

Aid for Trade and trade costs

MSc Thesis

Wageningen University – Department of social sciences

Chair group Development Economics

MSc International Development Studies (MID)

Loes van der Velde

920817-862-120

17 March 2017

Supervisor: Jeroen Klomp

DEC-80433

Abstract. The purpose of this thesis is to examine the impact of Aid for Trade on trade costs in developing countries. Donors shift their focus from traditional development cooperation towards trade-related aid as trade is considered the engine of economic growth. However, literature shows that the relationship between trade and growth is contingent on many factors. Likewise, previous research on the effectiveness of AfT in terms of export does not lead to a straightforward conclusion. This thesis aims to address the lack of quantitative evidence on AfT effectiveness by considering the relationship between AfT and trade costs, extending the empirical model used by Calì & te Velde (2011). The analysis of panel data covering 180 countries and years 2005-2015 does not show substantial results. Further research exploring the relationship is needed.

Table of contents

1. Introduction	5
2. Theory.....	8
2.1. Paradigm: Trade as an engine of growth.....	8
2.2. Aid for trade	11
2.2.1. Definition	11
2.2.2. The Aid for Trade Initiative	13
2.2.3. Aid for Trade effectiveness.....	14
2.3. Trade costs.....	17
3. Methodology.....	25
3.1. Model and hypotheses	25
3.1.1. Extending the model	26
3.1.2. Hypothesized interaction effects.....	26
3.2. Data collection.....	27
3.3. Data analysis	30
4. Results & discussion.....	33
4.1. Extended model.....	33
4.2. Interaction effects.....	35
5. Conclusion.....	39
References	41
Appendix 1. Tables of CRS codes per Aid for Trade category	48
Appendix 2. Tables from data analysis.....	54

List of figures

Figure 1 Aid for Trade: An expanding agenda.....	12
Figure 2 Aid for Trade and trade costs.....	17
Figure 3 Outputs achieved by Aid for Trade actions to reduce trade costs.....	23
Figure 4 The types of actions that have achieved the most positive results in reducing trade costs for goods and services	23

List of tables

Table 1 Summary statistics for the main variables.....	28
Table 2 Results of the regression analysis of the extended model.....	34
Table 3 Results of regression analysis with interaction effects.....	36
Table 4 CRS codes for aid to trade-related infrastructure.....	48
Table 5 CRS codes for aid to productive capacity building.....	49
Table 6 CRS codes for aid to trade policy & regulations and trade-related adjustment	53
Table 7 Composition of AfT variables.....	54
Table 8 Correlation matrix of the main independent variables	54

Acronyms and abbreviations

AfT	Aid for Trade
CRS	Creditor Reporter System
DAC	Development Assistance Committee
DB	Doing Business
DG TRADE	European Commission Directorate-General for Trade
EBA	Everything but Arms
EPA	Economic Partnership Agreement
GDP	Gross domestic product
LDC	Least developed countries
LPI	Logistics Performance Index
ODA	Official development assistance
OECD	Organisation for Economic Co-operation and Development
QWIDS	Query Wizard for International Development Statistics
SDGs	Sustainable Development Goals
SSA	Sub-Saharan Africa
TFA	Trade Facilitation Agreement
UN	United Nations
WB	World Bank
WDI	World Development Indicators
WGI	World Governance Indicators
WITS	World Integrated Trade Solutions
WTO	World Trade Organization

1. Introduction

Since the 2000s, the debate on aid effectiveness and the terms of engagement of donors has remained vivid among academics and policy researchers (Besada & Kindornay, 2013; Booth, 2012; Engel, 2014; Mawdsley, Savage, & Kim, 2014). The policies based on the Washington consensus favouring privatisation, liberalisation, and macro-economic stability, pushed by donor members of the Development Assistance Committee (DAC) in the 80s and 90s, are still in place, but targets have expanded to e.g. health, wellbeing and gender (Birdsall & Fukuyama, 2011; Gore, 2000; Hayami, 2003; Mawdsley et al., 2014; Öniş & Şenses, 2005; Rodrik, 2008; Stiglitz, 2008). Three main changes in development cooperation are that 1) development policy is less about poverty and more about trade and investment; 2) relations between donors and recipients will be based on national and commercial interests, intertwined with a broader foreign and security policy; and 3) the importance of involving institutions and government of both donor and recipient countries while pursuing their economic interests is emphasised (Cheru, 2014; Haan & Warmerdam, 2013; Zimmerman & Smith, 2011). The concept of development finance is widening as the system is becoming more fragmented with diverse donors, partner countries, and delivery modes (Zimmerman & Smith, 2011).

The UN recognises that the aid architecture is significantly changing and urges for a more integrated plan stimulating economic growth and for investment in enhancing productivity in recipient countries (Mawdsley et al., 2014; UN, 2015; United Nations, 2015). The Sustainable Development Goals (SDGs) illustrate the more cooperative and integrated form of development cooperation.

As economic growth is considered the fundamental driver of development, the Aid for Trade (AfT) Initiative was launched in 2005 at the Hong Kong WTO Ministerial Conference (Mawdsley et al., 2014; Stiglitz & Charlton, 2013). It builds on the notion that trade can contribute to productivity, economic growth, incomes, and jobs. Aid for Trade is Official Development Assistance (ODA) with the objective to reduce trade costs in developing countries, with the purpose to remove the binding constraints on trade and turn trade opportunities into trade flows (OECD, 2011b). In this thesis, the definition of Aid for Trade is data-driven, based on the categories used in OECD's Creditor Reporting System (CRS) where all ODA flows are recorded. AfT is composed of all sub-categories of aid to trade-related infrastructure; aid to productive capacity building; and aid to trade policy & regulations and trade-related adjustment. See Appendix 1 for all sub-categories that encompass these types of

AfT. OECD data show that trade-related ODA commitments were at \$44.5 billion in 2015, which amounts to roughly 25% of total ODA.

Aid for Trade fits in the shifted paradigm of development cooperation. It stimulates aid flows to trade-related activities, assisting countries to deal with the costs they are facing due to multilateral trade liberalisation in the WTO Doha Round. Trade costs include “all costs incurred in getting a good to a final user other than the cost of producing the good itself” (Anderson & van Wincoop, 2004). Low-income countries and in particular Sub-Saharan Africa are facing difficulties with reducing their relatively high trade costs (OECD/WTO, 2015). This research focuses on the effect of Aid for Trade on international trade costs as captured in the Doing Business databank from the World Bank, which was composed based on a method by Djankov, Freund, & Pham (2010). Here, trade costs are unilateral and capture the “*costs in US\$ (and the time) of handling and transporting a 20-foot container to (or from) the port of departure (or entry). These costs include costs for documents, administrative fees for customs clearance and technical control, terminal handling charges, and fees for in- country transport. The cost measure does not include tariffs or trade taxes and only official costs are recorded.*”

Aid for Trade is important as it is an opportunity to enhance economic growth opportunities: reducing internal trade costs does not require negotiations with other parties or countries or bilateral negotiations. Trade costs can be reduced through unilateral actions, supported by AfT disbursements. The trade costs that have most effects on restricting trade flows are domestic costs, which were not addressed under traditional development cooperation in the Washington Consensus (Hoekman & Nicita, 2011). The international community can contribute to economic growth opportunities through AfT directed at domestic costs, such as infrastructure, helping developing countries trade more efficiently.

Research on the effectiveness of Aid for Trade varies in definitions of Aid for Trade and dependent variables. Quantitative evidence of the effects of AfT is scarce, with little understanding of the effectiveness in achieving the general aims and the extent to which the different categories are successful (Calì & te Velde, 2011). Most studies are micro-based or qualitative, while macro studies may yield regularities across countries and could establish more stylised facts concerning Aid for Trade. Furthermore, up to now there is a lack of baseline data and quantitative indicators (Melo & Cadot, 2014).

This thesis investigates Aid for Trade and its effect on the costs of trading in developing countries. It contributes to literature by addressing the void in the quantitative assessment of Aid for Trade. This thesis follows the first part of the research conducted by Calì & te Velde (2011), though using a larger sample of developing countries and double the time period.

Furthermore, in this thesis, the impact of all broad categories of AfT is examined to gain more insight in the mechanisms behind Aid for Trade effectiveness. Economic variables are added with the aim of a better estimation of the relationship between AfT and trade costs. Lastly, several conditional relationships between AfT categories and economic factors are proposed and tested.

Research question:

What is the impact of Aid for Trade on trade costs in developing countries?

The rest of this thesis is organised as follows: section 2 describes the literature underlying the Aid for Trade initiative and its relation to trade costs, section 3 describes the method of analysis and the data used to test the theoretical hypotheses. The results of the regression analysis are shown and discussed in section 4, followed by a conclusion and recommendations for further research in section 5.

2. Theory

In this chapter, the first section outlines how trade is theorised to be an engine of growth and the role that trade costs play. The Aid for Trade Initiative is introduced and detailed in section 2.2. Lastly, section 2.3 describes the different types of trade costs and how Aid for Trade can affect the level of trade costs.

2.1. Paradigm: Trade as an engine of growth

The aim of the research is to examine the relationship between Aid for Trade and trade costs. The idea of Aid for Trade is based on the premise that trade can work as an engine for growth. An impressive amount of empirical studies have used a variety of cross-country growth regressions to examine the effects of trade openness on economic growth. This section outlines the main conclusions from recent literature.

Both the direction and the sign of the relationship between trade and growth remain at discussion as the effect of trade on economic growth has mixed support, reinforced by mixed empirical evidence with little robustness (Awokuse, 2008; Dollar, 1992; Eicher & Kuenzel, 2014; Frankel & Romer, 1999; Grossman & Helpman, 1990; Kim & Lin, 2009; Kneller, Morgan, & Kanchanahatakij, 2008; Sachs & Warner, 1995; Sakyi, Villaverde, & Maza, 2015; Singh, 2010; Wacziarg & Welch, 2008; Wang, Liu, & Wei, 2004; Yanikkaya, 2003). Among large global organisations like the WTO, OECD and the World Bank, there is a strong belief that the body of evidence supporting positive links between openness to trade and economic performance is large and expanding (OECD/WTO, n.d.; The World Bank Group & WTO, 2015). Currently, the consensus is that the impact of trade on growth is contingent on various aspects such as economic, social, political, institutional, and structural factors.

The first reason for the ambiguity of the relationship is that there is a lack of a clear definition of what is meant by trade or openness. Most literature considers the relationship between trade policies and growth rather than trade volumes and growth. This is also the main argument that Rodriguez & Rodrik (2001) make. They argue that the relationship between trade volumes and growth is at best very weak and at the worst doubtful, because trade volumes are contingent to many global and country specific factors. They criticise most empirical approaches and emphasise that the focus should be on contingent relationships between trade policy and growth. Yanikkaya (2003) explores these differences in definition and states that “the meaning of “openness” has become similar to the notion of “free trade”, that is a trade

system where “all trade distortions are eliminated”. Hence, different aspects of the concept of openness are measured, leading to various conclusions (Singh, 2010).

Second, the variety of measures of trade openness used in academic literature yield different conclusions as to the relationship with growth (Das & Paul, 2011; Sakyi et al., 2015; Sarkar, 2007; Yanikkaya, 2003). An ideal measure of openness would take into account all the barriers that interfere with international trade (Yanikkaya, 2003). Hallaert (2006) surveyed empirical literature on the relationship between trade and growth, reviewing different measures of trade openness: trade shares; trade barriers and measures of price distortion; indexes aggregating several measures of openness; and trade liberalisation. He concluded that the link between trade and growth is generally established, but econometric problems remain.

Yanikkaya (2003) uses trade volumes and trade restrictions as openness measures. He finds that in developing countries, the strong theoretical bias in favour of the positive effect of trade on growth can be supported empirically when openness is measured as trade share of GDP. However, when using trade restrictions as a measure of openness, he finds, contrary to theory, that in developing countries trade barriers are positively related to economic growth (Yanikkaya, 2003). This means that a more liberalised trade system is not always advantageous to developing countries. For example, higher trade restrictions may result in higher government revenue from taxes. Moreover, trade restriction might lead to positive production externalities in sectors competing with the restricted imports or may promote technologically more dynamic sectors over others, resulting in higher long-term GDP levels (Grossman & Helpman, 1990; Rodriguez & Rodrik, 2001)

Additionally, technology is a factor in the relationship between trade and economic growth. openness to trade leads to economic growth by introducing new technology through imports; increasing the market size to domestic producers raising the returns to innovation; and facilitating a country’s specialisation in research-intensive production (Harrison, 1996). Trade allows developing countries to access new products and inputs essential for economic growth. It also provides access to advance technological knowledge through importing or imitating from trade partners (Yanikkaya, 2003). This is in line with research by Wang et al. (2004) that the technological absorbing capabilities of a country, reflected in the level of human capital, is a condition for trade to have an impact on growth.

Kim and Lin (2009) find an income threshold above which greater trade openness leads to greater economic growth, whereas below the threshold trade has a negative effect on growth. They assert this conditional relationship to the hypothesis that low income countries underinvest in human capital which may prevent these countries from taking full advantage of the

technology transfer. If countries opening up to trade are behind the technological frontier, they might specialise in sectors with comparative disadvantage such as traditional goods and services and experience a reduction in economic growth (Kim & Lin, 2009).

Furthermore, the degree of knowledge exchange between trade partner moderates the relationship between trade and growth. The knowledge exchange driven by international trade introducing new or high-quality goods and services provides an impetus for growth (Wang et al., 2004). Assuming that international trade raises the diffusion of knowledge, international trade makes it easier for domestic producers to imitate and incorporate foreign technologies in their production processes, enhancing total factor productivity growth (Hallaert, 2006). Yanikkaya (2003) found that the more a country trades with the United States, the more likely its growth benefits through technology diffusion. This result particularly applies to developing countries, as there is a high discrepancy between the level of development between the highly innovative United States and LDCs.

Whether a relationship between trade and growth can be found also varies with the economic level of a country (Wang et al., 2004). In a cross country research, Sarkar (2007) finds empirical evidence for the relationship between higher real growth and a higher trade share only in rich and highly trade-dependent countries. A more recent meta-regression analysis shows that countries with a lower economic development level gain less from export as a driver of economic growth (Sannasse, Seetanah, & Jugessur, 2014). This result can be explained by the conditional nature of the relationship between trade and growth. The factors on which this relationship is contingent, are usually less opportune in LDCs than in high income countries, as described in above. Other researches find that not trade openness but export diversity serves as a crucial growth determinant for low income countries, and that the effect is weakened when a country's level of development increases (Eicher & Kuenzel, 2014).

Finally, one can consider the trade costs to affect the trade – growth relationship. The transaction costs incurred for importing to and exporting from an economy can influence the economy's trade position. Deardorff (2014) extends the concepts of the classical Ricardian comparative advantage model to include trade costs. The Ricardian model argues that the “countries will export goods that their labour produces relatively efficiently and will import goods that their labour produces relatively inefficiently” (Krugman, Obstfeld, & Melitz, 2010; Ricardo, 1817). Building on this notion of comparative advantage, each country can specialise in producing a certain good at a lower relative cost and trade it for the other good, which leads to an increase in world output (Krugman et al., 2010). Trade is however not only explained by relative production costs, Deardorff (2014) argues, but also by trade costs. If the trade costs in

a country are too high despite comparatively low production costs, the country may not have a comparative advantage in selling to foreign markets and growth is impeded.

Many developing countries face high trade costs and are marginalised in the world trade system. They lack exporting infrastructure for transport, electricity, and communication as well as the necessary technology and knowledge to meet the product standards of foreign high value markets (Stiglitz & Charlton, 2006). Reducing trade costs will help accomplish sustainable and inclusive economic growth in low-income countries, as the issue of high trade costs in lower income countries marginalises the poorest and most fragile economies (OECD/WTO, 2015). In a study of 105 developing countries, Hoekman and Nicita (2011) show that domestic trade costs are a significant determinant of trade flows.

2.2. Aid for trade

This section starts with the definition of Aid for Trade, followed by an account of the establishment and purposes of the Aid for Trade Initiative. Finally, subsection 2.2.3 discusses previous research on AfT effectiveness.

2.2.1. Definition

The AfT Initiative is grounded in existing development strategies and aims to stimulate that more resources are devoted to trade (European Commission DG Trade, n.d.). The main objective is to “interlock aid and trade policies in a coherent strategy for raising living standards and reducing poverty”. The approach targets all layers of the development assistance chain, from specific trade policy and regulations to more broad assistance to trade related needs. The establishment of the Initiative and its goals are detailed in Section 2.2.2.

Aid for Trade is not a new aid category but an integral part of ODA (OECD/WTO, 2011). There is no universal definition of Aid for Trade. The AfT initiative serves a certain intention but the execution is left to the DAC members’ interpretation. In this thesis, a data driven-definition of Aid for Trade is used. The WTO task force on Aid for Trade provides statistical queries that can be used to obtain AfT flows as reported to the CRS in OECD’s database (OECD, n.d.). The CRS codes for AfT disbursements are listed in Appendix 1.

According to the WTO task force, “projects and programmes should be considered as AfT if these activities have been identified as trade-related development priorities in the recipient country’s national development strategies” (WTO, 2006). The lack of universal definition complicates comparison and measurement of AfT effectiveness.

WTO's task force on Aid for Trade coined six categories of AfT, as depicted in Figure 1, and described below. More practical examples of these aid categories are given in Section 2.3 of this thesis.

- *Trade policy and regulation:* To help local authorities and organisations develop trade strategies, effectively participate in trade negotiations, and implement agreements. Examples include preparing, participating in and implementing international trade negotiations; developing and implementing technical standards; the trade aspects of regional communities; training, explaining rules and regulations.
- *Trade development:* e.g. Development of the business landscape, investment climate and trade promotion institutions; access to trade finance; analysis/institutional support for trade, market analysis and development.

Wider AfT agenda:

- *Building productive capacity:* To improve enterprises' capacities to engage in trade, creating a favourable business environment and building comparative advantages. Building productive capacity: productive sectors e.g. banking, financial and business services; SME promotion; agriculture, forestry, fishing, industry, mineral resources, and mining.

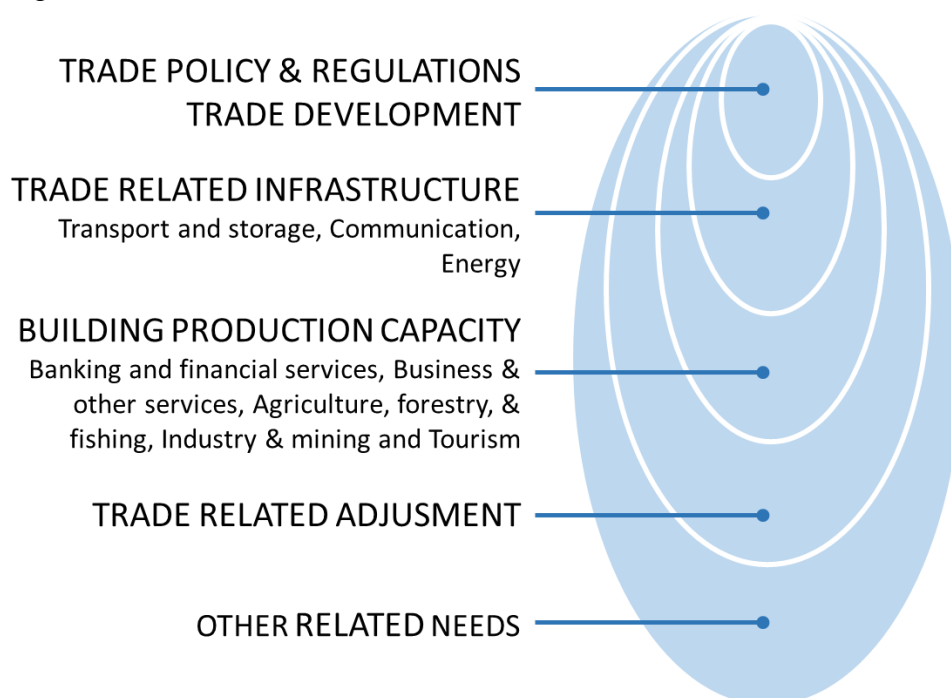


Figure 1 Aid for Trade: An expanding agenda
Adapted from (OECD, 2006)

- *Economic infrastructure:* To assist building the physical network of transport, storage, communications, and energy that links domestic and global markets. Physical

infrastructure including e.g. transport and warehousing, communications, energy generation and supply.

- *Trade-related structural adjustment*: To help developing countries with the costs associated with trade liberalisation, such as the loss of revenue from customs duties; trade-related budget support for honouring trade policy commitments entered into under multi-lateral agreements; contributions to government budget for implementation of recipients own trade reforms and adjustments to trade policy measures by other countries.
- *Other trade-related needs*: support identified as such by beneficiaries and not captured under the categories above.

2.2.2. The Aid for Trade Initiative

In 2005 the Aid for Trade Initiative was launched at the WTO Ministerial Conference in Hong Kong to complement the Doha Round of development and trade negotiations. In the previous Uruguay Round, developing countries had been let down and lost trust in the role of trade in economic growth (Melo & Cadot, 2014). The fundamental driver of the Initiative in 2005 seems to have been to restore the balance as the developing countries threatened to walk away from the Doha Round, stagnating WTO's agenda for expanding trade (Stiglitz & Charlton, 2013). Developing countries demanded financial compensation for concessions made in trade liberalisation negotiations and wanted to be facilitated to integrate into the world trading system (Martínez-Zarzoso, Nowak-Lehmann D., & Rehwald, 2014). The Initiative was the response to the request for actual financial and technical assistance and should mobilise adequate resources quickly before the Doha Round ended (Hallaert, 2013).

In the years following AfT's launch and the Doha Round, the international community reiterated the importance of Aid for Trade to remain on the political agenda, for the sake of attracting additional and sustainable financing for trade (European Commission DG Trade, n.d.).

The AfT Initiative aims to harmonise donors' resources to enhance trade opportunities and make aid more effective. It urges that aid is connected to the development strategies in place, to remove the binding constraints on trade and make trade more pro-poor (OECD, 2011b; WTO, n.d.). Or as the former Director General of the WTO put it, AfT is first and foremost about coherence and mainstreaming trade in national development strategies (Melo & Cadot, 2014; OECD, 2011b).

AfT aims reduce poverty by decreasing trade costs and therefore boosting exports and economic growth (OECD/WTO, 2015; OECD, 2011b; The World Bank Group & WTO, 2015). The AfT Initiative is built on the presumption that the relationship between trade and growth benefits both the recipients and donors more than in traditional development cooperation (Gruber, 2013). However, the underlying assumption that trade will lead to economic growth and development has been subject to debate as discussed in Section 2.1. OECD recognises that trade can reduce but also aggravate poverty, depending on factors like local conditions, but stresses that the aid community should remain focused on the importance of trade (Hayashikawa, 2009; OECD, 2011b).

An open, non-discriminatory trading system and meaningful trade liberalisation play a critical role in stimulating economic growth and sustainable development worldwide (UN General Assembly, 2012). The AfT Initiative aims to assist where adjustment costs are raised as the result of the imposed liberalised trade system as condition for development assistance for some countries during the Washington Consensus period (OECD, 2011b; Stiglitz & Charlton, 2013). The Aid for Trade Initiative aims to address these problems by pointing out the positive role of trade to both donors and donor countries, directing aid to the supply side of trade (OECD, 2011b).

Turning trade opportunities into actual trade flows may be inhibited by domestic constraints in least developed countries, like capacity constraints or a lack of trade-related infrastructure. To benefit from trade opening, investments in infrastructure, institutions, and productive capacity are needed (OECD, 2011b; Stiglitz & Charlton, 2006; WTO, n.d.) . Empirical literature argues that costs of trading induced by internal constraints are equivalent to tariff barriers, or in some cases even higher (Anderson & van Wincoop, 2004). Aid for Trade has the potential to be the push for donors to build infrastructure in order to unlock trade and growth, which has been an issue particularly in Africa (Melo & Cadot, 2014).

2.2.3. Aid for Trade effectiveness

This section discusses previous research on AfT effectiveness. Evidence on the impact of AfT on the trade performance of recipient countries is limited and meagre. Several studies look at the effectiveness of Aid for Trade and there are several literature reviews see e.g. (Cadot, Fernandes, Gourdon, Mattoo, & de Melo, 2014; Calì & te Velde, 2011; Hayashikawa, 2009; Hoekman & Wilson, 2010; Hühne, Meyer, & Nunnenkamp, 2014; Ivanic, Mann, & Wilson, 2006; Martínez-Zarzoso et al., 2014; Massa, 2013; Melo & Wagner, 2015; Vijil, Huchet-Bourdon, & Le Mouël, 2011; Vijil & Wagner, 2012). Most studies find positive yet weak results

for the impact of AfT on trade levels. However, macro studies suffer from an attribution problem as there is a lack of a convincing counterfactual. The impact of AfT varies depending on a number of factors as identified by Massa (2013) and highlighted below.

First, results of effectiveness studies differ as studies use different definitions and categories of AfT. Aid to infrastructure and aid to trade policy and regulation seem to get the most attention in empirical literature. For example, both Ferro, Portugal-Perez, & Wilson (2014) and Ivanic (2006) compose their AfT variable of several items of different categories. Calì & te Velde (2011) only focus on the trade policy and regulation category. Both Calì & te Velde (2011) and Ivanic (2006) find the impact of different aspects of AfT on the cost of trading to be heterogeneous. Aid to trade policy seems to have most effect on reducing trade costs in both importing and exporting countries (Helble, Mann, & Wilson, 2012; Ivanic et al., 2006). Moreover, highly targeted aid on trade policy and trade facilitation shows to be more effective than total Aid for Trade (Busse, Hoekstra, & Königer, 2012). Calì & te Velde (2011) find that, when considering AfT effectiveness in terms of exports, the effect is almost completely driven by aid to economic infrastructure. Vijil & Wagner (2012) find similar results. In the study by Ferro et al. (2014), aid to the transport and energy sectors is most effective in terms of export growth.

Ferro et al. (2014) show a positive link between AfT and exports, but find that the effectiveness of aid is contingent on the level of income of countries. The impact of aid to transport and banking services diminishes for country groups with higher income. Countries with higher income might be more financially developed, so aid to banking services is less essential and less effective. The same line of reasoning is valid for transport, as aid to transport is likely to be more effective in low income countries where transport services are of poor quality. On the other hand, when considering aid to energy and aid to business services, AfT becomes more effective in higher income country groups (Ferro et al., 2014; Portugal-Perez & Wilson, 2012). It can be argued that firms in middle-income countries have access to financial services, hence the priority shifts towards business development and technical advisory. This would also explain why the effectiveness of aid to the ICT sector is higher when the level of income of the recipient country increases (Portugal-Perez & Wilson, 2012).

Busse et al. (2012) distinguish between LDCs and non-LDCs in their country sample. The research finds that AfT is only effective on the costs of trading in non-LDCs, contrary to what one would expect. This is not necessarily due to disadvantages typically experienced by LDCs, but is more likely to be due to the relatively low aid flows to these countries. They conclude that trade-related aid to LDCs is not sufficient and not targeted enough (Busse et al., 2012)

The sector to which Aid for Trade is directed can also lead to varying effectiveness results. For aid to ICT it seems that it is more effective in the fuel sector and has a negative effect on the mineral resources sector (Portugal-Perez & Wilson, 2012). This could be the fuel and oil are more developed and have a greater need for ICT improvements. If aid to ICT is directed to the mineral resources sector, there might be no appropriate application for the investment. It appears that trade facilitation has more effect in the mineral resources sector, because the core business of mineral resources is extracting and selling (Portugal-Perez & Wilson, 2012). In the same study, trade facilitation is found to have less effect in the industry and textile sector, as the main activity in these sectors is processing goods rather than selling or buying. Ivanic et al. (2006) distinguish effects of aid to agricultural and aid to non-agricultural sectors. In the primary and processed agriculture sectors, aid to trade policy lowers the cost of trading. In the primary non-agriculture sector, aid to infrastructure and aid to trade development are most effective.

The geographical region in which the recipient country is located is also a characteristic that plays a role in AfT effectiveness. In Sub-Sahara Africa (SSA), aid for trade facilitation has a larger impact on the cost of trading relative to the global sample (Calì & te Velde, 2011). Calì & te Velde (2013; 2011) suggest that this is mainly caused by the facilitation of intra-SSA trade, for SSA has the lowest capacity to trade and the weakest infrastructure endowment, amplifying the cost reducing effect of aid to trade facilitation. Ivanic et al. (2006) find similar results. However, in terms of welfare gains, they find that the impact is largest in Asia, though this is due to Asia receiving the most aid and having a larger estimated reduction in trade costs.

Besides stimulating trade in developing countries, the AfT Initiative was effective in directing and mobilising donors' resources towards Aid for Trade. It has been an important achievement of the AfT Initiative, as it has been successful in diverging the WTO's and donor countries' interests (Hallaert, 2013). The broad definition of Aid for Trade was needed to cover all the technical and financial support discussed at the Doha Round negotiations. As donors could easily fit their aid flows in the Aid for Trade category, resource mobilisation was stimulated. On the other hand, after the launch of the Initiative, some recipient countries claimed to not have received any AfT, as flows through existing channels were now labelled as AfT and receiving countries did not experience additional support to trade. This resulted in confusion and suspicion around the genuineness of Aid for trade flows, which increased when no convincing results could be reported, and further put resource mobilisation in jeopardy. Furthermore, currently, development cooperation budgets are under pressure because of the financial crisis faced by most donors and the total amount of aid is no longer increasing. This

means that even resource mobilisation, the most evident achievement of the AfT Initiative, is at stake.

2.3. Trade costs

At the base of the rationale for the Aid for Trade lies the proposition that AfT will increase trade flows of the recipient countries and that increased trade will lead to poverty eradication. As described in section 2.2, AfT is considered effective in improving trade and trade is likely to lead to economic development. A way of approaching trade and how it can affect economic growth is by looking at trade costs. This section describes the mechanisms behind the relationship between Aid for Trade and trade costs.

In the economic literature, trade costs are defined as: “all costs incurred in getting a good to a final user other than the cost of producing the good itself: transportation costs (both freight costs and time costs), policy barriers (tariffs and non-tariff barriers), information costs, contract enforcement costs, costs associated with the use of different currencies, legal and regulatory costs and local distribution costs (wholesale and retail)” (Anderson & van Wincoop, 2004).

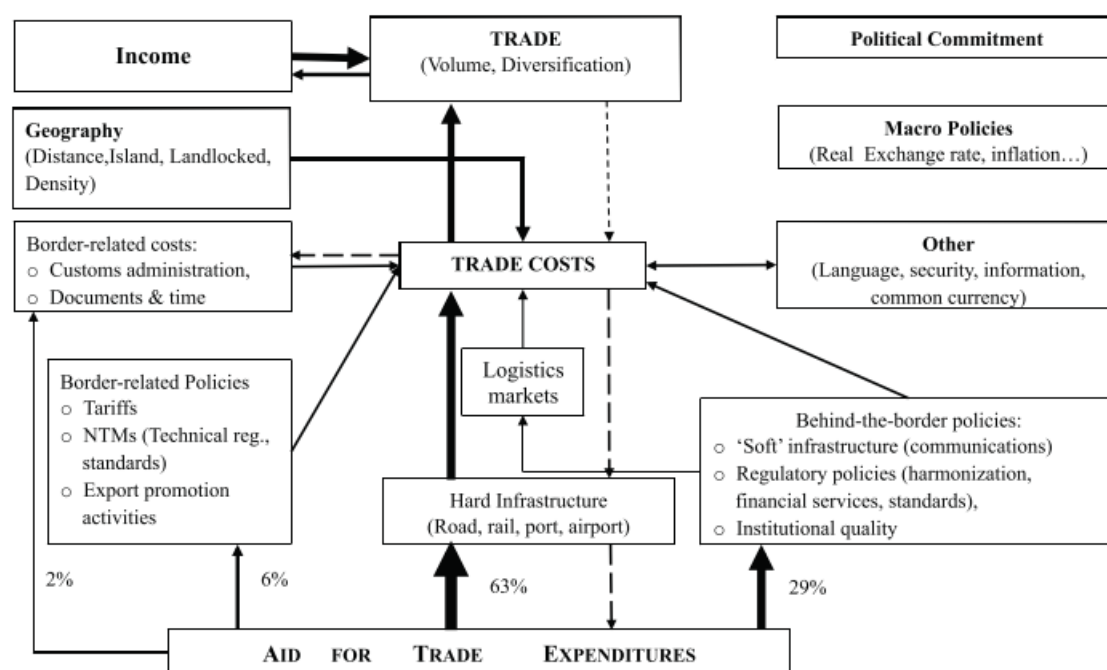


Figure 2 Aid for Trade and trade costs
Source: Melo & Cadot, 2014

The mechanisms on how Aid for Trade reduces trade costs are described in the meta-analysis by Melo & Cadot (2014) and shown in Figure 2. The percentages next to the bottom arrows and the thickness of the arrows indicate the share of AFT expenditure targeted to the respective objectives. The thickness of the other arrows represents the relative importance of

the linkages that have emerged across the studies examined by Melo & Cadot (2014). Dotted lines represent two-way causality.

Below, the mechanisms through which AfT influences trade costs are described with some examples.

Hard infrastructure

The largest share of AfT is spent on so-called ‘hard’ infrastructure, which is constructing or upgrading important gateway infrastructure ports and airports and the infrastructure connecting them to the rest of the countries like roads and railways. The literature surveyed by Melo & Cadot (2014) forms strong evidence of a two-step causal link from quality of infrastructure to trade costs and from trade costs to trade performance, with its theoretic foundations in the gravity equation and accompanying empirical framework. Vijil and Wagner (2012) researched the link between aid to infrastructure and the quality of infrastructure and found a significantly positive correlation.

Improving hard infrastructure makes transportation of goods easier and faster, reducing trade costs as there is a willingness-to-pay for saved transportation time (Anderson & van Wincoop, 2004). Improving the quality of infrastructure would reduce trade costs equivalent to a physical distance reduction (Cadot et al., 2014). In terms of export growth, reducing time to trade by ten days would be more effective than trade liberalisation, as products would be more attractive to import for other countries (Djankov et al., 2010). If the transport costs from one country to another are reduced by aid to economic infrastructure, trading products between countries would be more attractive (Cali & Razzaque, 2013). It turns out that in intra-SSA trade, as much as half of SSA’s relative disadvantage is due to transport cost (Cadot et al., 2014).

In developing countries, as the lumpy investment in infrastructure needed is postponed; AfT can serve by providing incentives for public-private partnerships or grants. AfT can provide support to economic infrastructure and better co-ordination with development finance institutions and the private sector (Cali & te Velde, 2011). Aid resources are needed to support the maintenance of infrastructure, where ordinary user-pay fee systems are not feasible or effective. For example, Ecuador and Colombia have collaborated to mobilise support to the construction of the new international Rumichaca Bridge and to the revision of the old bridge. With this project, waiting times have been reduced and the road could handle larger volumes of transportation (OECD/WTO, 2015).

Another example is the returns on a pan-African investment programme of road infrastructure development as estimated by Buys et al. (2006) in a cost-benefit analysis. The

research found a large impact of the funding programme, as it would generate \$254 billion of additional trade at a cost of about \$32 billion, with a payback horizon of just over one year.

Behind-the-border policies

Aid to hard infrastructure provides an opportunity to enter or maintain dialogue with the government of the recipient country, building ‘soft’ infrastructure for communication. Through this soft communication infrastructure, the root causes of developing countries’ infrastructure deficits can be addressed ‘behind the border’. Supporting the so-called ‘behind-the-border’ agenda ranges from regulation of trade-related (transportation) services to broader areas like privatisation and competition issues. Donors can play an important role stimulating regulatory frameworks and ensuring competition in service provision through their infrastructure to recipient governments (Cadot et al., 2014).

The second aspect of aid to behind-the-border policies is harmonisation. Harmonising regulatory policies of infrastructure and transportation services internationally can decrease freight rates by for example removing cartels, deregulating the shipping industry, or eliminating market power in shipping (Cadot et al., 2014). Similar effects are found in road transport. Harmonisation of regulation enhances the quality of the goods exported from the AfT receiving country and increases the attractiveness of those exported products (Calì & te Velde, 2011). Additionally, harmonising regulatory policies with other regulations and international standards stimulates the logistics market. In combination with improved access to financial services, this leads to lower trade costs.

Finally, aid to behind-the-border policies can lower trade costs through improving the quality of institutions. Corruption in weak institutions in for example ports can significantly increase transportation costs. Insecurity on contract enforcement and lack of transparency caused by the weakness of institutions also cause higher trade costs (Vijil & Wagner, 2012). Quality of institutions also plays an important role in the outcome of developing countries’ trade negotiations and in the participation in international standards organisations, in which lower trade costs and favourable trade conditions can be stipulated.

Border-related policies

A small portion of AfT expenditures goes to border-related policies. When these are more liberalised and export is promoted, trade costs are reduced. First, tariffs directly influence trade costs as they add on taxes to other trade costs when trades are made. However, these border barriers have been largely removed by trade liberalisation and associated policies such as EU’s Everything but Arms (EBA)s agreement, US’ African Growth & Opportunity Act

(AGOA) and more recently Economic Partnership Agreements (EPAs). These policies ensure duty-free and quota-free preference schemes to least developed countries (LDCs), stimulating trade by enhanced market access. Therefore, tariff barriers are close to non-existent in Northern countries for LDCs, and the payoff of trade facilitation in general is larger than the payoff of removing border barriers (Melo & Cadot, 2014).

Second, nontariff measures form a part of border-related policies. Favouring international (product) standards over regional standards can effectively promote LDCs' exports. Northern countries can provide a form of aid by limiting the use of regional, idiosyncratic standards and adopting international standards stimulates exporters to raise their quality to acceptable international standards. However, this harmonisation also poses a risk to developing countries as it may induce producers from the US or EU to enter the market, crowding out developing country exports. Furthermore, if the international standards are not adopted by other Southern markets, harmonisation would not lead to improved market access or consumer recognition in those markets.

An example of reducing trade costs through product standards can be found in Malawi. UNIDO (United Nations Industrial Development Organisation) assisted the country in developing robust infrastructure. The critical point in the quality infrastructure was the Malawi Bureau of Standards. The areas of testing and certification needed to improve relative to the strong demand for them from industry. With financing and support of UNIDO, aid was given to Malawi establishing a programme of capacity building so that tests, inspections and certifications issued by Malawian authorities can be recognised internationally. This resulted in a reduction in compliance costs for exporters (OECD/WTO, 2015).

Another way aid can influence border-related policies is by remedying asymmetric information about markets, alleviating moral hazard and adverse selection problems in terms of product quality (Melo & Cadot, 2014). Export promotion agencies help existing and potential exporters overcome these informational barriers, mainly through assistance in market prospection and promotion (Melo & Cadot, 2014). The price competitiveness of exports from the receiving country improves as the country's trade costs are reduced (Calì & te Velde, 2011).

Border-related costs

Border-related costs can be cut by diminishing bureaucracy and operating more efficiently at customs. An important effort was made with the WTO Trade Facilitation Agreement (TFA), a legal framework to “*expedite the movement, release and clearance of goods*”. It contains technical measures imposing obligations on WTO members to: 1) increase transparency; 2)

improve governance through disciplines on rule and decision-making processes; 3) implement streamlined and modernised border procedures and control techniques; and 4) enhance the movement of goods in transit.

An example of how border-related costs can be affected is found in Cameroon. A pilot study was done where frontline customs inspectors in customs bureaus worked under contracts with performance indicators (Cantens, Raballand, Bilangna, & Djeuwo, 2011). In the pilot, duties and taxes increased and the tax yield of the declarations rose, even when the number of imported containers fell due to the financial crisis. Additionally, the impact of the contract on clearance time was positive, with shorter clearance times and less variance. Lastly, the contracts heavily reduced costly practices such as re-routings between channels. Support to the fight against bureaucracy, could for example fall under aid to trade facilitation.

Other examples from the aid community concern upgrading relevant infrastructures such as border posts and streamlining procedures. India and Pakistan have only one land border crossing, through which in 2012-2013 more than half of India's imports from Pakistan and 25% of India's total exports to Pakistan passed, despite a restriction on which products are allowed to be traded. Trade facilitation measures improved performance, with India introducing an Integrated Check Post and similar facilities being developed in Pakistan. Due to the establishment of a cargo building, an export warehouse, and truck parking facilities, border crossing hours have been expanded to 12 hours and truck capacity has been increased tenfold. In sum, aid to trade facilitation resulted in lower trade costs and higher trade volumes (OECD/WTO, 2015).

Other factors

Other factors related to trade costs, trade and income of a country are macro policies and political commitment. The real exchange rate, inflation and other monetary policies can inhibit or enhance trade or the effects of trade. For success of policies both at the border and behind the border, political commitment is needed. Ownership of the objectives of reducing trade costs and increasing trade flows contributes to the sustainability of the policy effects.

Other factors determining trade costs that cannot be influenced by Aid for Trade are also depicted in the Figure 2. First, geography of a country is an important factor in determining trade costs, which is one of the fundamentals for the gravity theory. Distance between countries, being landlocked or an island and population density all determine trade costs. For example for landlocked countries additional costs to overland distance consist of border delays, uncertainty, higher insurance costs and charges by transit countries (Cadot et al., 2014). Other country

specific characteristics such as language, security, information, common currency also drive trade costs. As described in the literature reviewed by Anderson and Wincoop (2004), cost falls with common language and currency. A currency union positively affects trade flows between member countries. Improved information in the form of for instance telephone traffic and a high number of branches of the importing country's banks located in the exporter's country results in significantly higher trade. Finally, costs of writing and enforcing contracts across borders are higher than for internal trade. Self-insuring the costs of default on unenforced contracts are also likely to be higher.

Calì & te Velde argue that the role of Aid for Trade lies in addressing market failures that form barriers to trade (2011). A lack of co-ordination, ignoring externalities and leaving linkages and complementarities unexploited can cause nations to miss opportunities for trade optimisation. AfT can contribute by capacity building for trade policy to identify linkages and externalities and combine them in a national trade strategy. Second, the market failure in terms of failing to develop, adapt, and adopt technology can be addressed by trade facilitation and information provision. Finally, there is also governance failure that can be addressed by Aid for Trade. Aid for trade facilitation can streamline and structure administrative procedures and regulation (Calì & te Velde, 2011).

Some paths through which trade is impacted are less obvious, for example health and education, and are not reported in the CRS database under Aid for Trade projects so far. These fall under “other trade-related needs” and these activities would require donor and partner countries’ self-assessment(OECD, n.d.).

The qualitative component of the fifth OECD/WTO Aid for Trade monitoring exercise, which is based on self- assessments, case stories, evaluations and empirical studies submitted by 62 developing countries and 31 donors, provides a look into the various AfT efforts and their results (OECD/WTO, 2015). Figure 3 shows the outputs that have been achieved from aid for trade actions to reduce trade costs. Figure 4 shows the types of actions that were mentioned most frequently as the most positive results in reducing trade costs for goods and services. The figures show that most efforts evolve around customs procedures and regulation, infrastructure, and communication.

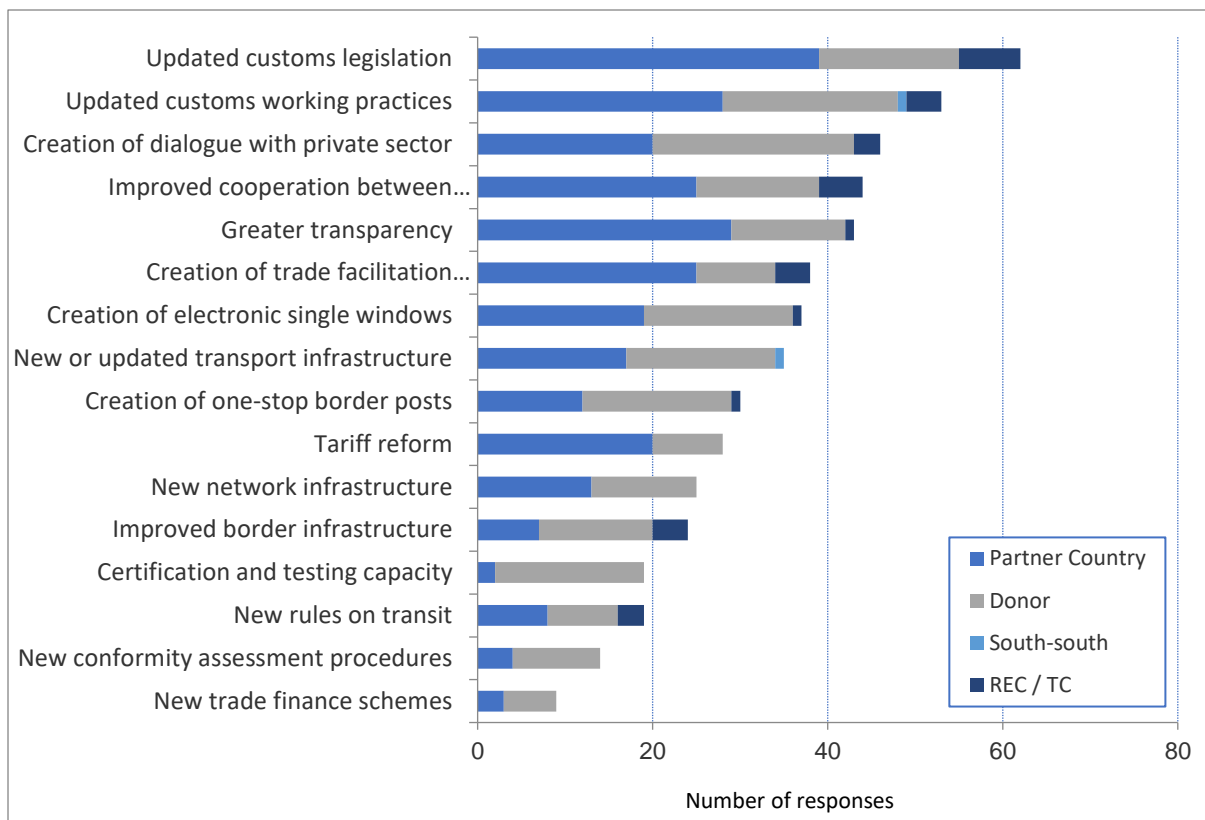


Figure 3 Outputs achieved by Aid for Trade actions to reduce trade costs

Source: Joint OECD/WTO Aid for Trade monitoring exercise (2015)

<http://dx.doi.org/10.1787/888933240799>

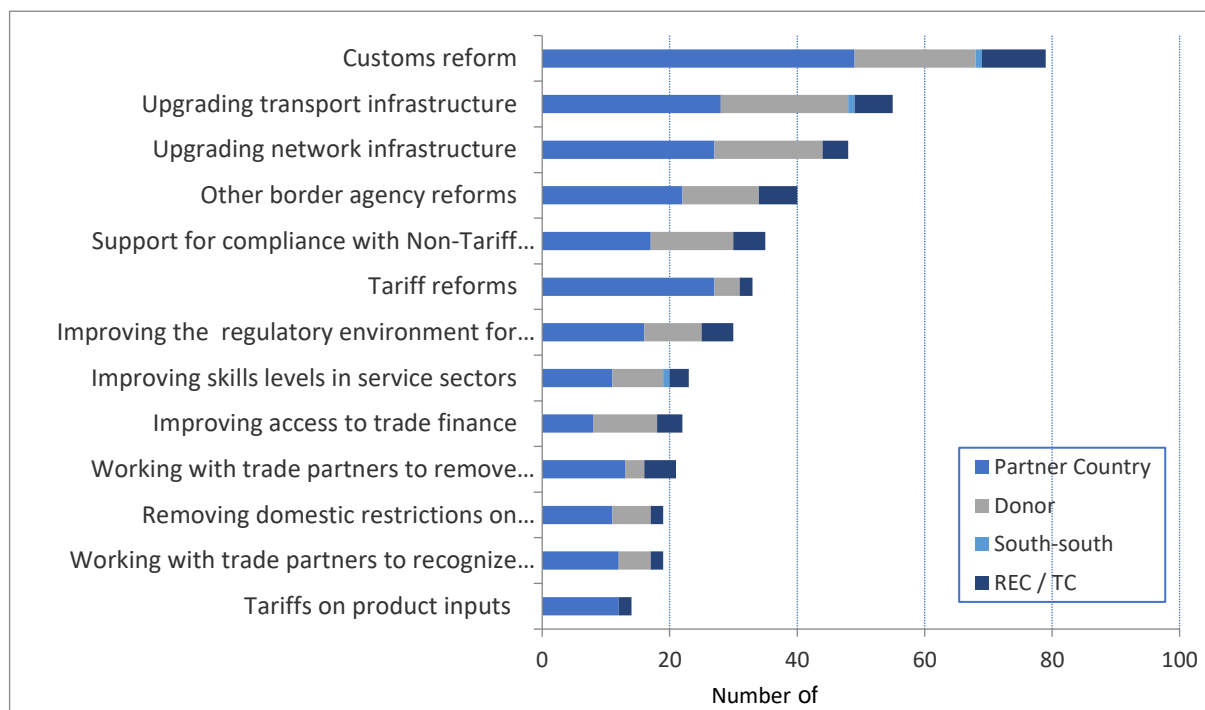


Figure 4 The types of actions that have achieved the most positive results in reducing trade costs for goods and services

Source: Joint OECD/WTO Aid for Trade monitoring exercise (2015)

<http://dx.doi.org/10.1787/888933240823>

Trade costs and the gravity model

A common used model in literature for estimating trade flows is the gravity model. The underlying hypothesis is that domestic trade costs and country specific factors representing the distance between respective countries are significant determinants of the volume of trade between countries (Hoekman & Nicita, 2011). The model predicts that reducing domestic trade costs and improving the business environment of a country will lead to increased trade levels.

The empirical framework of this research is based on the gravity equation theory. There are two ways of estimating trade costs in gravity model. Recently, one approach was developed in which aggregate bilateral trade costs can be estimated by inverting the gravity equation (Anderson & van Wincoop, 2003; Arvis, Duval, Shepherd, & Utoktham, 2013; Novy, 2013). In this top-down approach, changes in bilateral trade costs are inferred from changes in the ratio of bilateral trade shares. It results in an ad valorem estimate of total bilateral trade costs, including all trade barriers and tariffs, non-trade measures, currency barriers, etcetera. Arvis et al. (2013) apply this method to a large sample of 178 countries, including low-income countries, and find that trade costs have fallen less rapidly in low-income countries compared to developed countries. Both geography and policy variables contribute significantly to trade costs along expected lines (Arvis et al., 2013). However, the trade cost measure is an aggregated measure and across components there is strong multicollinearity, which inhibits insight in the major bottleneck of trade (Cadot et al., 2014).

The second way of estimating trade costs is the bottom-up approach, which uses the costs of importing or exporting and combines all components to reach a unilateral measure of trade cost that reflects the costs of trading for a certain country with all other countries. This approach is flexible and used in a variety of studies, where each study can focus on different aspects of trade costs, e.g. (Djankov et al., 2010; Hoekman & Nicita, 2011; Melo & Cadot, 2014). In this approach, indices for infrastructure or data from the Doing Business database from the World Bank are commonly used as proxies for trade costs components.

3. Methodology

This chapter outlines the methodology of this thesis. In Section 3.1, the model and hypotheses are presented. First, the model by Calì & te Velde is extended with AfT variables and economic control variables. Second, interaction effects between independent variables are proposed. The subsequent Section 3.2, provides a definition for all variables of the empirical model. The final Section 3.3 of this chapter describes the process of data analysis and the issues that were encountered.

3.1. Model and hypotheses

This thesis follows the empirical model by Calì & te Velde (2011) to test the relationship between trade costs and Aid for Trade. The AfT - trade costs relation is less complex, as reducing trade costs is a direct objective of AfT (Calì & te Velde, 2011), while the causality of the effect of aid on growth is perceived as a black box as improving growth is only an indirect objective of the various aid. The effect of Aid for Trade on unilateral trade costs is more general and practical, as bilateral trade cost data are not available for developing countries. This research relates AfT categories to cost of trading, estimating trade costs C_{trade} of country i at time t :

$$\ln C_{trade_{it}} = \alpha_i + \beta_1 \ln A_{TPR_{it-1}} + \beta_2 \ln A_{INF_{it-1}} + \beta_3 \ln A_{PC_{it-1}} + \gamma Z_{it-1} + \gamma_t + \lambda_i + \varepsilon_{it}$$

where $A_{TPR_{it-1}}$ is aid to trade policy and regulations; $A_{INF_{it-1}}$ is aid to economic infrastructure; $A_{PC_{it-1}}$ is aid to productive capacity building; Z is a vector of other determinants of C_{trade} , including income levels, population size, and governance indicators. Country-specific trends in the cost of trading which may be independent of AfT variables are captured in α_i , γ_t and λ_i which are country-fixed, time effects, and country-specific time trends respectively.

It is likely that the amount of AfT disbursed to a country is jointly determined with the level of trade costs in that country. In other words, the amount of AfT disbursed depends on how high trade costs are, and the level of trade costs depends on the amount of Aid for Trade received. To address this problem of endogeneity caused by simultaneity bias, all variables are lagged 1 year. Omitted variables and measurement errors may still cause endogeneity.

3.1.1. Extending the model

This research uses several Aid for Trade categories and varies the definition of trade costs to explore the relationships. This way, the research isolates impacts of specific types of aid to move away from the aid-growth debate. Where Cali & te Velde (2011) shortly discuss the effect of one AfT category on trade costs and then focus on AfT's impact on export levels, this thesis aims to go into depth in the AfT – trade cost relationship. To gain more insight in the mechanisms of this relationship all broad categories of Aid for Trade are used, thus aid to trade-related infrastructure and aid to productive capacity building are added to Cali & te Velde's model. Furthermore, economic control variables are added to prevent omitted variable bias, as the economic context in recipient countries may explain the variation in trade costs between countries. Finally, the analysis is run for a larger number of years, from 2005 – 2015.

3.1.2. Hypothesized interaction effects

As described in the AfT effectiveness section (0), the impact of AfT on trade cost may be conditional. It can be argued that the combination of certain aid flows or economic situation may be of importance to AfT's effectiveness in reducing trade costs. This research examines four types of interactions of interest.

Aid to infrastructure and aid to trade policy and regulation

The combination of aid to infrastructure and policy could negatively impact trade cost. Where aid focussed on policy seeks to strategize and enhance trade at governance level, aid to infrastructure provides the platform to efficiently apply and implement these strategies. It seems important that these aid flows are combined. For example, having a solid trade policy in place will not reduce the time in days it takes for a container to be exported if no investments have been made in infrastructure. If only one of both issues is addressed, the other issue remains a bottleneck to reducing trade costs.

The interaction with aid to trade policy could strengthen the recipient country's ability to implement its trade facilitation strategy. Imagine a country receiving aid to infrastructure, but where infrastructure investment policy is lacking. Aid to infrastructure may then deem ineffective in reducing trade costs as it is not appropriately spent on sustainable infrastructure construction or maintenance.

Hypothesis 1: Aid to trade policy and aid to infrastructure interact to predict trade costs in developing countries.

Aid to infrastructure and logistics performance

If the logistics performance of the recipient country is high, the marginal effectiveness of aid to infrastructure is likely to be higher because it takes a smaller investment in infrastructure to achieve a certain improvement. Upgrading infrastructure of high quality is less costly than completely constructing new infrastructure. The higher the country scores on LPI, the more effective aid to infrastructure is in reducing trade costs.

Hypothesis 2: A country's logistics performance and aid to infrastructure interact to predict trade costs in developing countries.

Aid to productive capacity building and aid to trade policy and regulation

Receiving the combination of aid to productive capacity building and aid to trade policy could lead to reduced trade costs in developing countries. Improving productive capacity needs to be complemented with appropriately adapted trade policy. For example, improvements in production quality do not result in reduced trade costs if domestic standards are not harmonised towards international standards. Both issues need to be addressed for the aid flows to be effective. If the standards are in place, but product quality is low, the impact on trade costs is smaller and vice versa.

Hypothesis 3: Aid to trade policy and aid to productive capacity building interact to predict trade costs in developing countries.

Aid to productive capacity building and economic freedom

Aid to productive capacity building could have a larger effect reducing trade costs if the economic freedom in the recipient country is high. If the initial status in a country is poor in terms of a functioning government and restrictive economic policies, a relatively larger investment is needed to reduce trade costs. For example, a small amount of aid would not be sufficient to establish monetary institutions and other financial services entities not yet in place to reduce trade costs, while the same amount of aid could be effective if it is spent on improving financial institutions.

Hypothesis 4: A country's economic freedom and aid to productive capacity building interact to predict trade costs in developing countries.

3.2. Data collection

This section provides a description of the data used in this thesis with summary statistics of the main variables and definitions for all variables. The sample consists of 180 developing countries receiving AfT as reported in the OECD CRS database. Time series goes as far back

as possible, which is 2002 for Aid for Trade as the coverage of disbursements data is estimated by OECD/DAC to be complete from 2002 onward (Calì & te Velde, 2011). However, trade cost data from WB's Doing Business databank are only available from 2005. Hence, data for the years 2005-2015 is used. All data was collected from open source databases. All data were combined into one panel data set. The rest of this section gives a description of the variables used in this research. Table 1 shows summary statistics for the main variables.

Trade cost variables

Data for trade costs were downloaded from the World Bank World Development Indicators (WDI) data bank, which is the same as the data that can be found in World Bank's World Integrated Trade Solutions (WITS) data bank. The data from WB Doing Business (DB) are available for the years 2005-2014.

This thesis primarily uses DB's cost of trading to import as the dependent variable, as developing countries typically import more than export. As defined by the World Bank DB database, cost of trading *“measures all fees associated with completing the procedures to export or import the goods on a 20-foot container in U.S. dollars. These include costs for documents, administrative fees for customs clearance and technical control, customs broker fees, terminal handling charges and inland transport. The cost measure does not include tariffs or trade taxes. Only official costs are recorded.”*

Table 1 Summary statistics for the main variables

	Observations	Mean	Standard Deviation	Minimum	Maximum
Cost to export (US\$ per container)	1472	1430.58	1023.837	214.50	9050.00
Cost to import (US\$ per container)	1472	1742.71	1328.871	206.10	10650.00
Time to export (days)	1472	26.18	16.077	6.00	102.00
Time to import (days)	1472	29.93	19.921	4.00	130.00
Aid to infrastructure ¹	1646	63.19	130.706	-0.20	1654.38
Aid to trade policy and regulations ¹	1626	3.68	14.639	0.00	419.91
Aid to business and other services ¹	1646	8.10	24.605	0.00	536.36
Aid to agriculture ¹	1828	28.93	51.462	0.00	601.42
Real GDP per capita	2143	12179.17	17759.371	405.48	143788.23
Population size	2351	33493788.92	1.401e+08	9530.00	1.37e+09
Government effectiveness score [-2.5; +2.5]	2294	-0.31	0.822	-2.49	2.43
Regulatory quality score [-2.5; +2.5]	2293	-0.31	0.846	-2.68	2.26
Economic freedom score [0; 100]	1872	57.40	10.773	1.00	90.10
LPI score (interpolated)	1288	2.64	0.468	1.21	4.19

¹ Aid for Trade data are disbursements in million constant US\$

Another measure of trade costs is time in days needed to process imports, defined as *“the time necessary to comply with all procedures required to import or export goods in calendar*

days. If a procedure can be accelerated for an additional cost, the fastest legal procedure is chosen. (...) The waiting time between procedures - for example, during unloading of the cargo - is included in the measure."

Aid for trade

This research uses a data driven definition of AfT, following Calì & te Velde (2011). Data for the AfT variables was downloaded from OECD WIDS database, using the Aid-for-trade statistical queries from the OECD, based on the flows reported to the Creditor Reporting System (CRS) with updated CRS codes (OECD/WTO, 2015; OECD, n.d.). Reliable data is available for the years 2002-2015.

Calì & te Velde (2011) use two categories of AfT for the cost of trading analysis: aid to trade policy & regulations and its subcategory aid to trade facilitation. As this research focuses on the differences between different categories, the three main categories of AfT are used: aid to trade-related infrastructure (A_{INF}); aid to productive capacity building (A_{PC}); and aid to trade policy & regulations and trade-related adjustment (A_{TPR}). See Tables 4-6 in Appendix 1 for the CRS codes corresponding to the Aid for Trade categories.

The Aid for Trade flows recorded are net disbursements of Official Development Assistance (ODA) at constant prices in 2014 US\$ millions and include all types of aid and channels and all donors. For the Aid for Trade variables, aid flows to specific sectors can be summed to compute categories of aid for trade.

Statistics on aid disbursements and commitments are faced with measurement issues and CRS does not provide information about trade-related technical assistance and trade development. Data on "other trade-related needs" cannot be extracted from the CRS. The aid flows reported in DAC statistics are net ODA. Repayments of loans are subtracted from gross ODA, hence, ODA is reported as a negative figure when repayments exceed new lending (OECD, 2011a).

Control variables

In the model, vector Z represents the control variables. Data for real GDP per capita and population size was downloaded from WB's World Development Indicators (WDI) databank and available for the years 2002-2015. Real GDP per capita is based on purchasing power parity (PPP), "*gross domestic product converted to international dollars using PPP rates. Data are in current international dollars based on the 2011 ICP round.*" Population size "*counts all residents regardless of legal status or citizenship*" in a country.

Two control variables considering countries' the capacity of the government to effectively formulate and implement sound policies were taken from WB's World Governance Indicators (WGI) databank, with data available for the years 2002-2015. Government effectiveness score is used by Calì & te Velde (2011), reflecting "*perceptions of the quality of public and civil services, its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies*". This research adds WGI's regulatory quality, reflecting "*perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development*" (Kaufmann, Kraay, & Mastruzzi, 2010). The governance indicators range from -2.5 to +2.5.

One economic control variable added to the model is the overall score from the international Logistics Performance Index (LPI) by the World Bank. It "*ranks 160 countries on six dimensions of trade (...) The data used in the ranking comes from a survey of logistics professionals who are asked questions about the foreign countries in which they operate.*" The data provide an overall score and scores for each of the components: customs; infrastructure, ease of arranging shipments; quality of logistics services; tracking and tracing; and timeliness. Scores are available for the years 2007, 2010, 2012, 2014, and 2016. LPI data can be linearly interpolated for the years in which no index has been published. As LPI is an index based on surveys from professionals, it can be assumed that the values do not change drastically in the years in which no survey was held.

An other economic control variable added to the model is taken from Heritage's Index of Economic Freedom. The Heritage Foundation covers 180 countries. The overall score from the index includes the following components: government integrity and spending; judicial effectiveness; tax burden; fiscal health; business freedom; labour freedom; monetary freedom; trade freedom; investment freedom; and financial freedom. The advantage of using the overall score over one of the components is that it will include more aspects of economic freedom. That way, more factors that influence trade costs are controlled for. Data for the index are available for the years 2002-2015.

3.3. Data analysis

This section describes the steps taken and issues encountered in the data analysis. The first step is dealing with missing observations. For the other variables, data cannot meaningfully be interpolated and rows with missing observations are dropped. For example, Aid for Trade flows are likely to fluctuate between years, as each disbursement is a conscious decision of donors.

Second, the broad categories aid to infrastructure and aid to productive capacity data need to be computed, as they are not reported as such to the CRS. Table 7 in Appendix 2 shows the composition of the AfT variables. For A_{INF} , only aggregate data available of subcategories Transport & storage and Communications are available, hence subcategory Energy generation & supply is excluded. For A_{pc} , data of all seven subcategories are available. When summing the seven subcategories of A_{pc} , 2081 missing values are generated. The large number of subcategories, each with missing observations, causes a large amount of missing values for the computed A_{pc} variable. Therefore, this research uses two subcategories aid to agriculture A_{agri} and aid to business and other services A_{busi} instead of A_{pc} . A_{agri} is an interesting component of aid to productive capacity as in most developing countries the agriculture sector accounts for a large share of GDP. A_{busi} is interesting as it is aimed directly at the private sector and trade. To standardise the AfT variables, they are all divided by population size.

Next, there are some problems of endogeneity, as receiving AfT and the amount of AfT is endogenous to trade costs and other variables. This may lead to the problem of selection bias, where countries receive AfT because they have high trade costs. There is also the possibility that not all of variables determining trade costs are included in the model, which is omitted variable bias. As discussed in Section 3.1, the independent variables are lagged to address simultaneity bias.

Furthermore, to fulfil the assumption of a normal distribution, natural logarithms of variables are taken if it yields a more normal distribution. This is the case for all aid and trade cost variables. For the control variables, the distribution of each variable is examined to determine whether to take natural logarithm.

The next step is dealing with zero aid flows. To avoid the loss of the observations with zero aid after the logarithmic transformation of the AfT variables, Calì & te Velde (2011) use a non-aid dummy which takes the value of 1 when $AfT = 0$ and zero otherwise. This research instead adds the smallest observation of each variable to all observations of that variable. Negative aid flows are dropped as they cannot be added as smallest flows, losing 13 observations.

An assessment of multicollinearity needs to be made to avoid two or more independent variables measuring the same effect. The threshold for multicollinearity is a correlation coefficient of 0.8. The correlation matrix shows that government effectiveness and regulatory quality are highly correlated (0.781). Following Calì & te Velde (2011), this research uses government effectiveness and regulatory quality is dropped.

Next, a likelihood-ratio test testing for heteroscedasticity is performed. The result is a large chi statistic, rejecting the null hypothesis for this test which is homoscedasticity. This means that the assumption that the variance of the error term is constant is violated. A Woolridge test for autocorrelation in panel data is executed. The outcome is that the null hypothesis of no autocorrelation is convincingly rejected. Therefore, serial correlation is present. This means that the assumption that the error terms are uncorrelated is violated. This does not bias the coefficient estimates, though the standard errors are underestimated. To deal with both heteroscedasticity and autocorrelation, clustered standard errors must be used when estimating the regression model. Clustering on the panel variable produces an estimator of the VCE that is robust to cross-sectional heteroskedasticity and serial correlation.

In this research, there is suspicion that the source of heterogeneity is individual specific intercepts and that the individual effect may be correlated with any regressor. Fixed-effects estimation seems appropriate, as fixed-effects models are designed to study the causes of changes within an entity. A Hausman test to compare fixed and random effects models is performed and the null hypothesis of Hausman test is rejected with a chi-statistic of 84.99. This means that the hypothesis that the individual effects are uncorrelated with the other regressors is rejected, and a fixed effect model is favoured over its random counterpart.

Finally, the regression analysis is run. The original model by Cali & te Velde (2011) is tested, with both Mcost and Mtime as dependent variable. Then, the extensions to the model are added in multiple ways, varying combinations of added AfT categories and economic control variables. Then, the four hypotheses with interaction effects are tested. As the A_{pc} category has been replaced by A_{busi} and A_{agri} , hypothesis 3 and 4 are split into sub-questions. Results are shown in the next chapter.

4. Results & discussion

This chapter details the results of the regression analyses. First, in Section 4.1, the outcomes of adding the AfT variables and economic control variables to the model are discussed. Second, in Section 4.2, the results of estimating the interaction effects between variables are presented and discussed per hypothesis.

4.1. Extended model

The first two models shown in

Table 2 correspond with the models estimated by Calì & te Velde (2011). The biggest difference between the results of their models and the results of the current research, is that A_{TPR} does have a significant negative effect on time to import at the 0.01 significance level. The difference could stem from the included subcategory *aid to trade facilitation*, which is treated as a separate independent variable and excluded from the broad A_{TPR} category in the model by Calì & te Velde (2011). The coefficient is rather small, which means that though the effect is significant, trade costs are only slightly reduced.

Extending the model by adding extra Aid for Trade variables A_{INF} , A_{busi} , and A_{agri} does not lead to substantially different results in models (3) and (4). Though, when the additional economic control variables are introduced, some points come to attention.

First, in (5) and (7), the A_{TPR} coefficient is positive and significant at the 0.05 level. This implies that a developing country's trade costs would increase when receiving aid to trade policy. A possible explanation for this counterintuitive result is that if A_{TPR} leads to e.g. implementing trade reforms and professionalization of border procedures, trade costs may increase as official costs rise. This is in line with the conclusions drawn from the case study introducing performance contracts for border officials in Cameroon mentioned in Section 2.3 (Cantens et al., 2011). When looking at the models with time to import as dependent variable, the A_{TPR} coefficients in (2) and (4) do have the expected sign, implying that the importing process indeed does become more efficient in terms of time needed.

Second, in models (6) and (8) the relationship between A_{TPR} and time to import is no longer significantly different from zero. This may be due to the smaller sample size in models (5) till (8) where economic control variables were added due the limited number of observations for the LPI variable.

Furthermore, the A_{TPR} coefficient in model (7) is slightly stronger than in model (5). Moreover, this is the only estimation in which one of the added AfT variables has a significant

coefficient. This could also be due to the smaller sample size. Alternatively, this could suggest that the cost reducing effect of A_{TPR} may be related to the disbursement of aid to trade-related infrastructure. This suggestion is further examined in hypothesis 1 in Section 4.2.

Table 2 Results of the regression analysis of the extended model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ln M cost	ln M time	ln M cost	ln M time	ln M cost	ln M time	ln M cost	ln M time
ln Atp _{t-1}	0.003 (0.005)	-0.020** (0.006)	0.005 (0.005)	-0.021** (0.007)	0.010* (0.004)	0.002 (0.004)	0.012* (0.005)	0.001 (0.005)
Gov. eff _{t-1}	-0.052 (0.062)	-0.167* (0.081)	-0.084 (0.068)	-0.151 (0.090)	-0.123 (0.088)	-0.191* (0.085)	-0.180 (0.094)	-0.204* (0.090)
ln pop _{t-1}	0.644** (0.208)	-0.450 (0.254)	0.589* (0.229)	-0.441 (0.296)	0.118 (0.280)	-0.984*** (0.278)	0.019 (0.321)	-1.062*** (0.293)
ln GDP _{t-1}	0.357*** (0.090)	-0.374*** (0.105)	0.352*** (0.104)	-0.364** (0.122)	0.625*** (0.159)	0.108 (0.153)	0.609*** (0.176)	0.139 (0.162)
ln Ainf _{t-1}			0.010 (0.011)	-0.011 (0.009)			0.034* (0.015)	0.004 (0.010)
ln Abus _{t-1}			-0.006 (0.006)	-0.003 (0.004)			0.000 (0.006)	0.001 (0.005)
ln Aagr _{t-1}			0.003 (0.011)	0.005 (0.008)			-0.007 (0.009)	-0.005 (0.011)
Ec. freedom _{t-1}					-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
LPI total _{t-1}					-0.000 (0.042)	-0.009 (0.033)	-0.009 (0.043)	-0.010 (0.035)
Constant	-5.913* (2.893)	13.440*** (3.407)	-5.176 (3.153)	13.357** (4.061)	0.145 (3.658)	18.375*** (3.570)	1.919 (4.166)	19.511*** (3.804)
Observations	1202	1202	1049	1049	690	690	636	636
R ²	0.253	0.286	0.261	0.288	0.248	0.111	0.285	0.114

Clustered standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Thus far, introducing the additional AfT variables and economic control variables does not add to the results of the regression analysis. This could be due to the moderate correlation between the AfT variables (see Table 8 in the appendix). Yet, adding these variables did lead to some changes in the coefficients of the original variables in models (5) till (8). However, as the coefficients do not significantly differ from zero, it is not possible to determine whether there are relationships between the added variables and trade costs. Therefore, some of these relationships will be further examined in the next section.

Finally, many relations of the original control variables with trade costs have significant coefficients while this is not the case in any of the models in the research by Calì & te Velde (2011). Generally, GDP and population size have a positive relation with Mcost and a negative relationship with Mtime, except in model (8). Government effectiveness has a significant coefficient in all models except (1).

The extended model may be suboptimal for estimating the relationship between trade costs and AfT. Serial correlation was detected, which means that?? An approach to avoid serial correlation would be to specify and estimate a dynamic model. In a dynamic model, the lagged dependent variable is included as an independent variable. It would address a problem of endogeneity common for time series analysis, where the value of a factor in period t is dependent on other factors in the model in period $t-1$. For instance, the level of Aid for Trade could be independent of all other factors within a period, but is influenced by the level of GDP and government effectiveness in the previous period.

Future research could include a dynamic model for the estimation of the causality between trade costs and AfT. However, it would need a larger time horizon T to avoid Nickell bias or dynamic panel bias. This bias arises from the lagged variable being correlated with the error term in the fixed effects specification. Moreover, the endogeneity due to simultaneity bias is will occur like in the static model.

4.2. Interaction effects

This section discusses the results of the regression analysis of interaction effects between variables, as shown in Table 3.

1: Aid to infrastructure and aid to trade policy and regulation

To further examine the effect of aid to infrastructure and aid to trade policy on trade costs, model (9) and (10) are estimated with interaction between these variables. The A_{TPR} coefficient in (10) implies that aid to trade policy alone has a negative impact on time to import. The size of the coefficient is not large enough to conclude that this effect is also economically meaningful.

The coefficient of the interaction term is significant neither in (9) nor in (10). This means that the interaction effect between receiving aid to infrastructure on trade costs as proposed in hypothesis 1 is not empirically supported. This could be due to opposing effects of the two AfT variables on trade costs. Intuitively, aid to infrastructure may reduce trade costs by making transport faster and more efficient. At the same time, aid to trade policy and regulation may raise trade costs if e.g. introducing standardised international regulation results in other requirements for products or trade processes. Therefore, even if a country receives a large amount of aid to infrastructure and trade policy, trade costs may remain the same.

Table 3 Results of regression analysis with interaction effects

	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
	ln M cost	ln M time	ln M cost	ln M time	ln M cost	ln M time	ln M cost	ln M time	ln M cost	ln M time	ln M cost	ln M time
Gov. eff _{t-1}	-0.057 (0.063)	-0.166 (0.084)	-0.133 (0.092)	-0.178* (0.083)	-0.064 (0.063)	-0.161 (0.082)	-0.078 (0.066)	-0.154 (0.088)	-0.112 (0.066)	-0.194 (0.101)	-0.115 (0.067)	-0.191 (0.105)
ln pop _{t-1}	0.604** (0.216)	-0.460 (0.271)	-0.023 (0.296)	-0.987*** (0.274)	0.601** (0.206)	-0.434 (0.260)	0.594** (0.227)	-0.427 (0.285)	0.611** (0.222)	-0.611* (0.277)	0.621* (0.246)	-0.632* (0.293)
ln GDP _{t-1}	0.356*** (0.099)	-0.349** (0.113)	0.574*** (0.157)	0.137 (0.146)	0.373*** (0.093)	-0.387*** (0.109)	0.387*** (0.096)	-0.391*** (0.116)	0.424*** (0.098)	-0.386** (0.119)	0.421*** (0.100)	-0.385** (0.122)
ln Atpr _{t-1}	0.006 (0.008)	-0.020** (0.007)	0.008 (0.005)	0.001 (0.004)	0.006 (0.006)	-0.020** (0.006)	0.002 (0.005)	-0.019* (0.008)	0.005 (0.005)	-0.019** (0.006)	0.007 (0.006)	-0.021** (0.007)
ln Ainf _{t-1}	-0.003 (0.011)	-0.008 (0.009)	0.092 (0.048)	0.023 (0.037)								
ln Atpr _{t-1}	-0.004 (0.005)	0.001 (0.003)										
# ln Ainf _{t-1}												
LPI total _{t-1}			0.064 (0.045)	0.014 (0.035)								
ln Ainf _{t-1}			-0.026 (0.018)	-0.010 (0.015)								
# LPI total _{t-1}												
ln Aagr _{t-1}					-0.007 (0.009)	0.003 (0.009)			0.084* (0.040)	0.064* (0.031)		
ln Atpr _{t-1}					-0.005 (0.003)	-0.001 (0.002)						
# ln Aagr _{t-1}												
ln Abus _{t-1}							-0.011 (0.008)	-0.003 (0.006)			-0.006 (0.035)	0.036 (0.025)
ln Abus _{t-1}							-0.003 (0.003)	-0.000 (0.002)				
# ln Atpr _{t-1}												
Ec freedom _{t-1}									-0.002 (0.001)	-0.000 (0.001)	-0.002 (0.001)	-0.002 (0.001)
ln Aagr _{t-1}									-0.001* (0.001)	-0.001* (0.001)		
# Ec freedom _{t-1}												
ln Abus _{t-1}											0.000 (0.001)	-0.001 (0.000)
# Ec freedom _{t-1}												
Constant	-5.327 (2.985)	13.453*** (3.668)	2.670 (3.858)	18.120*** (3.512)	-5.377 (2.864)	13.324*** (3.499)	-5.484 (3.156)	13.312*** (3.857)	-6.025 (3.060)	16.231*** (3.733)	-6.224 (3.421)	16.713*** (3.970)
Observations	1122	1122	704	704	1186	1186	1107	1107	1061	1061	1004	1004
R2	0.254	0.283	0.273	0.104	0.261	0.289	0.268	0.289	0.307	0.323	0.302	0.325

Clustered standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

2: Aid to infrastructure and logistics performance

To explore the relationship between aid to infrastructure and trade costs, model (11) and (12) are estimated using an interaction between A_{INF} and LPI. Most of the coefficients are comparable to those estimated without interaction terms in (7) and (8). The coefficients of the interaction effect are not significant in either model. This means that hypothesis 2, proposing that aid to infrastructure and LPI interact to predict trade costs, is not supported. This may be due to reversed causality, as it seems plausible that a country with high trade costs is likely to score low on logistics performance and is therefore selected to receive aid to infrastructure. Furthermore, the moderate correlation of -0.332 between aid to infrastructure and LPI may distort the outcome as the variables may overlap to measure the same effect.

Furthermore, this is the only model in Table 3 where control variable government effectiveness has a significant coefficient. Looking at the correlation matrix, the correlation coefficient of LPI and government effectiveness is quite large at 0.555. This implies that government effectiveness and LPI may measure the same effect, leading to a non-significant LPI coefficient in the estimation. The size of the coefficient suggests that government effectiveness has a slight impact on reducing the time to import. A more effective government has better quality policy and is more credible to implement them, which is likely to speed up the customs and border processes.

3a: Aid to agriculture and aid to trade policy and regulation

When considering the combination of aid to agriculture and aid to trade policy, there is no significant relationship to time to import or cost to import, nor any interaction effects. In model There are only significant coefficients for population size in (13) and for GDP in (13) and (14). Hypothesis 3a is not supported. However, intuitively, one could argue that if a country receives a large amount of aid to trade policy, it is likely that the government will introduce technical standards and harmonise of international trade procedures. Then, if aid to agriculture is given to e.g. improve agricultural financial services and agricultural co-operatives, trade costs are lowered as the differences between domestic and international product standards are smaller.

4a: Aid to agriculture and economic freedom

To gain insight in the effect of economic freedom on the relationship between aid to agriculture and trade costs, models (17) and (18) are estimated with interaction effects. In models (18), there is a positive and significant relationship between aid to agriculture and the dependent variable. This is not in line with intuitive expectations, as AfT's purpose is to reduce

time to import. An explanation for the positive relationship is that the professionalization of agriculture through A_{agr} could lead to time consuming legal and regulatory procedures of for instance agricultural co-operatives. The coefficients are fairly small, implying that the aid to agriculture is not very strongly related to time to import in developing countries.

Next, the interaction between aid to agriculture and economic freedom is considered. In both models the interaction coefficient is negative and significant. This means that the aid to agriculture and economic freedom interact to predict trade costs, supporting hypothesis 4a. Intuitively, if the economic freedom score is high, aid to agriculture reduces trade costs. If a country is considered economically free, it is likely there is less corruption, better government integrity and a better financial climate. This means that if economic freedom is high, the establishment of agricultural institutions as a result of aid to agriculture is effective in diminishing trade costs.

3b: Aid to business and aid to trade policy and regulation; 4b: Aid to business and economic freedom

For the hypotheses in which aid to productive capacity building is replaced by aid to business, no relevant significant coefficients are found. The hypothesis that aid to trade policy and regulation interacts with aid to business to predict trade costs cannot be supported. Likewise, the hypothesis that a country with a high level of economic freedom has a stronger relationship between aid to business and trade costs cannot be supported. The interaction coefficients in (15), (16), (19) and (20) are not significant, neither are the aid to business coefficients. The A_{TPR} coefficient in the models with time to import as dependent variable is negative at the 0.01 level, similar to the A_{TPR} in (4); and implies that A_{TPR} is the only AfT variable associated with the variation in time to import in those models. However, the size of the coefficient is quite small in both models, reflecting only a weak relationship between aid to trade policy and time to import

5. Conclusion

This chapter starts with a summary of this thesis and the answer to the research question. Next, policy implications of the findings of this research are discussed. Finally, the limitations of this thesis are followed by recommendations for further research.

The purpose of this thesis is to examine the impact of Aid for Trade on trade costs in developing countries. Donors shift their focus from traditional development cooperation towards trade-related aid as trade is now considered the engine of economic growth. Though, as outlined in chapter 2, literature shows that the relationship between trade and growth is contingent on many factors. Likewise, previous research on the effectiveness of AfT in terms of export does not lead to a straightforward conclusion. This thesis aims to address the lack of quantitative evidence on AfT effectiveness by considering the relationship between AfT and trade costs, extending the empirical model used by Calì & te Velde (2011).

Including economic control variables did not lead to a better prediction of trade costs. Examining interaction effects between variables did not lead to substantial findings either. The only significant interaction coefficient, for the interaction between aid to agriculture and economic freedom, was so small that it has no meaningful economic implications.

Policy implications can be drawn from the theoretical section of this thesis. The factors determining the effectiveness of Aid for Trade, combined with the mechanisms of trade costs, may lead to the conclusion that AfT needs to be specifically targeted. It must be planned with regard to the context of the recipient country. The level of economic development seems to be a condition for AfT effectiveness. Furthermore, it appears that aid efforts should be in line with the development strategies in place in the recipient country, as there are multiple channels through which AfT effectiveness is likely to be effective shown in the diagram in Section 2.3.

There are limitations to the research. First, there is a problem of data availability. Reporting of AfT to the CRS database is detailed but not complete. Aggregating data leads to a loss of observations. Availability of data on trade costs is more problematic. The data from the Doing Business database is rather complete but does not provide insight in the nature of trade costs. Data sources that do provide different components of trade costs are incomplete and cover only a limited number of countries. Especially data on non-trade measures is not available. It would be interesting to expand the indices of trade restrictiveness as designed by Kee et al. to cover more countries and a larger time span (Kee, Nicita, & Olarreaga, 2009). If more detailed data on trade costs were available, future research could include an effort to differentiate the impact of Aid for Trade on different types of trade costs.

Second, the research is likely to suffer from endogeneity and multicollinearity. As discussed in the results section, it could be interesting to estimate a dynamic model relating Aid for Trade to trade costs. However, as currently trade cost data is only available from 2005 onwards, this may also lead to biased results. Additionally, data for the control variables government effectiveness, LPI, and economic freedom are based on surveys in which people were asked to give their professional opinion. This reduces the reliability of the data and could lead to biased estimates due to measurement error.

A research with larger scope could explore more empirical models and explanatory variables. For example, future research could explore the differences between geographical regions and countries. Country specific characteristics such as technology endowment, infrastructure endowment and quality of institutions could be a condition for Aid for Trade to reduce trade costs.

Finally, it would be interesting to expand research to include human development, as that is the ultimate goal of development cooperation. This would fill the need for a broader perspective on development cooperation. As efforts are made to harmonise resources and direct attention to trade-related aid, an assessment in broader terms of effectiveness should be made. The biannual reports published by OECD/WTO could devote some thoughts to the effects on welfare and human development.

References

- Anderson, J. E., & van Wincoop, E. (2003). Gravity with gravitas : A solution to the border puzzle. *The American Economic Review*, 93(1), 170–192. <https://doi.org/10.1257/000282803321455214>
- Anderson, J. E., & van Wincoop, E. (2004). Trade Costs. *Journal of Economic Literature*, 42(3), 691–751. <https://doi.org/10.1257/0022051042177649>
- Arvis, J.-F., Duval, Y., Shepherd, B., & Utoktham, C. (2013). *Trade costs in the developing world: 1995-2010* (Policy Research Working Paper No. 6309). Washington, D.C. Retrieved from <http://developing-trade.com/wp-content/uploads/2015/03/Working-Paper-DTC-2015-2.pdf>
- Awokuse, T. O. (2008). Trade openness and economic growth: is growth export-led or import-led? *Applied Economics*, 40(2), 161–173. <https://doi.org/10.1080/00036840600749490>
- Besada, H., & Kindornay, S. (Eds.). (2013). *Multilateral Development Cooperation in a Changing Global Order*. New York: Palgrave Macmillan. <https://doi.org/10.1057/9781137297761>
- Birdsall, N., & Fukuyama, F. (2011). The Post-Washington Consensus: Development after the crisis. *Foreign Affairs*, 90(2), 45–53.
- Booth, D. (2012). Aid effectiveness: bringing country ownership (and politics) back in. *Conflict, Security & Development*, 12(5), 537–558. <https://doi.org/10.1080/14678802.2012.744184>
- Busse, M., Hoekstra, R., & Königer, J. (2012). The impact of trade facilitation on the costs of trading. *Kyklos*, 65(2), 143–163. Retrieved from <http://www.csae.ox.ac.uk/conferences/2011-edia/papers/446-Hoekstra.pdf>
- Buys, P., Deichmann, U., & Wheeler, D. (2006). *Road network upgrading and overland trade expansion in Sub-Saharan Africa* (Policy Research Working Paper No. 4097). Washington, D.C. Retrieved from <http://documents.worldbank.org/curated/en/441351468194327279/pdf/wps4097.pdf>
- Cadot, O., Fernandes, A., Gourdon, J., Mattoo, A., & de Melo, J. (2014). Evaluating Aid for Trade: A Survey of Recent Studies. *The World Economy*, 37(4), 516–529. <https://doi.org/10.1111/twec.12138>
- Calì, M., & Razzaque, M. (2013). Aid for Trade: Impact on Sub-Saharan Africa. In M. Razzaque & D. W. te Velde (Eds.), *Impact of Aid for Trade: A survey of empirical evidence* (pp. 102–127). London: Commonwealth Secretariat. Retrieved from

- http://www.keepeek.com/Digital-Asset-Management/oecd/commonwealth/trade/assessing-aid-for-trade_9781848591646-en
- Calì, M., & te Velde, D. W. (2011). Does Aid for Trade Really Improve Trade Performance? *World Development*, 39(5), 725–740. <https://doi.org/10.1016/j.worlddev.2010.09.018>
- Cantens, T., Raballand, G., Bilangna, S., & Djeuwo, M. (2011). Reforming customs by measuring performance: A Cameroon case study. In O. Cadot, A. Fernandes, J. Gourdon, & A. Mattoo (Eds.), *Where to spend the next million: Applying impact evaluation to trade* (pp. 183–206). London/Washington, DC: CEPR and the World Bank.
- Cheru, F. (2014). *Africa, emerging economies, and the changing development landscape*. New York.
- Das, A., & Paul, B. P. (2011). Openness and growth in emerging Asian economies: Evidence from GMM. *Economics Bulletin*, 31(3), 2219–2228.
- Deardorff, A. V. (2014). Local comparative advantage: Trade costs and the pattern of trade. *International Journal of Economic Theory*, 10(1), 9–35. <https://doi.org/10.1111/ijet.12025>
- Djankov, S., Freund, C., & Pham, C. (2010). Trading on time. *Review of Economics and Statistics*, 92(1), 166–173.
- Dollar, D. (1992). Outward-oriented developing economies really do grow more rapidly: Evidence from 95 LDCs, 1976-1985. *Economic Development and Cultural Change*, 40(3), 523–544. Retrieved from <http://www.jstor.org/stable/1154574>
- Eicher, T. S., & Kuenzel, D. J. (2014). The elusive effects of trade on growth: Export diversity and economic take-off. *Canadian Journal of Economics*, (Accepted for publication).
- Engel, S. (2014). The not-so-great aid debate. *Third World Quarterly*, 35(8), 1374–1389. <https://doi.org/10.1080/01436597.2014.946251>
- European Commission DG Trade. (n.d.). Aid for Trade. Retrieved November 24, 2015, from <http://ec.europa.eu/trade/policy/countries-and-regions/development/aid-for-trade/>
- Ferro, E., Portugal-Perez, A., & Wilson, J. S. (2014). Aid to the services sector: Does it affect manufacturing exports? *The World Economy*, 37(4), 530–541. <https://doi.org/10.1111/twec.12151>
- Frankel, J. A., & Romer, D. (1999). Does trade cause growth? *The American Economic Review*, 89(3), 379–399. Retrieved from <http://www.jstor.org/stable/117025>
- Gore, C. (2000). The rise and fall of the Washington Consensus as a paradigm for developing countries. *World Development*, 28(5), 789–804. [https://doi.org/10.1016/S0305-750X\(99\)00160-6](https://doi.org/10.1016/S0305-750X(99)00160-6)
- Grossman, G. M., & Helpman, E. (1990). The “new” growth theory: Trade, innovation, and

- growth. *The American Economic Review*, 80(2), 86–91. <https://doi.org/10.1257/jep.6.3.79>
- Gruber, L. (2013). Trade, growth, poverty, and politics: Toward a unified theory. *Politics & Policy*, 41(5), 723–764. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1111/j.1747-1346.2012.00387.x/abstract>
- Haan, A. De, & Warmerdam, W. (2013). New donors and old practices: The role of China in the multilateral system. In H. Besada & S. Kindornay (Eds.), *Multilateral Development Cooperation in a Changing Global Order* (pp. 215–240). New York: Palgrave Macmillan.
- Hallaert, J.-J. (2006). A history of empirical literature on the relationship between trade and growth. *Mondes En Développement*, 34(135), 63–77. <https://doi.org/10.3917/med.135.0063>
- Hallaert, J.-J. (2013). The future of Aid for Trade: Challenges and options. *World Trade Review*, (Available on CJO 2013), 1–16. <https://doi.org/10.1017/S1474745612000730>
- Harrison, A. (1996). Openness and growth: A time series, cross-country analysis for developing countries. *Journal of Development Economics*, 48, 419–447.
- Hayami, Y. (2003). From the Washington Consensus to the Post-Washington Consensus: Retrospect and prospect. *Asian Development Review*, 20(2), 40–65.
- Hayashikawa, M. (2009). Trading out of poverty: How Aid for Trade can help. *OECD Journal on Development*, 10(2), 1–38.
- Helble, M., Mann, C. L., & Wilson, J. S. (2012). Aid-for-trade facilitation. *Review of World Economics*, 148(2), 357–376. <https://doi.org/10.1007/s10290-011-0115-9>
- Hoekman, B., & Nicita, A. (2011). Trade policy, trade costs, and developing country trade. *World Development*, 39(12), 2069–2079. <https://doi.org/10.1016/j.worlddev.2011.05.013>
- Hoekman, B., & Wilson, J. S. (2010). *Aid for trade: Building on progress today for tomorrow's future* (Policy Research Working Paper No. 5361). *Policy Research Working Paper*. Washington: The World Bank. Retrieved from <https://openknowledge.worldbank.org/bitstream/handle/10986/3845/WPS5361.pdf>
- Hühne, P., Meyer, B., & Nunnenkamp, P. (2014). *Who benefits from Aid for Trade? Comparing the effects on recipient versus donor exports* (Kiel Working Paper No. 1852). *The Journal of Development Studies*. Kiel Institute for the World Economy. <https://doi.org/10.1080/00220388.2014.903246>
- Ivanic, M., Mann, C. L., & Wilson, J. S. (2006). *Aid for trade facilitation. International Journal of Development Issues* (Vol. 5). <https://doi.org/10.1108/eb045861>
- Kaufmann, D., Kraay, A., & Mastruzzi, M. (2010). *The Worldwide Governance Indicators: Methodology and analytical issues* (Policy Research Working Paper No. 5430). *Policy*

- Research Working Paper*. <https://doi.org/10.1017/S1876404511200046>
- Kee, H. L., Nicita, A., & Olarreaga, M. (2009). Estimating trade restrictiveness. *The Economic Journal*, 119(534), 172–199.
- Kim, D.-H., & Lin, S.-C. (2009). Trade and growth at different stages of economic development. *The Journal of Development Studies*, 45(8), 1211–1224. <https://doi.org/10.1080/00220380902862937>
- Kneller, R., Morgan, C. W., & Kanchanahatakij, S. (2008). Trade liberalisation and economic growth. *The World Economy*, 31(6), 701–719. <https://doi.org/10.1111/j.1467-9701.2008.01101.x>
- Krugman, P. R., Obstfeld, M., & Melitz, M. J. (2010). *International economics: Theory and policy*. Policy (9th ed.). Upper Saddle River: Prentice-Hall.
- Martínez-Zarzoso, I., Nowak-Lehmann D., F., & Rehwald, K. (2014). *Is Aid for Trade effective? A panel-quantile regression approach* (Discussion papers No. 210). Göttingen: Center for European, Governance and Economic Development Research (cege). <https://doi.org/10.2139/ssrn.2459475>
- Massa, I. (2013). Impact of Aid for Trade: A survey of empirical evidence. In M. Razzaque & D. W. te Velde (Eds.), *Assessing Aid for Trade: Effectiveness, current issues and future directions* (pp. 14–32). London: Commonwealth Secretariat.
- Mawdsley, E., Savage, L., & Kim, S. M. (2014). A “post-aid world”? Paradigm shift in foreign aid and development cooperation at the 2011 Busan High Level Forum. *The Geographical Journal*, 180(1), 27–38. <https://doi.org/10.1111/j.1475-4959.2012.00490.x>
- Melo, J. de, & Cadot, O. (2014). *Aid for Trade: What have we learnt? Which way ahead?* (O. Cadot & J. de Melo, Eds.). London: CEPR Press and FERDI. Retrieved from <http://archive-ouverte.unige.ch/unige:46904>
- Melo, J. de, & Wagner, L. (2015). *Aid for Trade as finance for the poor* (Development Policies No. 125). Clermont-Ferrand: FERDI.
- Novy, D. (2013). Gravity Redux: Measuring international trade costs with panel data. *Economic Inquiry*, 51(1), 101–121. <https://doi.org/10.1111/j.1465-7295.2011.00439.x>
- OECD. (n.d.). Aid-for-trade statistical queries. Retrieved November 1, 2016, from <http://www.oecd.org/dac/aft/aid-for-tradestatisticalqueries.htm>
- OECD. (2006). *Aid for Trade: Making it effective*. Paris: The Development Dimension, OECD Publishing. <https://doi.org/10.1787/19901372>
- OECD. (2011a). *Measuring aid: 50 years of DAC statistics - 1961-2011*. Paris. Retrieved from <https://www.oecd.org/dac/stats/documentupload/MeasuringAid50yearsDACStats.pdf>

- OECD. (2011b). *Trade for growth and poverty reduction (The Development Dimension)*. (J.-J. Hallaert & M. Hayashikawa, Eds.). OECD Publishing. <https://doi.org/10.1787/9789264098978-en>
- OECD/WTO. (n.d.). *Aid for Trade: Is it working?* Paris.
- OECD/WTO. (2011). *Aid for Trade: Showing results*. Paris. Retrieved from <http://www.oecd.org/aidfortrade/49015161.pdf>
- OECD/WTO. (2015). *Aid for trade at a glance 2015: Reducing trade costs for inclusive, sustainable growth*. Paris: OECD Publishing. https://doi.org/http://dx.doi.org/10.1787/aid_glance-2015-en
- Öniş, Z., & Şenses, F. (2005). Rethinking the emerging Post-Washington Consensus. *Development and Change*, 36(2), 263–290. <https://doi.org/10.1111/j.0012-155X.2005.00411.x>
- Portugal-Perez, A., & Wilson, J. S. (2012). Export performance and trade facilitation reform: Hard and soft infrastructure. *World Development*, 40(7), 1295–1307. <https://doi.org/10.1016/j.worlddev.2011.12.002>
- Ricardo, D. (1817). *On the principles of political economy and taxation*. (P. Sraffa, Ed.). London 1951.
- Rodriguez, F., & Rodrik, D. (2001). Trade policy and economic growth: A skeptic's guide to the cross-national evidence. In B. S. Bernanke & K. Rogoff (Eds.), *NBER Macroeconomics Annual 2000* (pp. 261–338). Cambridge: The MIT Press. <https://doi.org/doi:10.1086/654419>
- Rodrik, D. (2008). A practical approach to formulating growth strategies. In J. E. Stiglitz & N. Serra (Eds.), *The Washington Consensus reconsidered: Towards a new global governance* (pp. 356–366). Oxford: Oxford University Press.
- Sachs, J. D., & Warner, A. (1995). Economic reform and the process of global integration. *Brookings Papers on Economic Activity*, 1995(1), 1–118. <https://doi.org/10.2307/2534573>
- Sakyi, D., Villaverde, J., & Maza, A. (2015). Trade openness, income levels, and economic growth: The case of developing countries, 1970–2009. *The Journal of International Trade & Economic Development*, 24(6), 860–882. <https://doi.org/10.1080/09638199.2014.971422>
- Sannassee, R. V, Seetanah, B., & Jugessur, J. (2014). Export-led growth hypothesis: A meta-analysis. *The Journal of Developing Areas*, 48(1), 361–385. <https://doi.org/10.1353/jda.2014.0018>
- Sarkar, P. (2007). *Trade openness and growth: Is there any link?* (MPRA Paper No. 4997).

- Munich Personal RePEc Archive. Retrieved from <http://core.ac.uk/download/files/432/12014090.pdf>
- Singh, T. (2010). Does International Trade Cause Economic Growth? A Survey. *The World Economy*, 33(11), 1517–1564. <https://doi.org/10.1111/j.1467-9701.2010.01243.x>
- Stiglitz, J. E. (2008). Is there a Post-Washington Consensus Consensus? In J. E. Stiglitz & N. Serra (Eds.), *The Washington Consensus reconsidered: Towards a new global governance* (pp. 41–56). Oxford: Oxford University Press.
- Stiglitz, J. E., & Charlton, A. (2006). Aid for trade. *International Journal of Development Issues*, 5(2), 1–41. <https://doi.org/10.1108/eb045861>
- Stiglitz, J. E., & Charlton, A. (2013). *The right to trade: Rethinking the Aid for Trade Agenda*. London: Commonwealth Secretariat. Retrieved from <http://books.google.de/books?id=KbPV80OP2uQC>
- The World Bank Group, & WTO. (2015). *The role of trade in ending poverty*. Geneva: World Trade Organization. Retrieved from https://www.wto.org/english/res_e/booksp_e/worldbankandwto15_e.pdf
- UN. (2015). Transforming our world: The 2030 Agenda for Sustainable Development. In *Follow-up to the outcome of the Millennium Summit*.
- UN General Assembly. (2012). The future we want. In *Resolution adopted by the General Assembly on 27 July 2012 (A/RES/66/228)* (p. A/RES/66/288). Rio de Janeiro: UN General Assembly. https://doi.org/A/RES/66/288*
- United Nations. (2015). Summit charts new era of sustainable development: World leaders to gavel universal agenda to transform our world for people and planet [Press release]. Retrieved October 5, 2015, from <https://sustainabledevelopment.un.org/post2015/summit>
- Vijil, M., Huchet-Bourdon, M., & Le Mouël, C. (2011). *Aid for trade: A survey* (AFD Working Paper No. 110).
- Vijil, M., & Wagner, L. (2012). Does Aid for Trade enhance export performance? Investigating on the infrastructure channel. *World Economy*, 35(7), 838–868. <https://doi.org/10.1111/j.1467-9701.2012.01437.x>
- Wacziarg, R., & Welch, K. H. (2008). Trade liberalization and growth: New evidence. *The World Bank Economic Review*, 22(2), 187–231. <https://doi.org/10.1093/wber/lhn007>
- Wang, C., Liu, X., & Wei, Y. (2004). Impact of openness on growth in different country groups. *World Economy*, 27(4), 567–585. Retrieved from http://www.researchgate.net/publication/4792521_Impact_of_Openness_on_Growth_in_Different_Country_Groups

- WTO. (n.d.). Aid for Trade fact sheet. Retrieved September 19, 2015, from http://www.wto.org/english/tratop_e/devel_e/a4t_e/a4t_factsheet_e.htm
- WTO. (2006). *Recommendations of the task force on Aid for Trade* (Aid for Trade Task Force No. WT/AFT/1). Geneva.
- Yanikkaya, H. (2003). Trade openness and economic growth: A cross-country empirical investigation. *Journal of Development Economics*, 72(1), 57–89. [https://doi.org/10.1016/S0304-3878\(03\)00068-3](https://doi.org/10.1016/S0304-3878(03)00068-3)
- Zimmerman, F., & Smith, K. (2011). More actors, more money, more ideas for international development co-operation. *Journal of International Development*, 23(Advance online publication), 722–738. <https://doi.org/10.1002/jid>

Appendix 1. Tables of CRS codes per Aid for Trade category

Table 4 CRS codes for aid to trade-related infrastructure

Trade-related Infrastructure		
CRS code	Description	Clarifications / additional notes on coverage
210	Transport and storage	
21010	Transport policy & administrative management	Transport sector policy, planning and programmes; aid to transport ministries; institution capacity building and advice; unspecified transport; activities that combine road, rail, water and/or air transport. Whenever possible, report transport of goods under the sector of the good being transported.
21020	Road transport	Road infrastructure, road vehicles; passenger road transport, motor passenger cars.
21030	Rail transport	Rail infrastructure, rail equipment, locomotives, other rolling stock; including light rail (tram) and underground systems.
2104	Water transport	Harbours and docks, harbour guidance systems, ships, and boats; river and other inland water transport, inland barges and vessels.
2105	Air transport	Airports, airport guidance systems, aeroplanes, aeroplane maintenance equipment.
21061	Storage	Whether or not related to transportation. Whenever possible, report storage projects under the sector of the resource being stored.
21081	Education and training in transport & storage	
220	Communications	
22010	Communications policy & administrative management	Communications sector policy, planning and programmes; institution capacity building and advice; including postal services development; unspecified communications activities
22020	Telecommunications	Telephone networks, telecommunication satellites, earth stations.
22030	Radio/television/print media	Radio and TV links, equipment; newspapers; printing and publishing.
22040	Information and communication technology (ICT)	Computer hardware and software; internet access; IT training. When sector cannot be specified.
230	Energy generation and supply	
23110	Energy policy and administrative management	Energy sector policy, planning; aid to energy ministries; institution capacity building and advice; unspecified energy activities.
23181	Energy education/training	All levels of training not included elsewhere.
23182	Energy research	Including general inventories, surveys.
23210	Energy generation, renewable sources - multiple technologies	Renewable energy generation programmes that cannot be attributed to one single technology (codes 23220 through 23280 below). Fuelwood/charcoal production should be included under forestry 31261.

23220	Hydro-electric power plants	Including energy generating river barges.
23230	Solar energy	Including photo-voltaic cells, solar thermal applications, and solar heating.
23240	Wind energy	Wind energy for water lifting and electric power generation
23250	Marine energy	Including ocean thermal energy conversion, tidal and wave power.
23260	Geothermal energy	Use of geothermal energy for generating electric power or directly as heat for agriculture, etc.
23270	Biofuel-fired power plants	Use of solids and liquids produced from biomass for direct power generation. Also includes biogases from anaerobic fermentation (e.g. landfill gas, sewage sludge gas, fermentation of energy crops and manure) and thermal processes (also known as syngas); waste-fired power plants making use of biodegradable municipal waste (household waste and waste from companies and public services that resembles household waste, collected at installations specifically designed for their disposal with recovery of combustible liquids, gases, or heat). See code 23360 for non-renewable waste-fired power plants.
23310	Energy generation, non-renewable sources, unspecified	Thermal power plants including when energy source cannot be determined; combined gas-coal power plants.
23320	Coal-fired electric power plants	Thermal electric power plants that use coal as the energy source.
23330	Oil-fired electric power plants	Thermal electric power plants that use fuel oil or diesel fuel as the energy source.
23340	Natural gas-fired electric power plants	Electric power plants that are fuelled by natural gas.
23510	Nuclear energy electric power plants	Including nuclear safety.
23630	Electric power transmission and distribution	Grid distribution from power source to end user; transmission lines. Also includes storage of energy to generate power (e.g. pumped hydro, batteries) and the extension of grid access, often to rural areas.
23640	Gas distribution	Delivery for use by ultimate consumer.

Table 5 CRS codes for aid to productive capacity building

Productive capacity building		
CRS code	Description	Clarifications / additional notes on coverage
240	Banking and financial services	
24010	Financial policy & administrative management	Finance sector policy, planning and programmes; institution capacity building and advice; financial markets and systems.
24020	Monetary institutions	Central banks.
24030	Formal sector financial intermediaries	All formal sector financial intermediaries; credit lines; insurance, leasing, venture capital, etc. (except when focused on only one sector).

24040	Informal/semi-formal financial intermediaries	Micro credit, savings, and credit co-operatives etc.
4081	Education/training in banking & financial services	
250	Business and other services	
25010	Business support services & institutions	Support to trade and business associations, chambers of commerce; legal and regulatory reform aimed at improving business and investment climate; private sector institution capacity building and advice; trade information; public-private sector networking including trade fairs; e-commerce. Where sector cannot be specified: general support to private sector enterprises (in particular, use code 32130 for enterprises in the industrial sector).
25020	Privatisation	When sector cannot be specified. Including general state enterprise restructuring or demonopolisation programmes; planning, programming, advice.
311	Agriculture	
31110	Agricultural policy & administrative management	Agricultural sector policy, planning and programmes; aid to agricultural ministries; institution capacity building and advice; unspecified agriculture.
31120	Agricultural development	Integrated projects; farm development.
31130	Agricultural land resources	Including soil degradation control; soil improvement; drainage of water logged areas; soil desalination; agricultural land surveys; land reclamation; erosion control, desertification control.
31140	Agricultural water resources	Irrigation, reservoirs, hydraulic structures, ground water exploitation for agricultural use.
31150	Agricultural inputs	Supply of seeds, fertilizers, agricultural machinery/equipment.
31161	Food crop production	Including grains (wheat, rice, barley, maize, rye, oats, millet, sorghum); horticulture; vegetables; fruit and berries; other annual and perennial crops. [Use code 32161 for agro-industries.]
31162	Industrial crops/export crops	Including sugar; coffee, cocoa, tea; oil seeds, nuts, kernels; fibre crops; tobacco; rubber. [Use code 32161 for agro-industries.]
31163	Livestock	Animal husbandry; animal feed aid.
31164	Agrarian reform	Including agricultural sector adjustment.
31165	Agricultural alternative development	Projects to reduce illicit drug cultivation through other agricultural marketing and production opportunities (see code 43050 for non-agricultural alternative development).
31166	Agricultural extension	Non-formal training in agriculture.
31181	Agricultural education/training	
31182	Agricultural research	Plant breeding, physiology, genetic resources, ecology, taxonomy, disease control, agricultural bio-technology;

		including livestock research (animal health, breeding and genetics, nutrition, physiology).
31191	Agricultural services	Marketing policies & organisation; storage and transportation, creation of strategic reserves.
31192	Plant and post-harvest protection and pest control	Including integrated plant protection, biological plant protection activities, supply and management of agrochemicals, supply of pesticides, plant protection policy and legislation.
31193	Agricultural financial services	Financial intermediaries for the agricultural sector including credit schemes; crop insurance.
31194	Agricultural co-operatives	Including farmers' organisations.
31195	Livestock/veterinary services	Animal health and management, genetic resources, feed resources.
312	Forestry	
31210	Forestry policy & administrative management	Forestry sector policy, planning and programmes; institution capacity building and advice; forest surveys; unspecified forestry and agro-forestry activities.
31220	Forestry development	Afforestation for industrial and rural consumption; exploitation and utilisation; erosion control, desertification control; integrated forestry projects.
31261	Fuelwood/charcoal	Forestry development whose primary purpose is production of fuelwood and charcoal.
31281	Forestry education/training	
31282	Forestry research	Including artificial regeneration, genetic improvement, production methods, fertilizer, harvesting.
31291	Forestry services	
313	Fishing	
31310	Fishing policy and admin. management	Fishing sector policy, planning and programmes; institution capacity building and advice; ocean and coastal fishing; marine and freshwater fish surveys and prospecting; fishing boats/equipment; unspecified fishing activities.
31320	Fishery development	Exploitation and utilisation of fisheries; fish stock protection; aquaculture; integrated fishery projects.
31381	Fishery education/training	
31382	Fishery research	Pilot fish culture; marine/freshwater biological research.
31391	Fishery services	Fishing harbours; fish markets; fishery transport and cold storage.
321	Industry	
32110	Industrial policy & admin. mgmt.	Industrial sector policy, planning and programmes; institution capacity building and advice; unspecified industrial activities; manufacturing of goods not specified below.
32120	Industrial development	
32130	Small and medium-sized enterprises (SME) development	Direct support to the development of small and medium-sized enterprises in the industrial sector, including accounting, auditing, and advisory services.
32140	Cottage industries & handicraft	

32161	Agro-industries	Staple food processing, dairy products, slaughter houses and equipment, meat and fish processing and preserving, oils/fats, sugar refineries, beverages/tobacco, animal feeds production.
32162	Forest industries	Wood production, pulp/paper production.
32163	Textiles - leather & substitutes	Including knitting factories.
32164	Chemicals	Industrial and non-industrial production facilities; includes pesticides production.
32165	Fertilizer plants	
32166	Cement/lime/plaster	
32167	Energy manufacturing	Including gas liquefaction; petroleum refineries.
32168	Pharmaceutical production	Medical equipment/supplies; drugs, medicines, vaccines; hygienic products.
32169	Basic metal industries	Iron and steel, structural metal production.
32170	Non-ferrous metal industries	
32171	Engineering	Manufacturing of electrical and non-electrical machinery, engines/turbines.
32172	Transport equipment industry	Shipbuilding, fishing boats building; railroad equipment; motor vehicles and motor passenger cars; aircraft; navigation/guidance systems.
32182	Technological research & development	Including industrial standards; quality management; metrology; testing; accreditation; certification.
322	Mineral resources and mining	
32210	Mineral/mining policy & admin. mgmt.	Mineral and mining sector policy, planning and programmes; mining legislation, mining cadastre, mineral resources inventory, information systems, institution capacity building and advice; unspecified mineral resources exploitation.
32220	Mineral prospection and exploration	Geology, geophysics, geochemistry; excluding hydrogeology (14010) and environmental geology (41010), mineral extraction and processing, infrastructure, technology, economics, safety, and environment management.
32261	Coal	Including lignite and peat.
32262	Oil and gas	Petroleum, natural gas, condensates, liquefied petroleum gas (LPG), liquefied natural gas (LNG); including drilling and production, and oil and gas pipelines.
32263	Ferrous metals	Iron and ferro-alloy metals.
32264	Non-ferrous metals	Aluminium, copper, lead, nickel, tin, zinc.
32265	Precious metals/materials	Gold, silver, platinum, diamonds, gemstones.
32266	Industrial minerals	Baryte, limestone, feldspar, kaolin, sand, gypsum, gravel, ornamental stones.
32267	Fertilizer minerals	Phosphates, potash.
32268	Off-shore minerals	Polymetallic nodules, phosphorites, marine placer deposits.
332	Tourism	

33210	Tourism policy and admin. management	
-------	--------------------------------------	--

Table 6 CRS codes for aid to trade policy & regulations and trade-related adjustment

Trade policy & regulations & trade-related adjustment		
CRS code	Description	Clarifications / additional notes on coverage
331	Trade policy and regulations and trade-related adjustment	
33110	Trade policy and admin. management	Trade policy and planning; support to ministries and departments responsible for trade policy; trade-related legislation and regulatory reforms; policy analysis and implementation of multilateral trade agreements e.g. technical barriers to trade and sanitary and phytosanitary measures (TBT/SPS) except at regional level (see 33130); mainstreaming trade in national development strategies (e.g. poverty reduction strategy papers); wholesale/retail trade; unspecified trade and trade promotion activities.
33120	Trade facilitation	Simplification and harmonisation of international import and export procedures (e.g. customs valuation, licensing procedures, transport formalities, payments, insurance); support to customs departments and other border agencies, including in particular implementation of the provisions of the WTO Trade Facilitation Agreement; tariff reforms.
33130	Regional trade agreements (RTAs)	Support to regional trade arrangements [e.g. Southern African Development Community (SADC), Association of Southeast Asian Nations (ASEAN), Free Trade Area of the Americas (FTAA), African Caribbean Pacific/European Union (ACP/EU)], including work on technical barriers to trade and sanitary and phytosanitary measures (TBT/SPS) at regional level; elaboration of rules of origin and introduction of special and differential treatment in RTAs.
33140	Multilateral trade negotiations	Support developing countries' effective participation in multilateral trade negotiations, including training of negotiators, assessing impacts of negotiations; accession to the World Trade Organisation (WTO) and other multilateral trade-related organisations.
33150	Trade-related adjustment	Contributions to the government budget to assist the implementation of recipients' own trade reforms and adjustments to trade policy measures by other countries; assistance to manage shortfalls in the balance of payments due to changes in the world trading environment.
33181	Trade education/training	Human resources development in trade not included under any of the above codes. Includes university programmes in trade.

Appendix 2. Tables from data analysis

Table 7 Composition of Aft variables

Aft variable	Variable name	CRS code	Missing observations	Total obs.	Percent missing
Productive capacity building	A_{PC} (computed)	240 + 250 + 311 + 312 + 313 + 321 + 322 + 332	2,081	2,700	77.07
Banking and financial services		240	1,068	2,700	39.56
Business and other services	AFT_{busi}	250	1,045	2,700	38.7
Agriculture	AFT_{agri}	311	861	2,700	31.89
Forestry		312	1,374	2,700	50.89
Fishing		313	1,265	2,700	46.85
Industry		321	983	2,700	36.41
Mineral resources and mining		322	1,623	2,700	60.11
Tourism		332	1,320	2,700	48.89
Trade-related infrastructure excl. energy	A_{INF} (computed)	210 + 220	1,047	2,700	38.78
Transport and storage		210	890	2,700	32.96
Communications		220	960	2,700	35.56
Trade policy and regulations and trade-related adjustment	A_{TPR}	331	1,064	2,700	39.41

Table 8 Correlation matrix of the main independent variables

	lnl_Ainf	lnl_Atrpr	lnl_Abus	lnl_Aagr	lnl_gdp	lnl_pop	l_gov	l_regq	l_ecfr	l_lpi_ipo
lnl_Ainf	1.000									
lnl_Atrpr	0.466	1.000								
lnl_Abus	0.505	0.567	1.000							
lnl_Aagr	0.652	0.508	0.533	1.000						
lnl_gdp	-0.369	-0.080	-0.158	-0.501	1.000					
lnl_pop	-0.442	-0.482	-0.451	-0.470	0.030	1.000				
l_gov	-0.152	-0.067	-0.021	-0.323	0.623	0.059	1.000			
l_regq	0.030	0.153	0.145	-0.094	0.474	-0.034	0.781	1.000		
l_ecfr	0.108	0.190	0.130	0.020	0.270	-0.113	0.414	0.568	1.000	
l_lpi_ipo	-0.332	-0.219	-0.333	-0.493	0.504	0.431	0.555	0.456	0.186	1.000