

ANNEX F

METHODOLOGY FOR THE ECONOMETRIC ANALYSIS

This annex elaborates on the data and procedures for the econometric analysis in this chapter. Table F.1 compares this study with three recent similar studies of the impact of aid for trade on countries' export performance in order to demonstrate the similarities and differences. Compared to previous studies, the analysis presented here covers the most recent years of aid-for-trade assistance to developing countries. It covers 16 years of assistance, beginning with the earliest date of the Creditor Reporting System (CRS) aid-for-trade data set, 1995. As with other studies, our definition of aid for trade (Aft) covers all CRS bilateral assistance by donors to developing countries included in the CRS. Note that data are limited to assistance provided from reporting OECD countries that are members of the Development Assistance Committee; data from non-OECD donors, such as China, India, Brazil and Kuwait and some multilateral agencies, are therefore not possible to include. Moreover, multilateral reporting data are incomplete for earlier years and recent multilateral assistance takes the form of budget support and/or sector loans, which are difficult to associate with aid for trade.

Helble, *et al.* (2012) create their own stream of disbursement data going back to 1990 using the OECD CRS database, although data before 2002 on Aft projects are systematically under-reported because multilateral projects did not report. Cali and te Velde (2010) use disbursement data from 2002-07, with the effect on exports lagged one year. Vijil (2012), as in our analysis, uses the information on commitments to take advantage of a longer time period. Another major difference with respect to Cali and te Velde's analysis is that they use aggregate export volumes for each country included in their sample as their dependent variable while we use bilateral export trade pairs from developing countries and the rest of the world; this allows us to examine the effects of aid for trade received by importing countries in the analysis. Furthermore, other official development assistance flows besides those classified under aid-for-trade assistance are included as in Helble *et al.* (2012) and Vijil (2012).

Table F.2 shows the source of data used in this analysis. The four main sources considered here are the UN Comtrade for bilateral export flows of developing countries, the World Development Indicators for information such as GDP and population for both partners, CEPII datasets for gravity variables and bilateral distance measures, and the OECD CRS for aid for trade and other official development assistance from OECD countries to developing countries. The World Governance Indicators and Country Policy and Institutional Assessments datasets are used to measure government management and performance. The Correlates of War dataset is used to create a dummy variable for countries in (external or internal) conflict in a given period. Based on aid flows received by developing countries, as reported in the OECD CRS dataset, a dummy variable is created for countries not receiving Aft and ODA flows in a given period and these controls are included in the regression analysis, as suggested by Cali and te Velde and Vijil among others. Exports of ores and minerals under HS codes 26 and 27 are excluded from the analysis; countries for which the share of oil exports exceeds 75 percent of total exports are also excluded from the analysis. The dummy for Regional and Free Trade Agreement is built based on information published by the World Trade Organization, and is scored 1 when the trading country pairs are members of the same agreement.

The bottom panel of Table F.3 presents the complete list of countries following the Income Classification of the World Bank (WB) in 1995, according to historical thresholds published by this institution. The top panel of the table presents the summary statistics for the most relevant variables: exports (excluding minerals and oil) in billion current USD, average distance of export flows in thousand kilometres, GDP in billion current USD, total population in million inhabitants, and aid-for-trade and other official development assistance flows in million current USD.

Some clear patterns already emerge while looking at these averages, and they are valid while comparing income groups of the WB income classification or even by observing the performance of least developed countries. The first is that exports are greater for countries at higher levels of development and that per capita performance exceeds the aggregate performance as

the total population of countries becomes smaller at higher levels of development. Average distance of exports increases slightly with the level of development. Finally, there is a clear pattern of support to less developed countries, as they tend to concentrate large amounts of aid flows in AfT and other official development assistance.

Table F.4 gives partial correlations between total exports of developing countries and some explanatory variables used while applying the gravity framework to the explanation of trade flows. The GDP and the population of the exporting country are the variables most significantly correlated with aggregate values of exports. Aid for trade and other official development assistance flows are also positively correlated with export levels, but at lower levels of correlation. Other significant correlations are observed between the two flows of development assistance, and also between aid flows and the total population of the country, which is an expected result given that the amount of aid commitments will evolve with the size of the country.

The baseline framework for our empirical analysis is presented in Table E.1. Column 1 in this table presents the results of the gravity model where bilateral exports of developing countries are a function of the size of the exporting economy, the size of the importing economy, and the distance between the two countries as in the following specification:

$$X_{ij} = G \frac{Y_i^\alpha Y_j^\beta}{T_{ij}^\theta}$$

where X_{ij} denotes exports (excluding minerals and oil) of country i to country j , G is the gravitational constant between the two countries, Y_i and Y_j are the sizes of the exporting and importing economies respectively, and T_{ij} is measures of trade barriers between the two countries. Initially, we use the distance from the CEPII dataset as a proxy for trade barriers for the estimation of the log-linearised version of the gravity model. All regressions include exporter-, importer-, and year-fixed effects. Column 2 adds some commonly used control variables to the baseline specification, i.e. common border, common language, colonial relationships and landlockedness of countries. It also adds other controls such as remoteness of countries calculated as the product of the GDP-weighted distances of both countries with respect to all other partners, a dummy for conflict (time variant), and a dummy for regional trade agreements as listed by the World Trade Organization. Column 3 includes the aid flows received by the exporting and the importing countries in logs for aid-for-trade flows and other official assistance committed by bilateral donors. Column 4 includes dummy variables for countries not receiving aid flows, and this mainly affects importing countries given that most exporting countries receive aid flows. In order to avoid potential endogeneity issues related to aid-for-trade flows, we use three-year lagged AfT commitments. A sensitivity analysis of exports to lagged AfT commitments is presented in Table F.5. It demonstrates that improvements in exports can best be observed after a certain lag (three years) and that the impact of commitments increases over time.

TABLE F.1 OECD analysis in comparison with other recent studies

	Helble <i>et al.</i> (2012)	Cali and te Velde (2010)	Vijil (2012)	OECD (2013)– Newfarmer-Urgarte
Period covered	1990-2005	2002-07	1995-2005	1995-2011
Country coverage	170 trading countries	120 developing countries	All positive trade flows	109 developing countries exporting to all countries
Observations	108 304	508	95 280	142 448
Explained variable	Imports from country i to country j in each year	Total exports of a country in a given year	Exports of country i to country j in year t	Exports of country i to country j in year t
Zero trade flows	No	(not mentioned)	No	No
Aid for trade	Flows received by importer and exporter	Flows received by the exporter	Flows received by importer and exporter	Flows received by importer and exporter
Definition of AfT	Disbursements (constructed CRS 1990-05); trade policy and regulations, trade development and economic infrastructure	Disbursements (2002-2007); trade facilitation, trade policy and regulations, productive capacity and economic infrastructure	Commitments (1995-2005); trade policy and regulations, productive capacity and economic infrastructure	Commitments (1995-2010) with three-year lags; productive capacity, trade development and other aid for trade
Disaggregation of AfT on exports	No, but several aggregations of previous categories are tested.	Yes. Productive capacity and Infrastructure.	Yes. Institutions, productive capacity and infrastructure	Yes. Productive capacity, infrastructure and other AfT.
ODA	All other aid flows not included in AfT for both countries	No	All other aid flows not included in AfT for both countries	All other aid flows not included in AfT for both countries
Dummies for non-receivers of AfT and ODA	No	Yes	Yes	Yes
Fixed effects	Year and bilateral (five years) fixed effect	Year and exporter	Year	Year, exporter and importer

TABLE F.2 Definition of variables

Variable	Description	Source
Ln Exports_ijt	Total exports from country i to country j in year t in current million USD (in logs). Oil and mineral exports are excluded. Only positive values are considered.	UN Comtrade
Ln GDP_it	GDP of country i in current million USD in year t (in logs).	WB World Development Indicators
Ln POP_it	Total population of country i in year t (in logs).	WB World Development Indicators
Ln Distance_ij	Distance between the countries (in logs).	CEPII
Landlocked (i and j)	Dummy variable equal to one if at least one of the two countries is landlocked.	CEPII
Common border	Dummy for contiguity	CEPII
Common coloniser	Dummy for common coloniser	CEPII
Colonial relationship	Dummy for former colonial relationship	CEPII
Common language	Dummy for common official language	CEPII
AfT received by i (in year t)	Total amount of aid for trade received by country i from all bilateral donors in year t in current million USD (in logs)	OECD CRS dataset
Other ODA received by i (in year t)	Total amount of official development assistance, excluding aid for trade, received by country i from all bilateral donors in year t in current million USD (in logs)	OECD CRS dataset
Zero AfT (other ODA) received by i (in year t)	Dummies equal 1 if country i did not receive aid for trade (other ODA) flows in year t	OECD CRS dataset
Government effectiveness (in year t)	Government effectiveness (quality of public services, quality of the civil service and degree of its independence from political pressures, quality of policy formulation and implementation, and credibility of the government's commitment to such policies). It ranks between -2.5 and 2.5, but it has been normalised between 0 and 1 here.	WB Worldwide Governance Indicators
RTA dummy	Dummy variable equal to 1 for RTA in force.	WTO
Conflict in country i (in year t)	Dummy variable for countries under conflict in year t. Inter-state and civil wars are considered. A war is active as long as 1 000 fatalities are observed within a 12-month period. www.correlatesofwar.org/COW2%20Data/WarData_NEW/COW%20Website%20-%20Typology%20of%20war.pdf .	Correlates of War 4.0
Oil exporters excluded	Algeria, Angola, Azerbaijan, Bahrain, Congo, Rep. of, Gabon, Iran, Iraq, Kazakhstan, Kuwait, Libya, Nigeria, Norway, Oman, Qatar, Russia, Saudi Arabia, United Arab Emirates, Yemen, Venezuela. Countries are either major oil exporters or their share of oil exports in total exports is equal or higher than 75 percent.	Own calculations using trade data.

TABLE F.3 Summary statistics of main variables by income groups (1995)

Income group		Total exports	Distance	GDP in current USD	Population	AfT received	Other ODA received
Low income countries	Mean	5.2	6.2	43.9	65.1	160.4	443.6
	Std.	19.7	1.4	185.4	210.5	358.7	559.5
Lower middle income countries	Mean	29.1	7.1	119.1	58.8	153.4	323.5
	Std.	148.8	2.2	558.9	217.2	279.3	415.3
Upper middle income countries	Mean	26.0	7.6	147.5	24.0	44.3	123.1
	Std.	48.7	2.4	311.7	43.8	103.0	192.6
Least developed countries	Mean	0.7	6.2	6.1	15.5	64.4	303.0
	Std.	1.5	1.4	9.8	24.2	100.5	387.5
IDA countries	Mean	18.7	6.2	77.2	47.9	98.5	338.5
	Std.	138.4	1.6	520.9	201.6	204.5	412.5
All developing countries	Mean	20.5	6.9	102.2	51.8	127.3	310.3
	Std.	100.4	2.1	410	186.3	281.4	444.4
Low income countries	Bangladesh, Benin, Burkina Faso, Burundi, Cambodia, Central African Republic, Comoros, Eritrea, Ethiopia, The Gambia, Ghana, Guinea, Guinea-Bissau, Haiti, India, Kenya, Kyrgyz Republic, Madagascar, Malawi, Mali, Mauritania, Mozambique, Nepal, Niger, Pakistan, Papua New Guinea, Rwanda, Sao Tome and Principe, Sierra Leone, Sudan, Tajikistan, Tanzania, Togo, Uganda, Viet Nam, Zambia, Zimbabwe.						
Lower middle income countries	Albania, Armenia, Belarus, Bhutan, Bolivia, Bosnia and Herzegovina, Cameroon, Cape Verde, China, Côte d'Ivoire, Colombia, Djibouti, Dominican Republic, Ecuador, Arab Rep. Egypt, El Salvador, Georgia, Guatemala, Guyana, Honduras, Indonesia, Jordan, Kiribati, Lesotho, FYR Macedonia, Moldova, Morocco, Mongolia, Nicaragua, Paraguay, Peru, Philippines, Samoa, Senegal, Solomon Islands, Sri Lanka, Swaziland, Syrian Arab Republic, Thailand, Tonga, Turkmenistan, Ukraine, Vanuatu.						
Upper middle income countries	Argentina, Belize, Brazil, Botswana, Bulgaria, Chile, Costa Rica, Cuba, Dominica, Fiji, Grenada, Lebanon, Latvia, Lithuania, Malaysia, Maldives, Mauritius, Mexico, Namibia, Panama, Poland, Suriname, Tunisia, Turkey, Tuvalu, Uruguay, St. Lucia, St. Vincent and the Grenadines, South Africa.						
Least developed countries	Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Cape Verde, Central African Republic, Comoros, Djibouti, Eritrea, Ethiopia, The Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lesotho, Madagascar, Malawi, Maldives, Mali, Mauritania, Mozambique, Nepal, Niger, Rwanda, Samoa, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Sudan, Togo, Tanzania, Tuvalu, Uganda, Vanuatu, Zambia.						
IDA countries	Albania, Benin, Bangladesh, Bhutan, Burkina Faso, Burundi, Cambodia, Cameroon, Central African Republic, China, Comoros, Côte d'Ivoire, Djibouti, Arab Rep. Egypt, Eritrea, Ethiopia, The Gambia, Ghana, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Kenya, Kyrgyz Republic, Kiribati, Lesotho, FYR Macedonia, Madagascar, Malawi, Maldives, Mali, Mauritania, Moldova, Mozambique, Nicaragua, Niger, Nepal, Papua New Guinea, Rwanda, Samoa, Senegal, Sierra Leone, Solomon Islands, Sudan, Sao Tome and Principe, Tajikistan, Tanzania, Togo, Tonga, Tuvalu, Uganda, Vanuatu, Zambia.						

TABLE F.4 Correlation matrix of variables of interest

	Total exports	Average distance	GDP	Population	AfT received	ODA received
Total exports	1.00					
Average distance	0.20	1.00				
GDP	0.94	0.22	1.00			
Population	0.64	0.18	0.71	1.00		
AfT received	0.23	0.18	0.32	0.60	1.00	
ODA received	0.27	0.15	0.30	0.40	0.48	1.00

Notes: The correlation matrix is calculated using aggregate or average values for variables for all exporting countries. In that sense, total exports stands for aggregate exports of a developing country in a given year. Average distance is the average distance of all bilateral export flows of a developing country in a given year. GDP and population are the gross domestic product and total population observed in each country for each year. AfT received and ODA received are the total amount of aid-for-trade flows and other official development assistance flows received by the exporting country in each period considered here.

TABLE F.5 Lagged Impact of aid for trade on exports of developing countries (1995) (page 1 of 2)

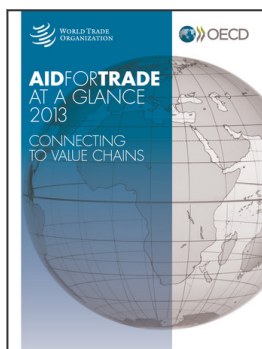
Dependent variable Exports from country i (DEV95) to country j (ALL) in year t	(1) AfT t-1	(2) AfT t-2	(3) AfT t-3	(4) AfT t-4	(5) AfT t-5	(6) ALL LAGS
Other ODA received by i	-0.015*** (0.006)	-0.018*** (0.005)	-0.018*** (0.005)	-0.018*** (0.005)	-0.015*** (0.005)	-0.018*** (0.006)
Zero other ODA received by i	-0.039 (0.037)	-0.039 (0.036)	-0.033 (0.036)	-0.041 (0.035)	-0.043 (0.035)	-0.037 (0.037)
Other ODA received by j	0.015*** (0.006)	0.016*** (0.005)	0.014*** (0.005)	0.013** (0.005)	0.012** (0.005)	0.005 (0.006)
Zero other ODA received by j	-0.029 (0.024)	-0.027 (0.024)	-0.033 (0.024)	-0.031 (0.024)	-0.038 (0.024)	-0.036 (0.024)
AfT received by i in t-1	0.005 (0.003)					-0.004 (0.004)
Zero AfT received by i in t-1	-0.007 (0.020)					-0.014 (0.021)
AfT received by i in t-2		0.018*** (0.003)				0.004 (0.004)
Zero AfT received by i in t-2		0.015 (0.020)				0.011 (0.021)
AfT received by i in t-3			0.030*** (0.003)			0.015*** (0.004)
Zero AfT received by i in t-3			0.021 (0.019)			0.012 (0.021)
AfT received by i in t-4				0.033*** (0.003)		0.013*** (0.004)
Zero AfT received by i in t-4				0.026 (0.019)		0.021 (0.021)
AfT received by i in t-5					0.043*** (0.003)	0.034*** (0.003)
Zero AfT received by i in t-5					0.044** (0.019)	0.045** (0.021)
AfT received by j in t-1	0.007* (0.004)					0.006 (0.004)
Zero AfT received by j in t-1	-0.028 (0.018)					-0.010 (0.018)

TABLE F.5 Lagged Impact of aid for trade on exports of developing countries (1995) (page 2 of 2)

Dependent variable Exports from country i (DEV95) to country j (ALL) in year t	(1) AfT t-1	(2) AfT t-2	(3) AfT t-3	(4) AfT t-4	(5) AfT t-5	(6) ALL LAGS
AfT received by j in t-2		0.003 (0.004)				-0.003 (0.004)
Zero AfT received by j in t-2		-0.041** (0.017)				-0.017 (0.019)
AfT received by j in t-3			0.008** (0.004)			0.003 (0.004)
Zero AfT received by j in t-3			-0.029* (0.017)			0.002 (0.019)
AfT received by j in t-4				0.007* (0.004)		-0.001 (0.004)
Zero AfT received by j in t-4				-0.048*** (0.017)		-0.029 (0.018)
AfT received by j in t-5					0.012*** (0.004)	0.010** (0.004)
Zero AfT received by j in t-5					-0.032* (0.016)	-0.018 (0.018)
All control variables in Table E.1	Yes	Yes	Yes	Yes	Yes	Yes
Importer and exporter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	142 448	142 448	142 448	142 448	142 448	142 448
R-squared	0.734	0.734	0.734	0.734	0.735	0.735

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