THE GRADUATE INSTITUTE | GENEVA
INSTITUT DE HAUTES ETUDES
INTERNATIONALES ET DU DÉVELOPPEMENT
GRADUATE INSTITUTE OF INTERNATIONAL
AND DEVELOPMENT STUDIES

Graduate Institute of
International and Development Studies Working Paper
No: 16/2012

Does Intra-Africa Regional Trade Cooperation Enhance Africa's Export Survival?

Dick Nuwamanya Kamuganga
Graduate Institute of International Studies

Abstract

In this paper, I use a stratified Cox Proportional Hazard Model to econometrically evaluate the effects of intra-Africa regional trade cooperation and other underlying factors on Africa`s export survival. Using a highly disaggregated dataset of bilateral trade flows at HS 6 digit level for 49 African countries for the period 1995 to 2009, I obtain 3 key main empirical results. First, intra-Africa regional trade cooperation do increase the likelihood of Africa`s export survival. The results show that the depth of regional integration matters on lowering Africa`s export hazard rates relative to countries that are not in any regional cooperation. Second, I find evidence that supports the "learning by export hypothesis". That is export experience within regional as well as rest of the world markets increases the likelihood of Africa`s export survival. Finally, results suggests that infrastructure related trade frictions such as costs to export, time to export, and customs procedures to export as well as weak export supporting institutions have a negative effect on Africa`s export survival. Similarly macroeconomic developments particularly exchange rate volatility, financial underdevelopment, "inappropriate" foreign direct investment hurt chances of an African export survival. The results also show that interaction effects between regional integration initiatives and a variety of these trade frictions namely: costs to export, time to export and customs procedures effects on hazard rates diminish in significance with the depth of regional integration over time.

Does Intra-Africa Regional Trade Cooperation Enhance Africa's Export Survival?

Dick Nuwamanya Kamuganga*

September 2012

Abstract

In this paper, I use a stratified Cox Proportional Hazard Model to econometrically evaluate the effects of intra-Africa regional trade cooperation and other underlying factors on Africa`s export survival. Using a highly disaggregated dataset of bilateral trade flows at HS 6 digit level for 49 African countries for the period 1995 to 2009, I obtain 3 key main empirical results. First, intra-Africa regional trade cooperation do increase the likelihood of Africa`s export survival. The results show that the depth of regional integration matters on lowering Africa`s export hazard rates relative to countries that are not in any regional cooperation. Second, I find evidence that supports the "learning by export hypothesis". That is export experience within regional as well as rest of the world markets increases the likelihood of Africa`s export survival. Finally, results suggests that infrastructure related trade frictions such as costs to export, time to export, and customs procedures to export as well as weak export supporting institutions have a negative effect on Africa`s export survival. Similarly macroeconomic developments particularly exchange rate volatility, financial underdevelopment, "inappropriate" foreign direct investment hurt chances of an African export survival. The results also show that interaction effects between regional integration initiatives and a variety of these trade frictions namely: costs to export, time to export and customs procedures effects on hazard rates diminish in significance with the depth of regional integration over time.

Key words: regional integration, export survival, trade relationships.

JEL classification: F14, F15, C14, C41

---

*International Economics Department, Graduate Institute of International and Development Studies, Geneva Switzerland. Email: Dick.kamuganga@graduateinstitute.ch. I am Grateful to Prof. Richard Baldwin, Patrick Low, Marcelo Olarreaga, Nicolas Berman, Altop-Lorenzo Rotunno, Christian M. Friedrich, Andreas Lendle, Matthias Rieger, Dany Jaimovich and Ollen Wanda for their numerous suggestions and comments to various versions of the paper. I am also grateful to Brown Bag Seminar participants at the Graduate Institute, Geneva, African Economic Conference participants in Kigali Rwanda 2012 for their useful comments that helped improve the paper. All remaining errors are purely mine.

1.Introduction

Why doesn't Africa sustain its export expansion along the existing products, new products to existing and new markets? The average survival rate for each of intra-Africa regions export relationships (exporter-product-market connection) is 35 percent for the first year. That is only 35 percent of export relationships initiated survive their first year of establishment- this implies 65 percent export relationship hazard rate across the region[1]. The median duration of an African export relationship is 1 year while the mean is only 2.08 years compared to 3 years for the rest of the regions (see Brenton *et al* (2009).

Export expansion can take place at least through three channels: first, through expansion along the existing trade relationships (intensive margin); second, along the new-product and new-market margins (extensive margin) and third, along the sustainability of exports both on the extensive and intensive margins of trade (see Stibart *et al*. 2011). The primary purpose of this paper is to explore the effects of Intra-Africa regional trade cooperation and other underlying factors that restrict or enhance Africa`s export relationship survival at exporter-product-market level once established along these three channels. It investigates whether intra-African regional trade cooperation increases the likelihood of this relationship to survive longer. The implicit research hypothesis is that intra-Africa trade cooperation may act to lower Africa`s high hazard rates through lowering both fixed and variable costs to exporting in the region. Similarly, the high hazard rates of African exports may be reflecting structural challenges of poor infrastructure-therefore high trade costs, a variety of at the border bureaucratic frictions, poor business environment, weak economic institutions and policy bias against exports. Also high hazard rates for African exports may reflect Africa`s comparative advantage in low-technology homogenous goods.[2]

The paper attempts to answer three related empirical research questions. First, what are the effects of intra-Africa regional trade cooperation on Africa`s export survival? Does it have an influence on the other underlying factors that restrict Africa`s export survival? Second, do learning effects from exporting in the regional as well as the rest of the world markets promote Africa`s export survival? Finally, what other underlying factors that restricts or enhances the probability of an African export relationship surviving for a long period. I attempt to find distinctive regional characteristics in Africa that affect the duration of African countries` export relationships once established. I explore to what extent these distinct regional characteristics within regional trade cooperation enhance the chances of an export relationship to survive longer. I use a bilateral trade flows disaggregated at HS 6-digit level for the 49 African countries for the period of 1995-2009 and a stratified Cox Proportional Hazard Model to econometrically evaluate the effects of intra-Africa regional trade cooperation and other underlying factors on Africa`s export survival within Africa and to the rest of the world. My dataset also contains 14 (see

[1] Source : Author`s calculations based on BACI/COMTRADE dataset on Africa`s bilateral trade flows (1995-2009)
[2] Research on trade duration shows that homogenous commodities have shorter spells than differentiated products (see *inter alia* Besedes and Prusa (2006a))

Table 13) African regional trade groups at different stages of trade cooperation.[3] I use this dataset to investigate distinctive regional characteristics that affect chances of African countries export survival for longer periods.

I find 4 stylized facts. First, results seem to suggest that African exports last longer when Africa exports to itself than to other regions. Second, there is considerable heterogeneity within African regional groupings depending on the depth of integration as well as within sectors for African exports-for instance, African traditional exports seem to have longer survival rates compared to other sectors. Third, intra-regional trade cooperation seem to positively affect survival rates of African exports. That is export relationships die faster in less integrated regions, landlocked countries and they seem to survive longer in the more advanced integrated regions and coastal countries. Finally, unlike other authors (for instance, Nitsch (2009)), I find more homogenous sectors largely exported to neighbouring regions and African traditional exports have the highest survival rates compared to more differentiated sectors i.e., I find that the duration of African exports is higher for traditional exports than for non-traditional exports.

Additionally the paper presents four main empirical results. The first empirical result is that intra-Africa regional trade cooperation matters for Africa`s export relationship survival. It increases the likelihood of an African export relationship surviving for a longer period, interestingly; deeper regional integration has higher survival rates than shallower regional groupings. The second result is that I find support for learning by exporting hypothesis. That is exporting experience matters. It increases the likelihood of Africa`s export relationship survival in all regions. Similar results are reported by Brenton *et al.* (2009) on the effects of exporting experience and export relationship survival for a different sample of countries. Third, is that there is a negative a statistically significant relationship between the likelihood of an African export relationship survival and infrastructure related trade frictions, negative policy shocks, financial underdevelopment, inappropriate FDI and quality of bureaucracy supporting exporting activities within Africa. Fourth, the results are robust when I interact the regional group dummies with cost to export, time to export and customs procedures to export. Thus the results tend to suggest that deeper trade cooperation is essential for Africa's export survival. This empirical evidence suggests that intra-Africa regional trade cooperation has non-negligible effects on Africa`s export survival. In terms of public policy implications, these findings suggest a need to compliment policy focus on promoting export growth by encouraging sustainable export relationships of existing and new exports.

The rest of the paper is organized in 6 sections as follows. The next section reviews related literature. In section 3, I present the prima facie evidence from the data and discuss data characteristics and data limitations. In section 4, I present the empirical strategy, and section 5 presents results and discussions. The final section of the paper contains my concluding remarks.

---

[3] (i) Monetary Union as most advanced stage of trade cooperation (ii) Common Market in which free flow of goods and services is permitted as well as flow of capital, labour among member countries (iii) Customs Union in which member states have removed trade barriers amongst themselves and impose a common external tariff on third parties (iv) Preferential Trade Area in which member states impose a preferential tariff on each other's goods and services and have varying trade policy instruments on third markets; (v) not yet in force regional trade initiatives/under negotiations; (vi) the rest of the world (including those African countries that have no on-going preferential trade arrangement between them).

2.Literature

In this section, I present both the related theoretical and empirical literature. But before, I review theoretical literature on determinants of export duration; I briefly consider theoretical literature on determinants of export participation. Vernon (1966) and Grossman & Helpman (1991) studied the patterns of specialization and attribute them to the life cycle of a product, the diffusion of technology or differences in factor accumulation. But none of these factors explain the dynamics of the survival of a typical trade relationship.

Baldwin, 1988 & 1989; Baldwin & Krugman, 1989, Dixit, 1989a & b and Krugman, 1989 attributed persistence of trade to sunk entry costs. For instance, Baldwin and Krugman (1989) theoretically explain the persistence effects of large exchange rate shock on trade flows, in which large exchange rate fluctuations lead to entry or exit decisions that are not reversed when the currency is returned to its previous level. Baldwin (1990)`s model on hysteresis of trade shows that in presence of market entry costs, exchange rate overvaluation leads to additional entry by foreign firms and these firms do not exit when the exchange rate shock passes. This is after incurring sunk costs in form of establishing marketing and distribution networks, research and development and reputation developments.

Roberts and Tybout (1997), Bernard and Jensen (1999, 2004) show empirically that the presence of sunk costs play a significant role in a firm`s decision to export. Roberts & Tybout use a dynamic probit model to investigate the exit and entry decision patterns of Columbian manufacturing firms from 1981 to 1989. They control for firms' past export status and show that exporting history matters. Bernard and Jensen (2004) using a panel of U.S. manufacturing plants and a linear probability empirical framework, show that being an exporter today increases the probability of being an exporter tomorrow by 36 percent.

Irarrazabal and Opromolla (2009) introduce uncertainty and sunk costs in a trade model with heterogeneous firms, where firm productivity evolves stochastically. They define a band of inaction like in Dixit (1989) and test using simulations how a cut in fixed costs and sunk costs could affect exporters and non-exporters status. Their results show that a reduction in a per-period fixed costs increases persistence in export status for exporters but decreases persistence for non-exporters. The central idea of this result is that as fixed costs decline, the probability that an exporter would be able to cover his fixed costs increases. On the other hand a reduction in sunk costs decreases the persistence in export status of exporters and non-exporters. They compare survival rates resulting from their simulations for both scenarios and observe that survival rates are larger when there are sunk costs.

Rauch and Watson (2003) study the trade relationships between the developed countries (DCs) buyers and less developed countries (LDCs) suppliers. They show that search costs do matter in initiation and sustainance of trade relationships. In their framework, persistence of a trade relationship depends on the initial trade value (i.e., the model predicts that the length of a trade relationship is positively correlated with the initial amount of the transaction and that the propensity to start low value transactions increases with the cost of search and decreases with the probability that the current or new supplier will be able to fulfil the large order successfully after training (with reliability)), an initial learning and confidence building i.e., stages of matching a buyer and a supplier, a buyer investing in the supplier to deepen their relationship. If confidence and trust are not established, the relationship fails and the buyer re-searches for another supplier.

The three steps are buyer-supplier matching, relationship deepening and (or) rematch. These authors note that buyers start with small purchases because of uncertainty surrounding the new supplier. Orders increase with deepening relationship between the buyer and supplier with respect to meet expectations on part of the buyer. In the African sample the initial transactions are generally very low. Rauch (2001) emphasizes networks` help to reduce such partner-related search costs because network members have thorough knowledge of each other's characteristics and more importantly, "their members are engaged in repeated exchange that helps sustain cooperation.

Besedes and Prusa (2006a, b), Besedes (2008), test some of the main predictions of the Rauch-Watson model using data on imports from the United States at the Tariff Schedule 8-digit level and at the HS 10 digit level. They find generally that trade relationships are short lived with hazard rate that decreases sharply over time. Work by Nitsch (2009), Fugazza and Molina (2009), and Besedes and Blyde (2010) document similar stylized facts on trade duration. That is trade duration is indeed very dynamic and brief across the board. It's affected by country characteristics, product characteristics, trade costs as well as market characteristics and structure (see Nitsch, 2009 for instance). Besedes and Prusa (2006a, b) show that duration of trade relationships face higher hazard rates for homogenous goods than for differentiated goods[4]. Besedes (2008) focuses on the persistence of short and small valued relationships by applying Rauch-Watson search model. In this framework, the buyers, i.e., importers start with small purchases because of the uncertainty surrounding the supplier. Orders increase with increasing confidence and certainty of the supplier's ability to fulfil the buyer's expectations. Shepherd (2007) offers insights for alternative explanation for low export values at the beginning of the export activity that could be related to traditional product cycle i.e., discovery, rapid growth, maturation and decline. The author argues that most of the new products do not get into the maturation stage.

Other related work by inter alia Eaton et al (2009); Freund & Pierola (2009) illustrate the importance of learning effects on export survival. Eaton *et al*. model shows that producers learn about the appeal of their products in a foreign market by committing resources to finding consumers and by observing the experiences of competitors. Using data on non-traditional agricultural products export for Peru, Freund and Pierola focus on product-specific uncertainty and the incentives of firms to develop new products for exporting and their results reveal interesting patterns of trial and error based on the frequency of entry and exit from foreign markets of firms.

Albornoz *et al*. (2012) try to distinguish between the first and subsequent markets by investigating a simple theoretical mechanism that rationalizes firm export dynamics. In their framework, a firm discovers its profitability only after engaging in exporting and firm profitability is positively correlated over time and across destinations. The authors use Argentinean firm-level manufacturing exports to illustrate support for "sequential exporting".

Brenton *et al*., (2010) perform analysis of a cross country bilateral export flows at product level. They found export activity to be perilous especially for low income countries. Their empirical

[4] In Besedes and Prusa (2006a) authors find that non-OECD countries have relatively shorter durations of trade than OECD countries.

results confirm the significance of a range of product- as well as country specific factors in determining the survival of new export flows. They also find that experience for exporting the same product to other markets or different products to the same market is found to strongly increase the chance of export survival. They show selected African countries to have relatively higher hazard rates than other regions of the world.

Cadot *et al*., (2011) use transactions level export data for four African countries (Malawi, Mali, Senegal and Tanzania) and they document high degree of experimentation at the extensive margin associated with low survival rates. They find that survival probabilities rise with the number of firms exporting the same product to the same destination from the same country, pointing towards the existence of cross-firm synergies. They also find that more diversified firms in terms of products, but even more in terms of markets, are more likely to be successful and survive beyond the first year. This is the only empirical paper that has dealt with the sample on Africa.

This paper has three key empirical differences with the cited papers. First, overall, none of the cited papers focuses specifically on the effects of intra-Africa`s regional trade cooperation on export relationship survival. Second, it focuses on role of regional and rest of the world market experience on promoting the likelihood of Africa`s export relationship survival and third, it studies other underlying factors for low survival rates for African countries.

3.Data

3.1. Summary Statistics

I summarize the data I have assembled here (see the appendix for a detailed description of variables used here and their sources). I use product level data (HS 6 digit level bilateral trade flows) from 49 African countries, for the period 1995-2009[5].The core dataset used consists of approximately 15.35 million observations of annual bilateral trade flows between 14 intra-African region groupings and the rest of the world (ROW) [6]. The unit of analysis is exporter-product-market level; this implies an exploration of 49 countries, 210 markets for the period of 1995 to 2009. These data are obtained from BACI CEPII international trade database, based on COMTRADE[7]. BACI provides harmonized bilateral trade data. They use different harmonization procedures (see Gaulier et al 2007), it reconciles mirror flows, thus providing a more complete and refined geographical coverage of trade flows at product level. This dataset therefore represents a relatively more accurate representation of bilateral trade matrix for African countries appropriate for this research on export relationship duration for African countries. The data is

[5] I take members of SACU as a block [i.e. Botswana, Lesotho, Namibia, South Africa and Swaziland]

[6] I do urge caution in interpretation of the current results on two major accounts with respect to this level disaggregation. First, possible minor changes in product specification leading to product reclassification of an otherwise identical product, there by resulting in a recorded failure of an export relationship. Second, African countries suffer severe statistical capacity problems to report data to UN COMTRADE, so I anticipate underreporting, missing trade etc. to affect my analysis and results.

[7] BACI international trade database has been painstakingly constructed to provide near accurate representation of bilateral trade flows for countries reporting trade to the UN COMTRADE database (see Gaulier et al 2007 for details of BACI data construction).

summarized in Table 6. Figure 1 illustrates the histogram of trade values (USD: 1000) for the whole sample.

3.2. Stylized Facts

I use simple graphical representation and tabulation to explore the data. I examine the differences in hazard rates (or survival rates) across the exporting regions (and compare intra-African and inter-Africa rest of the world-ROW hazard rates) for each of exporter-product-market trade relationships in each region and across sectors for HS 2 digit level data. I define a trade episode or a spell as the number of years in which a typical exporter-product-market export relationship lasts. That is, for each exporter-product-market, I define a spell's start and ending dates (by year) for a specific export relationship. I have censored spells that begin 1995 (left censored) and those that end in 2009 as right censored[8]. Notice that a spell is allowed to start and end at different years within the sample period i.e., a relationship can begin 1995 and end in 1997 between Uganda and China and another one between Uganda exporting coffee to Canada begin 1998 and end in 2004. Spells for specific export relationship beginning independently at anytime and end anytime during the sample period[9]. Table 6 provides an overview of the distribution of export flows for the African sample 1995-2009. In column 1 the table shows the evolution of export relationships for the full sample of African countries from 1995 to 2009. Column 2 shows the annual products exported per year. Column 3 shows the evolution of the average number of products exported to each partner. Column 4 shows the number of partners per year and column 5 shows the evolution of the average number of destinations for each product. Overall, the picture painted here is a relatively significant improvement in the export performance over the years in the sample period. For instance the export relationships more than doubled over the years and so is the average number of products exported to each partner.

Figure 2 presents a histogram of positive trade observations by size of groups. The figure shows that almost 80 percent of trade flows in the African trade matrix are "zero flows". This implies that only 20 percent of Africa's potential bilateral trade relationships are positive trade flows. Also all Africa trade relationships fall below the mark of USD 100,000 at product level. In addition, to this, I present more descriptive statistics of Africa's export relationships pair wise. Table 1 presents descriptive statistics for each regional grouping. That is number of spells per region at the beginning of the sample period 1995 and at end of sample period in 2009. It also shows the annual death rate per region. Notice that overall across the regions, the birth and deaths are very high but there are observable differences. For the full sample i.e., exports to the rest of the world the deaths are relatively smaller than the average death rates across the regions. Secondly, the death rates for countries in monetary unions are relatively lower than those of Common market which are in turn lower than those of the Customs Union and those of countries in a preferential trade arrangement (or negotiating a trade arrangement). The regional grouping with highest annual death rate is CEN-SAD with 60 percent annual death rates and the least is

[8] I cannot be absolutely certain that spells that begin 1995 are as a result of a start of new export relationships or continuing from the previous years before 1995. Similarly I cannot be certain that spells that end in 2009 are as a result of end of sample or truly it's because the export relationship is ending at this particular time.

[9] In my sample, the maximum length of a spell is 14 years. An event when African exporter fails to exports to its partner is called a "failure".

SACU with 25 percent. Third, the birth rates also take similar patterns according to the stage of regional integration.

Figure 2 shows the survival probability over time for intra-Africa exports and African exports to the rest of the world (ROW). In Figure 2, intra-Africa export relationships have slightly higher survival rates than the export relationships to the rest of the world (ROW). Similarly Figure 3 and Figure 4 show survival rates by regional groupings and coastal and landlocked countries respectively. The graphs show that the probability of death of export relationship is high in the first years of the export relationship discovery but decreases over time. Figure 4 shows the survival rates for maritime and landlocked exporters, it shows that maritime exporters have relatively higher survival rates than the landlocked exporters.

Table 2 shows the annual survival rates for each of the above regions. Once again, whole sample survival rates lie between the average of the intra-African trade sample (36 percent of initiated export relationship survives for their first year) and ROW sample survival rate is 34 percent of export relationships destined outside Africa survive their first year of initiation. Within intra-African region, again SACU (a quasi-monetary union, but a complete customs union since 1993) has the highest survival rate at 49 percent, followed by SADC and then UMA. Overall, deeply integrated regions have higher survival rates than those negotiating or not yet in any regional negotiating initiatives. Notice also that there is no survival completely to the end of the sample period. Relative to other regions studied so far, only 2 percent of African export relationships survive to the 10^{th} year.

Table 3 shows the survival rates based on countries at the coast and for landlocked countries. Survival rates for coastal countries (36 percent) are higher than for landlocked countries (25 percent). This implies only 25 percent of African landlocked countries truly survive their first year of an export relationship and by the end of 10^{th} year of exports it's only 1 percent of these relationships that still exist compared to 2 percent for the maritime members. This confirms stylized factors presented in literature on the challenges of landlocked developing countries (see Faye *et al*. (2004) for the analysis of challenges of landlocked countries). It's clear that maritime countries also have higher survival rates than their landlocked counterparts throughout the period of analysis. This once again is suggestive of inland domestic costs to export, time to export and customs procedures which are more significant for countries that are landlocked. Notice that the survivor function for deeper regional initiatives lies above those less integrated regions and also that maritime countries survivor functions lies above that of landlocked countries.

Table 4 shows survival rates by product sectors. Within sectors (HS 2 digit bilateral trade flows) there are observable differences regarding the survival rates. Take for instance, traditional African exports; sector 4 chapters 16 to 24 (which consist of prepared foodstuffs, beverages and spirits, tobacco) and sector 5 which is HS chapter 25-27 (which consist of mineral products, including mineral fuels etc.) have the highest survival rates. Within this group are traditional commodity exports like coffee, tea, cocoa, crude petroleum products - the major traditional African commodity exports. So it's not a surprise that these sectors have the highest survival rates of 42 and 40 percent of all export relationships in these sectors survive at the end of their first year. They are followed by vegetable products (sector 2-HS chapter 6-14). Within sector 2 the survival rate is 41 percent in the first year of an established export relationship. For the rest of the sectors as indicated in the table, the average survival rate for each sector is around 35 percent. Notice also the average survival rate across the sectors for the fifth year of African export relationship is only 8 percent. That is only 8 percent of export relationship established at the

beginning of the sample survival until their fifth year. At this stage mineral products have the highest survival rate of 11 percent.

As shown in these tables I can infer 4 stylized facts about this data: First, results seem to suggest that African exports last longer when Africa exports to itself than to other region; second, there is considerable heterogeneity within African regional groupings depending on the depth of integration as well as within sectors for African exports and African traditional exports have long survival rates compared to other sectors; third; regional trade cooperation seem to affect survival rates of African exports i.e., enhance export survival. That is export relationships die faster in the less integrated regions, landlocked countries and they survive longest in the maritime countries and more advanced integrated regions; and fourth, I can infer that infrastructure related export costs appear to be vital determinants of Africa's export relationships, other papers have found a significant influence of trade costs proxied by geographical distance on incidence of non-zero trade (see Baldwin and Harrigan (2007) for U.S. product level analysis.

In summary this analysis shows that: first, export failure is phenomenal in Africa. Second, the average survival rate for each of the regions considered is 35 percent for the first year. To put it differently 65 percent of export relationships initiated in Africa fail in the first year of their initiation. Third, intra-Africa export survival rates are slightly higher (36 percent) than survival rates for African exports to the rest of the World (ROW, 34 percent) for the first year of export relationship establishment. Fourth, the median duration of an African export relationship is 1 year while the mean is only 2.08 years compared to 3 years for the region of the regions (see Brenton et al. (2009). Just 2 percent of the (new) African export relationships last up to 10 years and 0.5 percent until the end of the sample period (15 years) in all of the regions under consideration. Fifth, these results also show that observed hazard rate patterns are reduced as African as African countries enter into deeper regional trade cooperation initiatives. Figure 3 illustrates this stylized fact by showing the corresponding survival rates plotted against time for each of the regions involved.

I do test these stylized facts econometrically in the next part of the paper using an econometric specification below based on Stratified Cox Proportional Hazard model (1972). My conjecture here is that the differences in the average survival rates across the regions as destinations of Africa's exports might not be solely the result of specialization patterns but other factors might be playing a role as well and that intra-Africa regional trade cooperation has an effect on these underlying factors.

3.3. Data quality issues

In this subsection, I would like to acknowledge some of the limitations of the dataset I use that may influence the results emerging from the analysis. First, recent empirical results (see inter alia, Besedes and Prusa (2006a), Nitsch (2009), Fugazza and Molina (2009)) all show that short duration of trade may be explained by the small value of initial transactions. In the current sample a large portion of the transactions are very small (90 percent of African trade transactions are less than USD: 5000), I envisage this observation to influence results biasing the exit rates upwards for the duration of African exports. At this stage of the research, I have no plausible solution to the noise in the data caused by the value of transactions. I do conduct the analysis with all transactions included to avoid the risk of reducing my observations and further lowering the quality of the data. So interpretation of the results should bear this in mind. But also since the

focus of my analysis is on exporter-product-market relationship, the overall effect of small values of African exports may be negligible to my results. Secondly, the size of the individual transactions may not be that important since my major focus of analysis is on whether regional integration really enhances the survival of the trade relationships, hence it should reduce the churning rates of exports-diminish the influence hit and run exports.

The third issue relates to the accuracy of related trade flows annually as reported by the African customs officials due to limited institutional capacity or sheer negligence to report regularly may be endemic among African countries. Sporadic reporting can cause measurement errors in the analysis taking simply unreported trade flows as trade relationship failures thus biasing hazard rates upwards. To overcome this short coming in the data by using the relatively improved dataset by BACI database which attempts to solve the problem of underreporting and erratic reporting by using mirrored data. BACI data uses mirror data based on the most reliable trading partner[10].

The fourth potential problem relates to the quality and availability of data for the infrastructure related trade frictions i.e., the costs to export, time to export, and procedures to export. These data are available only for a few years (2004-2009) for some of the African countries. To overcome this limitation, I endeavour to create the most feasible panel for my analysis for the period that this data is available. At most I have a 6 year panel as the most feasible panel for the regions under consideration.

Finally, with respect to the movement in relative prices during the sample period 1995-2009, I deflate GDP to yield real GDP prices using US GDP deflator 2000.

4.Empirical strategy

My empirical analysis is motivated by the desire to understand the effects of intra-Africa`s regional trade cooperation, regional and rest of world`s export experience on Africa`s exporter-product-market export relationship. Further still to investigate other underlying reasons for high hazard rates for African countries exports and whether regional trade cooperation has an effect on these factors consequently enhancing Africa's export relationship survival.

4.1. Empirical specification

The prima facie evidence in the previous part of the paper pointed to a number of peculiarities in the data for the sample. In this part, I concentrate on investigating the effects of intra-Africa regional trade cooperation, exporter experience on Africa`s export survival and other factors that may be restricting or enhancing export relationships survival within each region and also endeavour to explain the differences in survival rates within the region. I am particularly interested in the differences in each of the stages of regional integration as well as the differences between landlocked countries and their maritime counterparts.

[10] See Gaulier, G. & S. Zignago (2010) "BACI: International Trade Database at the Product-level The 1994-2007 Version"

Following Besedes and Prusa (2006a, 2006b) Blyde (2008) and Nitsch (2009), I use the continuous time proportional hazard (PH) model proposed by Cox (1972) to test 4 specific hypotheses:

H1: intra-Africa regional trade cooperation increases the likelihood of an African export relationship survival at exporter-product-market level

H2: The likelihood of an African export relationship survival at exporter-product-market level increases with export experience within the regional as well as international markets.

H3: The likelihood of an African export relationship at exporter-product-market level diminishes with the presence of infrastructure related trade frictions, policy shocks, financial underdevelopment, inappropriate FDI and weak institutions supporting exporting activity.

H4: The likelihood of an African export relationship survival at exporter-product-market level increases with the depth of regional integration-measured by interaction effects of infrastructure related trade frictions and the level of regional integration dummy.

To test these hypotheses, I estimate a simple stratified Cox proportional hazard model version in which I exclude left censored observations. I stratify the sample by exporter-product-market level, or HS 2 product categories or by regional grouping (but for brevity purposes I report results stratified at product category level). This implies that I allow the baseline hazards to vary at exporter-product-market across the product categories, the sectors or chapters, and the geographical region in the analysis i.e., I allow a separate baseline hazard function for each of the product group.

I use the following hazard rate function for the empirical analysis. Where the hazard rate $h(t)$ is the ratio of the probability of failure for an export relationship to the probability of its survival, thus:

$$h(t) = \frac{f(t)}{S(t)}$$

This can be interpreted to mean a risk of a failure of an export relationship by time t. I am interested in understanding the effects of intra-Africa regional trade cooperation, export experience and other underlying factors that influence the probability of failure for African exports both in intra-Africa trade as well as Africa's exports to the rest of the world.

Formally, the estimation equation takes the following form: I start with a baseline hazard function $h_0(t)$ and would like to model the influence of some covariates X on this baseline hazard

So I specify an exponential hazard function as

$$h(t) = h_0(t)\exp(X_i\beta)$$

The baseline hazard then corresponds to the case where $X = 0$. It is shifted up or down by an order of proportionality with changes in X

Where h is the hazard rate (the ratio of the probability of failure to the probability of survival) at time (t) in the Cox model and h_0 is the base hazard rate i.e. the risk at $x_i(t) = 0$. By assumption $h_o(t)$ is unknown but uniform across the group (for instance in across product categories) and is

left unparametrized. x_i is a vector of covariates representing the characteristics of individual i, and β is a vector of coefficients, accounting for the effects of those characteristics.

Since the model I run is a stratified general Cox (SC) model it can be specified as:

$$h_g(t, X) = h_{0g} \exp\left[\beta_1 X_1 + ...\beta_p X_P\right]$$

Where $g = 1,....,k^*$ strata defined from Z^*

Notice that there are same coefficients for each of stratum $\beta_1,.....\beta_p$. but the baseline hazard functions $h_{0g}(t)$ may be different for each stratum. $X_1,....., X_p$ directly included in the model, but Z^* appear only through the different baseline hazard functions.

I also run an alternative interaction model:

$$h_g(t) = h_{0g}(t)\left[\beta_1^* X_1 + ... + \beta_p^* + \sum_{j=1}^{k^*-1}\sum_{i=1}^{p} \beta_{ij}^* X_i Z_j^*\right] \text{ where the } \beta^* \text{ do not involve } g$$

I estimate the above as a log-linear version of this specification.

I group my sample into four major regional groups and therefore use 4 sets of variables to conduct my analysis i.e., first, I have a variable as a Monetary Union. It is a binary variable taking a value of 1 if a country belongs to a monetary union /single currency of some sort and zero otherwise. I also include a variable to reflect the number of years this country `s membership in the monetary union. This is also the case for the other 3 variables based on these regional groupings. That is (ii) Common Market, a binary variable taking value of 1 if a country is in a Common Market and Zero otherwise; (iii) Customs Union is a binary variable taking value of 1 if a country is in a Customs Union and zero otherwise; and the (iv) a preferential trade area (PTA) is a binary variable taking value of 1 if a country is in a preferential trade area and zero otherwise.

4.2. Econometric issues and caveats

The results in this paper are bound to be affected by at least 4 specific econometric problems. First, I face a potential endogeniety problem with some of my explanatory variables i.e., regional trade agreements. To overcome this problem, I have employed fixed effects estimation at exporter-product-market level, which could potentially reduce the biasness of my results due to endogeneity (see Baier & Bergstrand: 2004; 2007). Additionally, since the analysis focuses on exploring the correlation of export survival and regional trade cooperation in Africa, endogeniety problems may not of critical importance to my analysis.

Secondly, besides export experience and fixed effects, most of my explanatory variables do not vary at product level. The inferences drawn from this analysis would warrant that I either aggregate the data or use explanatory variables that vary at product level. Since this kind of data is not available for most of African countries. Despite the loss of efficiency of my estimates, product level data provides a significant amount of information on studying the export survival dynamics in Africa relative to aggregated data.

The third plausible limitation with my approach is that my unit of analysis is the exporter-product-market level (dyadprod), so the structure of the errors may not be homoscedastic. To correct this problem of heteroscedastic errors, I cluster the standard errors at the dyadprod level in all specifications.

Fourth, I use a continuous time proportional hazards model to evaluate the effects of regional trade agreements on Africa`s export survival. However, Brenton et al (2010) states that in presence of unobserved heterogeneity the continuous time proportional hazards model means the model is misspecified. I overcome potential misspecification through two strategies: first, I use a stratified proportional hazards variant of the model, stratified at exporter-product-market level. Second, I use an exporter-product-market fixed effects that takes into account the potential unobserved heterogeneity of export data at product level.

5.Results

Table 8 presents the main results with robust standard errors clustered at dyadprod level. In column 1 I present results for hypothesis **H1**. If **H1** is true, I expect a negative and statistically significant coefficient on the variables proxying the stages of intra-Africa regional integration i.e., the Monetary Union, Common Market, Customs Union and preferential trade area.

As Table 8 shows, all the coefficients on the regional trade cooperation variables carry the expected signs and are statistically and economically significant except the coefficient on the preferential trade areas (PTA). This provides evidence in support of the **H1**. This would imply that regional trade cooperation reduces the probability of failure for African export relationships-reduces hazard rates for the Africa`s exports. The Common market and Customs union results are more significant and robust throughout various specifications. The coefficient on Preferential Trade Agreements (PTA) carries a counterintuitive sign. It implies that Africa's preferential trade agreements enhance rather that reduce hazard rates in Africa. Similarly, Brenton et al (2010) in their specifications in a different framework from mine included a dummy for PTA to indicate a presence of a preferential trade agreement between the exporter and the importer, and they found the coefficient on the PTA increased the hazard rates significantly. They attribute this counterintuitive result to their possible definition of their relevant variable that is the fact that the reference year for the dummy is the starting year of the trade relationship. This implied that trade flows, which are subject to a trade agreement, only after they are initiated, is recorded as not being subject to the agreement. They also argue that this surprising finding could be that some agreements actually facilitate bilateral trade whereas others merely exist on paper. In this research, my conjecture is that this result is a result of the fact that most of the PTAs are currently under negotiations and therefore the protocols are not yet fully into force and therefore the benefits of the PTAs are not yet fully harnessed by the members i.e., the business networking effects, information frictions still exist and border bureaucracies are not harmonized yet. Ideally, one would like to distinguish the effects of each form of regional trade cooperation on export survival, evidence of which I present here.

Column 2 of Table 8 presents results for testing hypothesis **H2**. If **H2** is true, I expect the coefficient on the export experience to be negative and statistically significant. The results in column 2 of Table 8 indeed shows that export experience both product specific and market specific do indeed increases the likelihood of Africa`s export relationship survival (reduces

Africa`s exports hazard rates).I included both the product specific experience, i.e., a variable indicating whether the exporting country already exports the given product to other countries within the regional group and market specific experience. They are both significant and carry a negative sign indicating that export experience for a specific product or market do matter and reduce hazard rates significantly for African export relationships. Qualitatively similar results have been obtained by other authors inter *alia* Brenton *et al*. (2009), Faguzza and Molina (2009). The coefficient of 0.82 and 0.33 on product and market experience respectively signifies that the regional nature of exporting experience matters. The coefficient on the export product experience can be interpreted to mean that 100 percent increase in total exports of products within the same HS 6 digit product category implies an 82 percentage points in reduced hazard rates. This would also signify existence of learning effects specific to the product and to the region of destination of these exports that help exporters to sustain their export relationships. These results on export experience complements the finding of Roberts and Tybout (1997), Brenton *et al* (2010) who show that experience matters for the initiation of trade flows as well.

In column 3, I present the results for testing hypothesis **H3**. For testing this hypothesis, I include measures of infrastructure related trade frictions namely: costs to export; time to export and procedures to exports. If **H3** is true, I expect each of the coefficients of costs to export, time to export and procedures to export to carry a positive sign and to be statistically significant at least at 5 percent. In all specifications the variables carry the expected positive signs and statistically significant.

Additionally, in column 4 and column 5 I have included the measures of conflict, quality of institutions supporting exporting activity in Africa as well as a dummy for unilateral trade preference and measures of policy shocks namely: exchange rate volatility as well as financial underdevelopment, inappropriate FDI. These measures of macroeconomic development can affect export survival in either way. Negative macroeconomic developments will hurt export survival and positive macroeconomic developments will enhance export survival in Africa. In all specifications, I obtain positive coefficients, statistically significant for the conflict dummy as well as the measures of quality of institutions supporting exporting activities in Africa. These measures do increase the likelihood of Africa`s export relationship failure.

An indication that regime type as a proxy of quality and strength of institutions that support entrepreneurial activities does matter for the hazard rates of African export relationships. Since most of African countries have poor institutions and contract enforceability may not be up to standard to guarantee predictable standards on the suppliers' side. Ranjan and Lee (2007) work shows that the poor contract enforceability affects the volume of trade in their framework, the degree of contract enforceability in the country is proxied by an index of the rule of law provided by the international country risk guide (ICRG) database. In the current study, I use an alternative measure of the quality of institutions as the polity index provided by the polity IV project on political regimes and characteristics.

In the case of conflict, the conflict dummy unambiguously hurts the probability of export survival for African export relationships. The coefficient on this variable carries an expected sign, and is significant in all specifications. Overall, conflict and regime type seem to increase the hazard rates of African export relationships. The evidence strongly supports the prediction that hazard rates are higher for countries in conflict or have experienced conflict during the sample period.

I include a measure of unilateral preferences based on exporter eligibility and product eligibility for any of these preferences granted by the QUAD countries[11]. These are the traditional major African trading partners. The coefficient of the unilateral trade preference dummy is negative but statistically insignificant. This would imply that unilateral trade preferences do not matter for the hazard rates for African products. Previous studies have shown that unilateral trade preferences have anti-diversification effects (see Gamberoni (2007), Debaere and Mostashari (2010).

I use a measure of exchange rate volatility to test the effects of policy biases on Africa`s export relationship survival. The result show varied effects on Africa`s exports hazard rates. The variable is a measure of deviation from the trend of the bilateral nominal exchange rate. I use an absolute value from the deviation of the trend for the 15 years. The results on this variable are not robust, in some specifications; it seems to have a negative effect on hazard rates while in some specifications it seems to have positive effects. The estimated coefficient on exchange rate volatility suggests that a foreign depreciation (i.e., an increase in the foreign country's real exchange rate) is associated with higher hazard rates, a result that is possible due to non-linearity in the effect of exchange rate volatility on survival.

Normally, a decrease in the exporter's exchange rate during the life time of the export relationship implies that the importer's purchasing power in the exporter's currency rises. This implies that naturally, the exporter's products become more attractive and export relationships here are likely to be sustained. Intuitively, the length of an export relationship is likely to be affected by the movements of relative prices. That is an overvalued currency, as most of African countries currencies were artificially overvalued in the 90s, for example reduces the competitiveness of exports for the exporters in the African country. Conversely, an undervalued currency reduces the purchasing power of Africa's trading partners.

I use private credit to GDP ratio as a measure of financial development for African nations. The coefficient on this variable indicates a positive effect on the hazard rates of African exports. However, the result is not robust. Intuitively, underdeveloped financial system in which firms are unable to access financial resources for export activity or entrepreneurial start-ups especially in times of financial stress can force exporters out of business thus terminating export relationships untimely. Besides enterprises access financial services for export activity, also the costs of these services is vital for the success of firms in international markets. For instance, regional interest rates-regional cost of borrowing are the highest in Africa relative to other regions which imposes extra costs on business and are likely to determine if the firm persist in the export market or exits untimely.

On foreign direct investment, contrary to existing literature (see *inter lia*, Kemme *et al* (2009), on foreign direct investments export performance and export of differentiated products, the coefficient on FDI is positive and statistically and economically significant, indicating that FDI in Africa has a positive effect on hazard rates for African exports. Strangely, this result emerges even when the stylized facts show that actually African traditional exports have higher survival rates than the differentiated products (see survival rates by HS 2), in other words this results goes contrary to theory and the stylized facts from the data on African sample.

[11] The QUAD is a group of Africa's traditional trading partners. This is comprised of Canada, European Union, Japan and United States. They have traditional offered unilateral trade preferences, to many African beneficiary countries.

In Table 9 I present specifications for testing for hypothesis **H4**. In column 1 I present results with joint level effects of infrastructure related trade frictions, namely: costs to export, time to export and procedures to export (coefficients of these not reported for brevity purposes). In column 2, 3 and 4 I present their separate interaction effects with corresponding dummy for regional integration. The objective here is to test whether the depth of regional integration influences the effects of these infrastructure related trade frictions. The interaction of these measures with the key covariates of interest is to provide evidence for changes within the regional cooperation initiatives. The goal here is to understand whether regional trade cooperation influences these infrastructure and bureaucratic related trade frictions in the region, ease the search process i.e., if the factors affecting the survival of export relationship act differently within the regional integration initiatives. These specifications come at the cost of small sample size since for some variables only a limited number of observations are available.

In column 2 of Table 9 I present the specification with the variable of interest now being the cost to export. Notice the coefficient on costs to export is highly statistically significant and carries expected sign. Costs to export do increase hazard rates for African exports. Its effect does not change when I interact with regional variables. Except for the customs union dummy whose coefficient is negative and statistically significant. This would imply the interaction effects of this variable enhance the survival of Africa's export relationships. It's possible that costs to export are driven by the pervasiveness of poor infrastructure in Africa implying that even if countries regionally integrate, the exporting firms will still be experiencing the same hurdles within the region thus the observed interaction effects. Intuitively, I expect costs to export to be a key driver of high hazard rates of African export relationships. Costs to export is crucially based on distance, distance increases export costs in a number of dimensions; it increases the time and the costs of delivering a product to the market. The longer the distance covered by the shipment, the higher the cost of delivering a product to the market. The longer the distance covered by the shipment, the higher the chances of potential interruptions or delays which might prompt cancellations of subsequent orders. Direct measures of transport costs would have been more appropriate but unfortunately data on African exporters shipping costs and freight costs is very scanty and patchy (very few countries report detailed information on shipping costs as part of their trade data statistics).

In column 3 I present results for interaction effects for procedures to export-number of documents to export. The level effects of procedures to export shows that it increases the hazard rates and therefore reduces survival rates of African exports. The result shows the importance of procedures to export, it's highly significant and carries an expected sign i.e., high the number of procedures to export (number of documentation required) the high the chances of an export relationship failing (increases hazard rates for African exports). Being in a monetary union and customs union does reverse these negative effects on probability of export survival but not so in the common market and preferential trade area.

Finally, in column 4 I present results for the level effects of time to export and interaction effects for regional integration. I notice similar and robust results as in above. The level effects of time to export increase hazard rates for African export relationship, implying that the longer the exports are delayed at the border or in transit, the higher the chances are that some of the export relationships will be terminated (similar findings in different framework have been found by Freund and Rocha (2010) that transit delays is a key reason for failure of African export expansion at the extensive margin). The interaction effects work well for the monetary union,

Customs Union and PTA (i.e., in these regional groupings, imply there is a reduction in transit delays) and therefore a reduction in the hazard rates for African export relationship. For example numerous roadblocks, customs checks and procedures, unwarranted differing national product standards and product regulations show up as export costs in terms of export delays may act to contain export diversification by limiting regional trade flows and the experience in exporting to the respective trading partner.

I test the significance of the interaction effects and the interaction effects for time to export and regional trade cooperation were significantly different from zero at least at 5 percent level of significance.

In terms of other conventional determinants of bilateral trade flows, I do control for market size using sum of GDP for the trading partners in an export relationship (not reported for brevity purposes). For economic similarity, I use absolute difference in GDP per capita to control for tastes and preferences among trading partners. The results are as those reported in conventional determinants of bilateral trade flows in the gravity model, i.e., the larger the sum of GDP of trading partners, and indicator of market size, the more likelihood for an export relationship will survive longer (similar results have been obtained by Nitsch(2009)). That is hazard rates for African exports are largely reduced when the sum of the GDP of trading partners is very large signifying a large market size. Earlier research (see inter alia Baldwin and Harrigan (2007), Blyde (2008) and Brenton et al.(2010) have reported the importance of economic size of both trading partners in contributing to facilitating disappearance of zero flows in their trade matrix as well as their trade flow survival. Similarly, I find economic similarity between trading partners (measured by the absolute difference in GDP per capita) to significantly reduce the hazard rates of African export relationships. The measure of economic dissimilarity is between the partner countries is the differences GDP of the exporter and importer countries. It's also statistically significant, carries the expected sign in all specifications.

These empirical results could reflect one of the following stylized facts i.e., regional trade cooperation could have one of the three specific effects: first, an increase in the depth of regional trade cooperation could signify a reduction in search costs, reduction in border delays, and reduction in shipping costs effectively making it profitable to export within the region and thus sustaining product-country pair export relationship once it has been established; the second effect could result in also reduction of search costs via the network effects of the regional trade cooperation in which case a deeper regional trade cooperation signifies, the buyer seller partnership is easy to make since, trade frictions, information frictions are significantly reduced; and the third effect could also result in landlocked countries having easy access to port facilities through their regional neighbours which also would significantly reduce the transitional delays and hence likely enhance the survival probabilities of perishable exports from landlocked countries.

5.1. Robustness checks

In the first check, I use data based on only new export activities only. The results are presented in Table 10. The first column presents results of the key variables of regional trade cooperation under investigation. In the second, column I present the benchmark results as in main specification. In the third column to seventh column, I control for a variety of infrastructure related trade frictions and bureaucratic frictions. For space purposes, I do not report the results for

specifications involving interaction effects. But the results are qualitatively similar to those of my preferred specification. The estimates indicate no change qualitatively, providing the needed proof that the findings are robust.

The coefficients on the costs to export, time to export and procedures to exports covariates suggest that, the higher these costs are the strong the effect on the hazard rates, or the likelihood of an African export relationship to fail, that is the larger the negative effect on the survival of an export relationship.

In the second check, I use data adjusted for one year gaps following (Blyde (2008)), this time focusing on interaction effects. The results are presented in Table 11 columns 1-4. The estimates indicate one year gap adjustments do not alter the results in any significant way. The empirical results remain qualitatively unchanged.

My third test involves using a linear probability model to test the significance of my covariates on determining the length of a typical spell for a typical product-country pair export relationship. The results are shown in Table 11 column 1-4. The results are very much in line with those of my preferred specification. In sum, it turns out that the estimation results are remarkably robust across different samples and specifications. As in previous specifications, the time interaction term indicates that the effect of fixed export costs diminishes over time and this is consistent across regressions.

6.Concluding remarks

In this paper I have explored the effects of intra-Africa regional trade cooperation, export experience on Africa`s export relationship survival within Africa regional and international markets. I have also explored other underlying factors that restrict Africa`s export relationship survival namely infrastructure related trade frictions, macroeconomic development, foreign direct investment as well financial development. The unconditional results show that Africa`s export relationships are indeed short-lived. The average survival rate for each of intra-Africa regions export relationships (exporter-product-market connection) is 35 percent for the first year. That is only 35 percent of export relationships initiated survive their first year of establishment- this implies 65 percent export relationship hazard rate across the region[12]. The median duration of an African export relationship is 1 year while the mean is only 2.08 years compared to 3 years for the rest of the regions (see Brenton *et al* (2009). I find that African export trade relationships have a very short life, with the median duration of exporting a product just 1 year and average length of 2.08 years.

I obtain 3 key main empirical results. First, intra-Africa regional trade cooperation do increase the likelihood of Africa`s export relationship survival. The results show that the depth of regional integration matters on lowering Africa`s export hazard rates relative to countries that are not in any regional cooperation. Second, I find evidence that supports the "learning by export hypothesis". That is export experience within regional as well as rest of the world markets increases the likelihood of Africa`s export relationship survival. Finally, results suggests that

[12] Source : Author`s calculations based on BACI/COMTRADE dataset on Africa`s bilateral trade flows (1995-2009)

infrastructure related trade frictions such as costs to export, time to export, and procedures to export as well as weak export supporting institutions have a negative effect on Africa`s export relationship survival. Similarly macroeconomic developments such particularly exchange rate volatility, financial underdevelopments and inappropriate foreign direct investments hurt chances of an African export relationship survival. These factors increase the probability of export failure in all African regional groups. Evidence also suggests that interaction effects between regional integration initiatives and a variety of these trade frictions namely: costs to export, time to export and customs procedures effects on hazard rates diminish in significance with the depth of regional integration over time. I have also shown empirical evidence that intra-regional trade cooperation in Africa reduces significantly the effects of a number of these trade frictions, implying that deeper and increased trade cooperation would sustain Africa's export expansion. I find interaction effects significantly reversing the negative effects of the variables. Furthermore, evidence suggests that regional trade cooperation is helping to reduce the effects of these factors i.e., more integration leading to less border delays and transit delays, and lower cost of doing business is reducing the hazard rates for African exports.

For the future, this paper provides the first step in examining the role of intra-Africa trade cooperation in Africa's export expansion. There is a still a long way to go before refined policy recommendations can be derived from this research, however. That will require a systematic specific regional or country and firm-specific analysis of the factors influencing export survival. It's important to derive information from regional groupings that specifically have high failure rates of their exports both in the intra-regional and international markets.

References:

Allen, T. (2011) "Information Frictions in Trade" Job *Market Paper*, Yale University

Baldwin R. (1988), "Hysteresis in Import Prices: The Beachhead Effect" The American Economic Review, Vol. 78, Issue 4, pp.773-785.

…….... (1990) "Hysteresis in Trade" Empirical Economics, Vol. 15(2), pp 127-42

Baldwin, R. and J. Harrigan (2008) "Zeros, Quality, and Space: Trade Theory and Trade Evidence" *American Economic Journal: Microeconomics 3 (May 2011): 60–88*

Baldwin, R. & P. Krugman (1989) "Persistent Trade Effects of Large Exchange Rate Shocks" Quarterly *Journal Economics* 104(4), 635-654.

Bernard, A.B., Jensen, J.B., (2004), "Why Some Firms Export" *Review of Economics and Statistics* 86 (2), 561-569

Bernard, A.B., Jensen, J.B., (2004), "Exceptional Exporter Performance: Cause, Effect or both?" *Journal of International Economics* 47, 1-25

Besedes, T. and T. Prusa (2006a), "Product Differentiation and Duration of U.S. Import Trade," *Journal of International Economics*, 70, pp. 339-358

Besedes, T. and T. Prusa (2006b), "Ins, Outs and the Duration of Trade*", Canadian Journal of economics*, Vol. 39, No. 1 pp. 266-295

Besedes, T. and T. Prusa (2007), "The Role of Extensive and Intensive Margins and Export Growth," NBER Working paper # 13628

Besedes, T. (2008) "A Search Cost Perspective on Duration of Trade" *Review of international Economics* 16(5), 835-849

Blyde, J. (2008), "What Drives Export Survival? An Analysis of Export Duration in Latin America," mimeo, Inter-American Development Bank.

Brenton, Paul, Christian Saborowksi, and Erik Von Uexkull (2010), "What explains the Low Survival Rate of Developing Country Export Flows?" *World Bank Econ Review* (2010) 24(3) PP 474-499.

Cadot, Olivier, Leonardo Iacovone, Ferdinand Rauch, and Denise Pierola (2011), "Success and Failure of African Exporters," Policy Research Paper # 5657, The World Bank

Cleves, M.A., Gould, W.W. and Gutierrez, R.G. (2004), "An Introduction to Survival Analysis Using Stata" Stata Press, College Station, Texas

Cox, D. (1972), "Regression Models and Life Tables," *Journal of the Royal Statistical Society*, Series B, 34, pp.187-220.

Debaere, P. and S. Mostashari (2010) "Do tariffs for the extensive margin of international trade? an empirical analysis" Journal of International Economics, Vol. 81 pp 163–169

Dixit, A. (1989) "Hysteresis, Import Penetration, and Exchange Rate Pass-Through" *The Quarterly Journal of Economics*, Vol. 104, No.2 pp.205-228.

Faye *et al.* (2004) "The Challenge Facing Landlocked Developing Countries" *Journal of Human Development* Vol. 5 #1.

Fugazza and Molina (2009), "On the Determinants of Exports Survival" UNCTAD Policy Issues in International Trade and Commodities Study Series No.46

Freund C., and Rocha, N. (2010) "What Constrains Africa's Exports" Policy Research Working Paper # 5184.-

Gamberoni, E. (2007) "Do Unilateral Trade Preferences help Export Diversification?" an Investigation of the Impact of the European Unilateral Trade Preferences on Intensive and Extensive Margin of Trade" IHEID working paper 17-2007.

Gaulier, G. and Zignago, S (2007). "BACI: International Trade Database at the Product-level" CEPII, WP NO 2010-23

Grossman, G. and Helpma, E. (1991) *Innovation and Growth in the Global Economy*. Cambridge, MA: MIT Press.

Irarrazabal A.A., and Opromolla, L. D. (2009) "A Theory of Entry and Exit into Exports Markets" University of Oslo, Banco de Portugal.

Isham, J, L. Pritchett, M. Woolcock and G. Busby (2002), "The Varieties of the Rentier Experience: How Natural Resource Endowments and Social Institutions Affect Economic Growth," mimeo

Kemme, M.D, D. Mukherjee, and A. Nikolsko-Rzhevskyy (2009) “Foreign Direct Investment and Export Performance in Emerging Economies: Evidence from Indian IT firms” mimeo, University of Memphis.

Melitz, M. (2003), “The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity,” *Econometrica,* 71(6): 1695-1725.

Nitch, V. (2009), “Die another Day: Duration in German Import Trade,” *Review of World Economy* 145:133-154

Ranjan, Priya and Jae Young Lee, 2007, “Contract Enforcement and International Trade,” *Economics and Politics,* 19(2), July, 191-218

Rauch, J. E. (1999) “Networks versus Markets in International Trade” *Journal of International Economics*, 48(1), 7-35

Rauch, J.E. (2001) “Business and Social Networks in International Trade” *Journal of Economic Literature*, 39(4), 1177-1203.

Rauch, J. E. and Watson, J. (2003) "Starting small in an unfamiliar environment,” international *Journal of Industrial Organisation,* vol. 21(7), pp.1021-1042.

Rauch, J (2010), “Development through synergistic reform,” *Journal of Development Economics*, Vol. 93, Issue 2. pp 153-161

SACHS, J. and A. WARNER (2001), “The Curse of Natural Resources,” *European Economic Review*, Vol. 45, No. 4-6, pp. 827-838.

Shepherd (2007) “Product Standards, Harmonization, and Trade: Evidence from the Extensive Margin”. Policy Research Working Paper Series 4390. The World Bank

Stirbat L., R. Record and K. Nghardsaysone (2011) “Exporting from a Small Landlocked Economy: An Assessment of Firm-Product-Destination Survival Rates in the Lao PDR”. Policy Research Paper # 5695. The World Bank

Tybout R. and M. Roberts (1997) "The Decision to Export in Colombia: An Empirical Model of Entry with Sunk Costs" *The American Economic Review*, Vol. 87, No. 4, pp. 545-564

Vernon, R. (1966) “International Investment and International trade in the Product Cycle” *Quarterly Journal of Economics,* 80(2), 190-207.

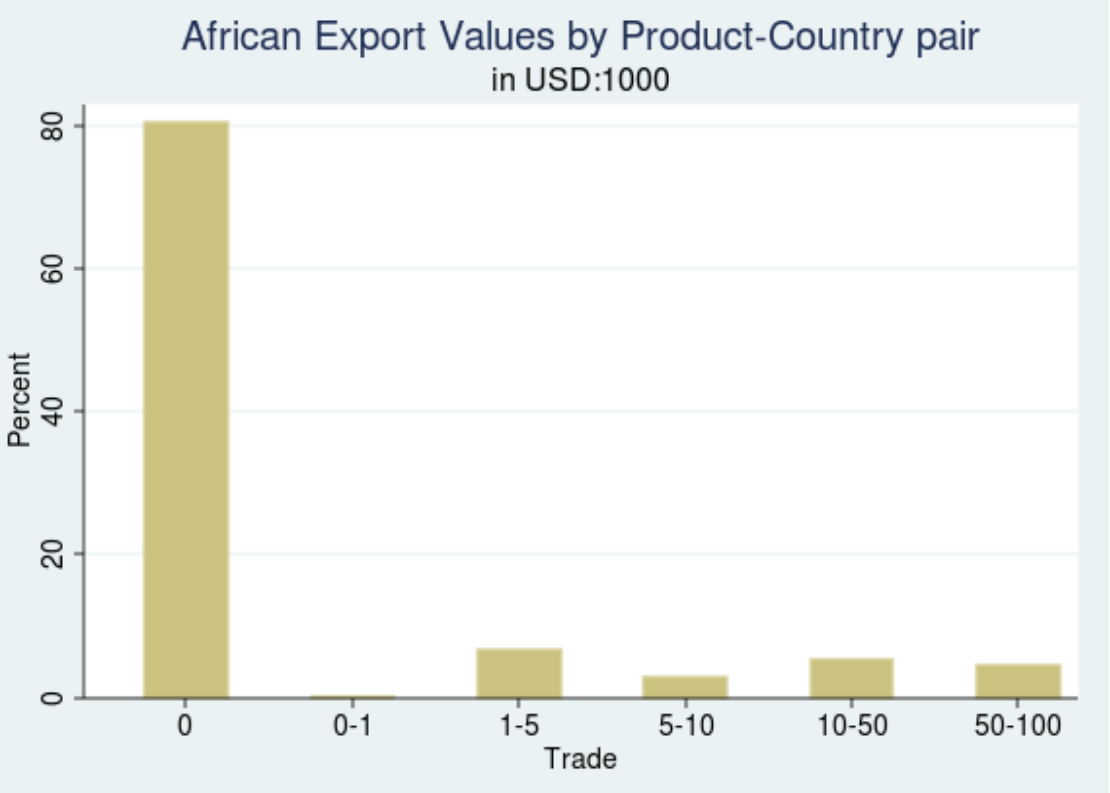
Wood, A. and J. Mayer (1998), “Africa’s Export Structure in a Comparative Perspective”, Study No. 4,

World Development Indicators (2011). The World Bank, Washington D.C.

UNCTAD (2001) African Development in a Comparative perspective, UNCTAD, Geneva, published in *Cambridge journal of Economics,* Vol. 5, No. 3, pp. 369-394.

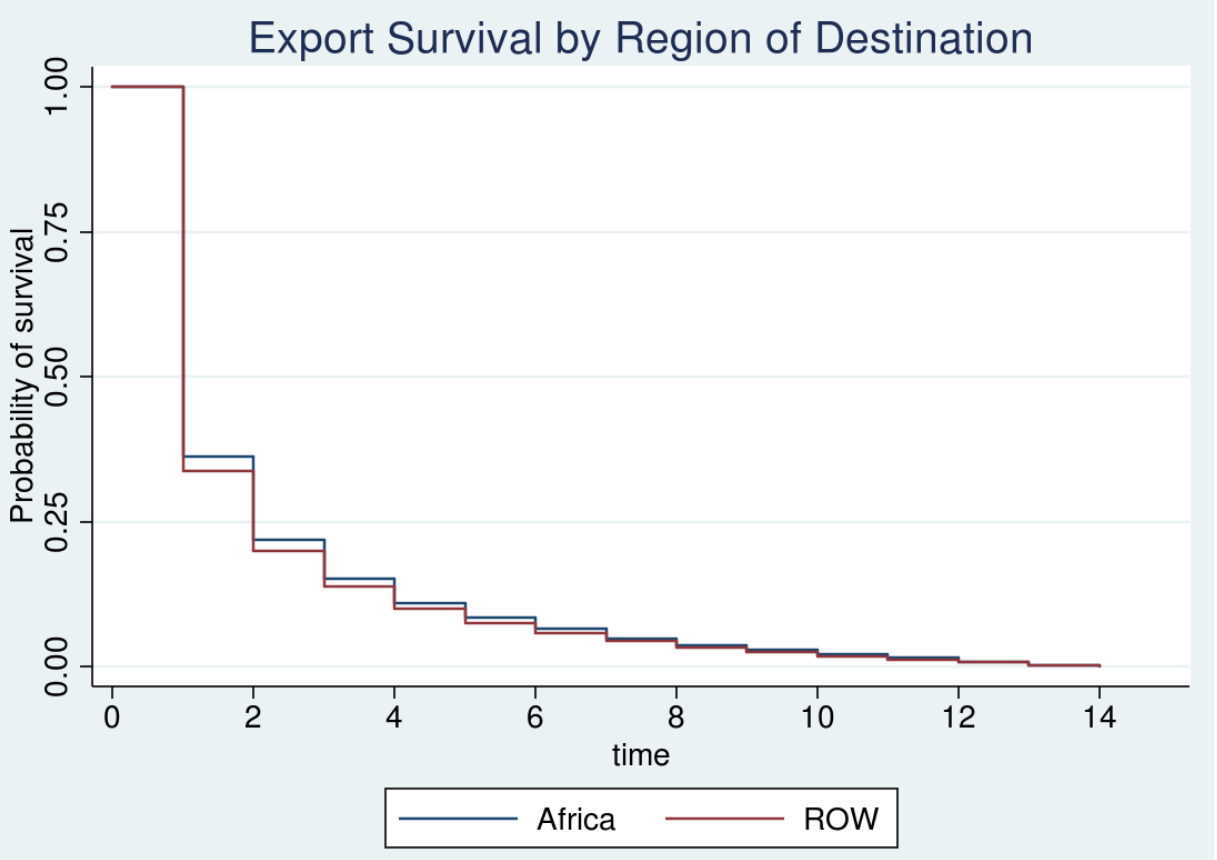
Appendix 2: List of Tables and Figures:

Figure 1: Histogram for the export values (USD: 1000) for African countries



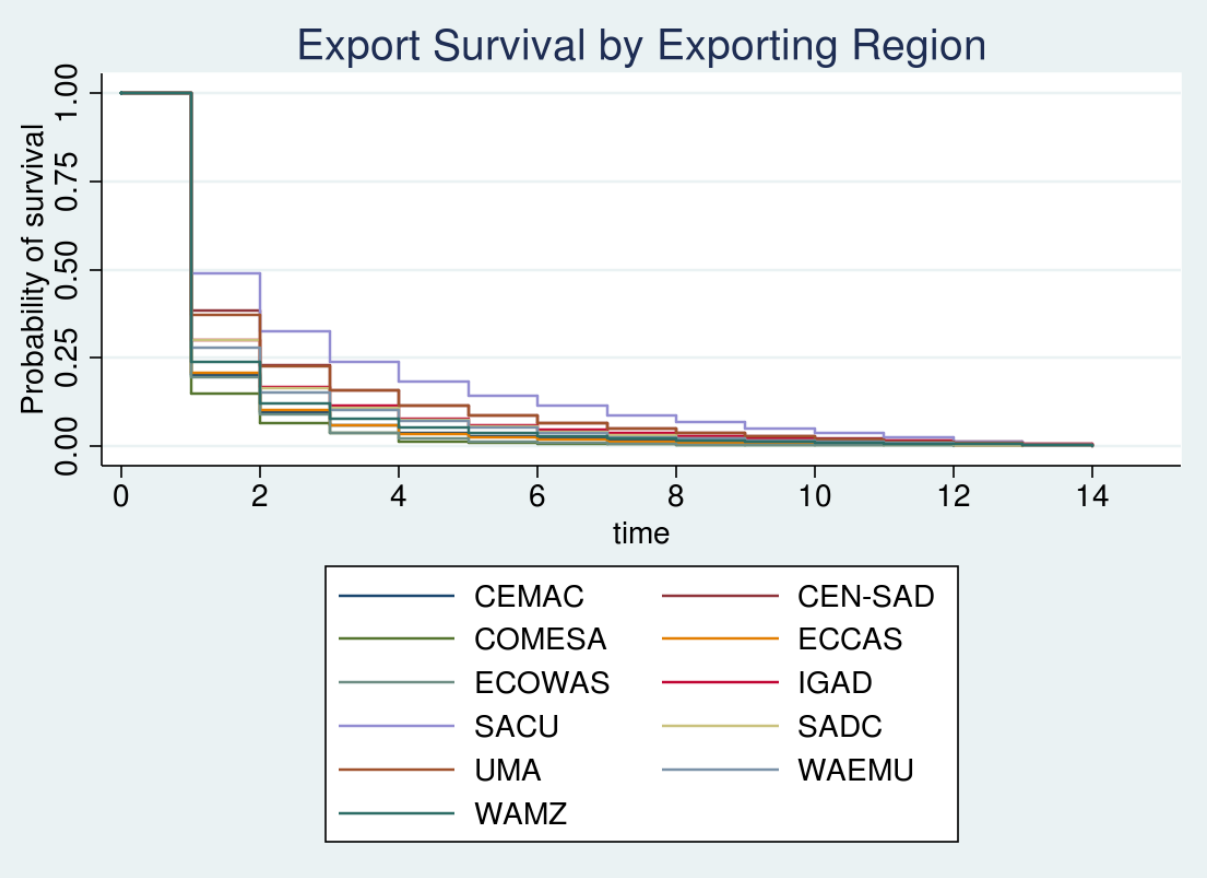
Notes: This histogram shows the distribution of positive trade observations. Almost 80 percent of potential trade flows at product level in Africa's trade matrix are "Zero flows". Trade is reported in 1000s of USD. This implies that only 20 percent of Africa's bilateral trade relationships are positive trade flows. Also all Africa trade relationships fall below the mark of USD: 100,000 at product level.

Figure 2: Export Survivals by Region (destination of exports)



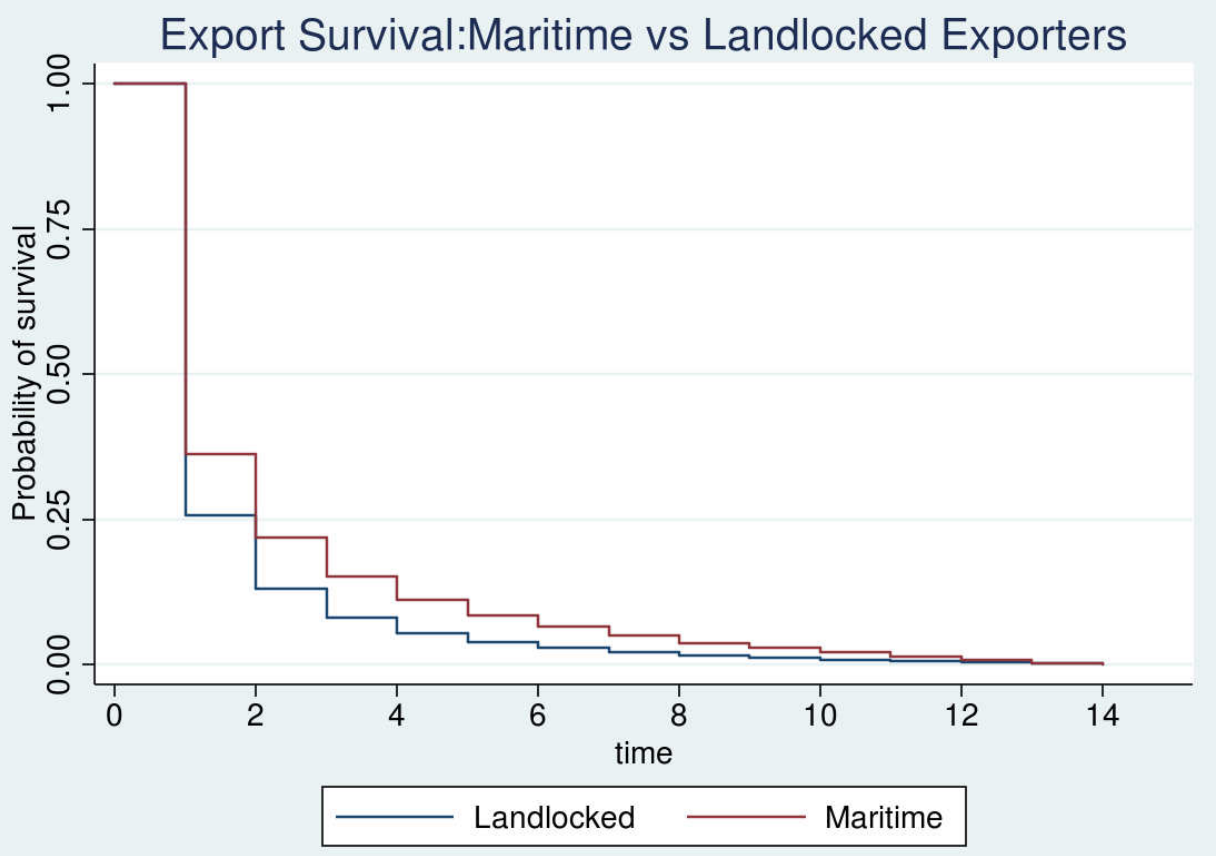
Notes: This graph shows that intra-Africa export relationships have slightly higher survival probabilities than African exports to the rest of the world.

Figure 3: Export Survivals by Exporting Region



Notes: This figure shows export survival probabilities within intra-African regional trade cooperation. Southern Africa Customs (SACU) the world's oldest customs union which is composed of Botswana, Namibia, Lesotho, South Africa and Swaziland has the highest survival probabilities of its exports. It also shows that less integrated regions like COMESA and ECCAS have low survival probabilities of their exports. In general, regions in deeper regional trade cooperation have relatively higher survival rates of their exports than less integrated regional grouping.

Figure 4: Export Survival: Maritime vs. Landlocked Exporters



Notes: This figure shows that coastal African countries have significantly higher export survival rates than the landlocked African countries.

Table 1: Annual Birth & Death per Regional Grouping

Region	Number of spells	Export relationships			Annual Death Rate	Annual Birth Rates
		Total	1995	2009		
COMESA	5642	101852	37476	48978	42%	43%
EAC	3093	52621	3330	37014	42%	47%
ECOWAS	4373	32847	20643	25582	37%	41%
SADC	4272	197968	102679	142662	30%	43%
SACU	2582	147250	92156	112089	24%	44%
CEN-SAD	7353	101852	32847	49386	46%	43%
ECCAS	2106	19055	11004	10698	51%	42%
IGAD	2313	52621	13446	32905	36%	42%
UMA	2522	68069	54263	58732	29%	44%
WAEMU	3136	32847	11122	28159	46%	44%
CEMAC	1478	11004	6141	7281	51%	45%
WAMZ	1824	28368	20423	25582	45%	47%
WAEMU	2940	32847	21381	28159	52%	45%
Landlocked	4241	26221	13446	15342	60%	51%
Maritime	5989	230815	52621	82402	35%	60%
Africa	10230	257036	66067	97744	38%	45%
ROW	17681	147250	42156	56089	33%	45%

Notes: Column 1 shows the maximum number of spells for each of the regional grouping. Column 2 shows the total export relationships per region. Column 3 and 4 shows the export relationships at the beginning and end of the sample respectively. While column 5 and 6 report the average annual death and birthrates respectively. It shows that maritime countries have the highest birthrates and also among the countries with least average death rates.

Table 2: Survival Rates for Regional Groupings

Year	SACU	SADC	UMA	EAC	COMESA	CEN-SAD	IGAD	WAEMU	ECOWAS	WAMZ	ECCAS	CEMAC	Africa	ROW
1	49%	41%	37%	32%	32%	32%	30%	28%	26%	24%	20%	20%	36%	34%
2	32%	25%	23%	18%	18%	19%	17%	15%	14%	12%	10%	9%	22%	20%
3	24%	18%	16%	12%	12%	13%	11%	10%	9%	8%	6%	6%	15%	14%
4	18%	14%	12%	8%	8%	9%	8%	7%	6%	5%	3%	4%	11%	10%
5	14%	10%	9%	6%	6%	7%	6%	5%	4%	4%	2%	3%	8%	8%
6	11%	8%	7%	5%	5%	5%	5%	4%	3%	3%	2%	2%	6%	6%
7	9%	6%	5%	4%	3%	4%	3%	3%	2%	2%	1%	2%	5%	4%
8	7%	5%	4%	3%	3%	3%	3%	2%	2%	1%	1%	1%	4%	3%
9	5%	3%	3%	2%	2%	2%	2%	1%	1%	1%	1%	1%	3%	2%
10	4%	2%	2%	2%	1%	2%	2%	1%	1%	1%	1%	1%	2%	2%
11	2%	2%	1%	2%	1%	1%	2%	1%	1%	1%	0%	0%	1%	1%
12	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%	0%	0%	1%	1%
13	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
14	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
15	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Notes: This table shows the survival rates for each regional grouping. It is clearly seen that Southern Africa Customs Union (SACU), Southern Africa Development Community (SADC) the Arab Maghreb Union and Intra-Africa export relationships have the highest export survival rates.

Table 3: Survival Rates for Maritime and Landlocked countries

Year	Maritime	Landlocked
1	36%	25%
2	22%	13%
3	15%	8%
4	11%	5%
5	9%	4%
6	7%	3%
7	5%	2%
8	4%	2%
9	3%	1%
10	2%	1%
11	1%	0%
12	1%	0%
13	0%	0%
14	0%	0%
15	0%	0%

Notes: The table shows that coastal Africa countries have higher survival rates than the landlocked African countries, by a factor of 11 percent in the first year of initiation of the export relationships.

Table 4: Survival Rates by product sectors

Year	HS 01-05	HS 06-14	HS 15	HS 16-24	HS 25-27	HS 28-38	HS 39-40	HS 41-43	HS 44-46	HS 47-49	HS 50-63
1	38%	41%	35%	42%	40%	36%	36%	38%	40%	36%	37%
2	23%	25%	20%	27%	25%	22%	22%	22%	25%	21%	22%
3	16%	18%	13%	19%	18%	15%	15%	15%	18%	15%	16%
4	11%	14%	10%	14%	14%	11%	11%	11%	13%	11%	11%
5	8%	11%	8%	11%	11%	9%	8%	8%	10%	8%	8%
6	6%	8%	6%	8%	8%	7%	6%	6%	8%	6%	6%
7	5%	6%	4%	6%	6%	5%	5%	4%	6%	5%	5%
8	4%	5%	3%	5%	5%	4%	4%	3%	5%	4%	4%
9	3%	4%	2%	4%	4%	3%	3%	2%	4%	3%	3%
10	2%	3%	1%	3%	3%	2%	2%	1%	3%	2%	2%
11	1%	2%	1%	2%	2%	1%	1%	1%	2%	1%	1%
12	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
13	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
14	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
15	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Notes: This table shows survival rates of products categories aggregated at HS 2 digit level and grouped into sectors. Sector 4 which is composed of HS chapter 16-24 has the highest survival rates. It's composed of prepared food stuffs, beverages, spirits and tobacco to a large extent traded intra-regionally. It's followed by sector 5 which is composed of Africa's traditional commodity exports like coffee, tea, cocoa and crude petroleum products. The message from this table is there is heterogeneity within the product categories of African exports and traditional exports have higher survival rates than non-traditional exports or value added products signifying a limited opportunity for African countries to expand their products sustainably along the extensive margin of trade.

Table 5: Survival Rates by product sectors

Year	HS 64-67	HS 68-70	HS 71	HS 72-83	HS 84-85	HS 86-89	HS 90-92	HS 93	HS 94-96	HS 97
1	37%	36%	36%	35%	29%	31%	28%	29%	34%	36%
2	22%	22%	20%	21%	16%	17%	15%	16%	20%	22%
3	15%	15%	14%	14%	10%	12%	10%	10%	14%	15%
4	11%	12%	10%	10%	7%	8%	7%	7%	10%	11%
5	8%	9%	8%	8%	6%	6%	5%	6%	8%	8%
6	6%	7%	6%	6%	4%	4%	4%	4%	6%	6%
7	5%	5%	4%	5%	3%	3%	3%	2%	5%	5%
8	4%	4%	3%	3%	2%	2%	2%	2%	4%	4%
9	3%	3%	2%	3%	2%	2%	2%	1%	3%	3%
10	2%	2%	2%	2%	1%	1%	1%	1%	2%	2%
11	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
12	1%	1%	1%	1%	0%	1%	0%	0%	1%	1%
13	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
14	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
15	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Notes: Like in table 4 above.

Table 6: Diversification of exports (HS 6-digit level data)

		Products		Partners	
Year	Number of trade relationships	Total	Average Number of products exported to each partner	Total	Average number of destination markets for each product
1995	99245	3238	1103	90	31
1996	113337	3436	1200	94	33
1997	135324	3748	1389	97	36
1998	146255	3941	1506	97	37
1999	155521	4086	1570	99	38
2000	170193	4299	1716	99	40
2001	175923	4369	1772	99	40
2002	201833	4717	2005	101	43
2003	230981	5028	2187	106	46
2004	238816	5098	2189	109	47
2005	253327	5188	2459	103	49
2006	255700	5208	2336	109	49
2007	266597	5213	2446	109	51
2008	278825	5221	2638	106	53
2009	247165	5036	2318	107	49

Notes:Column 1 shows the total number of trade relationships for the whole sample, column 2 shows the products exported annually, column 3 shows the average number of products exported to each partner, column 4 shows the number of destination markets and column 5 reports the average number of markets each product is exported. Overall, the table shows a rise in Africa`s export expansion both on product and market margins.

Table 7: Summary Statistics of Key explanatory variables

Full Sample	Statistics	Tariff	FDI_inflows	Exchange Rate Volatility	Financial Depth	Trade Facilitation	Customs Procedures	Time to Export	Cost to Export
Landlocked	mean	7.73	1473.10	108.63	0.10	29.94	3.26	48.67	2400.26
	p50	3.00	867.97	104.91	0.07	29.79	3.31	47.00	2098.00
	sd	12.18	1698.53	25.10	0.05	2.15	0.39	7.54	866.94
	min	0.00	15.84	62.60	0.03	26.00	1.94	32.00	1050.00
	max	630.00	7603.90	179.28	0.25	37.42	3.89	78.00	5497.00
	range	630.00	7588.06	116.69	0.22	11.41	1.95	46.00	4447.00
Maritime	mean	9.76	21319.71	103.96	0.40	22.19	3.76	25.21	1150.48
	p50	5.00	11649.40	100.56	0.45	22.81	3.76	26.00	1087.00
	sd	13.79	27829.82	24.16	0.24	3.21	0.57	9.04	438.22
	min	0.00	0.00	67.53	0.00	16.79	2.60	11.00	463.00
	max	3000.00	117434.15	597.36	0.87	32.57	5.10	69.00	3733.00
	range	3000.00	117434.15	529.83	0.87	15.78	2.50	58.00	3270.00

Notes: This table reports the summary statistics of the key explanatory variables. The table shows heterogeneity within the values of some of the explanatory variables depending on whether the country is coastal or landlocked.

Table 8: Effects of intra-Africa trade cooperation on export survival

Dep. Var: Hazard rate	(1)	(2)	(3)	(4)	(5)
Monetary Union	-0.037***	-0.015***	-0.019**	-0.039**	-0.032*
	(0.002)	(0.003)	(0.007)	(0.013)	(0.013)
Common Market	-0.227***	-0.242***	-0.033	-0.201***	-0.166***
	(0.005)	(0.005)	(0.025)	(0.045)	(0.045)
Customs Union	-0.181***	-0.278***	-0.276***	-0.264***	-0.452***
	(0.009)	(0.012)	(0.032)	(0.058)	(0.063)
Pref. Trade Area	0.040***	0.045***	0.144***	0.207***	-0.249
	(0.003)	(0.003)	(0.008)	(0.015)	(0.015)
Product experience		-0.824***	-2.171***	-4.734***	-4.722***
		(0.003)	(0.011)	(0.025)	(0.026)
Market experience		-0.330***	-0.574***	-0.769***	-0.747***
		(0.001)	(0.003)	(0.006)	(0.006)
Cost to export			0.048***	0.049**	0.022
			(0.008)	(0.018)	(0.020)
Time to export			0.230***	0.241***	0.120***
			(0.010)	(0.021)	(0.020)
Customs procedures to export			0.079***	0.077***	0.125***
			(0.004)	(0.012)	(0.013)
conflict dummy				0.027	0.041
				(0.020)	(0.026)
Polity index				0.001	0.005***
				(0.001)	(0.001)
Unilateral preferences dummy				-0.040	-0.053
				(0.198)	(0.199)
Exchange rate Volatility					0.538***
					(0.065)
FDI inflow					0.050*
					(0.022)
Financial Depth					0.325*
					(0.152)
Observations	11542256	9250650	3037841	1829512	1723532
Level of significance	*p<0.1	**p<=0.05	***p<0.01		

Notes: The dependent variable is the hazard rate. The unit of observation is the product-country pair. A positive sign on the coefficient signifies an increase in the probability of an export relationship failure (increase in hazard rate), a negative coefficient signifies an increased probability of export relationship survival (i.e., the covariate is negatively correlated with the hazard rate and positively correlated with export relationship survival). Stars indicate level of statistical significance: *** significant at 1%, ** significant at 5% and * significant at 10%

Table 9: Level & Interaction effects of infrastructure related trade frictions

Dep. Var: Hazard rate	(1)	(2)	(3)	(4)
Monetary Union	-0.019**	-0.224*	-0.793***	-0.507***
	(0.007)	(0.092)	(0.013)	(0.058)
Common Market	-0.033	-0.954***	-0.250***	-0.254***
	(0.025)	(0.237)	(0.034)	(0.116)
Customs Union	-0.276***	-3.350***	-1.497***	-2.722***
	(0.032)	(0.328)	(0.108)	(0.579)
Pref. Trade Area	-0.144	0.954***	0.656***	0.238**
	(0.008)	(0.237)	(0.016)	(0.086)
Product experience	-2.171***	-2.169***	-1.454***	-2.170***
	(0.011)	(0.011)	(0.006)	(0.011)
Market experience	-0.574***	-0.574***	-0.526***	-0.573***
	(0.003)	(0.003)	(0.002)	(0.003)
MU*cost to export		0.214***		
		(0.025)		
CM*cost to export		0.029*		
		(0.013)		
CU*cost to export		-0.418**		
		(0.044)		
PTA*cost to export		0.416***		
		(0.033)		
MU*procedures to export			-0.180***	
			(0.004)	
CM*procedures to export			0.178	
			(0.003)	
CU*Procedures to export			-0.307***	
			(0.020)	
PTA*procedures to export			0.360***	
			(0.009)	
MU*time to export				-0.103***
				(0.026)
CM*time to export				-0.137***
				(0.017)
CU*time to export				-0.625***
				(0.150)
PTA*time to export				-0.413***
				(0.038)
Observations	3,037,841	3,037,841	4,348,890	3,037,841
Level of significance	* p<0.1	** p<0.05,	*** p<0.01	

Notes: column 1 indicate specification including level effects of costs to export, time to export and procedures to export (not reported in table because of need to have a readable table). Column 2-4 presents the interaction effects all significant atleast 5 percent level. *** significant at 1%, ** significant at 5% and * significant at 10%.

Table 10: Robustness checks for benchmark results: Only new export relationships

	(1)	(2)	(3)	(4)	(6)	(7)
Dep. Var.: Hazard Rates						
Monetary Union	-0.062***	-0.045***	0.002	0.001	0.000	-0.010
	(0.003)	(0.004)	(0.007)	(0.007)	(0.007)	(0.007)
Common Market	-0.160***	-0.067***	0.086**	0.089***	0.089***	0.077**
	(0.006)	(0.012)	(0.027)	(0.027)	(0.027)	(0.026)
Customs Union	-0.124***	-0.355***	-1.031***	-1.036***	-1.036***	-1.054***
	(0.008)	(0.013)	(0.031)	(0.031)	(0.031)	(0.032)
Preferential Trade Area	0.032***	-0.101***	-0.174***	-0.172***	-0.171***	-0.160***
	(0.003)	(0.005)	(0.008)	(0.008)	(0.008)	(0.008)
Financial Depth		0.173***	0.986***	1.005***	1.014***	0.559***
		(0.030)	(0.048)	(0.048)	(0.047)	(0.052)
Institutions		0.003***	0.003***	0.005***	0.003***	0.004***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Conflict Dummy		0.019***	-0.102***	-0.102***	-0.102***	-0.112***
		(0.004)	(0.008)	(0.008)	(0.008)	(0.008)
Exchange rate volatility		-0.134***	0.474***	0.465***	0.465***	0.354***
		(0.012)	(0.021)	(0.021)	(0.021)	(0.021)
Unilateral Preference dummy		0.017	-0.324*	-0.327	-0.331	-0.299*
		(0.027)	(0.043)	(0.043)	(0.043)	(0.043)
Export Experience		-2.596***	-3.860***	-3.860***	-3.860***	-3.859***
		(0.010)	(0.018)	(0.018)	(0.018)	(0.018)
Market Experience		-0.424***	-0.453***	-0.453***	-0.453***	-0.455***
		(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
FDI Inflows		-0.074***	-0.006	-0.005	-0.006	-0.014*
		(0.005)	(0.007)	(0.007)	(0.007)	(0.006)
Time to Export			0.040***			0.041***
			(0.010)			(0.010)
Cost to Export				0.015		0.026**
				(0.009)		(0.010)
Procedures to Export					0.014***	0.011**
					(0.004)	(0.004)
Observations	1253379.000	1019390.000	1000502.000	945018.000	945018.000	945018.000
Level of significance	* p<0.1	** p<0.05	*** p<0.01			

Notes: In this specification, I use only new export relationships. Column 1 indicates the effects of key variables of interest-effects of stages of regional trade cooperation. Results are qualitatively similar to results in my benchmark specification. Clustered standard errors are in parentheses, stars indicate statistical significance: *** significant at 1%, ** significant at 5%, significant at 10%.

Table 11: LPM benchmark specification level effects

	(1)	(2)	(3)	(4)
Dep. Var.:Spell length				
Monetary Union	0.058*	0.002**	0.065	0.074***
	(0.067)	(0.114)	(0.076)	(0.078)
Common Market	0.096	0.097	0.071	0.089*
	(0.143)	(0.017)	(0.119)	(0.133)
Customs Union	1.196*	0.568**	1.164**	1.164***
	(0.051)	(0.002)	(0.012)	(0.001)
Preferential Trade Area	0.087	0.119	0.084	0.123
	(0.060)	(0.105)	(0.088)	(0.078)
Polity index	-0.005	-0.004	-0.006	-0.004
	(0.002)	(0.007)	(0.003)	(0.003)
Financial Depth	1.777**	0.842	1.586	1.778
	(0.003)	(0.602)	(0.320)	(0.280)
Conflict dummy	-0.049***	-0.191***	-0.085***	-0.069***
	(0.287)	(0.048)	(0.263)	(0.290)
Exchange rate Volatility	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
FDI inflow	-0.081*	-0.197***	-0.047***	-0.091***
	(0.102)	(0.028)	(0.092)	(0.083)
Cost to export	-0.034*			
	(0.172)			
Time to export			-0.240**	
			(0.066)	
Procedures to Export				-0.111**
				(0.026)
Constant	23.384	2.535	19.529	25.388
	(14.427)	(2.025)	(9.893)	(11.961)
Observations	2176836.000	3693834.000	2176836.000	2176836.000
R Sq.	0.825	0.718	0.825	0.825
level of Significance	* p<0.1	** p<0.05	*** p<0.01	

Notes: In this specification, I use a linear probability specification; the dependent variable is spell length of each export relationship. A positive coefficient implies that the covariates enhance the chances of export relationship survival. Clustered standard errors at dyadprod are in parentheses, stars indicate statistical significance: *** significant at 1%, ** significant at 5%, * significant at 10%.

Table 12: LPM Specification: Level & Interaction Effects of infrastructure related trade frictions

	(1)	(2)	(3)	(4)	(5)
Dep. Spell Length					
Monetary Union	0.019	0.064**	1.866***	0.117*	0.160**
	(0.087)	(0.022)	(0.150)	(0.046)	(0.051)
Common Market	1.717***	1.378***	3.263***	2.840***	2.826***
	(0.184)	(0.072)	(0.416)	(0.327)	(0.383)
Customs Union	2.820*	0.371	1.379*	0.310	6.347***
	(1.402)	(0.266)	(0.642)	(0.239)	(0.455)
Preferential Trade Area	0.034	0.334***	1.326***	1.144***	4.101***
	(0.125)	(0.028)	(0.278)	(0.137)	(0.217)
Time to export	-0.212***				
	(0.018)				
MU*time to export	0.008				
	(0.038)				
CM*time to export	-0.018				
	(0.025)				
CU*time to export	1.059**				
	(0.372)				
FTA*time to export	0.566***				
	(0.062)				
Cost to export			0.056***		
			(0.016)		
MU*cost to export			0.197***		
			(0.040)		
CM*cost to export			-0.272***		
			(0.021)		
CU*cost to export			-0.018		
			(0.091)		
PTA*cost to export			0.444***		
			(0.058)		
Procedures to export				0.125***	0.131***
				(0.011)	(0.011)
MU*procedures to export				0.118***	0.380***
				(0.015)	(0.021)
CM*procedures to export				-0.009	-0.017**
				(0.006)	(0.006)
CU*procedures to export				-0.198***	-0.416***
				(0.035)	(0.051)
PTA*procedures to export				0.329***	0.288***
				(0.036)	(0.038)
Observations	2,176,836	3,693,834	2,176,836	2,176,836	2,176,836
R.Sq.	0.825	0.718	0.825	0.825	0.825
Level of significance	* p<0.1	** p<0.05	*** p<0.01		

Notes: this is linear probability specification with interaction effects. A positive coefficient implies that the covariates enhance the chances of export relationship survival. Clustered standard errors are in parentheses, stars indicate statistical significance: *** significant at 1%, ** significant at 5%, * significant at 10%.

Table 13: Regional Trade Groupings

Regional trade groups and their membership

Regional Bloc	Number of Members	No. Of Overlapping members	pairings	Sources
Monetary Unions				
UEMOA	8		56	http://www.uemoa.int
CMA	4		12	http://www.imf.org
CEMAC [UDEAC	6		30	http://www.cemac.int/
Common Markets				
EAC	5		20	http://www.eac.int
Customs Unions				
COMESA	19		342	http://www.comesa.int/
ECOWAS	15		210	http://www.ecowas.int/
PTAs				
SADC	15		210	http://www.sadc.int
IGAD	6		30	http://igad.int/
ECCAS	10		90	http://www.ceeac-eccas.org
WAMZ	6		30	http://www.wami-imao.org
AMU	5		20	http://www.maghrebarabe.org
CEN-SAD	23		506	http://www.africa-union.org
IOC	4		12	http://www.ioconline.org
CILSS	13		156	http://www.cilss.bf/
Other sources			npr	http://www.africaecon.org

a. Monetary Union & Pseudo Monetary Union Blocs

Regional Block	Block Membership	Member`s Year of Entry [FTA]	Member`s Year of Entry [Customs Union]	Member`s Year of entry [Common Market]	Member`s Year of entry [Monetary Union]
UEMOA	Benin				1994
	Burkina Faso				1994
	Ivory Coast				1994
	Guinea-Bissau				1997
	Mali				1994
	Niger				1994
	Senegal				1994
	Togo				1994
CMA	Lesotho				1993
	South Africa				1993
	Swaziland				1993
	Namibia				1993
CEMAC (UDEAC)	Cameroon				1999
	Central African Rep.				1999
	Chad				1999
	Congo				1999
	Equatorial Guinea				1999
	Gabon				1999
	Sao Tome & Principe				1999

Notes: **UEMOA:** West African Economic and Monetary Union**; CMA:** The Common Monetary Area; **CEMAC**: Economic and Monetary Community of Central Africa;

b. Common Market Blocs

Regional Block	Block Membership	Member`s Year of Entry [FTA]	Member`s Year of Entry [Customs Union]	Member`s Year of entry [Common Market]	Member`s Year of entry [Monetary Union]
SACU	Botswana			November 11, 1994	
	Lesotho			November 11, 1994	
	Namibia			November 11, 1994	
	South Africa			November 11, 1994	
	Swaziland			November 11, 1994	
EAC	Burundi			1st July 2010	
	Kenya			1st July 2010	
	Rwanda			1st July 2010	
	Tanzania			1st July 2010	
	Uganda			1st July 2010	

c. Customs Union Blocs

Regional Block	Block Membership	Member`s Year of Entry [FTA]	Member`s Year of Entry [Customs Union]	Member`s Year of entry [Common Market]	Member`s Year of entry [Monetary Union]
COMESA	Angola				
	Burundi	21. déc.81	31st October, 2000		
	Comoros	21. déc.81	31st October, 2000		
	Dem. Rep. Congo	21. déc.81	31st October, 2000		
	Djibouti	21. déc.81	31st October, 2000		
	Egypt	06. janv.99	31st October, 2000		
	Eritrea	1994	31st October, 2000		
	Ethiopia	21. déc.81	31st October, 2000		
	Kenya	21. déc.81	31st October, 2000		
	Libya	03. juin.05	31st October, 2000		
	Madagascar	21. déc.81	31st October, 2000		
	Malawi	21. déc.81	31st October, 2000		
	Mauritius	21. déc.81	31st October, 2000		
	Namibia		31st October, 2000		
	Rwanda	21. déc.81	1st January 2004		
	Seychelles	2001	31st October, 2000		
	Sudan	21. déc.81	31st October, 2000		
	Swaziland	21. déc.81	31st October, 2000		
	Tanzania		31st October, 2000		
	Uganda	21. déc.81	31st October, 2000		
	Zambia	21. déc.81	31st October, 2000		
	Zimbabwe	21. déc.81	31st October, 2000		
ECOWAS	Benin	1975	24. juil.93		
	Burkina Faso	1975	24. juil.93		
	Cape Verde	1977	24. juil.93		
	Ivory Coast	1975	24. juil.93		
	Gambia	1975	24. juil.93		
	Ghana	1975	24. juil.93		
	Guinea	1975	24. juil.93		
	Guinea-Bissau	1975	24. juil.93		
	Liberia	1975	24. juil.93		
	Mali	1975	24. juil.93		
	Mauritania	1975	24. juil.93		
	Niger	1975	24. juil.93		
	Nigeria	1975	24. juil.93		
	Senegal	1975	24. juil.93		
	Sierra Leone	1975	24. juil.93		
	Togo	1975	24. juil.93		

COMESA: Common Market for Eastern and Southern Africa; ECOWAS: Economic Community of West African States.

d. Preferential Trade Areas

Regional Block	Block Membership	Member`s Year of Entry [FTA]	Member`s Year of Entry [Customs Union]	Member`s Year of entry [Common Market]	Member`s Year of entry [Monetary Union]
SADC	Angola	1992	01. Sept.00		
	Botswana	1992	01. Sept.00		
	Dem. Rep. Congo	1997	01. Sept.00		
	Lesotho	1992	01. Sept.00		
	Malawi	1992	01. Sept.00		
	Mauritius	1995	01. Sept.00		
	Madagascar	2005	01. Sept.00		
	Mozambique	1992	01. Sept.00		
	Namibia	1992	01. Sept.00		
	Seychelles	15. Sept.07	01. Sept.00		
	South Africa	1994	01. Sept.00		
	Swaziland	1992	01. Sept.00		
	Tanzania	1992	01. Sept.00		
	Zambia	1992	01. Sept.00		
	Zimbabwe	1992	01. Sept.00		

SADC : The Southern African Development Community

e. Preferential Trade Areas

Regional Block	Block Membership	Member`s Year of Entry [FTA]	Member`s Year of Entry [Customs Union]	Member`s Year of entry [Common Market]	Member`s Year of entry [Monetary Union]
IGAD	Djibouti	1996			
	Ethiopia	1996			
	Kenya	1996			
	Somalia	1996			
	Sudan	1996			
	Uganda	1996			
WAMZ	Gambia				2015(planned)
	Ghana				
	Guinea				
	Liberia				
	Nigeria				
	Sierra Leone				
ECCAS (CEEAC)	Angola	06.févr.98			
	Burundi	07. févr.98			
	Cameroon	08. févr.98			
	Central African Rep.	09. févr.98			
	Chad	10. févr.98			
	Congo	11. févr.98			
	Dem. Rep. Congo	12. févr.98			
	Equatorial Guinea	13. févr.98			
	Gabon	14.févr.98			
	Rwanda	15.févr.98			
	Sao Tome & Principe	16. févr.98			

Notes : **IGAD** : Inter-Governmental Authority for Development ; **WAMZ**: Western Africa Monetary Zone; **ECCAS**: Economic Community of Western African States;

f. Preferential Trade Areas

Regional Block	Block Membership	Member`s Year of Entry [FTA]	Member`s Year of Entry [Customs Union]	Member`s Year of entry [Common Market]	Member`s Year of entry [Monetary Union]
CEN-SAD	Benin				
	Burkina Faso	4th February 1998			
	Chad				
	Côte d'Ivoire				
	Egypt				
	Ghana				
	Guinea Bissau				
	Mali				
	Niger				
	Sudan				
	Central African Rep.	avr.99			
	Eritrea	avr.99			
	Senegal	févr.00			
	Djibouti	févr.00			
	Gambia	févr.00			
	Liberia				
	Libya				
	Morocco				
	Nigeria				
	Sierra Leone				
	Somali				
	Togo				
	Tunisia				

Notes: CEN-SAD: Community of Sahel-Saharan States

g. Preferential Trade Areas

Regional Block	Block Membership	Member`s Year of Entry [FTA]	Member`s Year of Entry [Customs Union]	Member`s Year of entry [Common Market]	Member`s Year of entry [Monetary Union]
IOC	Mauritius	1984			
	Seychelles	1984			
	Comoros	1984			
	Madagascar	1984			
CILSS	Benin	April 1994			
	Burkina Faso	April 1995			
	Cape Verde	April 1996			
	Ivory Coast	April 1997			
	Gambia	April 1998			
	Guinea	April 1999			
	Guinea-Basau	April 2000			
	Mali	April 2001			
	Mauritania	April 2002			
	Niger	April 2003			
	Senegal	April 2004			
	Chad	April 2005			
	Togo	April 2006			

Notes: IOC: Indian Ocean Commission; **CILSS**: Permanent Interstate Committee on Drought Control in the Sahel

Table 14: Variables Description and Data Sources

Variable	Description	Source
Trade Flows	HS 6 digit level for 1995-2009 bilateral trade flows	CEPII-BACI trade dataset (2010)
Tariff data	HS 6 digit level	UNCTAD TRAINS
GDP	Real GDP for partner countries	Nominal GDP is obtained from World Bank Development Indicators (2010)
Distance and other trade resistance variables	Standard gravity variables	CEPII
Regional Trade Agreements	13 intra-African regional groupings	http://rtais.wto.org/UI/PublicAllRTAList.aspx & several official websites
Monetary Union	A binary variable that equals one if the trading partners share a common currency, zero otherwise	author`s construction
Common Market	A binary variable that equals one if the trading partners share a common Market, zero otherwise	author`s construction
Customs Union	A binary variable that equals one if the trading partners share a common customs union, zero otherwise	author`s construction
Preferential Trade Area	A binary variable that equals one if the trading partners share a common preferential trade area	author`s construction
Depth of Integration index	Takes the value of: 4 for MU 3 for CM 2 for CU 1 for PTA	author`s construction
Trade costs	Costs to exports[13] Cost of doing business[14] Time to export[15] Customs procedures to export	World Development Indicators (World Bank, 2011)

[13] These include distribution costs due to poor road infrastructure (transport costs) poor ware house infrastructure (storage costs and port costs) inter-border costs and the freight costs to destination of the product. The variable is measured in USD per container.

[14] This variable is the number of days taken to export a container. It is recorded in calendar days

[15] This includes cost to register a business normalized as a percentage of gross national income (GNI) per capita