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What can trade facilitation do for Ghana?

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Abstract

The concept of trade facilitation has gained increased attention during the past decade. In today's globalized world, the relative cost of inefficient trade procedures has increased. The underlying aim of this study is to investigate whether inefficient trade procedures affect exports. More specifically, whether Ghana can increase its export volumes and/or export diversification by engaging in trade facilitation. It is also investigated whether the impact on agricultural products differs in comparison to other product groups.

The gravity equation and bilateral data on sub-Saharan Africa and the EU27 is used in order to quantify the impact of inefficient trade procedures on exports. This study makes use of the official cost to export a standardized 20-foot container as a proxy for trade procedures. The regression analysis suggests that Ghana, by engaging in trade facilitation, would gain in terms of increased export diversification but not in terms of export volumes. It is found that a reduction by 1% of the cost to export would reduce export volumes by 0.4% and increase export diversification by 0.2%. The impact on agricultural products was shown to not differ in comparison to other product groups. The policy simulation, which is based upon three potential scenarios, shows that a reduction of the cost to export would reduce Ghana's export volumes by 5; 9 and 19% and increase export diversification by 2; 4 and 8%. The field study, carried out in Ghana, suggests that a trade facilitation reform would not increase export volumes or export diversification much. It is suggested that reforms within other areas are of greater importance in order to increase exports from Ghana. Two of those areas are to improve the access to credit in Ghana and to improve the infrastructure in the country. The answer to the question of what trade facilitation can do for Ghana is 'not much', at least not within the area of the cost, the documentation or the number of days to export.

Keywords: Ghana, Trade facilitation, Exports, Doing Business Indicators, Gravity Equation

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Table of Contents

Abbreviations

COCOBOD	Ghana Cocoa Board
CPI	Corruption Perceptions Index
DDA	Doha Development Agenda
ECOWAS	Economic Community Of West African States
EDAIF	Export Development and Agricultural Investment Fund
EPA	European Partnership Agreement
EU	European Union
FE	Fixed Effects
GDP	Gross Domestic Product
GEPA	Ghana Export promotion Authority
GFZB	Ghana Free Zones Board
HDI	Human Development Index
ICT	Information and communications technology
LDCs	Least Developed Countries
MDG	Millennium Development Goals
NGOs	Non-governmental organizations
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Squares
SITC	Standard International Trade Classification
TI	Transparency International
TTCs	Trade Transaction Costs
UCDP	Uppsala Conflict Data Program
UN	United Nations
UN-CEFACT	United Nations Centre for Trade Facilitation and Electronic Business
UNDP	United Nations Development Programme
WB	World Bank
WDI	World Development Indicators

1. Introduction

Trade facilitation has gained increased attention during the past decade. In today's globalized world, where tariffs have been gradually reduced, the relative cost of inefficient trade procedures and barriers has increased. Trade facilitation, which aims at making the process of sending goods across the border more simple and smoother, has therefore come to characterize today's debate of both bilateral and multilateral trade negotiations. At the recent Bali Ministerial Conference of the WTO the members concluded on a trade facilitation agreement as a part of the 'Bali Package'. Trade facilitation is moreover one of the central subjects of the WTO Doha Development Agenda (DDA) (World Trade Organization 3, 2013).

A number of studies support the hypothesis that trade facilitation has a positive effect on export volumes (see e.g. Wilson et al., 2003, 2005; Persson, 2008; Lee and Park, 2007) and on the number of goods exported (see e.g. Bourdet and Persson, 2011; Dennis and Shepherd, 2007, 2011; Persson, 2008). Recent studies have emphasized that the impact differs between product groups (see e.g Sadikov, 2007; Persson, 2012) and that the impact might be greater in developing countries due to the existence of relatively inefficient trading procedures (Engman, 2005; Milner et al., 2008). It has furthermore been proposed that increased exports contribute to increased growth (Giles and Williams, 2000) and that a larger variety of goods exported contributes to a less volatile growth path (Newfarmer et al., 2009).

The underlying aim of this study is to investigate whether inefficient trade procedures affect exports, more specifically, whether it is likely that Ghana could increase its exports by engaging in trade facilitation. Ghana has experienced top growth rates during the past decade and has one of the most developed export sectors in the sub-Saharan African region. This study also determines whether agricultural exports are more or less sensitive towards relatively inefficient export procedures since the export base in many low- and middle income countries consist of a large share of agricultural exports. Two specific questions are answered in this study. First, does trade facilitation increase export volumes and/or export diversification from Ghana to the EU27 countries? Second, does the impact on agricultural products differ compared to the other product groups?

To shed light on this issue, three methodological approaches are employed. First, a regression analysis. The gravity equation is applied on bilateral data of sub-Saharan Africa and the EU27 in order to measure the impact of inefficient trade procedures on export volumes, export diversification and whether the impact is remarkably small or large on agricultural products. The

cost to export is applied as the proxy for trade procedures, the days to export and the documents to export are applied in the robustness analysis. Second, a simulation performed on Ghanaian case in order to determine by how much Ghana's exports would increase. The simulation is based on three potential reform scenarios. Third, a field study carried out in Ghana in order to identify the underlying obstacles and actual problems to export. A series of 23 interviews has been performed in order to dig deeper into the potential impact and implications of a trade facilitation reform. Various people with sound knowledge of and involvement in, the export sector have been interviewed on what they perceive to be the main procedural obstacles involved in exporting goods from Ghana. The quantitative analysis finds a robust impact of trade procedures on export diversification but not on export volumes. The field study concludes that a trade facilitation reform would not improve exports from Ghana to the EU27, at least not within the area of the cost, days or documentation related to exports.

This study aims to make a contribution to the academic research and to the policy debate on trade facilitation. This study's contribution to the research is a more concrete empirical description of how the barriers to trade are formed in reality and how those could be reduced. This study also provides an evaluation of the doing business indicators, whether those are likely to capture the complexity of the export sector and whether a reform within the area of the indicators is to be prioritized or not. At present, there is a lack of field research on trade facilitation, its problems and impact. Despite the general contribution, there is no previous research that investigates the impact on the agricultural sector separately, which additionally is a valuable contribution to the research.

The outline of this study is as follows, it begins with an introduction of the trade facilitation concept, background theories of importance are presented and the trade facilitating concept is linked to the empirics. This is followed by a section covering the previous research on trade facilitation. In the fourth section the quantitative part of the study is presented, including an introduction of the regression methodology and the results achieved. The fifth section contains the field study, i.e. the applied methodology, the output from the interviews and a discussion. Finally, a summary and conclusion of the final outcome, results and interpretations are found in the sixth section.

2. Background

2.1 Trade facilitation: Definition

A number of definitions of trade facilitation are applied in the literature. Some of the definitions cover a broad picture of the concept while other definitions are characterized by a more distinct coverage. In general, trade facilitation refers to the process of reducing the costs associated with trade. The definition used by the World Trade Organization (WTO) is "Removing obstacles to the movement of goods across borders (e.g. simplification of customs procedures)" (World Trade Organization 1, 2013). Other definitions with a broader perspective include procedures that take place behind the borders such as infrastructure. Engman (2005) uses the definition "simplification and harmonization of international trade procedures" where international trade procedures are "activities, practices and formalities involved in collecting, presenting, communicating and processing data required for the movement of goods in international trade". The Swedish National Board of Trade (2003; 2008) describes the trade facilitating process as a chain of events. The process starts with the buying process, continues with the transport process and ends with the payment process. To exemplify, a trade facilitation reform could e.g. be a standardization or reduction of the number of official documents required to export, making relevant information more accessible and improving payment systems (OECD, 2009).

In this study, three indicators are applied as proxies for trade procedures, the number of documents to export; the number of days to export and the cost to export. This definition captures a more narrow perspective of trade facilitation but has been frequently applied in previous studies. These indicators are presented in detail and are discussed in section 2.4.

2.2 Trade facilitation: Theoretical suggestions

The theory of inefficient cross-border trading procedures and its link to the number of goods and volume of goods exported has emerged from the heterogeneous firm trade theory suggested by Melitz (2003). It is suggested that firms differ in their level of productivity and face a fixed cost to enter the export market. A self-selecting strategy results in that more productive firms, which find it more profitable to export, are represented in the export sector. A reduction of the variable cost will affect both the volumes and the diversification of trade by making already existing exporters export more and increase the number of exporters due to a decrease in the threshold productivity required to enter the export market. It is argued that a reduction of the fixed costs to trade will not affect the volumes of trade since the existing exporters already have paid this cost. Instead, the reduction will induce new firms to enter the export market and thus

have a positive effect on the diversification of trade. Chaney (2008) has extended the initial setup which allows goods to react differently to the transaction cost. It is argued that firms vary by productivity and that the profitability of exports varies by destination. This results in that only firms with higher productivity will have positive profits and hence be exporters. The model shows that the sensitivity to trade procedures is determined by the elasticity of substitution. As goods become more differentiated, the elasticity of substitution decreases and the export diversification will become more sensitive while the export volumes will become less sensitive towards trade barriers. One could argue that many agricultural products are homogenous goods and hence characterized by higher elasticity of substitution. This would imply that agricultural products, in comparison to differentiated goods, are less sensitive in terms of export diversification while more sensitive in terms of export volumes towards trade barriers.

Successfully implemented trade facilitation programmes are likely to reduce the costs associated with trade, increase productivity and improve transparency in the trade sector (Lesser, C. and E. Moisé-Leeman, 2009). These reduced costs are commonly separated into direct and indirect costs to trade. The direct costs are the costs associated with documentation, border fees, transport- and storage costs. The indirect costs are associated with depreciation costs due to time delays at the border, lack of predictability and uncertainty regarding e.g. customs clearance of goods (Lesser, C. and E. Moisé-Leeman, 2009; Milner et al, 2008). The implementation of trade facilitation reforms does however imply expenses for both governments and businesses. The magnitude varies across countries and economic environments. A successful outcome of trade facilitation reforms generally depends on high-level commitment, a top-down and holistic approach, consultations with business and clear responsibilities (OECD, 2009; SWEDPRO, 2003).

2.3 Trade facilitation: Country heterogeneity and experiences

There are several empirical examples of successful trade facilitation reforms. One of those is the case of Vietnam which has simplified its trade procedures dramatically since year 1986. Some of the reforms that have taken place in Vietnam are: the creation of a website that outlines the relevant information on the trading requirements, creation of a manual of the customs procedures, translation of the customs law into five different languages; extension of customs services after official opening hours, and harmonization of national laws and regulations on customs procedures to the international counterparts (The Swedish National Board of Trade, 2003). Another example is the case of Angola where a 5-year custom expansion and modernization programme was implemented in the year 2000. By 2003, the revenue receipts had increased by 150% and the customs processing time had been reduced by 24 hours (OECD,

2005). Bangladesh implemented a customs modernization programme in 1999. By 2000, customs revenue had increased by 14% and the clearance times for exports had been reduced to 3-8 hours (Draper, 2000). Bolivia also implemented a customs reform project in 1997. By the year 2000 the customs clearance times had been significantly reduced (Escobar, 2004).

Mozambique experienced an implementation of a program aiming at improving customs legislation, systems and procedures. By 1999, the imports had increased by 4% and the customs revenue had increased by 58%. There was also a reduction in the clearance time of goods at the principal ports of entry into the country (OECD, 2005; Mwangi, 2004). A customs administration reform was implemented in Peru in the 1990s aiming at modernizing the customs administration. The customs revenue increased by 327% during the years 1990 to 1995 and the customs release time fell from 15-30 days to 2 hours-2 days (Goorman, 2004). Uganda also experienced a comprehensive customs modernization programme in the 1990s. In 2002, the revenue had increased from 7.7% to 13% as a share of GDP (De Wulf, 2004b).

2.4 Trade facilitation: Measures

In order to empirically illustrate the trade barriers caused by inefficient trade procedures most of the literature [1] applies the three indicators provided by the World Banks Doing Business Database. The trading across borders section of the database consists of three measures that aims at capturing the complexity of the trade procedures in certain countries. Every year, information on the documentation, the time and the cost related to import and export is collected in a standardized way. The information is collected from local freight forwarders, shipping lines, customs brokers and port officials. The measures reflect the trading environment for a medium size producer (defined as having at least 60 employees) that is importing or exporting goods from the main sea port. In the Ghanaian case, the indicators reflect the traders in the Accra region only, not the rest of Ghana, and reflect trade that is taking place from the main sea port, the Tema port. The goods should not require any phytosanitary or safety standards and should be transported in a dry-cargo, 20-foot full container load valued at 20,000 USD.

The documentation counts the number of documents required per shipment. Documents required for clearance, credit and transits are also accounted for. The documentation could be seen as a fixed sunk cost, once the traders have learnt how to fill in the forms the complexity of the process might not be perceived to be as harmful. The time dimension is calculated in days,

[1] See e.g. Djankov et al (2010); Persson (2008; 2012ab); Bourdet and Persson (2012)

from the day when the process is initiated until it is completed. It measures the fastest legal[2] procedure in the country and also accounts for the waiting time between procedures. The time could be seen as both a variable and fixed cost. If there is not much uncertainty related to the time process it could however foremost be perceived as a fixed cost. The cost to export accounts for the fees, measured in USD, required to import or export a 20-foot container. The cost covers administrative fees for customs clearance and inspections; port-related charges; documentation costs and inland transport costs. The cost related to sea transport is not accounted for though. The cost to export is to be seen as a variable cost since the cost has to be paid each time a container is sent. A summary of what the measures covers is illustrated in the table below.

Table 1. Trading across borders indicators

Documents to export and import
Bank documents
Customs clearance documents
Port and terminal handling documents
Transport documents
Days to export and import
Obtaining all the documents
Inland transport and handling
Customs clearance and inspections
Port and terminal handling
Does not include ocean transport time
Cost to export and import
All documentation
Inland transport and handling
Customs clearance and inspections
Port and terminal handling
Official costs only, not bribes

Source: www.doingbusiness.org

The measures have been mentioned as successful in their ability to reflect the complexity of the trading environment. Almost all countries in the world are represented in the survey and the indicators do therefore cover a broad geographical area and spread. The indicators are also very specific, they do not only capture the trade environment but also how long it takes, how much it cost and how many documents are required to export a good from a country. In sum, this makes the indicators comparable across countries and they are to be seen as objective rather than subjective (International Finance Corporation, 2014-05-23).

One should also be aware of the limitations of the indicators. First, the indicators are country-specific and do only reflect the country's own border, all trading partners are treated equally. The indicators do hence explain country specific procedures but are used to explain the bilateral trade

[2] By legal it is referred to the official procedure.

between countries. To exemplify, exporting a good from Ghana to Sweden is treated equally as exports from Ghana to the neighboring Burkina Faso. Second, the econometric identification relies on cross-country differences rather than time-series variation. Third, the indicators do not differentiate between product groups and do not cover all product groups. This implies that the measures might fail to indicate the true picture for specific products. The indicators only cover containerized products, not refrigerated food or goods that require phytosanitary or sanitary regulations. Neither do the survey account for the gold and oil industry, two areas of exports that are of great importance for Ghana. Forth, the indicators do only cover sea port trade. In reality, sea port trade might be more or less important for different countries. Fifth, the cost measures only measure the official costs and hence does not take informal costs such as bribes into account. Countries characterized by high informal costs in the trading procedures might therefore not be comparable to countries without a presence of informal costs in the export process. Sixth, the indicators cover medium sized traders with at least 60 employees. This is likely to make the measures incomparable since a company in Europe consisting of 60 employees might be considered as a small to medium size company while a company in west Africa consisting of 60 employees is considered as quite big. Seventh, the indicators do not cover trade in e.g. free zones. In Ghana, about 1/3 of the total exports departs from the free zone. If many of the reforms within the area of trade are directed towards the free zones this is to be seen as a problem since the indicator in that sense will fail in reflecting complexity of the trade procedures.

In sum, if one desires to capture the overall trading environment or receive a more proper picture of the export sector one has to dig deeper than just having a look at these measures. Which one of the indicators that is most relevant depends upon what the research is intended for. Both cost and time are usually seen as two important indicators but all of the measures are interrelated (International Finance Corporation, 2014-05-23). The mean, minimum and maximum values for the trade facilitation measures are presented in the table below for the time period considered in this study (2006-2012). The indicators for Ghana are illustrated separately.

Table 2. Measures of trade procedures in sub-Saharan Africa

Sample: 2006-2012	Cost	Days	Documents
Average	1749	32	8
Min	624	12	5
Max	5902	60	13
Ghana: 2006-2012			
Average	769	23	6
Min	624	19	6
Max	815	47	6
Sample average: Yearly development			
2006	1652	39	8.2
2007	1670	37	8.1
2008	1889	36	7.8
2009	1946	35	7.7
2010	1982	34	7.7
2011	1995	32	7.6
2012	2023	32	7.6
Ghana: Yearly development			
2006	624	47	6
2007	697	21	6
2008	805	19	6
2009	815	19	6
2010	815	19	6
2011	815	19	6
2012	815	19	6

Source: The Doing Business Database (World Bank). Data has been collected for the years 2006-2012.

The first row in the table above illustrates the sample statistics of the indicators. One can see that there is a quite high variation in both 'Days' and 'Cost' to export across countries in sub-Saharan Africa. However, the number of 'Documents' varies to a small extent. The cost to export contains a large cross-country variation, varying between 624 and 5902 USD. The second row illustrates the statistics for Ghana. One can see that the average cost, number of days and number of documents for the period considered are far below the sample average. The third row illustrates the development of the sample average over the time period considered. One can see that the yearly average number of documents has remained quite constant during the time period, the number of days has been somewhat reduced (39 to 32) and the cost to export has increased (from 1652 to 2023 USD). The last row illustrates the development in Ghana over the time period considered. One can see that the number of documents required has been unchanged over the period of time, the number of days has been heavily reduced (from 47 days to 19) and the cost to export has unexpectedly increased, from 624 to 815 USD, during the period considered. An explanation for the somewhat different patterns of movement of the indicators, where the cost to export is the variable of interest, could hypothetically be explained by the fact that large investments in facilitating trade have been performed which the government has to collect a payment for. This could hence be reflected in the increased cost during some of the years. The table also indicates that the development of the trading environment in Ghana has

remained static between the years 2009-2012. If the hypothesis outlined above would be true, this would reflect that no major investment was made during the period 2009-2012 in order to facilitate exports from Ghana. In 2012 it cost 815 USD, took 19 days and required 6 documents to export a standardized container from Ghana. Figures of the yearly development of the trade procedures are illustrated below.

Figure 1. Yearly development of trade procedures of the sample average[3]

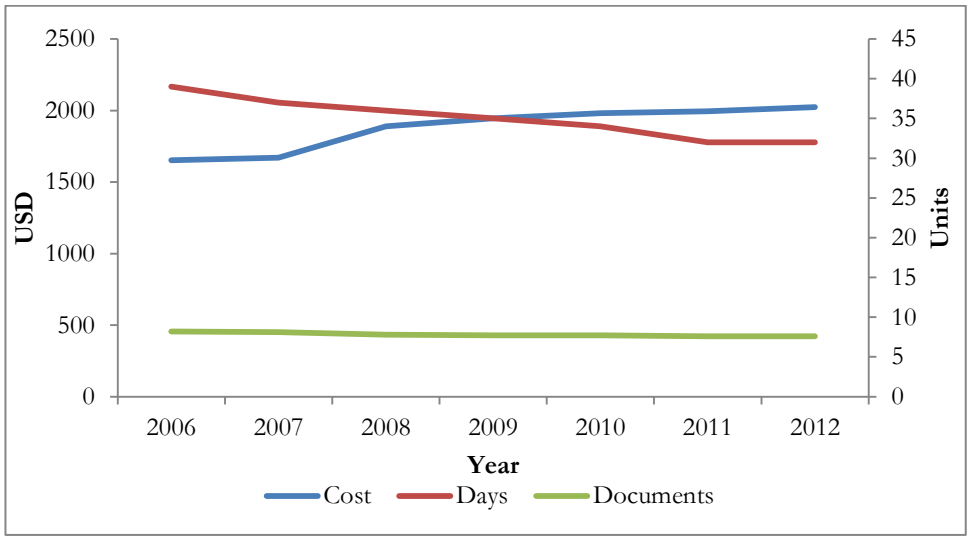
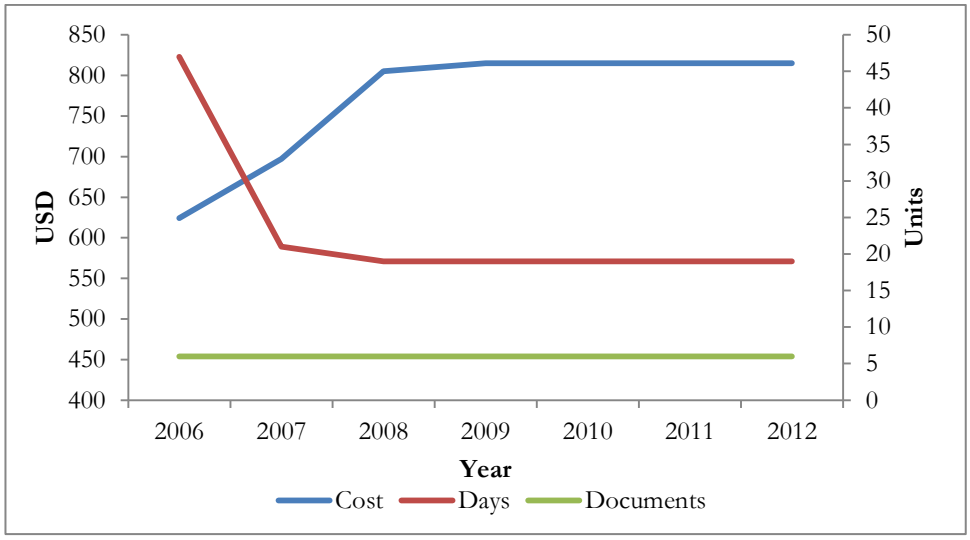


Figure 2. Yearly development of trade procedures in Ghana



As is illustrated in the figures above, the indicators for Ghana seem to follow the overall patterns of the sample. The number of documents has remained constant, the time to export has decreased and the cost to export has increased during the time period. The cost to export a

[3] The average is calculated for all countries included in the sample.

standardized container of goods has increased in Ghana during the past years, from 624 to 815 USD. One can see that the cost measure has remained constant for both Ghana and the sample average since year 2008.

It is argued that the three indicators are interrelated and capture similar aspects of the trade environment. One could however question whether they in fact capture different aspects of the complexity of a country's trade procedures since they all seem to follow three different patterns. One of them is constant, the other increasing and the last one decreasing during the time period. As was previously mentioned, the number of documents required to export does not vary either over time or much between countries. As was outlined previously the documentation can be seen as a fixed sunk cost to the trader and the number of documents does in fact not tell us anything about their complexity. This sheds doubt on whether it is a proper indicator for the complexity of the trade procedures within a country, not ruling out that it could be a proper measure if one desires to compare on a cross-country basis. The days and cost to export seem more appropriate if one wants to capture both the cross-country and time-series variation.

This study follows the study by Dennis and Shepherd (2011) which makes use of the cost indicator as a proxy for the complexity of trade procedures. It seems likely that the cost to export a standardized container of goods is correlated with the overall effect of relatively complex trade procedures. The indicator should therefore be successful in capturing the effect of trade procedure complexity on exported volumes and diversification. In addition to the cost measure, the documents and days to export are applied as robustness checks.

2.5 Ghana: Trade environment

The Ghanaian economy has been growing steadily since 2000, primarily led by the growth of the country's agricultural, mining and service sectors. In 2011 the economy grew by 14.4% and a major contributing factor was the increased oil production in the country (World Bank 1). The trade patterns for the Ghanaian economy in 2011 are presented in the table below.

Table 3. Ghana's major trade partners and main goods traded in year 2011.

Indicator	Export		Import	
Share of total world trade[1]	0.07		0.09	
Major trade partners[1]	European Union (27)	25.7	European Union (27)	38.5
	Togo	25	China	15.2
	South Africa	17.1	United States	9.6
Main goods[1]	Fuels and mining products	59.3	Manufactures	70.2
	Agricultural products	27.8	Agricultural products	12.9
	Manufactures	12.9	Fuels and mining products	1.7
Trade with the EU[2]	Primary products	97.6	Primary products	35.1
	Agriculture	47.7	Agriculture	13.9
	Fuels and mining products	49.9	Fuels and mining products	21.2

Note: That the last three rows do illustrate percentages of total exports, the values are presented in percentages and have been collected from the World Trade Organization 2 (2013) and EU (2012).

As is illustrated in the table the Ghanaian economy accounts for 0.07% of the total world exports and 0.09% of the total world imports. The European Union is Ghana's major trade partner, both in terms of imports and exports. Fuel, mining and agricultural products accounts for a large share of the country's exported goods. The exports have been dominated by cocoa, gold, timber and diamonds during the past decades. Ghana is the world's second largest cocoa producer and the economy hence relies heavily on cocoa production (Ghana Free Zones Board 1, 2014). Major import goods consist of manufactures. Isolating the trade to solely the EU27 shows that almost 50% of the exports from Ghana to the EU27 consist of agricultural products (food including fish and raw materials). Given this information it is evident that the agricultural sector is of importance for the Ghanaian economy.

In 1995 the 'Ghana Free Zones Board' (GFZB) was established in order to improve the non-traditional export sector. At the moment, one free zone (the Tema free zone) is in use and is mentioned to be of great importance for the Ghanaian export sector. In addition to the Tema Free zone, three other free zones (Shama Land Bank, Sekondi Export Processing Zone, Ashanti Technology Park) are to be developed during the upcoming years. Out of Ghana's total exports, 36%[4] are from the free zones and 64%[5] are from the traditional zones (University of Ghana, 2014-05-22).

In addition to the GFZB the 'Export Development and Agricultural Investment Fund' (EDAIF) was implemented by the Ghanaian government in 2001. The fund assists agricultural producers with financing production inputs such as machinery and fertilizers. The financial assistance is non-reciprocal and the EDAIF assists the producer until the producer enters the export phase.

[4] Whereof 80% is manufactured goods such as coca paste, canned tuna, cocoa butter, plastic, rubber sheets, fresh fruit, juice and agricultural products.
[5] Mainly consisting of cocoa, timber and gold.

At that moment, the producer can seek assistance from the 'Ghana Export Promotion Authority' (GEPA) (Export Trade, Agricultural and Industrial Development Fund, 2014-05-20). The GEPA was established in 1969 in order to promote and develop Ghana's non-traditional export base such as manufactured goods, arts and fabrics. The main task of the GEPA is hence to diversify the Ghanaian exports.

A number of reforms related to the trade facilitation area have been implemented in Ghana during the past decades. During the 1990s a large set of capacity enhancing reforms was implemented, in 2001 a customs ICT network was implemented and in 2008 the delivery times at the ports were reduced. In 2013 a more complex system of scanning imports was implemented which increased the customs clearance time (De Wulf, 2004a; World Bank Doing Business Report, 2013).

3. Previous research

The concept of trade facilitation has been heavily discussed both in the academic arena and within multilateral organizations during the past decade. Most studies suggest a positive and significant effect of trade facilitation on both export volumes and export diversification.

3.1 Export volumes

So far, the main focus of the trade facilitation literature has been concentrated on the impact on traded volumes. Both Engman (2005) and Milner et al (2008) suggest that trade facilitation, especially in low- and middle income countries, has a positive impact on trade flows. Wilson, Mann, and Otsuki (2003, 2005), Djankov, Freund and Pham (2010), Lee and Park (2007) all found significant effects on trade volumes. Wilson, Mann and Otsuki (2003; 2005) include four separate trade facilitation indicators and they find a significant effect for all of them. Djankov, Freund and Pham (2010) make use of the time aspect of exports. It is shown that for each additional day that a product is delayed in the exporting country, the trade volumes are reduced by at least 1 per cent. Clarke (2005) studied factors that affect the export performance of manufacturing enterprises in African countries and found that manufacturing enterprises are less likely to export in countries with poor customs regulations.

Persson (2008) assesses how transaction costs in terms of time delays affects traded volumes. A gravity equation is applied on a sample of two-way bilateral trade between 22 EU-countries and 100 developing countries. It is found that time delays by both the exporter and the importer decrease traded flows. More specifically, lowering border delays in the exporting country by one day from the sample mean would yield an export increase of about 1%, and the same reduction in the importing country would increase imports by about 0.5%. It is also found that the elasticity is non-constant and thus affects the marginal effect, if the waiting times are already high the marginal effect of waiting a little longer is associated with a smaller marginal effect.

Bourdet and Persson (2012) argue that the presence of unharmonized trade procedures within the EU causes negative effects on the import volumes. A gravity equation on bilateral imports is applied on exports from non-EU countries and it is found that a harmonization of the trade procedures to the level of the most efficient EU countries would increase the aggregated exports to the EU by 20% for the average exporter.

3.2 Export diversification

The trade facilitation literature is limited in its evidence on the matter of export diversification. Dennis and Shepherd (2007) find that export costs at the border have a significant negative effect on the number of goods exported. Data on imports from developing countries to the EU is used on an 8-digit section as a measure of export diversification. It is found that a 1 percent reduction of the cost to export increases the export diversification by 0.3 percent. Dennis and Shepherd (2011) uses data on imports from 118 developing countries to the EU and find that reducing the costs of exporting by 10 per cent will increase the export diversification by 3, 4 and 1 per cent respectively.

3.3 Export volumes and export diversification

Bourdet and Persson (2011) find support for the fact that trade facilitation increases both exported volumes and export diversification. A gravity equation on bilateral imports to the EU from non-EU Mediterranean countries is applied in order to assess the impact. It is found that a full harmonization of best-practice levels would increase the number of goods exported by 28% and the volumes by 57%. If the reform would be solely in the export countries there would be an increase by 13% on the number of goods exported and 40% on the volumes.

3.4 Product heterogeneity

Studies have also examined whether all products are similarly affected by trade procedures. Sadikov (2007) investigates whether trade facilitation affects differentiated and homogenous goods differently. The number of signatures required to export is applied as an indicator of trade procedures and the dependent variable is traded volumes. It is found that export volumes of differentiated products are more sensitive to changes in export signatures than export volumes of homogenous goods. Martínez-Zarzo and Márquez-Ramos (2008) also find evidence that trade facilitation has a stronger impact on the traded volumes of differentiated goods.

Persson (2012) uses data on imports from developing countries to the EU and makes use of the number of days needed to export as an indicator of export transaction costs. It is found that a 1% reduction of the days to export would increase the number of exported differentiated and homogenous goods by 0.6 and 0.3 per cent respectively. Policy simulations suggest that a reduction of the number of days to the most efficient country at the same development stage would increase the exported differentiated and homogenous goods by 62 and 26 per cent respectively.

4. Quantitative study

4.1 Empirical strategy

The quantitative analysis consists of two parts: First, a regression analysis where the gravity model is applied in order to measure the effect of inefficient trade procedures on export volumes, export diversification and on whether the impact differs on agricultural products. The data sample of sub-Saharan Africa is used in order to determine the average effect of the region. The model specifications are outlined in section 4.2.1 and 4.3.1. Second, a simulation of what the effect would be in Ghana if the reforms were adopted according to three potential scenarios. The simulation is presented in section 4.4. This is the baseline of how much a trade facilitation reform could increase export flows and diversification from Ghana to the EU27.

In order to carry out the regression analysis a panel-dataset for the years 2006-2012 has been collected on 49 countries in sub-Saharan Africa[6] and the EU27 countries[7]. The dependent variables used are traded volumes and the number of products exported for each bilateral trade pair. The data on the bilateral imports to all EU27 countries from all countries in sub-Saharan Africa has been collected on a 1-digit respectively 2-digit SITC (Standard International Trade Classification) level of the United Nations Comtrade Database.

The explanatory variable of main interest is the measure of trade procedures discussed in section 2.4. As was stated there, this study makes use of the cost to export a standardized container of goods. The other two measures, days to export and number of documents required to export are used in order to assess the robustness of the results. These indicators have been collected from the World Banks Doing Business Database. In addition to this, a set of control variables has been collected on: official language, colonial relationship, distance, landlocked countries, GDP, GDP per capita, corruption, human development and data on civil war. For a complete outline and description of the data set, see table A1-A4 in the appendix.

The estimators applied in this study follow the previous literature on the area. The ordinary least squares (OLS) estimator is applied in the case of export volumes. It is likely that a linear model is most appropriate when the export volumes are applied as the dependent variable, it hard to motivate that another estimator should be superior. In the case of export diversification the dependent variable is a count variable that varies between 0 and 65. The Poisson estimator is

[6] exporter
[7] importer

applied in order to estimate the relationship. The Poisson estimator is commonly applied when the dependent variable is a count variable and the benefit in this specific case is that it can make use of the zero-valued observations.

4.2 Export volumes

4.2.1 Model specification

Two models are considered in order to assess the impact of trade procedures on export volumes. The baseline and extended models are outlined below.

Baseline model:

$$lnM_{ijtd} = \beta_1 + \beta_2 lnGDP_{it} + \beta_3 lnGDP_{jt} + \beta_4 lnGDPpc_{it} + \beta_5 lnGDPpc_{jt} + \beta_6 lnDist_{ij} + D_1 Language_{ij} + D_2 Colony_{ij} + D_3 Landlocked_i + \tau_t + \lambda_d + D_4 ZAF_i + \beta_7 lnCost_{it} + \varepsilon_{ijtd}$$

Extended model:

$$lnM_{ijtd} = \beta_1 + \beta_2 lnGDP_{it} + \beta_3 lnGDP_{jt} + \beta_4 lnGDPpc_{it} + \beta_5 lnGDPpc_{jt} + \beta_6 lnDist_{ij} + D_1 Language_{ij} + D_2 Colony_{ij} + D_3 Landlocked_i + \tau_t + \lambda_d + D_4 ZAF_i + \beta_7 lnCost_{it} + D_5 Agri_d + \beta_8 lnCost_{it} Agri_d + \varepsilon_{ijtd}$$

The baseline specification follows the traditional Gravity model. The dependent variable (M_{ijtd}) is imports from country *i* to country *j* at year *t* on a one-digit division *d*. The one-digit division separates the export flows into 10 categories such as "0-Food and Live animals"; "1-Beevrages and Tobacco"; "7-Transport and Machinery equipment." The export volumes are explained by the importing and exporting countries GDP (GDP_{it} and GDP_{jt}), the importing and exporting countries GDP per capita ($GDPpc_{it}$ and $GDPpc_{jt}$) and the bilateral distance between the countries ($Dist_{ij}$). Additionally, three dummy variables, which are included in the model, take the value 1 if the trade pair shares a common language ($Language_{ij}$), a colonial history ($Colony_{ij}$) or if the exporting country is landlocked ($Landlocked_i$), and 0 otherwise. Year dummies are included in order to capture time specific shocks (τ_t) that affect the trade between sub-Saharan Africa and the EU27. To exemplify, such time shocks could be related to a sudden rise in the oil price, widespread economic recessions or a price change affecting agricultural goods. Product sector dummies (λ_d) are included for the 10 different product categories to control for unobserved time-invariant factors that are common within product groups but differ between them. To exemplify, such differences could be that some of the product groups are more dependent on oil production in comparison to other groups. Additionally, a dummy controlling for South Africa (ZAF_i) is included in order to control for the large scope of the exports originating from South Africa.

South Africa could be seen as a clear outlier in the sub-Saharan African sample due to the relatively efficient institutions and high production taking place in the country which hence motivates the importance to control for the country separately. The cost of exporting a standardized container ($Cost_{it}$) is used in order to capture the effect of relatively complex trade procedures.

The extended model also determines whether the impact differs between agricultural products and non-agricultural products. A dummy for agricultural products ($Agri_d$) is included as well as an interaction variable of the trade procedure and the dummy variable ($Cost_{it}Agri_d$). The interaction term indicates whether agricultural products are likely to be more or less sensitive towards complex trade procedures or not.

One could expect that the GDP should be positively related to export volumes, indicating that larger countries trade larger volumes. The variable GDP per capita is however somewhat unclear, the population effect running through the variable could be either positive or negative on traded volumes. I expect that landlocked countries or countries relatively far from each other trade lower volumes. I also expect that countries sharing a common language or a former colonial relationship trade larger volumes. It could furthermore be expected that the South African dummy is positive since a large share of trade volumes from the continent originates from there. I expect that both the product group and year dummies will be successful in capturing specific shocks and deviations from the overall pattern of movement. Furthermore, I expect that relatively high costs to trade do affect traded volumes negatively. The dummy for agricultural products could be either positive or negative. Given that a country, on average, exports a large quantity of agricultural products in relation to the country's own export base, the agricultural dummy will be positive. It will be negative if the country exports a relatively small share of agricultural products. If agricultural products are relatively more sensitive towards inefficient trade procedures the estimate will be higher and significant than the cost to export and lower if the opposite case applies. One could suspect that agricultural products are more sensitive towards complex border procedures since they, at the start, already are characterized by higher clearance costs and special border procedures such as sanitary and phytosanitary controls.

It is to be clarified that this study does not deals with the effect that relatively complex trade procedures in the EU27 have on exports from sub-Saharan Africa. Neither the impact of the timing aspect nor that of the adjustment process of the trade procedures on trade volumes are dealt with in this study.

4.2.2 Regression results

Table 4. Regression Results: Trade Volumes

Dependent variable: Volumes of export (USD) per SITC division 1		
Dependent variable	**Baseline model**	**Extended model**
GDP exporter	0.822***	0.785***
	(0.027)	(0.028)
GDP importer	0.869***	0.801***
	(0.020)	(0.021)
GDP per capita exporter	-0.288***	-0.301***
	(0.032)	(0.034)
GDP per capita importer	-0.026	-0.044
	(0.049)	(0.049)
Distance	-0.401***	-0.451***
	(0.096)	(0.100)
Common language	0.310***	0.213**
	(0.086)	(0.091)
Colony	1.382***	1.357***
	(0.104)	(0.113)
D_ZAF	2.006***	1.910***
	(0.134)	(0.142)
D_landlocked	-1.316***	-1.265***
	(0.087)	(0.089)
Export procedure (USD)	0.415***	0.390***
	(0.089)	(0.106)
D_Agri		0.000
		(0.000)
Interaction (D_Agri*USD)		0.133
		(0.120)
Estimator	OLS	OLS
Year effects	Yes	Yes
Product category effects	Yes	Yes
Number of observations	17129	17129
R2	0.338	0.283

Note: The dependent variable is logged bilateral volume per SITC (1-digit) division. Year effects imply that year dummies have been included and product category effect implies an inclusion of product-category dummies. Robust standard errors are provided in parentheses. Asterisks denote significance at the 1%(***), 5%(**) and 10%(*) levels.

The table above illustrates the estimated impact of complex trade procedures on export volumes. In the baseline regression one can see that the coefficients seem to be in line with the underlying Gravity theory. The trading countries' GDP is positive and significant, implying that larger economies export and import larger trade volumes. The GDP per capita of the exporter and importer illustrates a negative versus insignificant impact. The reason for these unexpected signs might be due to a decrease or increase in the population size. As expected, the distance and being a landlocked country have negative effects on export volumes. Sharing a common language and having a former colonial relationship are positively related to exported volumes. The export procedure ($Cost_{it}$) is positive and statistically significant on export volumes. It is to be interpreted as an elasticity measure and in contrast to what could be expected the estimates indicates that a 1% increase in the cost of exporting a standardized container implies an increase of exported

volumes by 0.415%. As is illustrated in the table, a substantial number of observations[8], namely 17 129, are used in the regressions and the applied estimator is the linear Ordinary Least Squares (OLS). The result suggests that a simplification of export procedures from sub-Saharan Africa would not have a positive impact, but a negative impact, on the exported volumes to the EU27. This clearly contradicts the previous research on the area. The underlying reason for this contradictory result could be that the cost indicator in fact reflect something else than the complexity of the countries trade procedures. As was brought up in section 2.4 it could be the case that the cost to export in fact reflects heavy investments in trade infrastructure which are paid for by costs to export goods. If so, this is likely to be the most reasonable explanation for this contradictory estimate.

In order to measure whether the impact on agricultural products differs, a dummy[9] variable is included in the extended model as well as the interaction variable of the dummy and the cost measure. The interaction variable is insignificant which indicates that agricultural exports are not relatively less or more sensitive towards complex trade procedures. This indicates that an impact of a trade facilitation reform is likely to not affect agricultural exports differently from other exports. One should however bear in mind that the cost measure in fact does not take product heterogeneity into account, and neither does the doing business survey cover agricultural goods. One can see that the coefficient estimate on the cost to export decreases somewhat upon the inclusion of the interaction variable which now suggests that a 1% increase in the cost to export is associated with an increase of 0.390% for both non-agricultural and agricultural products.

4.2.3 Robustness analysis

As always, one could consider a large set of channels through which the validity of the estimates presented in 4.2.2 could be questioned[10]. This section assesses whether the estimated impact above is robust when exposed to: (1) a change of the dependent variable (2) an inclusion of control variables and importer-specific effects (3) a reduction of the time dimension (4) a change of the estimator applied and (5) a change of the trade procedure indicator. The variable of interest is the applied measure of the trade procedure, the cost to export. The baseline regression presented in section 4.2.2 is used in all cases in the robustness analysis.

[8] I was however unable to make use of a fully balanced panel dataset due to missing data.
[9] The definition used here is the one suggested by *World Integrated Trade Solution* (WITS) which groups the product group 0,1,2 and 4. The dummy variable thus takes the value of 1 if the trade flow is recoded as the product group 0,1,2 or 4.
[10] It is to be outlined that no concerns is taken on the issue of endogeneity since it is not likely to be of great concern in the case of trade procedures and export volumes/diversification.

Aggregating the dependent variable

The first regression (1) makes use of the aggregated export volumes instead of the division into 10 product groups as the dependent variable. This is likely to reflect whether the overall traded volumes are in line with the more sensitive analysis of specific trade flows. Please note that the aggregated volumes of exports should not be directly compared with the baseline regression but only give a comparable indication of the direction of the estimate. The disaggregated level of the dependent variable provides us with a more detailed level of aggregation which hence enables a higher control of the explanatory variables. The second regression (2) makes use of the aggregated export volumes of agricultural goods as the dependent variable. The second regression is likely to illustrate whether the result seems to be consistent when non-agricultural products are excluded from the data set.

The estimates are not fully robust towards the use of an aggregated measure, and the distance variable turns insignificant in (1) when the aggregated export flows are applied as the dependent variable. The distance variable is however significant and negative in regression (2) when the aggregated agricultural exports are applied. The trade facilitation measure is insignificant in both (1) and (2) in contrast to the baseline regression. One reason for the insignificant relationship could be that there is a drastic reduction of the number of observations which hence enables one to control for omitted factors to a lower extent. The result is presented in table 5.

Control variables and importer-specific effects

This section assesses the presence of omitted variables. First, three control variables are added to the specification (3) that are likely to capture some of the unobserved factors that could explain why some countries that export more also have relatively more efficient export procedures. Three variables are added; a dummy which takes the value 1 if the country has experienced a major civil war during the past 20 years. The data is collected from Uppsala Conflict Data Program (UCDP) and is likely to reflect the status of the country's infrastructure and control for political sensitivity. It could be expected that countries that have experienced a civil war during the past years trade lower volumes. Additionally, the Corruption Perceptions Index (CPI) is included. The index is published yearly by the Transparency International (TI) where countries are ranked upon a set of criteria's. One could suspect that countries with relatively high levels of corruption also trade less due to hidden costs associated with exports. Lastly, the Human Development Index (HDI) is added in order to control for the human capital in the country. The HDI is published yearly by the United Nations Development Programme (UNDP) and one

could expect that countries with relatively high human development also trade more due to larger capacity in terms of human capital and productivity. Second, in order to control for potentially omitted effects linked to the importing country a dummy is included for each of the EU27 countries in the regression (4). The estimates (3) and (4) are presented in table 5.

As is indicated in the table below, the estimates (3) are not robust toward the inclusion of the three control variables. The distance variable and the cost to export are now insignificant. This could indicate that there is a presence of omitted variables in the regression. The control variables indicate that countries that have experienced a civil war during the past 20 years trade lower volumes, less corrupt countries export lower volumes and countries with a higher human development do also export lower volumes. When instead applying importer-specific dummies in regression (4) the distance indicator, the import GDP indicator turns insignificant. The importer effect itself captures the effect of the GDP- and the distance variable. The trade facilitation measure is still significant and positive despite the application of the importer-specific effects.

Table 5. Robustness estimates: Aggregated dependent variable, control variables and importer-specific effects

Dependent variable: Export volumes				
Dependent variable	**(1)**	**(2)**	**(3)**	**(4)**
GDP exporter	1.117***	0.929***	0.819***	0.922***
	(0.050)	(0.049)	(0.028)	(0.026)
GDP importer	1.268***	1.045***	0.871***	1.714
	(0.034)	(0.037)	(0.020)	(1.864)
GDP per capita exporter	-0.248***	-0.431***	-0.054	-0.310***
	(0.054)	(0.064)	(0.053)	(0.031)
GDP per capita importer	0.001	-0.178**	-0.043	-0.282
	(0.080)	(0.089)	(0.049)	(1.726)
Distance	-0.080	-0.387**	-0.147	0.164
	(0.177)	(0.186)	(0.102)	(0.102)
Common language	0.854***	0.813***	0.295***	0.385***
	(0.161)	(0.170)	(0.086)	(0.112)
Colony	1.430***	1.097***	1.374***	1.297***
	(0.190)	(0.203)	(0.103)	(0.114)
D_ZAF	1.407***	0.734***	2.005***	1.687***
	(0.222)	(0.247)	(0.137)	(0.131)
D_landlocked	-1.060***	-1.170***	-1.042***	-1.221***
	(0.102)	(0.124)	(0.106)	(0.085)
Export procedure (Cost)	-0.031	-0.028	0.094	0.366***
	(0.025)	(0.025)	(0.107)	(0.087)
D_civilwar			-0.269***	
			(0.074)	
CPI			-0.787***	
			(0.149)	
HDI			-0.787***	
			(0.231)	
Estimator	OLS	OLS	OLS	OLS
Year effects	Yes	Yes	Yes	Yes
Product category effects	No	No	Yes	Yes
Importer-specific effects	No	No	No	Yes
Number of observations	3749	3207	16961	17129
R2	0.473	0.361	0.341	0.381

Note: The dependent variable is the logged exported bilateral volumes. Note that (2) makes use of the logged aggregated agricultural export flows. Year effects imply that year dummies have been included while product category effect implies that product group dummies have been included in the regression. Robust standard errors are provided in parentheses. Asterisks denote significance at the 1%(***), 5%(**) and 10%(*) levels.

Time: yearly estimates

This section deals with the time dimension and the potential of serial correlation over time. The regressions are performed separately for each year and the time dummies are hence excluded. This implies that the analysis in this section relies on cross-country differences since the time series aspects within trade pairs are excluded. The estimates are presented in table 5. The estimates seem to be robust towards this exposure, but the common language dummy do however turns insignificant. The measure of the export procedure is positive and significant for most of the years. The coefficient value of the cost measure is slightly higher, compared with the baseline regression (1) during the years 2006-2011 and insignificant during the year 2012. This

indicates that there might be something other than inefficient trade procedures affecting export volumes between the SSA and EU27 during the year 2012. It could be a result of the deep financial crisis in the EU which points on the importance of including year dummies. The underlying reason could also be that there might be an adjustment process to export procedures and export volumes.

Table 6. Robustness estimates: Time

Dependent variable: Volumes of export (USD) per SITC division 1							
	(2006)	**(2007)**	**(2008)**	**(2009)**	**(2010)**	**(2011)**	**(2012)**
GDP exporter	0.749***	0.795***	0.889***	0.772***	0.797***	0.862***	0.884***
	(0.079)	(0.067)	(0.066)	(0.067)	(0.069)	(0.069)	(0.079)
GDP importer	0.872***	0.898***	0.933***	0.842***	0.802***	0.830***	0.922***
	(0.058)	(0.054)	(0.052)	(0.053)	(0.056)	(0.057)	(0.065)
GDP per capita exporter	-0.190**	-0.131*	-0.298***	-0.350***	-0.279***	-0.484***	-0.390***
	(0.075)	(0.071)	(0.068)	(0.076)	(0.085)	(0.089)	(0.101)
GDP per capita importer	0.016	-0.215*	-0.169	-0.012	0.103	0.138	0.099
	(0.134)	(0.123)	(0.122)	(0.125)	(0.130)	(0.135)	(0.156)
Distance	-0.299	-0.565**	-0.558**	0.165	-0.542**	-0.369	-1.002***
	(0.276)	(0.247)	(0.245)	(0.249)	(0.259)	(0.252)	(0.304)
Common language	0.523**	0.486**	0.372*	0.237	0.079	0.440*	-0.074
	(0.237)	(0.217)	(0.217)	(0.224)	(0.229)	(0.238)	(0.264)
Colony	1.194***	1.278***	1.421***	1.548***	1.628***	1.251***	1.257***
	(0.297)	(0.271)	(0.272)	(0.280)	(0.285)	(0.296)	(0.330)
D_ZAF	2.203***	2.118***	2.013***	1.707***	1.992***	2.102***	2.201***
	(0.389)	(0.357)	(0.351)	(0.345)	(0.348)	(0.351)	(0.384)
D_landlocked	-1.085***	-0.931***	-1.299***	-1.564***	-1.312***	-1.820***	-2.054***
	(0.195)	(0.203)	(0.213)	(0.225)	(0.216)	(0.273)	(0.421)
Export procedure (Cost)	0.574***	0.411*	0.486**	0.570**	0.493**	0.577**	0.547
	(0.214)	(0.221)	(0.220)	(0.240)	(0.231)	(0.286)	(0.418)
Estimator	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Product category effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	2375	2671	2795	2593	2523	2320	1852
R2	0.340	0.331	0.346	0.327	0.335	0.360	0.366

Note: The dependent variable is the logged exported volume per SITC division 1. Year effects imply that year dummies have been included while product category effect implies that product group dummies have been included in the regression. Robust standard errors are provided in parentheses. Asterisks denote significance at the 1%(***), 5%(**) and 10%(*) levels.

Alternative estimators

One could also consider whether the estimates are robust when applying alternative estimators. Fixed effects are applied in (5) for each bilateral trade pair and each product category. The fixed effects approach excludes time-invariant bilateral variables that are constant over time in order to control for the time-invariant effects. The difference between the OLS estimates and the fixed effects estimates is thus that only the effects over time within each trading pair and product category are considered rather than the cross-section impact as in the OLS estimates. More weight is hence placed on the time series variation rather than the cross-sectional variation. A

Poisson estimator is applied in (6). A Poisson estimator is a multiplicative model which allows for nonlinearities and makes use of the zero-valued trade flows (Santos and Tenreyro, 2006). In addition to the Poisson regression, a negative binomial estimator is applied in (7). The negative binomial model has the advantage of being less restrictive in its assumptions, it does not assume that the mean equals the variance.

One can see that the cost to export turns insignificant when applying the fixed effects estimator in (5). The Poisson estimator applied in (6) and the negative binomial estimator applied in (7) makes use of 500 additional observations. The zero valued trade flows are however considerably few, indicating that a higher digit-level could be efficient in providing more efficient estimates. The cost measure is significant when the Poisson estimator is applied but insignificant when the negative binomial estimator is applied. The latter clearly points on that the estimates are not robust which indicates that one should be very careful in interpreting the estimate of export volumes.

Table 6. Robustness estimates: Estimators

Dependent variable: Volumes of export (USD) Per SITC division 1			
	(5)	**(6)**	**(7)**
GDP exporter	6.575***	8.073***	0.796***
	(1.086)	(0.000)	(0.045)
GDP importer	0.037	-5.041***	0.669***
	(1.358)	(0.000)	(0.035)
GDP per capita exporter	-4.681***	-4.095***	-0.006
	(1.183)	(0.000)	(0.051)
GDP per capita importer	1.445	4.482***	0.251***
	(1.256)	(0.000)	(0.097)
Distance		3.748***	0.940***
		(0.747)	(0.184)
Common language		-4.401***	0.186
		(0.473)	(0.129)
Colony		6.619***	1.400***
		(0.503)	(0.161)
D_ZAF		-14.084***	-0.579***
		(0.386)	(0.140)
D_landlocked		-35.855***	0.179
		(0.792)	(0.231)
Export procedure (Cost)	-0.220	0.188***	-0.151
	(0.165)	(0.000)	(0.136)
Estimator	FE	Poisson	Neg. Binomial
Year effects	Yes	Yes	Yes
Product category effects	No	Yes	Yes
Importer-specific effects	No	No	No
Number of observations	17129	17630	17630

Note: The dependent variable is the exported bilateral volume per SITC division 1. The logged value is applied in (11) but the absolute value is used when estimating by the Poisson model and the Negative binomial model. Standard errors are provided in parentheses. Asterisks denote significance at the 1%(***), 5%(**) and 10%(*) levels.

Applying other measures of trade procedures

One could also consider whether the estimated impact of the trade procedure differs when either of the other two measures, Days and Documents, is applied. It is commonly argued that the measures are interrelated and thus capture a somewhat similar picture of the trading environment. If so, the estimate of the trade procedure should remain positive and significant when the cost is altered to the number of days to export (8) and the number of documents to export (9). In this section the cost to export is hence substituted by the days to export in (8) and the number of documents required to export in (9).

One could also consider whether the indicators in fact capture different dimensions of the trading environment. As was discussed in section 2.9, the measures show a different development over time and across countries thus indicating that they might not capture the same complexity of trade procedures. Instead, one could suspect that they actually complement each other and that several measures could be used in the same regression. In (10) the cost to export and the days to export are included simultaneously, and in (11) all three indicators are included. The results are presented in table 7 below.

Table 7. Robustness estimates: Measure of trade procedures

Dependent variable: Volumes of export (USD) per SITC division 1				
	(8)	**(9)**	**(10)**	**(11)**
GDP exporter	0.832***	0.809***	0.826***	0.811***
	(0.026)	(0.027)	(0.027)	(0.027)
GDP importer	0.868***	0.870***	0.868***	0.869***
	(0.020)	(0.020)	(0.020)	(0.020)
GDP per capita exporter	-0.208***	-0.245***	-0.244***	-0.244***
	(0.032)	(0.031)	(0.034)	(0.034)
GDP per capita importer	-0.020	-0.029	-0.021	-0.023
	(0.049)	(0.049)	(0.049)	(0.049)
Distance	-0.458***	-0.309***	-0.456***	-0.389***
	(0.098)	(0.097)	(0.098)	(0.099)
Common language	0.312***	0.308***	0.308***	0.303***
	(0.086)	(0.086)	(0.086)	(0.086)
Colony	1.381***	1.370***	1.383***	1.376***
	(0.103)	(0.104)	(0.103)	(0.104)
D_ZAF	1.866***	1.996***	1.938***	1.990***
	(0.132)	(0.133)	(0.135)	(0.136)
D_landlocked	-1.293***	-1.051***	-1.425***	-1.343***
	(0.081)	(0.058)	(0.093)	(0.096)
Export procedure (Cost)			0.287***	0.231**
			(0.098)	(0.100)
Export procedure (Days)	0.538***		0.395***	0.269**
	(0.109)		(0.120)	(0.123)
Export procedure (Documents)		0.664***		0.462***
		(0.128)		(0.140)
Estimator	OLS	OLS	OLS	OLS
Year effects	Yes	Yes	Yes	Yes
Product category effects	Yes	Yes	Yes	Yes
Number of observations	17129	17129	17129	17129
R2	0.338	0.338	0.339	0.339

Note: The dependent variable is the exported bilateral volume per SITC division 1, the logged value has been used. Standard errors are provided in parentheses. Asterisks denote significance at the 1%(***), 5%(**) and 10%(*) levels.

The independent variables remain robust when the trade procedure measure is altered in regression (8) and (9). In line with the measure of the cost to export, both of the measures (Days and Documents) indicate a positive, significant impact on trade volumes. This indicates that the three measures in fact could capture similar effects of the trading environment. One should however cast doubt on the positive association between the indicators and the export volumes. The cost measure is robust towards the inclusion of the two additional measures in (10) and (11) but the coefficients are slightly reduced. The variables Days and Documents remain constant and significant upon the inclusion of the three measures in the very same regression. This could indicate that the measures on the other hand could capture different aspects of the trading environment, which points towards the need of more research on what these measures do capture. To shortly summarize the robustness of the obtained estimates on export volumes; the

estimates are not robust towards a set of exposures which clearly highlights that we should be very careful in interpreting the results.

4.3 Export diversification

4.3.1 Model specification

One model is considered in order to assess the impact of trade procedures on export diversification. The baseline model is outlined below.

Baseline model:

$$ln\,NO_{ijt} = \beta_1 + \beta_2 lnGDP_{it} + \beta_3 lnGDP_{jt} + \beta_4 lnGDPpc_{it} + \beta_5 lnGDPpc_{jt} + \beta_6 lnDist_{ij} + D_1 Language_{ij} + D_2 Colony_{ij} + D_3 Landlocked_i + \tau_t + D_{12} ZAF_i + \beta_8 lnCost_{it} + \varepsilon_{ijt}$$

The baseline specification illustrates the specification applied in order to estimate the impact of relatively complex trade procedures on the number of goods exported. The underlying Gravity theory applied in the previous section does not state that there should be a positive relationship between the explanatory variables and export diversification, as in the case of export volumes. The theory has however been frequently applied in other studies[11] examining the impact of export procedures on export diversification. The dependent variable NO_{ijt} is the number of products imported from country *i* to country *j* at year *t* counted on a two-digit division *d*. The two-digit division divides the export flows into 67 different categories such as "01-Meat and Meat preparations"; "24-Cork and Wood"; "67-Iron and Steel". The maximum value of the number of products a country could export would be 67. The variation in the sample used in this study is between 0 and 65 for each bilateral partner and year.

The number of products exported is explained by the importing and exporting countries GDP (GDP_{it} and GDP_{jt}), the importing and exporting countries GDP per capita ($GDPpc_{it}$ and $GDPpc_{jt}$) and the bilateral distance between the countries ($Dist_{ij}$). Additionally, three dummy variables are included in the model, taking the value 1 if the countries share a common language ($Language_{ij}$), or a colonial history ($Colony_{ij}$) or if the exporting country is landlocked ($Landlocked_i$), and 0 otherwise. Lastly, year dummies are included in order to capture time specific shocks (τ_t) and a dummy controlling for South Africa (ZAF_i). The cost of exporting a standardized container ($Cost_{it}$) is included In order to capture the effect relatively complex trade procedures on export

[11] See e.g. Dennis and Shepherd (2007; 2011); Bourdet and Persson (2011)

diversification. Since the dependent variable now consists of a variable counting the number of products exported the effect cannot be captured separately for agricultural products and including an interaction variable can hence not be done.

The expected effects on export diversification is the very same as was outlined in 4.2.1. One could hence expect that there should be a similar impact of complex trade procedures on the number of goods exported. One offsetting effect that would contradict the findings in the previous section would be if countries face a tradeoff between increasing volumes of exports, and thus specialize into one sector or to diversify their production into a large set of sectors.

4.3.2 Regression results

Table 8. Regression Results: Export diversification

Dependent variable: The number of products exported on a SITC division 2.	
	Baseline regression
GDP exporter	0.415***
	(0.025)
GDP importer	0.429***
	(0.022)
GDP per capita exporter	0.007
	(0.027)
GDP per capita importer	0.133***
	(0.047)
Distance	0.269***
	(0.101)
Common language	0.443***
	(0.106)
Colony	0.563***
	(0.149)
D_ZAF	0.359**
	(0.174)
D_landlocked	-0.199***
	(0.067)
Export procedure (Cost)	-0.176***
	(0.043)
Estimator	Poisson
Year effects	Yes
Number of observations	3794

Note: The dependent variable is the number of bilateral exported products per SITC (2-digit) division. Year effects imply that year dummies have been included. Robust standard errors are provided in parentheses. Asterisks denote significance at the 1%(***), 5%(**) and 10%(*) levels.

The table above illustrates the estimated impact of relatively complex trade procedures on export diversification. The trading countries' GDP is positive and significant, implying that larger economies have a more diversified export and import structure. However, the GDP per capita

for the exporter illustrates an insignificant impact indicating that richer countries in sub-Saharan Africa do not export a wider range of products. The GDP per capita for the importer illustrates a positive and significant impact indicating that richer countries in the EU27 import a larger variety of products. Unexpectedly, the distance term is now positive and significant indicating that countries further from each other seem to trade a wider range of products. Therefore, one cannot expect that a long distance is the major determinant of product variety in exports but that there are other factors that have a greater impact. One could expect that product variety to a larger extent has to do with the exporting country's product capacity rather than the distance itself. Sharing a common language or being in a former colonial relationship indicates a positive impact on the number of products exported. Being a landlocked country is negatively related to the number of products exported while the dummy for South Africa indicates that a larger number of products are exported from this country. The cost to export is negative and significant on the number of products exported. The coefficient estimate indicates that a 1% decrease in the cost of exporting a standardized container is associated with an increase of 0.176% of the number of products exported from SSA to the EU27. The Poisson estimator is applied in order to estimate the impact, and is commonly applied when the dependent variable is a count variable. In contrast to the case of export volumes these findings are in line with the previous research (see e.g. Persson, 2012a; Dennis and Shepherd, 2007, 2011). It is hard to determine the underlying reason for why the estimates are in line with the previous research in the case of export diversification but not in the case of export volumes. One explanation could be the Poisson estimator is very efficient in providing accurate estimates while the OLS-estimator is not as successful when determining the impact on export volumes.

4.3.3 Robustness analysis

This section assesses whether the estimated impact above is robust when exposed to: (1) a change of the dependent variable, (2) an inclusion of control variables and importer-specific effects, (3) a division upon yearly estimates, (4) altering the estimator applied and (5) altering the measure of the trade procedure. The baseline regressions presented in section 4.3.1 are applied in this robustness analysis.

Altering the dependent variable

In this section, the number of agricultural products is used as the dependent variable in regression (1) in order to examine whether the result seem to be consistent when excluding the non-agricultural products. The data is not measured within product sectors and the dependent variable is therefore already on an aggregated level, in contrast to the case of export volumes. The

result is presented in table 9. The explanatory variables are not robust towards altering the dependent variable and hence excluding all non-agricultural products from the count variable. The GDP and GDP per capita of the importer are now insignificant while the GDP per capita of the exporter has turned negative and significant. Sharing a common language or a former colonial relationship is now insignificant on the number of products exported. The explanatory variable of interest do seems to be robust towards the exposure. The cost to export is still significant and negative for the number of products exported but the coefficient value is somewhat reduced. The estimate indicates that a simplification of trade procedures by 1% is associated with an increase of 0.095% of the number of agricultural products. This indicates that the cost to export harm the diversification of agricultural exports less in comparison to other product groups.

Control variables and importer-specific effects

This section assesses the presence of omitted variables. First, three control variables, which are added to the specification (2), are likely to capture some of the unobserved factors that could explain why some countries that export a greater number of products also have relatively more efficient export procedures. Three variables are added, identical to the ones in the export volumes robustness section. Those are a dummy which takes the value 1 if the country has experienced a major civil war during the past 20 years, the Corruption Perceptions Index (CPI) and the Human Development Index (HDI). Second, in order to control for potentially omitted effects linked to the importing country a dummy is included for each of the EU27 countries in the regression (3). The estimates (2) and (3) are presented in table 9 below.

As is indicated in the table below, the estimates in (2) are robust toward the introduction of the three control variables. The export procedure is significant and negative for the number of products exported but the coefficient value is somewhat reduced. The control variables indicate that the fact that countries which have experienced a civil war during the past 20 years, or are relatively more corrupt, does not export a lower number of products. Higher levels of human development do however imply that countries have a more diversified export base. When applying importer-specific dummies in (3), the GDP for the importer turns insignificant but the export procedure remains significant and negative for the number of products exported.

Table 9. Robustness estimates: Altering the dependent variable, control variables and importer-specific effects

Dependent variable: Number of products exported per SITC division 2			
	(1)	**(2)**	**(3)**
GDP exporter	0.258***	0.427***	0.449***
	(0.019)	(0.028)	(0.023)
GDP importer	-0.019	0.425***	-0.289
	(0.016)	(0.022)	(0.427)
GDP per capita exporter	-0.135***	-0.097**	-0.014
	(0.023)	(0.045)	(0.025)
GDP per capita importer	0.035	0.127***	0.697*
	(0.034)	(0.047)	(0.394)
Distance	0.232***	0.272***	0.567***
	(0.081)	(0.102)	(0.101)
Common language	-0.014	0.435***	0.560***
	(0.080)	(0.107)	(0.118)
Colony	-0.060	0.611***	0.426***
	(0.112)	(0.152)	(0.147)
D_ZAF	0.418***	0.370**	0.284*
	(0.128)	(0.174)	(0.153)
D_landlocked	-0.420***	-0.191***	-0.172***
	(0.062)	(0.071)	(0.060)
Export procedure (Cost)	-0.095*	-0.095**	-0.170***
	(0.055)	(0.046)	(0.042)
D_civilwar		0.003	
		(0.074)	
CPI		0.044	
		(0.058)	
HDI		0.526***	
		(0.196)	
Estimator	**Poisson**	**Poisson**	**Poisson**
Year effects	Yes	Yes	Yes
Importer-specific effects	No	No	Yes
Number of observations	3794	3720	3794

Note: The dependent variable is the number of bilateral exported products per SITC (2-digit) division. Year effects imply that year dummies have been included in the regression. Standard errors are provided in parentheses. Asterisks denote significance at the 1%(***), 5%(**) and 10%(*) levels

Time: Yearly estimates

This section deals with the time dimension and the potential of serial correlation over time. The regressions are performed separately for each year (the time dummies are hence excluded) and are presented in table 10. The estimates are somewhat robust towards this exposure except for the variable of interest, and the export procedure is now insignificant in all cases except for 2007 and 2011. This could indicate that there is a lagged effect running from export procedures of the number of products exported and that the time dimension hence is of importance to take into consideration, especially from a policy perspective. Overall, the result indicates that the trade facilitation measure is jointly significant but not separately on export diversification.

Table 10. Robustness estimates: Time

Dependent variable: The Number of products exported per SITC division 2.	(2006)	(2007)	(2008)	(2009)	(2010)	(2011)	(2012)
GDP exporter	0.287***	0.321***	0.377***	0.400***	0.379***	0.332***	0.312***
	(0.037)	(0.032)	(0.034)	(0.035)	(0.035)	(0.034)	(0.041)
GDP importer	0.412***	0.448***	0.414***	0.373***	0.408***	0.445***	0.447***
	(0.027)	(0.026)	(0.026)	(0.027)	(0.027)	(0.027)	(0.033)
GDP per capita exporter	-0.110***	-0.029	-0.020	0.055	0.121***	0.115***	0.069
	(0.034)	(0.032)	(0.034)	(0.041)	(0.043)	(0.044)	(0.050)
GDP per capita importer	0.176***	0.172***	0.158***	0.201***	0.202***	0.092	0.080
	(0.059)	(0.057)	(0.059)	(0.062	(0.062)	(0.062)	(0.075)
Distance	0.437***	0.035	0.305**	0.398***	0.464***	0.155	-0.006
	(0.126)	(0.117)	(0.121)	(0.126)	(0.125)	(0.122)	(0.154)
Common language	0.374***	0.474***	0.390***	0.302**	0.342***	0.466***	0.384***
	(0.120)	(0.117)	(0.117)	(0.125)	(0.125)	(0.126)	(0.148)
Colony	0.382**	0.436***	0.433***	0.617***	0.576***	0.375**	0.451**
	(0.159)	(0.155)	(0.159)	(0.170)	(0.169)	(0.169)	(0.200)
D_ZAF	0.938***	0.844***	0.397**	0.076	0.024	0.316*	0.545**
	(0.202)	(0.199)	(0.201)	(0.203)	(0.197)	(0.189)	(0.216)
D_landlocked	-0.383***	-0.110	-0.279**	-0.236**	-0.260**	-0.141	-0.232
	(0.090)	(0.100)	(0.108)	(0.120)	(0.109)	(0.131)	(0.208)
Export procedure (Cost)	0.019	-0.251**	-0.060	-0.146	-0.059	-0.269**	-0.114
	(0.099)	(0.109)	(0.113)	(0.124)	(0.116)	(0.132)	(0.205)
Estimator	Poisson	Poisson	Poisson	Poisson	Poisson	Poisson	Poisson
Number of observations	538	610	608	571	557	516	394

Note: The dependent variable is the number of bilateral exported products per SITC (2-digit) division. Standard errors are provided in parentheses. Asterisks denote significance at the 1%(***), 5%(**) and 10%(*) levels.

Alternative estimators

One could also consider whether the estimates are robust when applying alternative estimators. Fixed effects are applied in (4) and (5) for each bilateral trade pair and product category. The latter estimator do makes use of the poisson fixed effects which excludes all variables that are constant over time in order to control for the time-invariant effects. The fixed effects approach hence measures the effects over time within each trading pair rather than the cross-sectional variation. In addition to the fixed effects approach, a negative binomial estimator is applied in (6). The results are presented in table 11.

Table 11. Robustness estimates: Alternative estimators

Dependent variable: Number of products exported per SITC division 2.			
	(4)	**(5)**	**(6)**
GDP exporter	2.927***	1.972***	0.349***
	(0.538)	(0.317)	(0.013)
GDP importer	-0.857	-0.444	0.416***
	(0.540)	(0.431)	(0.010)
GDP per capita exporter	-2.650***	-1.725***	0.016
	(0.572)	(0.348)	(0.014)
GDP per capita importer	1.274***	0.867**	0.157***
	(0.492)	(0.398)	(0.024)
Distance			0.262***
			(0.048)
Common language			0.385***
			(0.047)
Colony			0.476***
			(0.064)
D_ZAF			0.445***
			(0.076)
D_landlocked			-0.256***
			(0.043)
Export procedure (Cost)	-0.013	-0.131**	-0.102**
	(0.080)	0.051	(0.045)
Estimator	Fixed effects	Poisson fixed effects	Neg. Bin.
Year effects	Yes	Yes	Yes
Number of observations	3794	3721	3794

Note: The dependent variable is the number of bilateral exported products per SITC (2-digit) division. The logged value is applied in (4) while the absolute value is applied in (5) and (6). Year effects imply that year dummies have been included in the regression. Standard errors are provided in parentheses. Asterisks denote significance at the 1%(***), 5%(**) and 10%(*) levels.

One can see that the negative effect of the cost to export is insignificant when applying the fixed effects approach. However, the cost to export remains significant and negative when the fixed effects poisson estimator and the negative binomial[12] estimator are applied. The estimated impact of a 1% cost reduction is now thought to increase the number of products exported by 0.102-0.131%.

Applying other measures of trade procedures

One could also consider whether the estimated impact of the trade procedure differs when either of the other two measures, Days and Documents, is applied. In this section I substitute the cost to export for the documents required to export in (7) and the number of days to export in (8). In (9) and (10) the number of agricultural products is used as the dependent variable. In (11) both the cost and days to export are included and in (12) all three indicators are included. The results are presented in table 12 below.

[12] A negative binomial fixed effects estimator was also applied but achieved similar estimates at Poisson fixed effects and is therefore not illustrated in the table.

Table 12. Robustness estimates: Other measures of trade procedures

Dependent variable: Number of products exported per SITC division 2.						
	(7)	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
GDP exporter	0.409***	0.409***	0.254***	0.250***	0.415***	0.414***
	(0.025)	(0.025)	(0.019)	(0.019)	(0.025)	(0.025)
GDP importer	0.431***	0.431***	-0.019	-0.020	0.429***	0.429***
	(0.022)	(0.022)	(0.016)	(0.016)	(0.022)	(0.022)
GDP per capita exporter	-0.002	0.001	-0.147***	-0.138***	0.008	0.006
	(0.027)	(0.027)	(0.023)	(0.023)	(0.028)	(0.028)
GDP per capita importer	0.134***	0.134***	0.035	0.035	0.133***	0.133***
	(0.047)	(0.047)	(0.034)	(0.034)	(0.047)	(0.047)
Distance	0.258**	0.255**	0.235***	0.234***	0.268***	0.274***
	(0.101)	(0.101)	(0.081)	(0.080)	(0.101)	(0.101)
Common language	0.442***	0.442***	-0.014	-0.014	0.443***	0.443***
	(0.106)	(0.106)	(0.080)	(0.079)	(0.106)	(0.106)
Colony	0.570***	0.569***	-0.060	-0.060	0.563***	0.561***
	(0.149)	(0.149)	(0.112)	(0.112)	(0.149)	(0.149)
D_ZAF	0.391**	0.389**	0.447***	0.453***	0.358**	0.365**
	(0.174)	(0.174)	(0.127)	(0.126)	(0.174)	(0.174)
D_landlocked	-0.308***	-0.323***	-0.465***	-0.502***	-0.201***	-0.194***
	(0.062)	(0.060)	(0.054)	(0.046)	(0.068)	(0.068)
Export procedure (Cost)					-0.177***	-0.173***
					(0.044)	(0.044)
Export procedure (Documents)		0.034		0.172***		0.058
		(0.041)		(0.064)		(0.049)
Export procedure (Days)	-0.026		-0.051		0.005	-0.023
	(0.035)		(0.056)		(0.036)	(0.043)
Estimator	Poisson	Poisson	Poisson	Poisson	Poisson	Poisson
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	3794	3794	3794	3794	3794	3794

Note: The dependent variable is the number of bilateral exported products per SITC (2-digit) division. Year effects imply that year dummies have been included in the regression. Standard errors are provided in parentheses. Regression (7) makes use of the documents required to export; (8) makes use of the number of days to export. In (9) and (10) the number of agricultural products is used as the dependent variable. In (11) both the cost and days to export is included and in (12) all three indicators are included. Asterisks denote significance at the 1%(***), 5%(**) and 10%(*) levels.

The independent variables remain robust towards changing the measure of trade procedures in (7) and (8). In contrast to the previous estimates, both of the measures (Days and Documents) indicate an insignificant impact on the number of exported products. This cast doubt on the hypothesis that the indicators capture similar aspects of the trading environment. When applying the number of agricultural products as the dependent variable in (9) and (10), the number of documents is negative and significant for the number of exported products. The coefficient estimate is slightly higher than the cost measure applied in (1). However, the number of days is insignificant for the number of products. This indicates that the number of agricultural products exported is more harmed by complex trade procedures related to documentation in comparison to other products exported. The estimates also indicate that the barriers related to the documentation to export do not harm export diversification. The cost measure is robust towards

the inclusion of the additional measures in (11) and (12). The coefficient estimate of the cost to export is nearly identical to that in the baseline regression.

4.4 Simulation: By how much would Ghana's export increase?

Based on the estimates obtained in 4.3 a simulation of the impact on Ghana's export volumes and export diversification is made based on three potential scenarios. These simulated effects are the base of how much trade facilitation would increase export flows and export diversification in Ghana. As was illustrated in Table 1, it took 19 days, 6 documents and cost 815 USD to ship a standardized container of goods from Ghana in 2012.

The three considered scenarios are: (1) a reduction of the cost in Ghana (815 USD) to the same export cost as faced by producers in Sweden (725 USD), who are facing one of the lowest costs on the European continent; (2) a reduction of the cost in Ghana (815 USD) to the same cost as faced in 2006 (624 USD); (3) a reduction of the cost in Ghana (815 USD) to the lowest export cost in the doing business survey which was attained by Malaysia (450 USD). The three considered scenarios are illustrated in table 13 below.

Table 13. The three considered scenarios

Scenario	**(1)**	**(2)**	**(3)**
Cost reduction from 815 USD to:	725 USD	624 USD	450 USD
Cost-reduction in %	-11%	-23%	-45%
Explanation	The same cost as in Sweden in year 2013.	Identical to the cost in Ghana in year 2006.	Reduction to the lowest value attained (Malaysia) in the 2013 DB survey.

The simulation follows the following formula:

$$Y_i = C_i x_i$$

Where Y_i is the simulated impact on export volumes or export diversification, C_i is the cost reduction presented in the table above and x_i is the estimated effect obtained in section 4.2 and 4.3.

4.4.1 Export volumes

The baseline regression suggests that a 1% increase of the cost to export a standardized container implies an increase of exported volumes by 0.415%. The robustness analysis shows that the estimate is not robust towards a set of different exposures. The impact on agricultural export volumes in the extended model suggests that a decrease of the cost to export a standardized container would have no different impact on agricultural export volumes in comparison to other products.

Given this information, a cost reduction according to any of the three outlined scenarios would have a negative impact on export volumes from Ghana to the EU27. In other words, the estimates suggest that there would be no gain for Ghana in terms of increased export volumes but a loss by engaging in trade facilitation. Neither would Ghana's agricultural export sector gain from a trade facilitation reform. By multiplying the obtained estimate (0.415 %) with the magnitude of the cost reduction (11%; 23% and 45%) the simulated impact for Ghana is achieved. A cost reduction by 11% is simulated to decrease export volumes by 4.6%, a cost reduction by 23% is simulated to decrease export volumes by 9.5% and lastly, a cost reduction by 18.7% is simulated to reduce export volumes by 18.7%. As have been mentioned before, those findings are to be interpreted very carefully. The results and the considered scenarios are presented in the table below.

Table 14. Simulation: Export volumes

Scenario	**(1)**	**(2)**	**(3)**
Cost reduction from 815 USD to:	725 USD	624 USD	450 USD
Cost-reduction in %	-11%	-23%	-45%
Explanation	The same cost as in Sweden in year 2013.	Identical to the cost in Ghana in year 2006.	Reduction to the lowest value attained (Malaysia) in the 2013 DB survey.
Simulated impact on export volumes	-4.6%	-9.5%	-18.7%
Simulated impact on agricultural export volumes	-4.6%	-9.5%	-18.7%

4.4.2 Export diversification

The estimated impact obtained in the baseline regression in 4.3 suggests that a 1% reduction of the cost to export a standardized container is associated with an increase of 0.176% of the number of products exported from SSA to the EU27. The robustness analysis indicates that the estimated impact is robust towards a set of different exposures. In year 2012 Ghana exported a range of 58 different products to the EU27. The results for each of the considered scenarios are presented in the table below.

Table 15. Simulation: Export diversification

Scenario	**(1)**	**(2)**	**(3)**
Cost reduction from 815 USD to:	725 USD	624 USD	450 USD
Cost-reduction in %	-11%	-23%	-45%
Explanation	The same cost as in Sweden in year 2013.	Identical to the cost in Ghana in year 2006.	Reduction to the lowest value attained (Malaysia) in the 2013 DB survey.
Simulated impact on the number of exported products (in percentage)	1.9%	4.0%	7.9%
Simulated impact on the number of exported products (in products)	+1 product	+2 products	+5 products

As is illustrated in the table above, the potential impact of adopting the first scenario, reducing the cost to export to the same value as in Sweden, suggests an increase of export diversification from Ghana to the EU27 by 1.9%[13] which implies a diversification of one[14] additional product. Considering the second scenario, a cost reduction to the same cost, as was present in Ghana in 2006, would imply an increase in export diversification of 4% and hence two additional products. Considering the third scenario of reducing the cost to export to the top score value of Malaysia would increase export diversification by 7.9% which hence implies five additional products. In sum, the simulation shows that Ghana could gain substantially in terms of export diversification by reducing the cost to export and thus engage in trade facilitation.

[13] 11*0.176=1.9%

[14] 58*1.019=59 => 59-58=1

5. Field study

5.1 Overview of field study methodology

In order to dig deeper into the question regarding what trade facilitation could do for Ghana a field study was performed in the Accra[15] region. A series of 23 interviews and meetings were held over 8 weeks. The interviews[16] were held with government officials, local umbrella organizations, producers and international organizations. A detailed list of the performed interviews and meetings is found in the Appendix (A5).

A standardized questionnaire of 7 questions was applied during the interviews in order to identify what the respondent perceive to be the major barriers to increased export volumes and increased export diversification. The questionnaire also covered questions on policy implications, product heterogeneity and specific barriers related to exports to the EU27. In order to evaluate whether a trade facilitation reform would be of relevance, the trading across borders indicators were presented to the respondents. Those indicators are also outlined in section 2.4 and consist of the number of Documents required to export; the number of Days required to export and the Cost required to export. Each respondent was asked if he or she perceived that a reduction in each of the indicators documents, days or cost would increase export volumes and/or export diversification from Ghana to the EU27. The respondents were also asked to judge if a reform within that area would be of relevance in comparison with a reform in other potential areas. The questionnaire was not applied during the meetings which were more informal discussions on the issue of trade facilitation and the barriers to exports. The questionnaire is found in the Appendix (A6).

The performed series of interviews are an important complement to the estimates and theoretical suggestions found in this study. The unique set of interviews have provided a more reliable and complete answer and understanding of what a trade facilitation reform could do for Ghana's export volumes and diversification. Likewise, the exclusive series of interviews have enabled a more specific outline of policy suggestions, and what areas to prioritize, that complement the vague suggestions presented in the literature. The interviews have also provided me with valuable information regarding the doing business indicators. The information received from the

[15] The capital of Ghana

[16] I also intended to perform interviews with producers that are not (yet) involved in the export sector, this group of actors was however excluded from the survey.

interviews enabled me to judge if the indicators are of relevance when one desires to measure the ease of trading in a specific country.

Ghana is a stable country, both politically and economically, which has contributed to a successful field study. This has enabled me to easily get into touch with skilled people within the trade facilitation area and hence collect representative answers. The respondents cover a broad sphere of the Ghanaian community which therefore is likely to provide me with a complete picture of the export environment and the perceived barriers. I did not encounter any problems in arranging interviews or finding knowledgeable people willing to share their information. A limitation of the study could be the quite narrow definition of the concept of 'trade facilitation' which, in this study, relies on the doing business indicators. The definition was necessary to apply in order to receive somewhat specific answers and be able to judge if the doing business indicators in fact capture the complexity of the trade procedures in a country and/or something that is perceived as relevant. The limitation of the narrow definition could therefore also be seen as one of the strengths of this study.

5.2 Output from the interviews

5.2.1 What are the major barriers to increased export volumes and diversification?

The respondents came up with a large set of suggestions of what they perceive to be the major barriers to increased export volumes and export diversification. The outlined barriers are linked to both the supply as well as the demand side of the economy, and seem to constrain both export volumes and diversification jointly. Many of the respondents stressed that the combination of the high competition on the price-focused world market and the lack of supply capacity in Ghana limits the Ghanaian export performance (Federation of Ghanaian Industries, 2014-05-14; African Cashew Alliance, 2014-04-29; University of Ghana, 2014-05-22; U.S. Embassy, 2014-04-24; Ministry of Food and Agriculture, 2014-04-24; Blue Skies Ltd, 2014-05-06). The lack of supply capacity increase the production costs which, in many cases, results in that the Ghanaian industries are unable to compete on the world market (Blue Skies Ltd, 2014-05-06). The respondents did also stress the importance of diversifying its export base due to the relatively unstable world market prices. This outlines why it is of importance for Ghana to diversify its production base.

The respondents outlined five main barriers that are related to the supply side of the economy. First, the poor condition of the **infrastructure** in Ghana. More specifically: Poor inland roads and transport opportunities to the port; Low accessibility of vessels and air freights that connect the port in Ghana with the ports in Europe; Poor accessibility to (cold) storages at the ports and Lack of electricity for the machinery. These result in a costly, time consuming and problematic procedure when goods are moved both within Ghana and from port to port (Bomarts Farms Ltd, 2014-05-06; University of Ghana, 2014-05-22; Federation of Ghanaian Industries, 2014-05-14; African Cashew Alliance, 2014-04-29; Global Shea Alliance, 2014-04-29; Ghana Export Promotion Authority, 2014-05-13). The presence of many roadblocks and bribes during inland transport were also stressed as a factor that limits Ghana's export performance (Borderless Alliance, 2014-04-29).

Second is the poor **access to credit** and government assistance in funding (U.S. Embassy, 2014-04-24; Federation of Ghanaian Industries, 2014-05-14; Ghana Freezones Board, 2014-05-02; African Cashew Alliance, 2014-04-29; Export Trade, Agricultural and Industrial Development Fund, 2014-05-20; Bomarts Farms Ltd, 2014-05-06; Ghana Export Promotion Authority, 2014-05-13). The limited access to credit has made it very costly to borrow in Ghana, the interest rate on loans at commercial banks is currently around 28% and thus very high (Federation of Ghanaian Industries, 2014-05-14; Ghana Export Promotion Authority, 2014-05-13). The underlying reason for the high cost to borrow is outlined to be the poor macroeconomic control of the Bank of Ghana and to some extent the selfish interests by policy makers. The high cost to access credit is thought to mainly reduce export volumes but also export diversification. (Ghana Export Promotion Authority, 2014-05-13) Moreover, it seems to foremost harm the country's mining sector (Ministry of Food and Agriculture, 2014-04-24) and hinder many small enterprises from entering the export sector (Golden Glow Money Lending, 2014-04-23).

The third barrier outlined is the lack of adequate **technology** and machinery. This has resulted in obsolete machinery, fertilizers, spare parts and inputs. (University of Ghana, 2014-05-22; Milani Ltd., 2014-04-23) It was also outlined that the government policies have not been supportive enough in funding or improving technological access for the industries (University of Ghana, 2014-05-22). One example was outlined on the Ghanaian pineapple industry. In 2004, the demand for pineapples switched almost entirely from the type *smooth cayenne* variety to the *MD2*[17]. This shift of pineapple demand required a new and more advanced technology. The Ghanaian pineapple industry was to a large extent unable to respond to the shift, mainly due to a lack of

[17] There are three different types of pineapples produced: Smooth Cayenne, MD2 and Sugar Loaf.

government assistance in providing funding for the technology upgrade. This resulted in a sharp reduction of Ghana's pineapple exports, mainly due to lack of finance to upgrade technology, research and thus development (Ghana Export Promotion Authority, 2014-05-13). During this point of time, many of Ghana's pineapple producers made a choice to diversify the production base. One of those is the Bomarts Farms Ltd which enrolled in mango exports in 2005 (Bomarts Farms Ltd, 2014-05-06; University of Ghana, 2014-05-22). Milani Ltd also underlined the importance of diversifying its production base, mainly due to the unstable world prices and high competition in the pineapple industry (Milani Ltd., 2014-04-23).

The fourth barrier outlined is the lack of skilled **labour**. This especially constrains the production of the agricultural producers, commonly located in small villages far from the major cities in Ghana where much of the skilled labour is located. In addition to this, many youths in Ghana have migrated to the urban areas for employment which furthermore has reduced the supply of labour (Bomarts Farms Ltd, 2014-05-06; University of Ghana, 2014-05-22; Milani Ltd., 2014-04-23). The poor labour standards in factories also harm Ghana's reputation which furthermore harms the country's export performance (African Cashew Alliance, 2014-04-29). The fifth barrier is mentioned as the **bureaucracy** related to port procedures and administrations. These high controls at the border often delay export of goods from Ghana to Europe (Bomarts Farms Ltd, 2014-05-06; Milani Ltd., 2014-04-23; U.S. Embassy, 2014-04-24; University of Ghana, 2014-05-22; Ghana Freezones Board, 2014-05-02).

Other barriers were also said to harm Ghana's export volumes and export diversification. The distribution of **land** in Ghana is characterized by many small plots which hinder a large scale production (U.S. Embassy, 2014-04-24; Ghana Export Promotion Authority, 2014-05-13). Additionally it was mentioned that much of Ghana's exports consist of **unprocessed** raw materials and that there is plenty of room for value addition (Private Enterprise Foundation, 2014-05-15; African Cashew Alliance, 2014-04-29). Furthermore, uncertainty regarding the **weather** conditions especially constrains fruit exporters (Bomarts Farms Ltd, 2014-05-06; University of Ghana, 2014-05-22; Borderless Alliance, 2014-04-29). The unstable Ghanaian **currency**, 'Cedi', is also regarded as hurting the country's export performance (Ghana Export Promotion Authority, 2014-05-13). Likewise were the uncertainties regarding agricultural **inputs** and raw materials were also mentioned to be a barrier (Blue Skies Ltd, 2014-05-06).

Five barriers that are related to the demand side of the export sector were also outlined by the respondents. First of all, the high **regulations** and requirements of the standards of the products

on the world market. Especially the phytosanitary and sanitary regulations are mentioned as a reason that hurts both volumes and diversification of exports. It is stressed that these rules and regulations also change frequently and that a lot of uncertainty therefore is related to these regulations (Bomarts Farms Ltd, 2014-05-06; Ministry of Food and Agriculture, 2014-04-24; University of Ghana, 2014-05-22; Private Enterprise Foundation, 2014-05-15; Federation of Ghanaian Industries, 2014-05-14; Ghana Cocoa Board, 2014-05-07; Ghana Freezones Board, 2014-05-02; African Cashew Alliance, 2014-04-29; Blue Skies Ltd, 2014-05-06; Borderless Alliance, 2014-04-29). Second is the fact that the EU27-countries are producing a large amount of the **demand** themselves in order to protect the domestic industries (University of Ghana, 2014-05-22; Global Shea Alliance, 2014-04-29). Third is the presence of many synthetic **substitutes** for e.g. cocoa, timber and furniture on the market (University of Ghana, 2014-05-22). Fourth is the poor international perception and poor attempts at **marketing** the products (Ghana Cocoa Board, 2014-05-07; Global Shea Alliance, 2014-04-29). Fifth is the issue of guaranteeing **food security** at the domestic level which unable many countries in West Africa to export their products due to policy regulations (Borderless Alliance, 2014-04-29).

The previously outlined barriers were said to hurt both the country's export volumes and export diversification. The respondents mentioned that the Ghanaian export sector is characterized by a low degree of diversification in comparison to the Ghana's potential. Ghana's export base was described to be too narrow for the economy to withstand economic shocks (Ministry of Trade and Industry, 2014-04-24). When specifically discussing the barriers to increased export diversification two additional issues were outlined. First, that regulations and restrictions set up by the trading partner do increase as the goods are **processed**. This makes it challenging to diversify from raw materials to processed goods (Federation of Ghanaian Industries, 2014-05-14; Ghana Cocoa Board, 2014-05-07). Second is the lack of **knowledge** of what sectors that it is profitable to diversify into, and where the Ghanaian industries have a competitive advantage (University of Ghana, 2014-05-22).

Some of the producers that participated in the interviews said that they have chosen to diversify its production base. Bomarts farms Ltd, one of Ghana's major pineapple producers has diversified its production into mango and dried mango exports. They are also sourcing funds for melon production (Bomarts Farms Ltd, 2014-05-06). Milani Ltd is another large producer of pineapples in Ghana. They have recently diversified its production base into passion fruit. They are also planning to expand into the ginger industry in the future (Milani Ltd., 2014-04-23). The

Blue Skies Ltd which accounts for more than 1% of Ghana's total export produces fresh cut fruits. The company was previously enrolled in juice export but is nowadays solely enrolled in fresh cut fruit export. The juice is still produced for the domestic market. The reason why the juice production was not successful in exports is the high competition in Europe, the market relies on price competition and the supermarkets usually do not market the product properly (Blue Skies Ltd, 2014-05-06).

5.2.2 Do the barriers constrain some sectors of the economy more than others? Are there any specific barrier related to trade with the EU27?

When it comes to the issue of whether the barriers seem to differ between product groups, and if the barriers harm some sectors of the export base more than others, the respondents outlined a set of different aspects. The barriers harm the agricultural products more than other sectors of the export base (U.S. Embassy, 2014-04-24; Ministry of Food and Agriculture, 2014-04-24; Private Enterprise Foundation, 2014-05-15; Federation of Ghanaian Industries, 2014-05-14). Also within the agricultural spectra, some products are more affected than others. Mango, pineapple, papaya and pepper producers often find it hard to meet the phytosanitary and sanitary requirements (U.S. Embassy, 2014-04-24; Ministry of Food and Agriculture, 2014-04-24). The cocoa industry is also mentioned to face higher challenges in comparison to many other sectors. Cocoa beans are said to be harder to grow and harder to adjust in comparison to fresh fruits (Ghana Cocoa Board, 2014-05-07; Milani Ltd., 2014-04-23; U.S. Embassy, 2014-04-24).

Meeting the requirements for yams, palm oil, bananas and cashew nuts is mentioned to be simpler (Ministry of Food and Agriculture, 2014-04-24; African Cashew Alliance, 2014-04-29). It is also said that the processed products face higher barriers to increased volumes and diversification due to the stricter regulations on them (Federation of Ghanaian Industries, 2014-05-14). Lastly, some of the respondents did not perceive that the barriers differ significantly between product groups relying on the argument that the retailers clearly state the requirements for each exported product category (Blue Skies Ltd, 2014-05-06; Bomarts Farms Ltd, 2014-05-06).

When it comes to the issue of whether the respondents perceived that there are any specific barriers related to exports to the EU(27), the answers were generally no (Federation of Ghanaian

Industries, 2014-05-14; Global Shea Alliance, 2014-04-29; Blue Skies Ltd, 2014-05-06). The EU27 is described as more quality focused than e.g. the Middle East region (Milani Ltd., 2014-04-23; University of Ghana, 2014-05-22). There is a general presence of high regulations on both the EU27 and the US markets but it is not perceived that the regulations are stricter on the EU27 market (Ghana Freezones Board, 2014-05-02). Regarding the agricultural exports it is thought that it is easier to export goods to the EU27 in comparison to the United States or Canada, contingent upon that Ghana ratifies the European Partnership Agreement (EPA) (Ministry of Food and Agriculture, 2014-04-24; Borderless Alliance, 2014-04-29; University of Ghana, 2014-05-22; Private Enterprise Foundation, 2014-05-15; Bomarts Farms Ltd, 2014-05-06). It is however evident that it is much easier to meet the regulations of exports and especially agricultural exports in the West African region in comparison to trade outside the region (Borderless Alliance, 2014-04-29).

When it comes to the cocoa industry on the other hand, it is perceived that the European food laws are stricter in comparison to other trading partners. Those laws and regulations are not only related to sanitary requirements but also to labour practices and social regulations (Ghana Cocoa Board, 2014-05-07). Other explanations for low export volumes from Ghana to the EU27 in some areas could be the low price offer the producers receive. Mim Cashew Ltd mentions this as a main reason for why low volumes of cashew nuts are exported to the EU27, and the price offer they receives is often lower than the world market price or below the offer they receives from the United States (Mim Cashew and Agricultural Products Ltd, 2014-04-16).

5.2.3 Would a reduction of the cost to export increase export volumes and diversification from Ghana to the EU27?

Some of the respondents perceived that a reduction of the cost to export would improve mainly the export volumes but also the diversification from Ghana (Milani Ltd., 2014-04-23; U.S. Embassy, 2014-04-24; Ministry of Trade and Industry, 2014-04-24; University of Ghana, 2014-05-22; Ghana Freezones Board, 2014-05-02; African Cashew Alliance, 2014-04-29; Ghana Export Promotion Authority, 2014-05-13). Especially the cost of handling, inspection and clearance at the ports are said to have a positive impact on export volumes and diversification if reduced (Ghana Cocoa Board, 2014-05-07). Likewise, the high shipping costs of sending goods from the port in Ghana to the port in the EU27 were argued to have a negative impact on export volumes and diversification (Ghana Export Promotion Authority, 2014-05-13). Producers of

fresh fruits were mentioned to be more positively affected by a reduction of the cost to export (Ministry of Trade and Industry, 2014-04-24).

Other respondents argued that a reduction of the cost to export would have no impact on export volumes and diversification. The respondents said that the production cost and costs related to infrastructure but that the cost to export itself does not constrain Ghana's export performance. It was however stressed that there could be a small but positive impact for small scale producers. Large scale producers on the other hand are likely to be unaffected by a reduction of the cost to export since the cost to export per item already is perceived as low (Ministry of Food and Agriculture, 2014-04-24; Blue Skies Ltd, 2014-05-06; Private Enterprise Foundation, 2014-05-15; Federation of Ghanaian Industries, 2014-05-14; Bomarts Farms Ltd, 2014-05-06).

5.2.4 Would a reduction of the time to export increase export volumes and diversification from Ghana to the EU27?

Many of the respondents did not perceive that a reduction of the number of days would improve the export volumes or the diversification from Ghana. (Milani Ltd., 2014-04-23; Bomarts Farms Ltd, 2014-05-06; Ghana Export Promotion Authority, 2014-05-13; Blue Skies Ltd, 2014-05-06). Even though there are many and time consuming checks on the goods before they are sent, the time required for these checks are known. This implies that there is not much uncertainty related to the time aspect (Federation of Ghanaian Industries, 2014-05-14; Ghana Cocoa Board, 2014-05-07). It was also outlined that the time dimension from the port in Ghana to the port in the EU is not the major problem, but rather the time delay when transporting goods from the farms/factory to the port in Ghana (Private Enterprise Foundation, 2014-05-15).

Other respondents stated that a reduction in time could have an impact on export volumes and diversification. Especially fresh fruit producers that lack good cold storage opportunities were said to be positively affected (Ministry of Food and Agriculture, 2014-04-24; Ministry of Trade and Industry, 2014-04-24; Ghana Freezones Board, 2014-05-02; African Cashew Alliance, 2014-04-29; U.S. Embassy, 2014-04-24; Ghana Export Promotion Authority, 2014-05-13). When digging deeper into what procedures of the time aspect that would have the greatest impact, the customs and port procedures were mentioned as the two areas that would have the greatest impact on volumes and diversification (University of Ghana, 2014-05-22). The impact was said to affect volumes and diversification likewise.

It could however be suspected that the answer could differ on products sent from the free zone and outside the free zone. Bomarts Farms Ltd exports their goods from the free zones. They

state that it takes 14 days to export from the port in Ghana until it arrives in the EU27 and that they do not perceive that a reduction of the number of days would improve their volumes or diversification of exports (Bomarts Farms Ltd, 2014-05-06). According to the Trading across borders indicators, which do not cover traders within the free zones, 19 days is required to export a good from Ghana. The time aspect therefore differs significantly for producers within respectively outside the free zones.

5.2.5 Would a reduction of the documentation to export increase export volumes and diversification from Ghana to the EU27?

Most of the respondents did not perceive that a reduction of the number of documents required to export would improve export volumes and diversification from Ghana. It is outlined that the documentation rather consists of a single sunk cost but once the traders have learned how to handle the documentation it is not perceived as a barrier. The Blue Skies Ltd mentioned that they have 5-6 employees dealing solely with the documentation which points to the somewhat complex procedure. It is argued that they do not perceive that a simpler procedure would improve their volumes or diversification of exports but that small-scale producers with less capacity could be positively affected (U.S. Embassy, 2014-04-24; Ministry of Food and Agriculture, 2014-04-24; Milani Ltd., 2014-04-23; Private Enterprise Foundation, 2014-05-15; Federation of Ghanaian Industries, 2014-05-14; Blue Skies Ltd, 2014-05-06).

Some of the respondents argued that a reduction of the number of documents could have a small impact on both volumes and diversification. The documentation related to the customs clearance and ports could have a small impact if reduced. Fulfilling the documentation of the rules of origin and the EU GSP-documentation is also perceived as complex to fill in (University of Ghana, 2014-05-22; Ghana Cocoa Board, 2014-05-07; Ministry of Trade and Industry, 2014-04-24; African Cashew Alliance, 2014-04-29). Additionally, if the bureaucracy related to the documentation were reduced, it could be expected that it could have a positive impact on both volumes and diversification (Bomarts Farms Ltd, 2014-05-06; Ghana Freezones Board, 2014-05-02; Ghana Export Promotion Authority, 2014-05-13).

5.2.6 Is it of importance to introduce trade facilitation means in Ghana at the moment?

Regarding the discussion on whether trade facilitation means should be introduced in Ghana the respondents were asked if h it would be of importance to reduce the number of days, the cost or

the number of documents required to export. Some of the respondents argued that it would not be of much importance to introduce trade facilitation means in Ghana at the moment but that it could be of importance if it were combined with other reforms (Blue Skies Ltd, 2014-05-06; U.S. Embassy, 2014-04-24; Federation of Ghanaian Industries, 2014-05-14). Another comment to the question was that the producers did not mention any of the barriers (days, cost and documents) as an issue but that it does not necessarily imply that it is irrelevant (Global Shea Alliance, 2014-04-29). Another respondent said that there is always room for improvement but that the area of cost, documents and days is not of great importance for Ghana's export performance (Private Enterprise Foundation, 2014-05-15; International Finance Corporation, 2014-05-23).

Other respondents argued that it could be of relevance for Ghana to introduce trade facilitation means and that it should be prioritized. Reducing the cost is argued to be of importance, as is the number of days. The documentation on the other hand is not argued to be prioritized if it is compared with the other two indicators (cost and days) (Milani Ltd., 2014-04-23; Ministry of Trade and Industry, 2014-04-24; University of Ghana, 2014-05-22; Bomarts Farms Ltd, 2014-05-06; Ghana Export Promotion Authority, 2014-05-13). Many of the respondents also underlined that these answers are contingent upon the ratification of the EPA. If the agreement was not to be ratified it would imply a sharp increase in tariffs. The pineapple industry would face an increase in tariffs by 40% which would reduce the competitiveness of many producers drastically in Ghana (Milani Ltd., 2014-04-23). It was thought that a trade facilitation reform in the area of cost, days and documents would foremost have an impact on volumes rather than diversification (University of Ghana, 2014-05-22).

Ghana Cocoa Board argued that the relevance of a trade facilitation reform differs between product groups. For unprocessed cocoa beans the cost to export is an important indicator while for processed cocoa products the number of days is the indicator that is most relevant. The documentation related to the inspection standards is furthermore a relevant area for improvement, both for processed and unprocessed cocoa (Ghana Cocoa Board, 2014-05-07). One of the respondents argued that it is of great importance to introduce trade facilitation means in Ghana and that all of the indicators are of relevance. It was argued that an improvement of the current trade facilitation indicators would reduce the other barriers that were outlined since it would be more profitable for farmers to increase export volumes and diversify the production base. This would not only improve the competitiveness of Ghana's exporters but also allow for new producers to enter the export sector which could boost the effect further (University of Ghana, 2014-05-22; African Cashew Alliance, 2014-04-29).

5.2.7 Are there any other areas where reforms should be prioritized?

When the respondents were asked if they perceived that there was any other areas where reforms should be prioritized the following suggestions came up. The suggestions are all linked to the supply side of the economy. Two possible explanations for this phenomenon might be that affecting the demand of the export sector might be either very complex or not as relevant as the supply side challenges. The respondents were also asked to judge if a reform within the area of cost, days or documentation are of relevance in comparison to the other areas outlined. Many of the respondents answered that other suggestions are of greater importance in order to increase exports from Ghana (Blue Skies Ltd, 2014-05-06; U.S. Embassy, 2014-04-24; Federation of Ghanaian Industries, 2014-05-14; Milani Ltd., 2014-04-23; Bomarts Farms Ltd, 2014-05-06; Ghana Export Promotion Authority, 2014-05-13; Ghana Freezones Board, 2014-05-02; African Cashew Alliance, 2014-04-29; Federation of Ghanaian Industries, 2014-05-14; Global Shea Alliance, 2014-04-29; Private Enterprise Foundation, 2014-05-15). The suggestions are outlined below.

First up is improving the **financial access** in Ghana (Milani Ltd., 2014-04-23; Ministry of Trade and Industry, 2014-04-24; Golden Glow Money Lending, 2014-04-23). It is moreover suggested that there is an urgent need for the Ghanaian government to stabilize the **Ghanaian currency** (GHC) which has depreciated by 70% against the USD during the past years. It was stressed that the Bank of Ghana should not control the exchange rate or manipulate the currency as have been done previously (Milani Ltd., 2014-04-23; Ghana Export Promotion Authority, 2014-05-13; Federation of Ghanaian Industries, 2014-05-14; Blue Skies Ltd, 2014-05-06). The next suggestion is that the government **funding** for agriculture should be improved. It is suggested that a specific bank for agricultural producers should be developed, which was recently implemented successfully in Costa Rica, the world's leading pineapple producer (Bomarts Farms Ltd, 2014-05-06). It was furthermore suggested that the government should subsidize fertilizers in order to overcome challenges to meet the restrictions and overcome agricultural diseases (Milani Ltd., 2014-04-23). Another respondent argued that work towards **liberalizing** the economy in order to allow for foreign direct investment and spillovers of knowledge is of great importance in order to improve Ghana's export performance (U.S. Embassy, 2014-04-24).

It was furthermore argued that it is of importance to improve roads, motorways and domestic **transport** opportunities in Ghana (Bomarts Farms Ltd, 2014-05-06). Implementing **policies** that promotes export diversification is also outlined as an area of importance. Most of Ghana's export

today consists of cocoa, oil and gold. It is argued that there is plenty of room for Ghana to be competitive within the agricultural sector (Bomarts Farms Ltd, 2014-05-06). There is furthermore need for the government to reduce the **market inefficiencies**. The government of Ghana has e.g. introduced a floor price for Shea Butter which has caused inefficiencies on the market for Shea butter (Global Shea Alliance, 2014-04-29).

Improving **port facilities** is also an area that is suggested to be prioritized. Especially improving cold storages and warehousing opportunities (Milani Ltd., 2014-04-23; Private Enterprise Foundation, 2014-05-15). It was moreover suggested that the access to vessels and air **transport** should be improved, especially the air conditioned transport (Ministry of Food and Agriculture, 2014-04-24; Federation of Ghanaian Industries, 2014-05-14; Ghana Cocoa Board, 2014-05-07). Special vessels and containers adjusted for cocoa bean transport is also demanded since cocoa beans often are damaged upon arrival in the EU (Ghana Cocoa Board, 2014-05-07). Improving the **customs authority** in terms of accessibility and efficiency is furthermore suggested to be of great importance (Ghana Export Promotion Authority, 2014-05-13). Creating a **one stop center** where all the documentation could be done is also said to be of great importance (Ghana Freezones Board, 2014-05-02).

Expanding the **free zones** is furthermore suggested to be of importance. Likewise is the need to reduce the **corruption** and bribes involved in the process of exporting (Federation of Ghanaian Industries, 2014-05-14; Ghana Freezones Board, 2014-05-02). It is evident that the suggestions of improving port facilities, the customs authority and the creation of a one-stop center all would fall under the trade facilitation area. Reducing the corruption could also to some extent be related to a trade facilitation reform depending upon the definition of it.

5.2.8 What are planned in terms of trade facilitation reforms for the future? What future challenges could be expected?

The Ministry of Trade and Industry are planning to implement a set of new trade policies to increase the export diversification and hence the competitiveness of Ghana's export sector. There are also plans for improving and expanding the port facilities in Ghana. A pilot project for exporters to track the containers from port to port has recently been implemented and will in the near future be implemented on a full scale (Ministry of Trade and Industry, 2014-04-24; U.S. Embassy, 2014-04-24). Another pilot project has been implemented where hardcopies has been substituted by electronic documentation. If successful it will be implemented on a full scale and is likely to make documentation more efficient and hence less time consuming (Ministry of Trade

and Industry, 2014-04-24; Milani Ltd., 2014-04-23). There are also plans for improving the water system of the Volta river to facilitate the transport of goods from the north of Ghana to the south. This is likely to reduce the time aspect of the inland transportation of goods, a large quantity of Ghana's production is located in the north of the country but exported from the south (Ministry of Trade and Industry, 2014-04-24). In order to improve the electricity supply in the country the government of Ghana is looking for companies abroad that could provide Ghana with additional energy (Ghana Export Promotion Authority, 2014-05-13).

There is furthermore work being done on harmonizing the trade procedures within the West African region by the ECOWAS commission. This is likely to attract more trade to take place within the region which could imply lower exports to the EU27 given that there is a tradeoff between the two. There are also discussions on implementing a common currency in the West African region by the year 2020 which, if implemented, should increase trade volumes within West Africa. (Borderless Alliance, 2014-04-29).

Future challenges that one should be aware of is the urbanization that is taking place in Ghana. There is also an expansion of the cities towards where the producers are located. This urbanization is likely to bring more traffic and increase the price of land for many of the producers. Other future challenges outlined is the unstable market, the global warming and the increased interest rates (Milani Ltd., 2014-04-23; Wampah, 2014). It has also been announced that macroeconomic forecasting and analyses are to be improved during the upcoming years (Ablordeppey, 2014). This could contribute positively to stabilizing the Ghanaian currency and the macroeconomic environment. In addition to this, Ghana Mineral Commission is striving to diversify and increase investment rates in Ghana's mining sector. The mining sector in Ghana is limited to a few traditional minerals and the diversification of the sector would hence contribute positively to the export performance of Ghana (Aubynn, 2014).

6. Summary and conclusion: What could trade facilitation do for Ghana?

The aim of this study has been to examine whether inefficient trade procedures affect exports. It is investigated if it is likely that Ghana could increase its export volumes and diversification by engaging in trade facilitation. Two specific questions are answered. First, does trade facilitation increase export volumes and/or export diversification from Ghana to the EU27 countries? Second, does the impact on agricultural products differ compared to the other product groups?

Three proxies of trade facilitation reforms are applied in this study. The cost to export is applied as the proxy in the quantitative analysis, in addition to this, the days and documents to export are used as robustness indicators. All of them are applied and evaluated in the field study. The quantitative analysis of this study suggested that there would be a loss from a trade facilitation reform in terms of export volumes but a positive effect on export diversification. The estimates suggested that a 1% increase of the cost to export is associated with an increase of exported volumes by 0.415%. The impact on agricultural products was shown to not differ in comparison to other product groups. The obtained estimates for export volumes contradict the previous research on the area and are shown to not be robust towards a set of exposures. The estimates on export volumes should therefore be interpreted with caution and it is not appropriate to draw any conclusions based on the estimates of export volumes. It is hard to pinpoint the underlying reason behind why the obtained estimates contradict the previous research. One possible explanation would be that the cost to export reflects investments that has been made in the export sector and that the government in return has to increase the cost to export. The obtained estimates on export diversification are however in line with the previous research (see e.g. Persson, 2012a; Dennis and Shepherd, 2007; 2011). The estimate suggests that a 1% reduction of the cost to export is associated with an increase of 0.176% of the number of products exported. It was shown that the estimates are robust towards a set of exposures.

The robustness analysis points to the importance of conducting more research on what the Doing Business Indicators capture. If they are interrelated they should be showing a somewhat similar path of the impact of relatively complex trade procedures on exports. This study contradicts this hypothesis. The policy simulation showed that a reduction of the cost to export, according to three potential scenarios, would reduce export volumes of the Ghanaian exports by 5; 9 and 19% and increase export diversification by 2; 4 and 8% respectively.

The field study outlined that the major barriers to increased export volumes and diversification in Ghana is not foremost constrained by factors related to trade procedures. The underlying obstacles were lack of proper infrastructure, poor access to credit, low levels of technology, lack of skilled labour and high bureaucracy. It was furthermore found that the Ghanaian export sector is constrained by the high regulations on the world market. It was argued that Ghana's agricultural sector is more constrained, especially the cocoa sector, compared to other sectors. The barriers to export did also constrained processed products more than the unprocessed products. It was generally not perceived that there are any specific barriers related to exports to the EU27 except for the cocoa industry for which European food laws and restrictions are higher than when trading with other regions.

When it comes to the question of whether it would be of relevance to introduce trade facilitation means in Ghana none of the indicators Cost; Days; Documents were seen as areas that would have a great impact on export volumes or diversification. The cost to export was seen as the area that would have the greatest impact while the documentation was seen as the least important area. The reason why the documentation was not seen as a constraint was that it is a one-time sunk cost rather than a variable cost to exporters. The explanation for the time to export was that there is not much uncertainty related to the time aspect, which implies that it does not harm the export process that much. Lastly, the importance of the cost to export was said to be undermined by the overall production costs. It was thought that it would be of greater importance to reduce the production costs rather than the export cost itself.

In order to answer the two outlined questions one can argue that a trade facilitation reform is not likely to increase the export volumes or the export diversification from Ghana to the EU27 substantially. At least not in the area of reducing the cost, days or documentation related to the export process. Regarding the second question on whether the impact on agricultural products differs one can argue that fresh fruit producers, small-scale producers and Ghana's cocoa sector would be more positively affected by a reform in the area of trade facilitation. Whether or not the impact is greater on volumes or diversification is harder to tell. The quantitative analysis suggest that the impact runs through increased diversification while the information obtained from the field study suggests that the impact on volumes is likely to be greater than on export diversification.

To conclude, what could trade facilitation do for Ghana? The answer is not much, at least not in the area of cost, days or documentation to export. A trade facilitation reform in the area of

improving port facilities and customs authorities would on the other hand also fall under the broader definition of trade facilitation and is hence likely to have a substantial impact on export volumes and export diversification. Instead of the three areas where trade facilitation reforms could be implemented the output from the field study suggested other areas that should be prioritized in order to increase export volumes and diversification from Ghana to the EU27. The suggestion of developing the free zones is already being implemented. The suggestion of the need to stabilize the Ghanaian currency is likely to be partly dealt with due to the implementation of a programme aiming at improving the macroeconomic forecasting. Still, stronger efforts on the area are needed. There is also ongoing work on expanding the port facilities and the inland transportation using the Volta river. There is however an urgent need to improve the inland road connections and to improve the conditions of the already existing roads. Likewise is there an urgent need to improve the financial access in Ghana, which is likely to become even worse since the interest rates are expected to increase during the upcoming years. This is of great concern for the Ghanaian export sector but also for the economy as a whole. There is also a need to introduce means that can improve and facilitate the customs authority, reduce the corruption in Ghana and make it more profitable for the cocoa sector in order to maintain and improve the export volumes and diversification from Ghana to the EU27.

One could question whether the findings in this study of Ghana are possible to generalize across countries. It is hard to determine whether the results could be generalized and it is evident that more research is needed on the issue. One could however suspect that the findings in this study could be generalized for relatively stable countries in sub-Saharan Africa but that more research is needed in order to determine this.

This study clearly points towards the need of more research on trade facilitation, and for the research to move behind the three indicators provided by the Doing Business Survey. One could question whether the measures in fact capture the complexity of trade procedures in different countries, and whether they should be used as proxies for trade facilitation reforms. It is also of critical importance to move beyond cross-country econometric studies in order to evaluate the importance of trade facilitation reforms, especially in a developing country context. It is evident that more research is needed on the issue and that field studies are of great relevance if one desires to determine the impact of a trade facilitation reform on export volumes and diversification in a certain country or region.

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Appendix

A1. Variables and Data sources

Variable	Source	Description
Imports	UN Comtrade	Dataon imports to EU27 from sub-Saharan Africa at a 1 respectively 2-digit SITC division. The value of trade flow is measure in USD and used as the indicator of export volumes and used to calculate the number of products exported.
Official language	CEPII	Dummy equal to one if the trade pair share language
Colony	CEPII	A dummy variable indicating if a trade pair has ever between in a colonial relationship
Distance	CEPII	The distance in kilometers between the main cities within each trade pair
Landlocked	CEPII	Dummy equal to one if a country is landlocked.
GDP	World Bank	GDP in constant 2005 USD
GDP per capita	World Bank	GDP per captita in constant 2005 USD
The number of documents required to export	World Bank Doing Business Database, Trading across borders	A count variable of all the documents required to export.
The number of days required to export	World Bank Doing Business Database, Trading across borders	The number of calendar days required to export. The time calculation for a procedure starts from the moment it is initiated and runs until it is completed
The cost to export	World Bank Doing Business Database, Trading across borders	Official fees levied on a 20-feet container leaving the exporting country. The cost is measured in USD and cover all the fees associated with completing the procedures to export or import the container. The fees include costs for documentation, administrative fees, port-related charges and inland transport costs. The cost does not include customs tariffs or costs related to sea transport. Only the official costs are recorded.
Corruption Perceptions Index (CPI)	Transparency International	The corruption perceptions index rank countries annually by 'their perceived levels of corruption'. A higher rank implies lower levels of corruption.
Human Development Index (HDI)	UNDP	The human development index is a weighted measure of life expectancy, education and income that rank countries of their human development. A higher score implies a higher human development.
Civil war	UCDP/PRIO	The data on civil war lists countries that has experienced a major or minor armed conflict from the year 1946 to the present.

A2. Descriptive statistics of variables: Export Volumes

Variable	Obs	Mean	Std. Dev.	Min	Max
Export volumes	19376	23317.39	201097.7	0	9315265
GDP exporter	17849	4.26e+10	8.40e+10	1.20e+08	3.07e+11
GDP importer	18875	9.80e+11	9.83e+11	1.36e+10	3.07e+12
GDP per capita exporter	17849	1714.431	2303.244	146.3977	13019.56
GDP per capita importer	18875	31296.68	13410.76	3997.037	87716.73
Distance	17923	6478.912	1804.706	2783.383	10486.7
Common language	17923	.1732969	.3785143	0	1
Colony	17923	.1004854	.3006545	0	1
D_SouthAfrica	19376	.0877374	.2829199	0	1
D_landlocked	18149	.3243154	.4681314	0	1
Export procedure (Cost)	18148	1749.231	781.0472	624	5902
Export procedure (Days)	17849	31.60967	11.77561	12	60
Export procedure (Documents)	17849	7.614656	1.617219	5	13
D_Agri	19250	.4036883	.4906491	0	1
Interaction (D_Agri*Cost)	17849	.567518	1.546489	0	6.872128
Dummy_Civilwar	17953	.1730073	.3782641	0	1
Corruption Perceptions Index (CPI)	17859	3.175779	.9928997	1.6	6.5
Human Development Index (HDI)	17785	.4681441	.0971478	.262	.683

A3. Descriptive statistics of variables: Export Diversification

Variable	Number of observations	Mean	Std. Dev.	Min	Max
Number of products	4308	12.82985	14.89402	0	65
Number of agricultural products	4181	3.96508	4.539958	0	22
GDP exporter	3881	2.85e+10	6.46e+10	1.20e+08	3.07e+11
GDP importer	4085	7.12e+11	8.91e+11	1.36e+10	3.07e+12
GDP per capita exporter	3881	1477.747	2220.031	146.3977	13019.56
GDP per capita importer	4085	28997.94	15857.88	3997.037	87716.73
Distance	3897	6284.201	1693.358	2783.383	10486.7
Common language	3897	.1283038	.3344707	0	1
Colony	3897	.0567103	.2313179	0	1
Dummy_SouthAfrica	4308	.0438719	.2048337	0	1
D_landlocked	3995	.3849812	.4866518	0	1
Export procedure (Cost)	3994	1837.271	903.3831	624	5902
Export procedure (Days)	3881	33.02654	12.39093	12	60
Export procedure (Documents)	3881	7.658078	1.679107	5	13
Dummy_Civilwar	3940	.1974619	.3981343	0	1
Corruption Perceptions Index (CPI)	3914	3.058453	.9718499	1.6	6.5
Human Development Index (HDI)	3900	.45221	.0958582	.262	.683

A4. List of countries in the sample

Sub-Saharan Africa			European Union	
Angola	Gambia (the)	Sudan	Austria	Luxemburg
Burundi	Guinea-Bissau	Senegal	Belgium	Latvia
Benin	Euqatorial	Sierra	Bulgaria	Malta
Burkina Faso	Kenya	Swaziland	Cyprus	Netherlands
Botswana	Liberia	Tchad	Czech Republic	Poland
Central African Republic (the)	Lesotho	Togo	Germany	Portugal
Ivory Coast	Madagascar	Tanzania	Denmakr	Romania
Cameroon	Mali	Uganda	Spain	Slovakia
Congo (the Democratic Republic)	Mozambique	South	Estonia	Slovenia
Congo	Mauritania	Zambia	Finland	Sweden
Comoros	Mauritius	Zimbabwe	France	
Cape Verde	Malawi		Gabon	
Eritrea	Mayotte		Greece	
Ethiopia	Namibia		Hungary	
Gabon	Niger (the)		Ireland	
Ghana	Nigeria		Italy	
Guinea	Rwanda		Lithuania	

A5. Interview Schedule

This is an overview of the interviews and meetings that has been carried out during the field study. During the interviews a formal questionnaire has been followed while the meetings were characterized by more informal structures and conversations regarding the barriers to exports. The date, name of the person and company is outlined below. All interviews has been recorded, if the reader desires to listen to them please don't hesitate to contact the author.

No	Date	Specification	Company/Organization	Name of the respondent
1	2014-04-16	Meeting (email)	Mim Cashew & Agricultural Products Ltd	Joseph Yeung, Managing Director.
2	2014-04-03	Meeting	University of Ghana Legon, Department of Economics	Dr. Festus Ebo Turkson.
3	2014-04-23	Interview	Milani Ltd	Mr. Jerome Buchwalder, Production Manager. Mr. Roland Botekway, export manager. Mrs. Tigri Evelyn Faalong, Human resources and administration.
4	2014-04-23 Kl. 14-15:30	Meeting	Golden Glow Money Lending	Mr. Ernest A. Okyere, Operations Manager.
5	2014-04-24 Kl. 10.00-11.30	Interview	The Embassy of the United States of America	Stuart Banashek, Economic Analyst.
6	2014-04-24	Interview	Ministry of Food and Agriculture	Leonard Dumatonu, Regional Pland

	Kl. 12:00-13:00			Protection and Regulatory Services.
7	2014-04-24 Kl. 14:30-15:30	Interview	Ministry of Trade and Industry	Mr. Patrick Poku, Ag. director, trade facilitation.
8	2014-04-29	Interview	Borderless Alliance	Mr. Justin Bayili, Executive secretary. Mrs. Afua Eshun, Advocacy Program Advisor.
9	2014-04-29	Interview	African Cashew Alliance	Mr. Roger Brou, Managing director.
10	2014-04-29	Interview	Global Shea Alliance	Mr. Joseph Funt, Managing director.
11	2014-05-02	Interview	Ghana Freezones Board	Mrs. Lydia Atta-Saow, Assistant Marketing Officer.
12	2014-05-06	Interview	Blue Skies Ltd	Mrs. Victoria O. Asante, Administrative Coordinator. Mr. Stephen Morris, Group Tecnhical Manager. Mrs. Ruth Smith Adjei, Ghana general manager.
13	2014-05-06	Interview	Bomarts Farms Ltd	Mr. Anthony Botchway, Chief Executive Officer.
14	2014-05-06	Meeting	Volta Canada Industries Ltd	Mr. Raymond G. Micah, Chairman/ Chief Executive Officer.
15	2014-05-07	Interview	Ghana Cocoa Board	Mr. Emed Amegashie, Marketing Manager
16	2014-05-07	Meeting	Cocoa Processing Company	Mrs. Vera Adjei Agyemfra, Principal Sales/ Marketing Officer.
17	2014-05-08	Meeting	International Finance Corporation, the World Bank Group	Mr. Alain T. Traore, Senior Operations Officer for Investment Climate Advisory Services in Africa
18	2014-05-13	Interview	Ghana Export Promotion Authority (GEPA)	Mr. Emmanuel Quao, Head of projects.
19	2014-05-14	Interview	Federation of Ghanaian Industries (FAGE)	Mr. Frederique Ayeh, 2nd Vice President.
20	2014-05-15	Interview	Private Enterprise Foundation (PEF)	Mr. Nana Osei-Bonsu, Chief Executive Officer.
21	2014-05-20	Meeting	Export Development and Agricultural	Mrs. Audreu Atawi-Darkwah, Project

			Investment Fund (EDAIF)	Officer.
22	2014-05-22	Interview	University of Ghana Legon, Department of Economics	Dr. Festus Ebo Turkson.
23	2014-05-23	Meeting	International Finance Corporation, the World Bank Group	Ms. Mikiko Imai Ollison, Private Sector Development Specialist, Doing Business Unit.

A6. Questionnaire: "What could trade facilitation do for Ghana?"

Overall description

This outlined questionnaire will guide the interview carried out by Ms. Evelina Nilsson. The series of interviews are carried out in Ghana in April-May 2014 as a part of the study "What could trade facilitation do for Ghana?" Five sub-groups of actors are interviewed; government agencies, researchers, multilateral organizations, producers and other organizations. All interviews are documented and recorded. The date, location, name and title of the respondent is noted. The respondent has the possibility to choose not to answer any of the questions asked if he/she wish to. The estimated time required for each interview is 45 minutes. For a summary of the study, see the separate attached file "Summary Trade Facilitation Ghana Evelina Nilsson".

Questionnaire

1. Could you please briefly describe *your* relation to the export sector in Ghana?
2. Broadly speaking, what do *you* perceive as the major barriers to increased:
    a. Export volumes of already exported products?
    b. Export diversification? (i.e. widen your export base)
3. Do *you* perceive that the barriers differ between product groups?
4. Do *you* perceive that there are any specific barriers related to exports to the EU27 that are not present when exporting to other regions?
5. In my regression analysis three measures, from the Doing Business Database (trading across borders section) provided by the World Bank, are employed as empirical measures of trade barriers.

Trading across borders indicators

Documents required to export and import (number)
Bank documents Customs clearance documents Port and terminal handling documents Transport documents
Time required to export and import (days)
Obtaining all the documents Inland transport and handling Customs clearance and inspections Port and terminal handling Does not include ocean transport time
Cost required to export and import (USD per container)
All documentation Inland transport and handling Customs clearance and inspections Port and terminal handling Official costs only, not bribes

Source: www.doingbusiness.org

Do *you* perceive that a reduction in:

a. The number of documents to export
b. The time (days) to export
c. The cost to export

Would increase *your* export volumes or export diversification? Can *you* relate this to any previous experience? Are the measures of importance if compared with *your* previous suggestions in question 2?

6. Would *you* say that it is of importance to introduce trade facilitation means (documents; days; cost) in Ghana at the moment? Do the importance differ between product groups, which and why? Are there any other areas where reforms should be prioritized in order to increase the exporting activities?
7. Do you have the ability to provide me with further contact details to other actors involved in the trading sector that could contribute with valuable information for my study?