043	0.327	0.009	-0.730	0.217	-0.573	-0.589	0.206
	(0.232)	(0.367)	(0.476)	(0.634)	(0.411)	(0.221)	(0.178)	(0.448)	(0.647)	(0.747)	(0.387)	(0.207)
GE_{jt}	0.129*	-0.113	-0.302	0.014	0.275*	0.118	0.219***	-0.045	0.017	0.603	0.179	0.055
	(0.068)	(0.256)	(0.352)	(0.303)	(0.156)	(0.087)	(0.084)	(0.610)	(0.378)	(0.399)	(0.239)	(0.130)
Constant	27.024*	-51.978	20.523	-12.145	30.759	35.917	0.133	-2.348	-11.620	-21.702	1.858	-16.758*
	(14.033)	(39.008)	(29.497)	(56.644)	(31.575)	(25.797)	(4.858)	(32.792)	(15.900)	(16.309)	(12.898)	(10.073)
N	1372	954	110	667	1145	1376	1515	1082	1297	782	1285	1518
df_m	31	31	31	31	31	31	31	31	31	31	31	31
r2	0.4422	0.2412	0.0839	0.1849	0.00004	0.0597	0.9710	0.6559	0.6701	0.8316	0.7783	0.9220
Sargan test statistics												
Chi2	250.0	189.6	140.5	138.5	142.0	165.0	36.5	163.2	57.5	72.8	44.8	51.1
P-value	0.000	0.000	0.000	0.000	0.000	0.000	0.0367	0.000	0.0001	0.000	0.0042	0.0007

Note: Robust standard errors reported in parentheses. Levels of significance: *(10%), ** (5%), *** (1%). All estimations include year fixed effects. LDV = Lagged dependent variable. OBS = Other business services; CRS = Computer-related services. The Sargan test statistics of overidentifying restrictions are also reported in the table.

Annex 4, Table 3: Impact of services AfT by sector on disaggregated services imports (GMM)

Bernard Hoekman and Anirudh Shingal

	Services imports (Difference GMM)						Services imports (System GMM)					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	$Trans_{jt}$	$Comm_{jt}$	$Finance_{jt}$	CRS_{jt}	OBS_{jt}	$Travel_{jt}$	$Trans_{jt}$	$Comm_{jt}$	$Finance_{jt}$	CRS_{jt}	OBS_{jt}	$Travel_{jt}$
LDV	0.037	0.205***	0.135*	0.195	0.424***	0.167	0.307***	0.295***	0.516***	0.344*	0.581***	0.395*
	(0.029)	(0.045)	(0.070)	(0.174)	(0.090)	(0.153)	(0.093)	(0.053)	(0.121)	(0.179)	(0.086)	(0.215)
$\ln(AfT\_Transport_{jt-1})$	0.006	-0.036	-0.000	0.108*	0.019	0.015	0.004	-0.063*	-0.004	0.102**	-0.006	-0.017
	(0.015)	(0.032)	(0.023)	(0.059)	(0.023)	(0.022)	(0.010)	(0.035)	(0.029)	(0.052)	(0.018)	(0.014)
$NAfT\_Transport_{jt-1}$	0.026	0.052	0.021	0.104	-0.050	0.045	0.050	0.096	0.040	0.194	0.078	0.079
	(0.044)	(0.241)	(0.078)	(0.165)	(0.083)	(0.058)	(0.066)	(0.286)	(0.100)	(0.196)	(0.159)	(0.091)
$\ln(AfT\_Communications_{jt-1})$	0.003	0.007	0.007	0.023	-0.056	0.035*	0.002	-0.015	-0.002	-0.040	-0.033	0.045*
	(0.013)	(0.036)	(0.022)	(0.051)	(0.048)	(0.019)	(0.016)	(0.044)	(0.027)	(0.039)	(0.065)	(0.024)
$NAfT\_Communications_{jt-1}$	-0.049*	-0.002	0.041	0.110	-0.054	-0.012	-0.028	0.137	0.166	0.166	-0.026	-0.018
	(0.028)	(0.106)	(0.083)	(0.169)	(0.072)	(0.037)	(0.046)	(0.125)	(0.112)	(0.193)	(0.086)	(0.049)
$\ln(AfT\_Financial_{jt-1})$	0.008	-0.060**	0.016	0.067**	0.016	0.021	0.007	-0.077***	0.028	0.064*	0.017	0.031**
	(0.009)	(0.028)	(0.016)	(0.032)	(0.024)	(0.013)	(0.010)	(0.029)	(0.021)	(0.033)	(0.029)	(0.015)
$NAfT\_Financial_{jt-1}$	0.119	0.093	0.111	0.152	0.057	0.050	0.152	0.136	0.175	0.247	0.032	0.098
	(0.080)	(0.170)	(0.132)	(0.185)	(0.092)	(0.065)	(0.099)	(0.193)	(0.154)	(0.231)	(0.091)	(0.082)
$\ln(AfT\_Energy_{jt-1})$	-0.000	0.006	0.029**	0.012	-0.020	-0.021*	0.000	0.007	0.010	0.004	-0.008	-0.044*
	(0.009)	(0.033)	(0.015)	(0.034)	(0.024)	(0.013)	(0.010)	(0.033)	(0.024)	(0.043)	(0.018)	(0.025)
$NAfT\_Energy_{jt-1}$	0.007	-0.018	-0.046	0.050	0.036	-0.012	0.025	0.070	-0.024	0.040	0.077	0.037
	(0.033)	(0.132)	(0.045)	(0.142)	(0.088)	(0.043)	(0.043)	(0.163)	(0.063)	(0.174)	(0.109)	(0.058)
$\ln(AfT\_OBS_{jt-1})$	0.006	0.003	-0.017	-0.093**	-0.001	0.021	0.011	0.064	-0.016	-0.120**	0.003	0.004
	(0.015)	(0.048)	(0.019)	(0.045)	(0.032)	(0.015)	(0.012)	(0.056)	(0.025)	(0.055)	(0.035)	(0.021)
$NAfT\_OBS_{jt-1}$	-0.204	-0.730*	-0.306	-0.693	-0.368	-0.216	-0.226	-0.677	-0.326	-0.777	-0.443	-0.251
	(0.177)	(0.397)	(0.233)	(0.613)	(0.240)	(0.197)	(0.188)	(0.416)	(0.320)	(0.731)	(0.304)	(0.245)
$\ln(AfT\_Travel_{jt-1})$	-0.011	0.017	0.047	0.085*	-0.058	-0.017	-0.024	0.019	0.044	0.110**	-0.074	-0.021
	(0.015)	(0.028)	(0.032)	(0.051)	(0.037)	(0.016)	(0.019)	(0.038)	(0.046)	(0.051)	(0.046)	(0.019)
$NAfT\_Travel_{jt-1}$	0.003	0.049	-0.047	-0.030	-0.069	-0.045	0.024	0.091	0.028	-0.016	-0.046	-0.008
	(0.020)	(0.119)	(0.061)	(0.116)	(0.066)	(0.029)	(0.033)	(0.157)	(0.076)	(0.116)	(0.082)	(0.042)
$\ln(AfT\_CRS_{jt-1})$	0.009	-0.006	0.025	-0.105*	0.005	-0.002	0.023	0.014	0.012	-0.144**	0.004	0.007
	(0.019)	(0.055)	(0.042)	(0.058)	(0.037)	(0.017)	(0.023)	(0.071)	(0.050)	(0.061)	(0.037)	(0.018)
$NAfT\_CRS_{jt-1}$	-0.000	0.037	0.127**	0.062	0.023	0.010	0.008	0.062	0.126*	0.113	0.021	0.020
	(0.020)	(0.073)	(0.054)	(0.089)	(0.082)	(0.034)	(0.030)	(0.105)	(0.070)	(0.120)	(0.087)	(0.034)
$\ln(Pop_{jt})$	1.479***	1.892***	3.206***	1.011	1.061**	0.602**	0.426***	0.351	0.021	0.114	-0.062	0.718*
	(0.310)	(0.733)	(1.007)	(1.478)	(0.534)	(0.305)	(0.132)	(0.215)	(0.339)	(0.244)	(0.203)	(0.421)
$\ln(MP_{jt})$	-0.096	-1.737	-0.389	-1.786	-0.707	-1.442	0.329	1.543	-1.004	-0.712	-0.403	0.159
	(0.424)	(1.426)	(0.804)	(1.439)	(0.927)	(1.039)	(0.454)	(1.069)	(0.697)	(1.047)	(0.617)	(0.699)
$\ln(CPI_{jt})$	0.179	0.152	0.121	0.745	0.333	0.349	0.116	0.132	0.183	1.006	0.094	0.132
	(0.143)	(0.339)	(0.305)	(0.493)	(0.259)	(0.232)	(0.126)	(0.313)	(0.199)	(0.846)	(0.232)	(0.215)
GE_{jt}	-0.023	0.376	-0.079	0.441*	0.242	-0.005	0.136	0.665**	0.186	0.433	0.223	0.239
	(0.069)	(0.237)	(0.195)	(0.230)	(0.185)	(0.064)	(0.095)	(0.290)	(0.331)	(0.478)	(0.212)	(0.201)
Constant	-16.194	9.565	-38.541	22.271	0.437	25.600	-10.289	-37.312*	22.341	11.070	11.657	-11.576
	(10.147)	(35.211)	(24.838)	(41.586)	(20.604)	(23.927)	(9.327)	(22.406)	(17.331)	(21.744)	(12.302)	(17.402)
N	1382	955	1269	858	1223	1366	1524	1084	1412	978	1369	1508
df_m	31	31	31	31	31	31	31	31	31	31	31	31
r2	0.3985	0.1361	0.2581	0.1527	0.4651	0.1411	0.7714	0.5988	0.5986	0.5690	0.8418	0.6959
Sargan test statistics												
Chi2	95.4	91.1	149.8	143.2	115.4	142.7	92.6	55.6	142.5	50.8	96.4	153.0
P-value	0.0761	0.1294	0.000	0.000	0.003	0.000	0.000	0.0002	0.000	0.0007	0.000	0.000

Note: Robust standard errors reported in parentheses. Levels of significance: *(10%), ** (5%), *** (1%). All estimations include year fixed effects. LDV = Lagged dependent variable. OBS = Other business services; CRS = Computer-related services. The Sargan test statistics of overidentifying restrictions are also reported in the table.

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