The impact of trade facilitation factors on South Africa's exports to a selection of African countries

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Economic growth can be enhanced through increased trade among countries, provided the correct institutional structures are in place. A country's trade is dependent not only on its own trade facilitation reforms but also on those of the trading partners. This paper, using an augmented gravity model, examines trade facilitation factors that impact on South Africa's exports to other selected African countries. The results of the estimation reveal the following. An improvement in the customs environment within the importing country provides the largest gain in terms of increasing trade flows, followed by the regulatory environment and domestic infrastructure. Furthermore, adjacency and common language impact positively on South African exports, while distance between countries impacts negatively on it. Being part of the Southern African Development Community is also enhancing exports from South Africa, compared with being part of the East African Community.

Keywords: exports; regional integration; trade facilitation; gravity model

JEL codes: F14; F15; F18

1. Introduction

Presently, there exist multiple un-serviced (and indeed unserviceable) visions, interests, expectations and responsibilities vested on regional integration projects within the continent. Consequently, it is not clear that regional integration in Africa has helped to substantially improve trade among African countries. The literature acknowledges that membership in many regional trade agreements (RTAs) can complicate administrative procedures, raising trade facilitation costs. Multiplicity of rules from different RTAs strains institutions charged with administering trade agreements on issues such as customs procedures and technical standards. For African countries with weak institutions and limited capabilities for such complex administrative requirements as imposed by multiple commitments, the impacts on overall trade and development can be daunting. It is therefore not surprising that conclusions on the impact of regional integration of intra-group trade in Africa have been mixed. Cernat (2001) – working on the Southern African Development Community (SADC), the Common Market for Eastern and Southern Africa, and the Economic Community of West African States – found that African RTAs have a positive impact on intra-RTA trade. However, the World Bank (2005) and Yeats (1998) concluded that African regional blocs are potentially more trade diverting and have doubtful non-economic benefits.

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Increasingly, trade among contiguous countries is organised along RTAs. However, Africa's experience in regional integration is severely considered to have fallen short of the optimal. Regional integration in the African context is a linear market integration, following a stepwise process of integration. This process is the integration of goods, labour and capital markets, and ultimately monetary and fiscal integration. The sequence of agreements signed during the process is normally a free trade area, then a customs union, a common market, and lastly the integration of monetary and fiscal aspects to establish an economic union (Hartzenberg, 2011). While RTAs have multiplied on the continent, intra-group trade among participating countries has been either volatile or stagnant since 1980. Initially, weak commitments by integrating countries contributed to these poor outcomes.

The success of regional integration projects the world over is heavily impacted by the state of infrastructure among integrating countries. It is known that infrastructure, including both human and physical infrastructure, is weak in many parts of Africa. Transportation networks across countries in Africa are probably some of the least modernised globally, and communication infrastructure is skeletal and costly while social infrastructure and institutions are also weak. It is therefore critically important to supplement existing RTAs with improved trade facilitation measures between countries. RTAs provide a broad political commitment of cooperation between countries but trade facilitation measures are vital instruments to ensure success in terms of improved trade flows. Consequently, it would be interesting to determine the role of trade facilitation measures in importing countries as an instrument to enhance exports from South Africa.

South Africa is uniquely placed among developing African countries to trade with its neighbours, being the largest economy in sub-Saharan Africa. It has a far more diversified economy than the rest of sub-Saharan Africa and boasts higher output and better infrastructure than all its neighbours. Unlike most other neighbouring African countries, South Africa's exports are more diversified. Meanwhile, it has been actively involved in intensive regional trade formation negotiations and institution-building with countries in southern Africa and is a member of the oldest customs union in the world, namely the Southern African Customs Union. The relationship between trade flows and the impact of trade facilitation measures between South Africa and a selection of 15 other African countries (see Appendix A for a complete list of countries) is therefore analysed. To reap the potential benefits of increased trade flows, trade facilitation measures need to be in place in order to enhance these flows. The potential gains accruable from regional integration and proximity between South Africa and these countries may partly be offset by the negative effects of poor trade facilitation measures. It is not a stretch of imagination to propose that poor trade facilitation measures, alongside a weakening output base, could increasingly contribute to the dwindling trade fortunes in Africa. Effective trade facilitation among trading partners in Africa is expected to improve overall trade.

This paper intends to investigate the impact of trade facilitation measures among these countries. It investigates this position using exports from South Africa to a sample of 15 African countries. Eleven of these countries are part of the SADC whereas the remaining four are from the East African Community (EAC). Although the initial intention was to select only SADC countries, data availability prevailed and therefore some EAC countries that are relatively close to South Africa were added to provide an improved sample of countries. The analytical framework is the standard gravity

model, augmented with selected measures of trade facilitation. The paper is organised as follows. Section 2 explores the literature on trade facilitation, while Section 3 explains the methodology. Section 4 presents the estimation results, and the conclusion is provided in Section 5.

2. Trade facilitation

The empirical literature on trade facilitation is somewhat limited (Wilson et al., 2003). Although there is no standard definition of trade facilitation, it generally addresses the logistics of moving goods through ports more efficiently or the simplification of the documentation system associated with cross-border trade (Wilson et al., 2004). Recently, the definition has been expanded to include the broad trading environment, transparency and customs and regulatory environments. Trade facilitation is the simplification and harmonisation of trade procedures through:

- reduced transport costs (APEC, 1999; UNCTAD, 2001; Fink et al., 2002);
- improved port facilities (Fink et al., 2002);
- efficient and modern customs regimes (Hummels, 2001);
- transparent and harmonised regulations (Hertel et al., 2001); and
- improved information technology infrastructure (Freund & Weinhold, 2000; Hertel et al., 2001).

Despite the recent growth in empirical studies on the relationship between regional integration and trade facilitation, there remain several inadequacies in these studies (Njinkeu et al., 2008). Maur (2008), underscoring the relationship between regional integration and trade facilitation, makes a retrospective assessment of the implications of regional integration on trade facilitation. Acknowledging that most regional trade agreements presently incorporate trade facilitation dimensions, he tries to evaluate the implications of trade facilitation reforms at the three levels they are usually undertaken – national, regional and multilateral. The aim of the paper was to investigate how regional initiatives can contribute to trade facilitation reform. Secondly, following Sauve & Zampetti (2000), he observes that transaction costs to provision of regional trade facilitation are optimised when the most appropriate participants partake in such provision (Arce & Sandler, 2002). Maur concludes the need to address coordination and capacity failures, which can occur when disparate national governments independently tackle regional trade facilitation challenges. What in essence is needed is an appropriate choice of operational platform for delivering on regional trade facilitation reforms.

Furthering the debate on regional facilitation, Pitigala (2005) studied the seven South Asian countries in the South Asia Preferential Trade Arrangement (SAPTA) – Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka.[2] The author first selected various definitions of 'natural trading partner', including Lipsey-Summers' volume of trade, geographical proximity and trade complementarity. On the volume of trade criterion, the work finds that only Bhutan and Nepal, which have strong trading links with India on account of being landlocked, qualify for such characterisation. He further showed that the SAPTA countries all demonstrate a tendency to trade intensively with partners outside the region. This was either due to comparative

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[2]SAPTA members have in principle agreed to fully implement a free trade area, transforming the group to the South Asian Free Trade Area, beginning in 2006 and full implementation to be completed between 2009 and 2013.

endowments or long historical, religious, cultural or other affiliations. On trade complementarity, using revealed comparative advantage indices, he found that exports from India and Pakistan complemented the imports of a number of countries in the region. Revealed comparative advantage indices of other countries in the region showed limited complementarity. The study concludes that the countries in SAPTA can be characterised only moderately as natural trading partners.

Dennis (2006) studied the Middle East and North Africa region and focused on the development prospects of trade agreements and facilitation measures in the region. A two-pronged analysis was adopted based on the welfare gains accruable from the myriad regional trade agreements that were fomalised in the region and a comparison of these with the gains accruable from trade agreements with the European Union. The study employs the computable general equilibrium model with modifications to capture trade facilitation through technical progress in trading activities. His analysis allows for inputting higher indirect costs owing to longer and more cumbersome transit processes in trade between any two countries (Hertel et al., 2001). Dennis also incorporated new insights from Fox et al. (2003) and OECD (2003) allowing for direct (tax component) cost imputation (Zarrouk, 2003). The work concluded that intra-group and European Union integration has a positive impact on welfare in the region. Adding trade facilitation measures helped to further shore up the gains to about three times their original values.

Baller (2007) examined the trade facilitation question from a more micro and sectoral perspective. Given the position of several firm-level surveys that identify technical regulations, rules of origin and customs procedures as key non-tariff barriers, this research focused on the nature of and solutions to technical regulations as a barrier to trade. The study first structured a theoretical position derived from Melitz (2003), who attempted to formalise expected impacts of harmonisation and mutual recognition agreement programmes. The empirical work in turn examines sectoral impacts of technical barriers to trade liberalisation on both participating and excluded countries using a two-stage gravity model. Identifying two potential channels for increased trade flows from endogenous firm selection process, the work specifically analysed surveys of telecoms and medical devices industries in the sample countries. The first part of the findings on mutual recognition agreements is consistent with a-priori expectations, namely that they do have a positive impact on both export probabilities and trade volumes for partner countries. The impact of harmonisation was not as significant for integrating countries and did not seem to matter for excluded developing countries, but was positive for excluded developed countries. Equally, the probability that harmonisation would bring in new exporting firms was higher than the probability that existing firms will increase volume of their exports.

Other studies include APEC (1999), Fox et al. (2003), OECD (2003) and Hertel & Keeney (2005). APEC's (1999) approach was seminal in this respect, with work on its member countries. It finds that the members' income can be boosted by up to 0.4% by improving trade liberalisation and facilitation measures. Fox et al. (2003) accounted for both direct (tax) and indirect costs of trade facilitation costs between Mexico and the United States, and find welfare gains for both economies. In turn, OECD (2003) puts estimated gains from reductions in trade transactions costs at 1% of global trade value. Hertel & Keeney (2005), feeding estimates from Wilson et al. (2004) into their model, noted facilitation-induced gains in global merchandise trade.

A study of Brazilian ports by Hummels (2001) links trade facilitation measures to tariffs, estimating that each day saved in shipping time reduces ad-valorem tariffs by 0.5%. Furthermore, the study estimates that administrative and customs costs add 20% to the total export cost. Countries with access to Internet facilities seem to have a higher propensity to export. Freund & Weinhold (2000) illustrate that a 10% increase in web hosts increase trade by 1%, while Fink et al. (2005) show the importance of communications and calculate that a 10% fall in telecom costs increase trade by 8%. A multi-dimensional approach is adopted by Wilson et al. (2003) to analyse various aspects of trade facilitation. The results show that improving procedures and infrastructure can make considerable savings. According to them, economic theory generates a simple chain of causality to explain the relationship in this challenging trade environment. They state that human development is enhanced through income growth, while income growth increases with higher levels of trade. Trade again increases through improved trade facilitation efforts that will further be explored in this paper.

Given the above literature on the importance and potential impact of trade facilitation, it is evident that members belonging to a trade group can experience trade facilitation-induced gains, over and above the gains originating from the process of integration itself. These gains would obviously be welcomed because of the positive impact on welfare in such a region. However, being successful could be jeopardised if countries independently attempt regional trade facilitation actions. These studies therefore emphasise the importance of upgrading the standards of their general trade environments, as African countries significantly lag behind in customs reforms, to their own detriment. This background formed the platform on which the current study was based.

3. Methodology

3.1 The basic model

The basic estimation framework for this study is the gravity model, which has come to be a popular formulation for bilateral trade. Proposed by Tinbergen in 1962, the model follows the basic Newton's 'law of universal gravitation' in physics and assumes the amount of trade between countries to be an increasing function of the size of each country, represented by its economic growth (gross domestic product [GDP]), and a decreasing function of the obstacles to trade represented by the distance between the two countries. However, it omits a significant amount of unexplained variation in trade (Head, 2003). As a consequence, many works (including Rose, 2001; Frankel & Rose, 2002; Glick & Rose, 2002; Rose & Engel, 2002; Wilson, 2002, 2003; Carrere, 2004; Njinkeu et al., 2008) 'augmented' the traditional gravity model. Traditional variables for augmentation generally include income per capita, adjacency, common language or colonial ties, border effects and membership of regional integration arrangements (Head, 2003).

The basic gravity equation explains the size of exports from country i to country j by three factors: the total potential supply of the exporting country i, the potential demand of the importing country j, and the factors that represents the resistance to trade flow between countries. In its basic form, exports from country i to country j are determined by their economic sizes (GDP), population, geographical distances and a set of dummies that incorporate some kind of institutional characteristics common to

specific flows. The gravity model is generally specified (Breuss & Egger, 1999:83; Jakab et al., 2001:280; Martinez-Zarzoso & Nowak-Lehmann, 2003:296) as:

$$\ln X_{ij} = \alpha_0 + \alpha_1 + \ln Y_i + \alpha_2 \ln Y_j + \alpha_3 \ln POP_i + \alpha_4 \ln POP_j + \alpha_5 \ln D_{ij}$$
$$+ \alpha_6 \ln A_{ij} + u_{ij} \tag{1}$$

where X_{ij} is exports of goods from country i to country j, Y_i and Y_j are the GDPs of the exporter and importer, POP_i and POP_j are the populations of the exporter and importer, D_{ij} is the distance in kilometres between the two countries, A_{ij} represents any other factor that influence trade between the countries, and u_{ij} is the error term.

In particular, with the attention of this work being on trade facilitation, several studies such as Limao & Venables (2001), Clark et al. (2004) and Njinkeu et al. (2008) use augmented gravity models to explain the impact of trade facilitation.

3.2 Augmented model – trade facilitation representation

A key challenge of empirical analyses of trade facilitation is that of definition and data. Maur (2008) citing Wilson (2002) defines it as the simplification of the trade interface between partners. These comprise inter alia compliance to government rules by traders, enforcement by authorities of these rules (including taxes), exchange of information, financing, insurance, information and communications technology and legal services, transport, handling, measurement and storage. This vast coverage of issues in trade facilitation is also overlooked in perceptions and understanding of various regional trade and bilateral trade agreements. Maur (2008) underscores trade facilitation reform as the sum of efforts undertaken at the national, regional and multilateral level designed to reduce trade transaction costs.

To help muddle through the facilitation maze, Wilson et al. (2004) adopted four broad measures that should generally meet policy-makers' needs. These apply to efficiency at harbours and ports, the customs environment, regulatory environment and the quality of domestic infrastructure. This paper will also include the four measures, namely port efficiency, customs environment, regulatory environment and domestic infrastructure, proposed by Wilson et al. (2004). However, this paper will augment and adjust the specific composition of the four measures slightly, based on relevant and available data for the sample countries. Data for the first measure are obtained from the *Doing Business Report* of the World Bank (2005–2011) and the last three measures from the World Economic Forum's (2005–2011) *Global Competitiveness Report*. As the scales of these surveyed data differ, the data need to be adjusted to be comparable. Each observation of the raw series is indexed to the average of all selected countries' data points of the same indicator within a specified year. Next, the indexed indicators are combined, using a simple average method to form four trade facilitation measures. According to Wilson et al. (2003) there is no specific argument, theoretical or statistical, to choose a different aggregation method.

The first measure is 'port efficiency', which will be represented by one indicator – namely the number of documents that needs to be obtained to import a product. The rationale is that this would show the efficiency and ease of the import process of commodity traffic at the point of entry into the country. The 'customs environment' is the second measure and consists of two indicators, namely the burden of custom

procedures (formalities regulating entry and exit of merchandise) and prevalence of trade barriers (existence of tariff and non-tariff barriers). This indicates a measure of indirect customs costs and administrative transparency and also captures tariff barriers. The 'regulatory environment' is the third measure used and consists of one indicator, namely the burden of government regulation pertaining to and compliance to administrative requirements such as permits, regulations and reporting. 'domestic infrastructure' is the last measure and comprises the average of two indicators, namely overall infrastructure quality (roads, railroad, ports and air transport) and the availability of the latest technology (information and communications technology). It measures the broad indices of physical infrastructure support available for business and trade in a country, and largely impacts on trade quality and volume. Poor supply and quality of these indicators could be considered a major impediment to productivity and trade. The idea behind these measures is to get a sense of some 'border harmonisation' elements such as port efficiency, customs procedures and regulatory environment, and of 'border facility support' elements such as technology and infrastructure. Incorporating these measures in the model will yield:

$$\ln X_{ij}^t - \alpha_0 + \alpha_1 \ln Y_j + \alpha_2 \ln PE_j + \alpha_3 \ln CE_j + \alpha_4 \ln RE_j + \alpha_5 \ln INF_j + \alpha_6 EX_{ij}$$
$$+ \alpha_7 \ln D_{ij} + \alpha_8 D_{ADJ} + \alpha_9 D_{ENG} + \alpha_{10} D_{SADC} + \varepsilon_{ij} \qquad (2)$$

with total exports (X_{ij}) of goods from country i (South Africa) to country j (importing country) as the dependent variable. The standard notation for income (Y) is used to reflect the GDP of the importing country. PE is port efficiency of the importing country, CE the customs environment of the importing country, RE the regulatory efficiency of the importing country, INF the domestic infrastructure of the importing country, EX_{ij} the real effective exchange rate between countries i and j in US\$, and D_{ij} the distance between capital cities of trading countries. Because some of the selected countries are landlocked, it is advisable to rather consider distance between capital cities and not main ports. Lastly, D_{ADJ} is a dummy for adjacency to South Africa, D_{ENG} represents the English language as a trading language, while D_{SADC} represents being part of the SADC group of countries and ε is a normally distributed random error term.

Based on theory, income (GDP) is expected to impact positively on trade (Chaisrisawatsuk & Chaisrisawatsuk, 2007; S ̈o derstrom, 2008; Zaki, 2008; and so forth), so the expected sign of the coefficient Y is positive. Based on the indicators used to form the trade facilitation measures, an increase in the measures (worsening) are expected to have a negative impact on exports from South Africa. Therefore the trade facilitation measures including port efficiency (PE), customs environment (CE) and regulatory environment (RE) should all have negative coefficients. However, the infrastructure (INF) measure should have a positive impact on trade flows as an increase in these indicators indicates an improvement in infrastructure in the importing country. In general, a higher rate of exchange (depreciation) leads to an increase in exports, while an appreciation of the real exchange rate leads to a decrease in exports. It is therefore expected that the coefficient should be positive when the real exchange rate (EX) depreciates and should be negative when the real exchange rate appreciates. In general, longer distances (D) between trading partners would deter trade and the measure is therefore expected to have a negative coefficient. Adjacency to South Africa (D_{ADJ}), a common language (D_{ENG}) and being part of the SADC should impact trade

positively. English is an official language in South Africa and so English-speaking countries should have improved trade relations with South Africa.

3.3 Estimation methodology

Panel data involve different models that can be estimated, such as pooled, fixed and random effects. The pooled model assumes that countries are homogeneous, while fixed and random effects introduce heterogeneity in the estimation. When estimating the trade flows between a randomly drawn sample of trading partners, a random effects model is more appropriate; while a fixed effects model is more appropriate when estimating the flows of trade between an ex-ante pre-determined selection of countries (Martinez-Zarzoso & Nowak-Lehmann, 2003). This paper analyses the trade between South Africa and a pre-selection of 15 trading partners, and therefore the fixed effects model is used. To confirm the poolability of the data, the F-test is performed and the results show that the null hypothesis of equality of the individual effects or homogeneity for all countries is rejected. This confirms that a model with individual country effects (fixed effects) is the preferred model. The Hausman test is also executed within the random effects model in order to detect misspecification or to ensure that the X-regressors and individual effects are not correlated. The results show that the Hausman specification test (7.863 [0.248]) accepts the null hypothesis of no misspecification. This result therefore indicates exogeneity of the X-regressors and thus no correlation between the individual effects and the X-regressors.

However, the fixed effects model cannot estimate variables directly that do not change over time (time invariant), such as distance, because the inherent transformation wipes out such variables. This problem was addressed by Martinez-Zarzoso & Nowak-Lehmann (2003), who suggested that these variables can be estimated in a second regression by running the pooled model. In this second estimation, the individual effects obtained in the first estimation through the fixed effect model will be used as the dependent variable, with time invariant and dummy variables as explanatory variables. This is estimated as:

$$IE_{ij} = \eta_0 + \eta_1 D_{ij} + \eta_2 D_{ADJ} + \eta_3 D_{ENG} + D_{SADC} + \mu_{ij} \qquad (3)$$

where IE_{ij} is individual effects from the first estimation and other variables are as defined earlier.

3.4 Country representation and data

The data for the study include 15 countries from southern and eastern Africa (for a complete list, see Table A1 in Appendix A) between 2008 and 2010. Although it is acknowledged that the financial crises of 2008/09 may impact on the data, it seems the impact is negligible pertaining to the countries used in this study. According to Kavli & Kotze (2012), it is most probably a reflection of limited integration of these African economies in the world's financial markets. Data for the trade facilitation measures have been drawn from the *Global Competitiveness Report* and the *Doing Business Report* of the World Bank. The rest of the data are collated from the Quantec Easy Data database, while data on distances were obtained from the University of Essex, calculated using the distance formula that applies the longitude and latitude of the capital city of each country in the sample. The dataset comprises 45 observations, including three annual observations for 15 countries.

4. Estimation results

Table 1 presents the results for the fixed effects model, which estimates country-specific effects and introduces heterogeneity with an adjusted R-square of 0.998. The estimation is a two-step procedure that first obtains estimates using the augmented variables of Equation 2 with country fixed effects and, second, includes the fixed effects of the first estimation combined with the dummy variables. The essence of the two-stage process is to be able to adequately sieve the impact of the trade facilitation variables independent of 'noise' from other non-variant factors in the model.

The results of the fixed effects model as shown in Table 1 indicate that the coefficient of the importing country's GDP is positive as expected and is statistically significant. An increase in the importer's GDP causes an increase in the exports from South Africa, and this is as expected from theory. The coefficients for all of the four trade facilitation measures are statistically significant. Although the port efficiency variable is statistically highly significant, the sign of the coefficient is positive, which is unexpected. Analysing this inconsistency, it seems as if the correlation coefficient between the two variables is somewhat weak and may therefore causing an unexpected positive coefficient. The coefficients for the customs environment and regulatory environment are negative as expected and are statistically significant. The domestic infrastructure recorded a positive coefficient as expected and is statistically significant. The customs environment is the trade facilitation measure that shows the biggest potential impact affecting exports from South Africa. This is followed by the regulatory environment and domestic infrastructure measures. The results seem to indicate that while a factor such as port efficiency may be important for overall productivity and exports, its impact should be discarded. These results, to a large extent, summarise the logistic challenges that directly face cross-border trade (Clark et al., 2004).

The coefficient of the real exchange rate is positive as expected but is not statistically significant. From the results it seems that the impact of the real exchange rate on exports from South Africa is marginal. Given that the South African Customs Union members, including South Africa, Botswana, Namibia and Swaziland (Lesotho was not part of the study), can import directly from South Africa using the South African rand, this may in part explain the meagre effect of the real exchange rate.

Table 1: Estimation results

Variable	Fixed effects model
Constant	11.895 (4.831)***
Importer's GDP	0.861 (8.179)***
Port efficiency	2.118 (10.424)***
Customs environment	−0.765 (−4.121)***
Regulatory environment	−0.492 (−2.346)***
Infrastructure	0.415 (1.530)*
Exchange rate	0.189 (1.252)
Adjusted R-squared	0.988
F-test	1 007.299 (0.000)***

Notes: Significant at ***1%, **5% or *10% level. The t-statistics of all variables are presented in parentheses.

The country or cross-section specific effects show the effect of factors that are unique to each country but not included in the estimation of the model. This shows that trade between South Africa and the sample countries differs from country to country, given the unique feature of each country. Table A1 in Appendix A shows that there are features in some countries that promotes export products from South Africa to Botswana, Mauritius, Mozambique, Namibia, Swaziland, Zambia and Zimbabwe (countries with positive signs). However, it is also shown that there are unobservable country characteristics that discourage South Africa's exports to certain countries (countries with negative signs), including Angola, Burundi, Kenya, Madagascar, Malawi, Rwanda, Tanzania and Uganda. This makes sense because all of these latter countries, with the exception of Angola, are geographically more separated. Furthermore, Burundi, Kenya, Rwanda and Uganda are not part of the SADC and would thus be at a disadvantage relative to some of the other sample countries.

The second-stage regression includes some factors that may explain some of these unobservable country characteristics (fixed effects) in Table A1 of Appendix A. It is important from a policy perspective to analyse these export inhibiting factors, which discourage exports from South Africa to these countries. Certainly, there are dynamic gains from regional integration (Coe et al., 1997; Neary, 2001; Velde & Meyn 2008; and so forth), but these are mostly indirect and even more difficult to measure. Table 2 presents the results of the second-stage regression and shows that all dummies including distance, adjacency, language and being part of the SADC are statistically significant and aligned with theory. Distance has a negative effect on exports, while adjacency to South Africa and the English language is associated with increased exports. Importing countries where English is the official language are generally associated with an increase in South African exports. Being part of the SADC group of countries also has a positive impact on exports from South Africa, as expected.

5. Policy implications

This work set out to evaluate the impact of various trade-related factors on exports from South Africa within southern and eastern Africa. The study is undertaken within the context of conclusions by Aldaz-Carroll (2006) that developing countries face an increasing need to upgrade the standards of their general trade environment. The results of this study are consistent with findings in Limao & Venables (2001) and Kurz et al. (2008), among others, which show that African countries significantly lag behind in customs reforms that reduce the burden of the cross-border process and enhance turnaround time for cargo at ports.

Table 2: Second-stage regression: fixed effects regressed on dummies

Independent variable	Coefficient (t-statistic)
Constant	3.970 (5.771)***
Distance	−0.761 (−9.288)***
Adjacency	0.841 (4.774)***
English language	0.818 (9.113)***
SADC dummy	0.795 (18.334)***
Adjusted R-squared	0.989

Notes: Significant at ***1%, **5% or *10% level. The t-statistics of all variables are presented in parentheses.

The argument can be made that South Africa is uniquely being sandwiched within relatively low-income countries with weak infrastructure. First, the blind pursuit of regional economic agreements simply based on expectations of positive impact borne out of theoretical postulations simply does not help. Worse still, when countries do not regularly evaluate the impact using indicators of welfare improvement, the trade creation and integration efforts among participating countries may dwindle even further. It is usually taken for granted by most countries that relative proximity qualifies them for regional integration without complementary evaluation of the trade facilitation measures. The result is the frustration that has come to characterise most regional integration efforts in Africa with divergent economic bases. A weak assessment of the trade facilitation environment ultimately may mean a demise of the efforts and loss of investments with overall negative impact on welfare.

Three of the four measures of trade facilitation constructed for the purpose of this study show an important impact to enhance trade flows. The customs environment (including the burden of customs procedures and prevalence of tariff barriers) has the largest negative coefficient in the estimation results. The magnitude of this variable in the importing country seems to be the most important measure impacting on exports from South Africa. According to the estimates, the regulatory environment (burden of government regulation) follows in terms of importance to impact negatively on trade. Improving domestic infrastructure (including overall infrastructure and latest technology availability) has a positive impact on trade and could improve the process for importing countries to speed up cross-border flows. It seems as if the port efficiency (number of documents needed to import) is insignificant in terms of the whole process to enhance export flows to the selected group of countries.

Trade facilitation involves political, economic, business, administrative, technical, technological and financial aspects that are critically important to ensure the smooth flow of goods and services between countries. The more efficient and effective these aspects are, the more economically desirable for the countries involved in this process. Governments need to pursue the establishment of a transparent and predictable cross-border trade environment. Simply put, the overall trade environment can work against trade flows within the region if not well complemented by trade facilitation factors. Equally, investments in regional trade agreements matter little when trade facilitation variables are not in place. African countries can ill-afford a situation where trade facilitation factors, which they can control, harm their economic prospects and progress.

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Appendix A

Table A1: Country fixed effects

Country	Fixed Effects
Angola	**−0.754443**
Botswana	2.273070
Burundi	**−2.581298** (non-SADC)
Kenya	**−0.559121** (non-SADC)
Madagascar	**−0.938713**
Malawi	**−0.089373**
Mauritius	0.279975
Mozambique	0.942819
Namibia	1.728855
Rwanda	**−2.314523** (non-SADC)
Swaziland	1.235588
Tanzania	**−0.344424**
Uganda	**−1.280330** (non-SADC)
Zambia	1.553702
Zimbabwe	0.848215

Source: Estimation results. Bold text indicates unobservable country characteristics that discourage South Africa's exports to these countries.

Southern African Development Community (SADC)

Angola

Botswana

Madagascar

Malawi

Mauritius

Mozambiques

Namibia

Swaziland

Tanzania

Zambia

Zimbabwe

East African Community (EAC)

Burundi

Kenya

Rwanda

Tanzania

Uganda