REGIONAL INTEGRATION, TRADE DURATION AND ECONOMIC GROWTH IN THE EAST AFRICAN COMMUNITY: THREE EMPIRICAL ESSAYS

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Dedication

To my dad and mum,

who enshrined in me the ethos of original thought.

To my wife - Irene,

and my daughters - Genesis and Heaven,

who have taught me to value relating with others, and with their thoughts.

Abstract

The objective of this thesis is to investigate empirically the impact of regional trade agreements (RTAs) on trade, the duration of trade and economic growth in the East African Community (EAC) consisting of the republics of Kenya, Uganda, Burundi and Rwanda and the United Republic of Tanzania.

Since the birth of the World Trade Organization (WTO) in 1995 and the establishment of the multilateral trading system, both developed and developing countries have initiated policies aimed at promoting North–South and South–South trade. Despite these efforts, the impact of multilateral trade agreements on trade and economic growth has been complex and is not well understood. The changing global marketplace—a consequence of external shocks and trade policy reforms across the developed and developing world—has led to increased regionalisation globally. Lack of scholarship on specific regional integration (RI) entities, such as the EAC, motivates the current research. In addition, as much as trade liberalisation in the EAC is commendable, there is strong evidence that trade reforms perform very poorly (Mishra, 2018; Rodrik, 1992). For instance, the EAC remains a marginal player in the global trade in goods (United Nations Conference on Trade & Development [UNCTAD], 2019). Further, the EAC's level of intraregional trade is the lowest among all African RTAs, implying that the EAC does not perform as well as it does in the area of trade integration (Economic Commission for Africa [ECA], 2017). Such low levels of intraregional trade are still observed even though tremendous resources and strong political will continue to back progress towards implementation of the bloc (Vickers, 2017). Further, there are still discrepancies in the size and relative strength of the economies of the countries participating in the EAC, creating tensions over the perceived distribution of the benefits of RI (ECA, 2017).

This thesis reports three empirical studies. The first examines the impact of RTAs on trade in the EAC. Utilising the traditional gravity model, this study extends the model to account for zero trade, endogeneity and heterogeneity. The model is estimated using the Poison pseudo-maximum likelihood estimator and a comprehensive panel dataset for the EAC for the period 1990–2017. The empirical results indicate, first, that although RTAs enhance trade in the EAC, the impact varies across the Common Market for Eastern and Southern Africa (COMESA), WTO markets and regional blocs. Second, although the RTAs enhance trade at the bloc level, results vary by country. Kenya, Rwanda and Uganda experience pure trade creation in the EAC

market, though Uganda's intra-bloc trade is below expectation. Third, the results indicate that there is asymmetry across products. For example, food trade leads to pure trade creation in the EAC and COMESA markets, but pure trade diversion in the WTO. Fourth, there is variation in the performance of products within countries, though the EAC RTA leads to trade creation for all products across the EAC. These empirical findings are robust to alternative model specifications.

The second empirical study examines the impact of RTAs on the duration of trade in the EAC. The study specifies a variant of survival models and estimates the models using a comprehensive dataset for the period 1988–2015. The model is estimated using Kaplan–Meier, Cox proportional hazards and discrete time estimators. The empirical results show, first, that RTAs enhance the duration of exports in the EAC market, and inconsistently drive the duration of exports of the EAC in the COMESA market. However, RTAs do not lengthen the duration of EAC exports in the WTO trading market in aggregate. Second, the impact of RTAs on the duration of exports varies across countries: the EAC bloc leads to the persistence of exports in Tanzania and Uganda, while the COMESA bloc increases the duration of Kenya's exports. Third, the impact of RTAs is heterogeneous across products. Fourth, the impact of RTAs on the duration of EAC exports is short lived with 50% of exports coming to an end within 2–3 years. Fifth, export hazards are quite high at the beginning of trading relationships but stabilise over time, albeit for only a few trade spells. That is, the key drivers of trade duration are gravity-like covariates, fixed trade cost variables and duration 'type' covariates.

The third empirical study examines the impact of RTAs on economic growth in the EAC. The study specifies an endogenous growth model and estimates the model using feasible generalised least squares and panel corrected standard error estimators. The empirical results indicate, first, that RTAs and trade openness enhance economic growth in the EAC. Second, RTAs have impacts that are more significant for economic growth in the EAC than for trade openness measures. Third, the impact of trade liberalisation varies across regional markets. For instance, the EAC regional market has a more significant impact on economic growth than do plurilateral (COMESA) and multilateral (the WTO) trade agreements. Fourth, the impacts of RTAs on economic growth vary across countries in the EAC. These empirical results are robust to alternative model specifications

The thesis makes three major contributions that have important policy implications. The first draws from the empirical findings of Study 1, which provides new evidence that RTAs do have a positive effect on trade in the EAC and support third countries' trade. However, the impacts of RTAs on trade vary across countries and product groupings. The policy implication is that there is a need to strengthen trade liberalisation within the EAC with a special focus on strengthening RTAs. Adopting holistic policies may not be appropriate because of their varying impacts at country and sectoral levels. Policies should be particularly cognisant of each country's economic conditions. The second contribution draws from the empirical findings of Study 2. Utilising a new and comprehensive dataset, the study provides new empirical evidence that RTAs increase the duration of exports in the EAC. That is, it takes 2–3 years for half of the exports to dissipate in the EAC. The policy implication is that there is a need to explore ways in which RTAs can be used to increase the duration of trade in the EAC. Country and product characteristics in the EAC should be taken into account in plans to expand trade opportunities within particular regional markets, if trade relationships are to be extended. The third contribution draws on the empirical findings of Study 3. The study provides new empirical evidence that although RTAs do have a positive effect on economic growth, this varies across countries in the EAC. Empirical results reveal that investment and human capital are growth enhancing, while expansion of domestic credit by the private sector and 'import openness' are growth impeding. The policy implication is that there is a need to factor in trade liberalisation through RTAs in economic growth strategies other than via trade openness measures alone.

Statement of Originality

I, **Francis EJONES**, hereby certify that the written work in this thesis is my own work, conducted under formal supervision. The thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. I give consent to the final version of my thesis being made worldwide when deposited in the University's Digital Repository, subject to the provisions of the Copyright Act 1968.

Francis EJONES Date: 08/08/2020

Statement of Authorship

I, **Francis EJONES,** hereby certify that the research work in this thesis contains studies in print/scholarly output of which I am a joint author. I have included as part of the thesis a written statement, endorsed by my supervisors, attesting to my contribution to the joint publication/s/scholarly work.

Francis EJONES Date: 08/08/2020

Endorsement by Co-Authors

This is to certify that Research Higher Degree Candidate, **Francis EJONES**, has contributed to the papers contained the thesis. Francis EJONES developed research questions, methodology and statistical analysis of data, interpretation of results and writing of manuscripts.

Francis EJONES Date: 08/08/2020

Associate Professor Frank W. AGBOLA Date: 19/08/2020

Professor Amir MAHMOOD Date: 08/08/2020

Statement on Draft Manuscripts Contained in the Thesis

The chapters presented in this thesis are largely a series of published and unpublished studies that I have completed on the topic. The following studies are listed in the order in which they are presented in the thesis.

- Study 1—Chapter 4: Ejones, F., Agbola, F. W., & Mahmood, A., (2020). Do regional trade agreements promote international trade? New empirical evidence from the East African Community. Unpublished study, currently under review by *Journal of International Trade & Development*.
- Study 2—Chapter 6: Ejones, F., Agbola, F. W., & Mahmood, A., (2020). Modelling the impact of trade liberalisation on economic growth in the East African Community: A panel data analysis, *International Trade Journal.* Forthcoming.

My co-authors certify that I am the primary contributor to each of these studies. I initiated the research idea, undertook the literature review, conducted the data analysis and wrote the first draft of each of these manuscripts. My co-authors gave me guidance regarding the topics and literature, reviewed the drafts of each manuscript, and provided feedback.

Conference Presentations

Selected chapters from this thesis that have been presented at conferences are as follows:

- Do regional trade agreements promote South–South trade? New empirical evidence from the East African Community. Study presented at the 94th Conference of the Western Association International (WEAI), San Francisco, CA 28 June–2 July 2019 (with Frank Agbola and Amir Mahmood).
- Does trade liberalisation enhance economic growth? New empirical evidence from the East African Community. Study presented at the 14th Western Economic Association International Conference, 11–14 January 2018, The University of Newcastle, Newcastle, Australia (with Frank Agbola and Amir Mahmood).

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I appreciate the feedback offered by reviewers from various journals to which I submitted the manuscripts that form chapters in this thesis. I also recognise that reviews from seminar participants of the World Economic Association International 2017, 2019 and the various seminars held by the economics discipline at the Newcastle Business School. In addition, I am highly appreciative of the ideas with which Prof Tibor Besedeš provided me to construct a survival dataset. I also recognise the opportunities Dr. Vlasta Macku- Chief of the Virtual Institute of the United Nations Conference on Trade and Development secured for me, to hone my skills and knowledge in the area of international economics and trade. Upon such capacities, I have excelled at teaching, research, in employment and seamlessly applied the skills to complete this PhD thesis.

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List of Abbreviations

ACFTA	African Continental Free Trade Area
ACP	African, Caribbean and Pacific
AEC	African Economic Community
ARII	African Regional Integration Index
AU	African Union
CDF	Cumulative distribution function
CES	Constant elasticity of substitution
Clog-log	Complementary log-log
CM	Common market
COMESA	Common Market for East and Southern Africa
CPH	Cox proportional hazards
CU	Customs union
DDA	*Doha Development Agenda*
DRC	Democratic Republic of Congo
EAC	East African Community
EACJ	East African Court of Justice
EAHC	East African High Commission
ECA	Economic Commission for Africa
EGT	Endogenous growth theory
ERP	Economic recovery programme
EU	European Union
FDI	Foreign direct investment
FTA	Free trade area

FGLS	Fully generalised least squares
GATT	*General Agreement on Tariff and Trade*
GBLN	Globalisation
GDP	Gross Domestic Product
GNI	Gross National Income
IIT	Inter-industry trade
IMF	International Monetary Fund
LM	Pagan Lagrange Multiplier
LDC	Least developed country
MESTREG	Multilevel mixed effects parametric survival model
MTA	Multilateral trade agreement
MU	Monetary union
NAFTA	North American Free Trade Area
NGT	Neoclassical growth theory
OLS	Ordinary least squares
PAFT	Pan-African Free Trade
PCSE	Panel-corrected standard estimator
PPML	Poisson pseudo-maximum likelihood
PTA	Preferential trading area
PTC	Permanent Tripartite Commission
REC	Regional economic community
RI	Regional integration
ROW	Rest of the world
RTA	Regional trade agreement

SADC	Southern African Development Community
SAP	Structural adjustment programme
SITC	*Standard International Trade Classification*
SSA	Sub-Saharan Africa
TC	Trade creation
TD	Trade diversion
US	United States
VCE	Variance–covariance
WDI	World Development Indicators
WITS	World Integrated Trade Solution
WTO	World Trade Organization

Chapter 1: Introduction

1.1 Background to the Thesis

The objective of this thesis is to investigate the role and impact of regional trade agreements (RTAs) on trade, the duration of trade and economic growth in the East African Community (EAC), which is comprised of the republics of Kenya, Uganda, Burundi and Rwanda, and the United Republic of Tanzania.

Since the formalisation of the multilateral trade agreement (MTA) system through the World Trade Organization (WTO) in 1995, both developed and developing countries have embarked on policies aimed at promoting North–South and South–South trade. Despite these efforts, the impact of MTAs on trade and economic growth has been complex and is not well understood. Proponents of MTAs argue that free trade increases overall trade imports and exports through the gradual elimination of tariffs and enhancement of freedom to trade internationally. The orthodox theory of international trade supports this argument, favouring free trade based on economic efficiency and welfare enhancement (Krugman, 1987, 1991a). The argument that MTAs enhance trade dates back to Smith (1869), who argues that opening markets up to domestic and foreign competition would promote greater prosperity than applying stringent government regulations. This prediction espoused more recently in the works of Bhagwati (1971, 1989, 1993, 1994), Bhagwati, Greenaway and Panagariya (1998) and Bhagwati and Panagariya (1996). To consolidate the gains from multilateral trade, some countries should free up their trade and not manipulate their terms of trade, as this is a self-defeating process that leads to a reduction in the volume of trade and welfare in the long run (Johnson, 1954). To avoid countries acting unilaterally and to continually reduce their trade restrictions—thus overcoming this inefficiency—Mayer (1981) argues that countries should cooperate in a binding agreement. The *General Agreement on Tariffs and Trade* (GATT)/WTO system was designed to enable countries to mutually agree on reducing trade barriers (the principle of reciprocity or national treatment) and to not discriminate between countries (the most-favoured nation or principle). These two principles are operating rules allowing countries in the multilateral system to escape adverse terms-of-trade effects associated with unilateral tariff reduction, driven by 'the prisoners' dilemma' (Bagwell & Staiger, 1997, 1999a, 1999b; Subramanian & Wei, 2007). The theory behind the GATT/WTO effectively meant that member countries could avoid the inefficiency of one country's unilateral actions on another—a situation of 'non-cooperative equilibrium' known as the Nash equilibrium (Johnson, 1954).

Since the formation of the GATT in 1947 and its successor the WTO in 1995, which covers most trade (Irwin, 2005; Liu, 2009), international trade has grown by a factor of 27. In addition, trade as a ratio of Gross Domestic Product (GDP) increased from 5.5% in 1950 to 19.4% in 2005 (Subramanian & Wei, 2007; WTO, 2007).

Another argument in favour of the GATT/WTO is that it has introduced trade rules to prevent countries from taking trade restrictive measures (Van den Bossche, 2005, 2006) and diminish barriers that impede the flow of international trade (Tomz, Goldstein & Rivers, 2007). This has promoted fairness and encouraged the expansion of international commerce to all corners of the world (Irwin, 1995). In addition, the GATT/WTO introduced a global trading system with a dispute settlement unit, a mechanism that has introduced security and predictability in trade after the unnecessary trade wars of the 1930s and 1940s (Van den Bossche, 2005, 2006). This new global system has become a source of prosperity for the last seven decades (Subramanian & Wei, 2007). Further, the WTO introduced the protection and promotion of important non-economic and societal values, and interests such as public health, public morals, human rights and consumer security (Van den Bossche, 2005, 2006). Further, the GATT/WTO has introduced a greater measure of equity in international economic relations (Van den Bossche, 2005, 2006).

However, critics of MTAs argue that the GATT's efforts failed to contain protectionist pressure in its first six decades of existence (Irwin, 1995, 2005, 2019). Despite the successes of MTAs in promoting trade and economic growth, in recent times there has been a decline in trade under MTAs (Bhagwati, 1993, 2008; Krugman, 1991a, 1993). In 2005, the multilateral trading system almost came to a halt under the *Doha Development Agenda* (DDA) (Hartman, 2013). The failure of the DDA has been attributed to the European Union (EU) and the United States (US) not considering development aspects of developing countries and least developed countries (LDCs) in the WTO (Sorgho, 2016). The most acerbic critic of the GATT/WTO is Rose (2004a, 2004b), who finds that the WTO did not trade more than countries that abstained from membership. Following criticism of his earlier studies, Rose (2010) still finds that there are no strong positive effects of the GATT/WTO. Irwin (1995) finds that the GATT/WTO's success is by no means uniform. In fact, Subramanian and Wei (2007) confirm that the GATT/WTO effectively promotes trade in developed countries, but not in developing countries. Further, the WTO promotes trade in less protected sectors—but not agriculture and textiles—and for new WTO members but not old GATT members (Subramanian & Wei, 2007).

In 2007, WTO Director General Pascal Lamy notes that WTO membership had failed to deliver the promised pro-development changes to developing countries, as their interests had

been sidelined by the economic and political interests of the global powers (WTO, 2007). The director general notes that finding 'development' in the Doha Development Round is like looking for a needle in a haystack. Baldwin (2006) notes that MTAs have generated complexities in their operations of trade and thus created adverse effects on developing countries' trade agendas.

The failure of the GATT/WTO to meet the needs of developing countries has resulted in the establishment of RTAs (Hartman, 2013; Hur & Park, 2012). RTAs are aimed at consolidating developing countries' bargaining power in important sectors of their economies to achieve sustainable economic growth and development (African Union [AU], 2016; Head & Ries, 2004; United Nations Conference on Trade & Development [UNCTAD], 2019). Consequently, developing countries have embraced regional integration (RI) as a core component of their strategies to promote trade, economic growth and development (Hartman, 2013; Sorgho, 2016).

1.2 Problem Statement

The changing international trade environment has compelled many developing countries, especially in Africa, to form themselves into RTAs (Hur & Park, 2012; Mathieson, 2016; Sorgho, 2016). RTAs are expected to consolidate LDC partner countries' bargaining power in sectors that directly support their development, such as agriculture, agricultural raw materials and food trade, inter alia (Head & Ries, 2004). However, the extent to which these RTAs have affected trade and economic growth remains complex and is not well understood. Four issues have emerged in relation to why the impact of RTAs on the economic activity of developing countries remains problematic. The first is the lack of reliable data on trade across countries. Unlike the datasets used in this study, all datasets for the other studies are not as disaggregated. Second, there is a lack of sophisticated econometric techniques for dealing with zeros in trade data series. The methodologies and econometric processes adopted in previous studies produce estimates that are spurious and do not incorporate contemporary methodologies. Third, empirical studies guiding the evolution of these RTAs and the process of formulating regional policies are few and inadequate. Fourth, such studies (Abrego, Amado, Gursoy, Nicholls & Perez-Saiz, 2019; Abrego, Riezman & Whalley, 2005; Socrates, Moyi & Gathiaka, 2020; Stack, 2009; Urata & Okabe, 2014) are tainted with unacceptable prepositions, strong statements, theory and causal empiricism rather than robust empirical studies that are theory based. Their conclusions are too general to address pertinent issues in the evolution of these RTAs, and as such, are devoid of explicit policy outcomes and any intention to guide

sectoral or specific policy needs of African countries to achieve their implicit aims. In light of the glaring inadequacies of contemporary evidence to support the surge in regionalism, three key issues have been identified for exploration in this thesis: RI and trade; the duration of trade relationships; and economic growth.

The first issue relates to the impact of RI on trade. In this regard, the thesis employs the customs union (CU) theory developed to explain the trade impact of RI, which is inconclusive regarding the outcome of RI (Abrego et al., 2005; Frankel, Stein & Wei, 1997; Hayakawa, Ito & Kimura, 2016; Sorgho, 2016; Viner, 1950). Several frameworks involving the Vinerian CU theory have been developed that have further confounded the trade effects of RTAs. For example, some frameworks claim that RTAs are pure trade creating (Abrego et al., 2005; Clausing, 2001; Lipsey, 1957, 1960) while others claim that RTAs provide mixed and ambiguous outcomes, just like in the Vinerian model (Abrego et al., 2005; Bhagwati & Panagariya, 1996; Pant & Sadhukhan, 2009; Plummer, 2004; Viner, 1950, 1951; Williams, 1972). Empirical approaches to RI adopt the same Vinerian trade effects and produce further ambiguity in relation to the outcomes of RTAs for trade (Clausing, 2001; Hayakawa et al., 2016; Magee, 2008, 2016). For instance, some empirical studies claim that RTAs enhance trade (Baldwin & Venables, 1995; Head & Ries, 2004; Kessie, 2007). Others claim that they impinge on trade (Bhagwati, 1993), while others find that outcomes are ambiguous (Kennan & Riezman, 1990). In addition, these studies fail to properly capture the true Vinerian trade effects. As such, these studies report unreliable effects of RTAs (Baier, Bergstrand, Egger & McLaughlin, 2008; Carrere, 2006; Soloaga & Winters, 2001). In addition, RTA scholarship is concentrated on RI in Europe (Stack, 2009) with less attention paid to the EAC. For example, in all studies cited in chapter four on the effect of RI on trade, only Urata and Okabe (2014) examined RI in Africa. Further, that study (Urata and Okabe (2014)) is limited in its treatment of RTAs in Sub-Saharan Africa (SSA), including only the Common Market for East and Southern African (COMESA).

The second issue this thesis explores relates to the role of RI in reducing the frailty of trade relationships once they have begun. The theory of RI was developed within the context of the plethora of international trade literature that has always presumed—erroneously—that trade relationships persist once they have begun. However, recent empirical research shows that trade relationships are far more fragile than previously thought, yet no theories exist to explain the short-term nature of trade relationships (Besedeš & Prusa, 2003, 2006a; Hess & Persson, 2012). Empirical evidence relating to trade duration is complex and contradictory, and studies have barely tackled the issue of the duration of trade relationships (Besedeš & Prusa,

2003). First, there are widely varying estimates of survival rates and these rates are not specific to the frailty of developing countries' trade relationships (Besedeš, 2008; Besedeš & Prusa, 2006a, 2006b; Fugazza & Molina, 2016; Nitsch, 2009). Second, this thesis determines that there are mixed results pertaining to the impact of RTAs on the duration of trade relationships. Some studies argue that RTAs reduce the frailty of trade relationships and others argue that RTAs have a limited impact, at best, on strengthening trade relationships (Kamuganga, 2012). Other studies report that RTAs provide mixed outcomes (Besedeš & Prusa, 2003; Fertő & Soós, 2009). Third, there is a dearth of studies on the determinants of trade relationships, especially from developing countries (Besedeš, 2008; Besedeš & Prusa, 2006a, 2006b; Hess & Persson, 2011; Nitsch, 2009; Obashi, 2010). The few studies on trade duration are tainted with controversy and conflicting views on several aspects of trade persistence, such as the role of RTAs in trade duration and survival rates (Fugazza & Molina, 2016; Nitsch, 2009).

The third issue this thesis explores relates to characterising the trade–growth nexus within the context of the EAC, since the impact of trade liberalisation on trade is still unsettled, and the role of RTAs is not well explored (Hashemzadeh & Woolley, 2003; Hur & Park, 2012). Theoretical underpinnings of the trade–growth nexus are characterised by a lack of consensus on the growth effects of trade liberalisation (Hossain & Joarder, 2014; Singh, 2010). Regardless of the theoretical contradictions of the trade–growth nexus, many countries, especially from SSA, continue to liberalise trade mainly through RTAs with the sole aim of boasting their economic growth and development (EsteveE-Perez, Requena-Silvente & Pallardo-Lopez, 2013). However, economic growth has not kept pace with this trade liberalisation, particularly in Africa (Constantinescu, Mattoo & Ruta, 2016; Winters, 2004). Empiricists have neglected the growth effects of RTAs in SSA (Baldwin & Venables, 1995; Liu, 2016; Vamvakidis, 1998). The few studies that have tackled this issue report mixed outcomes of trade liberalisation for economic growth. For example, a few studies find negative effects of RTAs on growth (Henrekson, Torstensson & Torstensson, 1997; Vanhoudt, 1999), which improve when the definition of RI is enhanced (Liu, 2016). In addition, previous studies consider only trade outcomes or trade openness as their definition of trade liberalisation, neglecting RI or trade policy (Camarero, Martinez-Zarzoso, Nowak-Lehmann & Tamarit, 2016; Harrison, 1996). Auxiliary studies on the trade–growth nexus concentrate on developing countries in South Asia and South America. Any impact of trade liberalisation on trade is refuted in South America but supported in the Southeast Asia because these countries had implemented supportive domestic policies by the time they adopted RTAs (Liu, 2016). The EAC provides a unique case since it

is the world's most ambitious trade liberalisation programme whose stable macroeconomic policies have not been explored.

1.3 Research Questions

Following from the above problem statement, this thesis develops three research questions:

1. Do RTAs promote trade in the EAC?
2. What is the role of RTAs in enhancing the EAC's duration of trade?
3. Does the EAC's trade liberalisation policy impact on economic growth?
4. To make policy recommendations for enhancing the efficacy of regional trade agreements and their impact on economic growth in the East African Community.

1.4 Objectives of the Study

The objectives of this thesis are to:

1. empirically investigate the impact of RTAs on trade in the EAC
2. examine the impact of RTAs on the duration of trade in the EAC
3. empirically investigate the impact of trade liberalisation on economic growth in the EAC.
4. make policy recommendations for enhancing the efficacy of regional trade agreements and their impact on economic growth and trade duration in the East African Community.

1.5 Brief Outline of the Methodology

The theoretical underpinnings of the impact of RI were developed to explain regionalism in Europe and the West—not RTAs in the developing world. Increasing application of these models is reported, but less attention is paid to explaining RTA evolution in developing countries (Stack, 2009) and several issues of interest in the Global South (developing countries) are inadequately addressed. For example, scholarship has focused on regionalism of countries in South Asia and South America while ignoring regionalism in SSA. The few relevant studies have produced mixed results. The limited studies on trade duration are tainted with controversy and conflicting views on several aspects of trade persistence such as the role of RTAs in trade duration and survival rates (Fugazza & Molina, 2016; Nitsch,

2009). Any impact of trade liberalisation on economic growth was refuted for South America but supported for the East Asia Sea because countries in these regions had implemented supportive domestic policies by the time they adopted RTAs (Liu, 2016).

This thesis applies an economic rationale in an empirical endeavour to examine the role of EAC RI on trade, duration of trade relationships and economic growth. The thesis adopts and applies contemporary developments of various aspects of regionalism using the context of the EAC. This should enable a strong economic analysis to support the process of regionalism in the Global South. To this end, the thesis develops three studies that apply different methodologies to resolve or examine whether regionalism enhances trade; reduces trade frailty once relationships have started; and promotes economic growth. The first empirical endeavour of the thesis applies a descriptive analysis to provide simple graphics of EAC trade by country and product over the period under study. In addition, the contextualisation section analyses regionalism in SSA in general and the EAC region in particular. The findings of the analysis illuminate characteristics or regional evolution vis-à-vis trade evolution but do not focus on the 'why' of trade enhancement, trade frailty reduction or economic growth on the region. The 'why' of the thesis is analysed in three empirical studies.

The first empirical study examines the question: Does LDCs' membership of regional trading blocs promote trade in the EAC? The study applies the canonical gravity model and extends the model to correct for zero trade, heterogeneity and endogeneity to examine LDCs in the context of the EAC. The thesis employs the Poisson pseudo-maximum likelihood (PPML) estimator to investigate whether RTAs promote trade in the EAC. The model is estimated using a comprehensive panel dataset (to improve efficiency) (Yotov, Roberta, Monteiro & Larch, 2016) of the imports of the world from the five EAC partners' trade, in five products or sectors for the period 1990–2017. The study uses data for every 3 years from 1993 to 2017 following Cheng and Wall (2005), Olivero and Yotov (2012) and Trefler (2004). This is because trade policy changes do not adjust instantaneously (Trefler, 2004) and when using fixed effects, the endogenous variable 'trade' cannot fully adjust in a single year (Cheng & Wall, 2005). In addition, I introduce a set of three-way indicator variables that account for the presence of intra-bloc, export diversion and import diversion of EAC trade liberalisation policy within the EAC, COMESA and WTO trading blocs or markets.

The second empirical study examines the question: Does participation in RI enhance the duration of trade relationships using the context of the EAC? This study implements the full range of survival models, including non-parametric, semi-parametric and parametric models, to explore the robustness of the results. The first part of the analysis explores non-

parametric methods. Specifically, the Kaplan–Meier (Kaplan & Meier, 1958) and Nelson–Aalen (Aalen, 1978; Nelson, 1972, 2000) estimators are used to determine the probability of EAC trade terminating, as widely used in trade duration studies such as Besedeš and Prusa (2003, 2006a), Brenton, Saborowski and von Uexkull (2010), Obashi (2010), and Volpe Martincus and Carballo (2008). Because of the inadequacy of non-parametric estimations in controlling for country, product and pair-specific characteristics of trading, the study implements both semi-parametric and parametric methods (Chen, 2012; Obashi, 2010). For the second component of the analysis, the study implements the Cox proportional hazards (CPH) semi-parametric model for baseline purposes. The main results are estimated using continuous–discrete parametric methods, since such estimators allow for smoothing of 'meaningless' data and inclusion of endogenous policy variables, and test different parametric forms to produce more robust results (Brenton et al., 2010; EsteveE-Perez et al., 2013; Gullstrand & Persson, 2015; Hess & Persson, 2012; Rodríguez, 2010). This thesis study estimates panel logit models, panel complementary log-log (clog-log) models and multilevel mixed effects parametric survival models (MESTREG), and fits probit models. The empirical study uses both country and product-level data as encouraged by Fugazza and Molina (2009) and adopts the use of export data as encouraged by Besedeš and Prusa (2010), Brenton et al. (2010) and Shao, Xu, and Qiu (2012). Exports refer to imports by the rest of the world (ROW) of 13 products from the five EAC partner countries. RI is indicated by dummies—1 for exporter and importer belonging to the same bloc and 0 otherwise. These dummies capture the intra-bloc participation of the EAC in the EAC, COMESA bloc WTO blocs for the period 1988–2015.

The third empirical study examines the question: Does trade liberalisation enhance economic growth in the EAC? This study is preceded by checks of the characteristics of the data to avoid estimating spurious regressions, as argued by Wooldridge (2010). This process indicates that the dataset used for this empirical study has a panel structure characterised by complex error structures (Reed & Ye, 2011). In addition, the study identifies that the data suffer from (1) cross-sectional dependence according to the Breusch–Pagan Pagan Lagrange Multiplier (LM) test; (2) heteroscedasticity according to Stata's xttest 3 test, and (3) serial correlation according to Stata's xtserial test. This implies that the study should adopt an estimator that can handle contemporaneous correlations, heteroscedasticity and first-order autocorrelation. Accordingly, the study adopts the panel-corrected standard estimator (PCSE) for the main regressions because the primary interest is in constructing accurate confidence intervals (Beck & Katz, 1995; Moundigbaye, Rea & Reed, 2018; Reed & Ye, 2011). The PCSE estimator produces heteroscedastic-consistent standard errors and controls for cross-sectional

and temporal dependence (Hoechle, 2007). For sensitivity analysis, I apply fully generalised least squares (FGLS) because the estimator primarily enhances the efficiency of my estimates (Reed & Webb, 2010; Reed & Ye, 2011). I measure trade liberalisation using both trade outcomes and trade policy measures. The trade outcomes measures include trade openness indicators, import openness and export openness measures. I measure trade policy using dummies that measure the intra-bloc trade created in the EAC, COMESA and WTO blocs or markets. I undertake the analysis at the bloc and country levels. I undertake a panel study with panel data spanning 1988–2017.

1.6 Contribution of the Study

This thesis makes three major contributions. First, empirical Study 1 finds that RTAs enhance trade in the EAC, thus reconciling the mixed results of the role of RTAs in trade in SSA, using the EAC context. In addition, the study provides new empirical evidence regarding EAC regional policy; most studies on RTAs are concentrated in Europe with less attention paid to the EAC bloc or to regionalism in developing countries, especially in SSA (Stack, 2009). This study contributes to the growing literature concerned with the effect of RI on developing countries in general and on the EAC specifically. Unlike previous studies, this study sheds light on the role played by RTAs in trade, and disaggregates the analysis by country and product. Accordingly, the empirical study finds that RTAs have heterogeneous effects on country and products, even in regional markets that originally did not show trade-enhancing effects at the aggregate or bloc/market level. Finally, I apply convectional gravity estimation to a comprehensive EAC trade dataset, shedding light on the greater impacts of regionalism on trade by regional market, country and product, and on how the products perform in different countries.

Second, empirical Study 2 provides evidence of the effect of EAC regional policy on the duration of trade relationships in a regional bloc that has been neglected in the literature. In addition, Study 2 reconciles apparent inconsistency or controversy about the role of RTAs in the duration of trade relationships (Besedeš, 2013). It enhances understanding of the stability of EAC trade relationships since few studies examine hazard rates and death of EAC trade relationships, yet factors causing death of existing trade flows impede future trade growth in the EAC. In addition, the study reconciles ambiguity relating to product type, duration dependence and determinants of export death. Study 2 furnishes robust evidence that the EAC RTA enhances the duration of trade, but this varies by country and product traded.

Third, empirical Study 3 bridges the knowledge gap that exists on the role of the EAC in economic growth and reconciles mixed findings in the literature on different aspects of the trade–growth nexus. The thesis reconciles the lack of consensus on the growth effects of RTAs and openness (Hur & Park, 2012). In addition, the thesis simultaneously analyses both trade policy and trade volumes, deviating from previous studies that use only trade volumes, neglecting trade policy (Camarero et al., 2016; Harrison, 1996). This approach provides robust results on the impact of trade liberalisation and growth (Doyle & Martinez-Zarzoso, 2011). Specifically, RTAs with countries in the same region have stronger effects on economic growth than do plurilateral agreements and MTAs with markedly different countries. The empirical study also indicates that regionalism in the EAC has heterogeneous effects on economic growth across countries.

1.7 The Organisation of the Thesis

This thesis consists of seven chapters (see Figure 1.1). Chapter 1 provides a snapshot of the thesis, including the motivation for the study, research questions and objectives, brief methodology and contribution of the thesis.

Chapter 2 provides an overview of the evolution of the theory of RI. This is followed by a critical review of the literature on trade, trade duration and economic growth, and an outline of theoretical and empirical considerations. Finally, gaps in the literature are discussed.

Chapter 3 provides an overview of trade policy reforms and regionalism in the EAC. This chapter extends the analysis to discuss the trends in trade and economic growth within the EAC. Further, EAC country heterogeneity in the trade in goods is discussed.

Chapter 4 empirically examines the impact of RI on trade in the EAC. Both the theoretical and empirical underpinnings of the impact of RI are mixed (Abrego et al., 2005; Pant & Sadhukhan, 2009). In addition, while a growing number of theoretical and empirical studies examine the impact of RTAs on trade, those within the context of developing countries remain limited (Stack, 2009). This chapter reviews the empirical literature and empirically examines the impact of EAC regionalism within the EAC, COMESA and WTO markets in the context of the EAC regional policy endeavour.

Chapter 5 explores the duration of trade relationships with a particular emphasis on examining the role of RI in trade hysteresis upon becoming part of a regional entity. The chapter applies contemporary discrete-time models to shed more light on the frailty of trade

relationships of developing countries. It includes a review of the relevant literature of survival analysis and presents the empirical results.

Chapter 6 investigates the effect of trade liberalisation (i.e. trade openness [trade outcomes] and RI [trade policy]) on economic growth in developing countries using the context of the EAC. A review of the theoretical and empirical literature on the effects of trade liberalisation on economic growth is presented, and it includes the empirical results for the role of trade liberalisation (including trade openness and RI) in economic growth.

Chapter 7 summarises the key findings, draws some conclusions, outlines the policy implications of the empirical findings and suggests areas for future research.

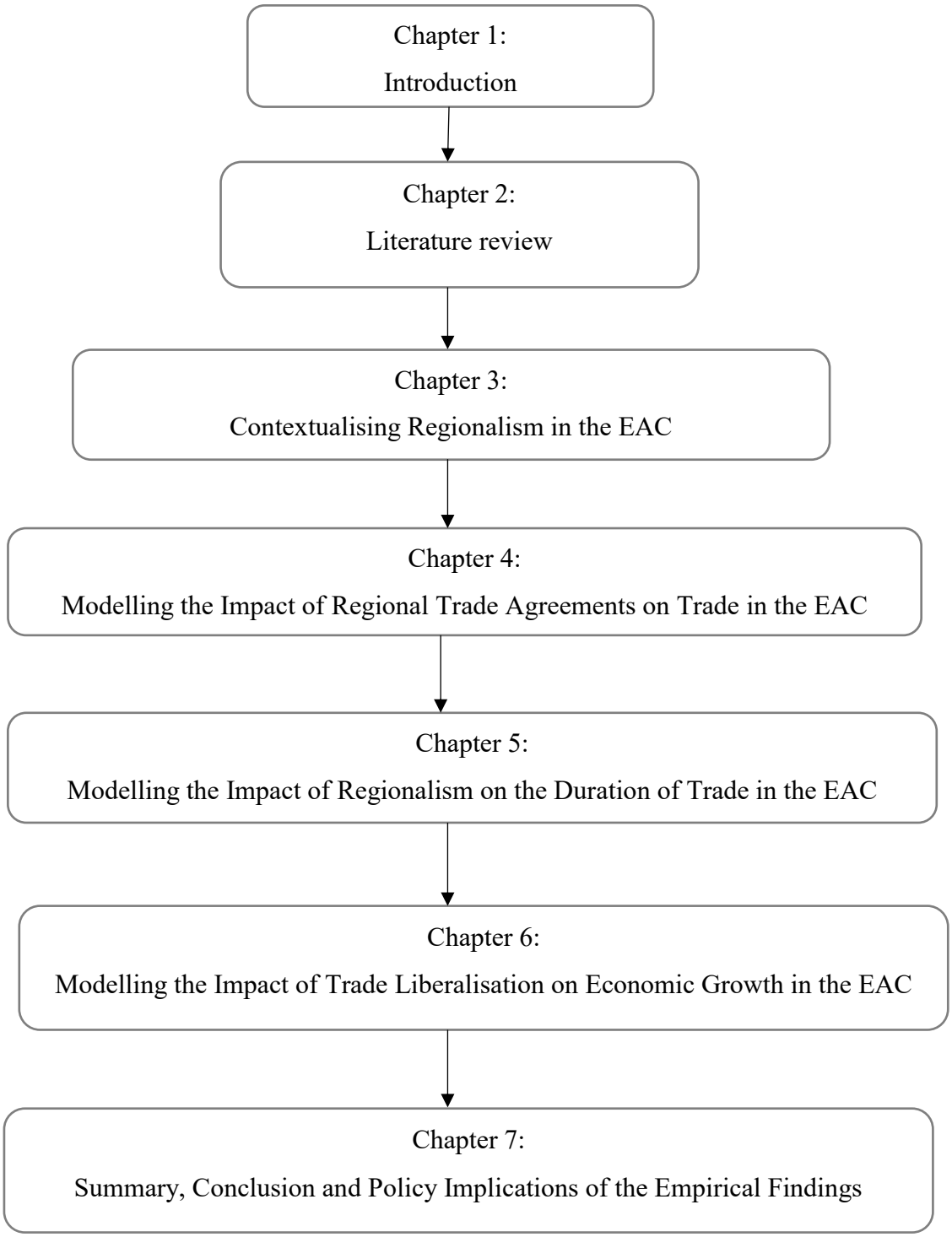

Figure 1.1. Structure of the thesis.

Chapter 2: Literature Review

2.1 Introduction

The purpose of this chapter is to outline theoretical and empirical underpinnings of the concepts of RI, trade duration and the trade–growth nexus in the formation of a RTA.

Trade policy liberalisation leads to reallocation of resources and formation of new trade relationships. RI is expected to generate benefits in the form of welfare and spur economic growth as trade relationships persist. However, whether welfare is enhanced, trade relationships persist and economic growth is realised is an empirical question, since theoretical underpinnings are ambiguous in relation to their presumed outcomes. The review adopts an economic approach and discards the political approach relied on when forming RI blocs. A political economy approach relies on flowery administrative statements and casual empiricism, unlike economic approaches that rely on economic empiricism (Ejones, 2015). Political economy therefore fails to address key questions on the formation of RI. Consequently, the study focuses on the concept of RI, trade duration (or survival) and the nexus between trade and growth. A definition of key terms is provided in Section 2.2. A sequential theoretical review of the concepts is provided in Section 2.3, with Subsections 2.3.1, 2.3.2 and 2.3.3 reviewing the theoretical literature on trade, the duration of trade and the trade–growth nexus, respectively. Section 2.4 reviews empirical studies related to the concepts of trade, the duration of trade and the trade–growth nexus. The implications of the reviewed study findings are outlined in Section 2.5, and Section 2.6 provides concluding remarks.

2.2 Definition of Key Terms

The following section examines key terms in the broader domain of international economic integration as the background to which the literature on RTA and contextual factors on trade, the duration of trade and economic growth, is examined.

2.2.1 Definition of regional integration

It is useful to define the term ‘regional integration’ (or broadly, regional economic integration) to identify whether countries or territories are integrated into the same economic region (Viner, 1950). Neither theoreticians nor empiricists have made any headway towards agreeing on a concrete definition for an economic region (Mansfield & Milner, 1999).

Proximity, policy coordination and improved market access (and sometimes market entry) are desirable traits of defining RI traditionally (Mansfield & Milner, 1999, 2010; Mansfield & Solingen, 2010; Shams, 2002; Väyrynen, 2003). RI is the process of independent nations (or even groups of nations or customs territories) forming integrated economic units with the ROW and/or third countries (Ejones, 2015). This leads national states to share part or all of their decisional authority with an emerging international organisation in an economic area or entity; hence, RI (Schmitter, 1970). According to teaching material developed on RTAs by the Virtual Institute of the UNCTAD, RI can be formed through sectoral or general integration, as follows:

- Sectoral integration focuses on merging sectors/subsectors and industries (e.g. agriculture, industry and service) of the integrating nations.
- General integration focuses on merging entire policies (e.g. trade, investment and monetary policies) of the integrating nations.

Whether sectoral or general integration, the scope of convergence of economic and political policies of the integrating nations will vary in design and scope (Mansfield & Milner, 2010), and may be in the form of a:

- Preferential trading area (PTA)—involves integrating countries granting preferential access to commodities and possibly services to each other rather than third countries or the ROW. The preference may not be symmetrical for all bloc members and may not cover all merchandise or services. An example of a PTA is the economic partnership agreement involving the EU and African, Caribbean and Pacific (ACP) countries, currently being negotiated.
- Free trade area (FTA)—involves bloc members removing trade barriers (mainly tariffs) for other bloc members, though each member could maintain its own external tariff with the ROW. In an FTA, members have a rules-of-origin document to certify the origin of the merchandise or service. This overcomes the problem of trade deflection. Trade deflection is a situation that arises when goods from the ROW enter the trading bloc through a country with the lowest external tariff and shipped to other bloc members. An example of an FTA is the North American Free Trade Area (NAFTA) comprised of Mexico, the US and Canada.
- Customs union (CU)—includes all characteristics of an FTA in addition to members maintaining a common external tariff for each product category traded with the ROW. An example of a CU is the Southern African Customs Union, comprised of Botswana, Lesotho, Namibia, South Africa and Swaziland.

- Common market (CM)—has all the characteristics of a CU augmented by a free flow of factors of production, particularly labour and capital, across the bloc. An example of a CM is the EAC, comprised of Burundi, Kenya, Rwanda, Tanzania and Uganda.
- Monetary union (MU)—is a CU that entails members coordinating a common monetary policy, and consequently applying a common currency or even fixed exchange rates. An effective MU involves the coordination of economic policy, especially fiscal policy. An example of a MU is the Organisation of the Eastern Caribbean States.
- Political union—is a MU with members coordinating common foreign and security policies, coupled with good governance; for example, mainland Tanzania and Zanzibar forming the United Republic of Tanzania.

The term 'regional integration' is a generic term that refers to all of the above terms. Traditional theoretical ventures explore FTAs and CUs. However, recent empirical studies do not distinguish between different types of RI listed above (Mansfield & Milner, 2010). The current study follows in the same tradition since the focus is not on the type of RI but the impact of a regional trade policy once established. Further, the study adopts a RI process as governed and regulated by the WTO multilaterally. The WTO's GATT in Article 24 and Enabling Clause 22 grants more flexible rights to South–South members to enter RI with the objective of facilitating trade, not to create barriers. The WTO framework clarifies the notification, configuration and scope of RI.

Notification is a transparency measure that clarifies membership of the RI and reporting of trade measures that could affect other members. The WTO requires RI members to uphold both internal conditions that facilitate trade between constituent members and external conditions not to impinge on trade to other members. The internal conditions require that duties and other restrictive regulations are eliminated concerning virtually all trade with bloc members or at least to most products originating from the territory of the RI. External conditions require that the regional entity does not create trade barriers towards other WTO members not a party to the RI.

2.2.2 Definition of trade in a regional context

The thesis defines the regressand as the value of imports of the ROW (importers) from the five EAC partner countries (exporters). Hereafter, this value is referred to as the exports or trade of the EAC. Subramanian and Wei (2007) encourage the use of unidirectional trade as the regressand because:

- All theoretical expositions of gravity-like stipulations support the use of unidirectional export data as the regressand, rather than the sum of trade and exports.
- The effects of trade policy are closely related to imports rather than exports and would increase imports and not exports. Subramanian and Wei (2007) argue that there is no valid theoretical argument for a country's or region's exports to expand by the same proportion even if the Abba Learner Symmetry holds. The Abba Learner Symmetry refers to equivalence of import and export restrictions and notes that the removal of import barriers serves to raise exports as well as imports (Devereux, 1997; Lerner, 1936).
- The application of the effect of export trade liberalisation policies is ambiguous in theory as the progressive reduction of exports tends to reduce exports too.

2.3 Review of Theoretical Studies

This section examines the theoretical underpinnings of the impact of RI on trade, the duration of trade relationships and the trade–growth nexus. The literature is reviewed to establish the meaning of RI and the channels through which it acts to enhance trade, increase the duration of trade relationships and boost economic growth. The theoretical literature is examined in Subsection 2.3.1; the duration of trade relationships in Subsection 2.3.2; and the nexus between trade and growth in Subsection 2.3.3.

2.3.1 Theories of regional integration

RI theories are nearing completion of their seventh decade, and continue to attract controversy among social scientists (Caporaso, 1998) in search of rigorous explanations for economic and political integration (Mattli, 1999). These theories originally envisioned an explanation for European integration after the destruction of World War II (Hooghe & Marks, 2019; Kaiser, 1972) and were later adopted to explain the integration of North America, South American and then the ROW (Haas, 1970). According to Haas (1976), the main assumptions upon which these theories were built are:

- the outcome of the integration process should be spelt out by the evolved institutional framework
- any conflicts arising from trade-offs between regional members and non-members should be resolved in favour of enhancing the welfare of regional members

- all regional resolutions should be incrementally arrived at.

The evolution of RI theories has been inspired by several disciplines and subject matters (Haas, 1970), giving rise to four separate theoretical conventions:[1] federalism; the confederation of national states; functionalist 'free trade' areas; and neo-functionalism (or an economically integrated entity) at its inception (Lindberg & Scheingold, 1970). Lindberg and Scheingold (1970) categorise functionalist and neo-functionalist theories or strategies as economic in orientation; and federalism and confederation theories as political in orientation. Theories that are political in orientation seek an integration that is a system of nation-states (Kaiser, 1972), while theories that are economic in orientation assume away the relevance of institutional and political forces. These theories focus on causality between factor and product markets in estimating the welfare effects of integration in terms of trade creation (TC), trade diversion (TD) and terms of trade (Mattli, 1999). The CU theory is a classic economic account of RI (Mattli, 1999), and its premises or ideas echo those of most premises of the neo-functionalist theory of integration.

The review adopts integration theories that are economic in orientation and whose central concern is stocktaking the evolution of the CU theory. This strategy enables the thesis to focus on markets (the regional economic area) and omit institutional dimensions of integration, namely rules, regulations and policies that enable shallow and deep integration (Mattli, 1999). To remedy any weakness that may arise from such an approach, the thesis analyses the framework of the WTO. The WTO is a rules-based organisation with the goal of integrating markets multilaterally (Van den Bossche, 2005, 2006). This then bridges political science and economic approaches without delving into the intricacies of the political science approach.

2.3.1.1 Functionalist theory of regional integration

The thesis of functionalist theory is that governments can integrate their activities in relation to less politically sensitive needs of their citizens by jointly identifying concrete tasks and practical problem-solving solutions in an ever-spreading web of regional institutions (Caporaso, 1998; Haas, 1970; Schmitter, 1970).

In Schmitter (1970), at the inception of the integration process, national units identify and jointly act upon common objectives that are converged in an establishment called a RI. If

[1] Other theoretical conventions, such as intergovernmentalism and communications approaches are not explored since they do not qualify as theories and are not central to the issues raised in this thesis (Kaiser, 1972).

first-level common objectives are not met by implementing strategies from the established regional entity, there is a revision of strategies to consider alternative integrative obligations. This re-evaluation of strategies and objectives leads to re-definition of the integration process of an ever-spreading web of institutional and territorial organisations of increasing authority and relationship. Achievement of the outcome of the RI is, however, constrained by certain tensions and enhanced by contradictions. The model's hypothesised basic contradictions are:

- ambiguity in proportioning the benefits of the integration process equitably
- impracticality of sustaining prolonged separation of non-political and difficult issue areas in an increasingly complex and interdependent policy matrix,
- the impossibility of isolating the deliberations of the regional process from the external dynamics of the region
- envy among regional partner nations resulting from some performing better than others because of higher transaction volumes and information available to them.

Consideration of feedback on these contradictions enables the RI process to be dynamic, moving from one success to another, creating a success syndrome. However, if any assumptions or contradictions of the functionalist model are not met, the theory collapses and fails to describe the RI process. Further, the theory does not have provisions to consider barriers to optimal resource utilisation or exchange, meaning that it fails to explain economic integration (Schmitter, 1970). Other criticisms of the functionalist theory are as follows:

- First, the strongest criticism of the functionalist model (and all prior models) comes from Haas (1970) calling them 'pre-theories'. According to Haas (1970), these theories fail to describe, explain and predict the pattern of RI since they (1) lack complementarity because they are layered in several levels of abstraction; and (2) do not explain what is endogenous or what is being measured. These pre-theories are discarded as theories of RI because they fail to link the RI process to its outcome (Haas, 1961, 1970).
- Second, Schmitter (1970) argues that pre-theories are inadequate to explain the integration process since they sloppily conceptualise integration variables, fail to specify identified variables and have few operational references. Ultimately, the thesis concludes that the pre-theories—especially the functionalist theory—fail to show sensitivity to the likelihood of alternative outcomes of the integration outcome.

Functionalist design structure tackles outcomes and does not explain the process of integration. It conveniently introduces the concept of spillover to explain the process of

integration, thus failing to advance understanding of integration (Caporaso & Keeler, 1993). These failures of the functionalist 'theory' to explain, classify and generate hypotheses to advance debate about RI created a vacuum that was filled by the neo-functionalist theory (Haas, 1970; Lindberg & Scheingold, 1970). The neo-functionalist theory of integration is discussed below.

2.3.1.2 Neo-functionalist theory of integration

The neo-functionalist theory of RI carries forward many ideas of the functionalist theory (Caporaso & Keeler, 1993; Mattli, 1999) in clarifying strategies that guided Europe beyond World War II (Hooghe & Marks, 2019; Rosamond, 2000). Neo-functionalism retains from functionalism concepts such as functional spillover-explaining change; common interest; group dynamics; muted ideological conflicts; and mixed economies (Caporaso & Keeler, 1993; Mattli, 1999; Wiener & Diez, 2009). Also, the theory extends or introduces new concepts to our understanding of RI. For example, it clarifies what the dependent variables of a RI process are and emphasises the centrality of decision making (institutions) and integrative habits (attitudes) in theory (Caporaso & Keeler, 1993; Haas, 1970).

Neo-functionalism offers a comprehensive explanation for RI (Mattli, 1999) that uses language borrowed from a wide range of theories including interest group theory; systems theories; and economics (Caporaso & Keeler, 1993). Haas (1970) argues that neo-functionalism explains how and why national units merge and mix with neighbours in a larger centre (institutions) with jurisdiction to resolve conflict and standardise economic activity. It assumes that conceding national sovereignty to a supranational entity enables states to maximise welfare (Mattli, 1999). There is also a presumption that national units are rational and consolidate societal demands into a preference function for bureaucrats to negotiate at the supranational level (Caporaso, 1998). Rosamond (2000) identifies other propositions as being:

- to incrementally embark on integration from less politically sensitive but key strategic economic sectors
- to create a supranational authority delinked from national interest to guide the deepening of integration that creates the impetus for further integration and necessity for greater regulatory complexity
- that economic integration and political integration are self-reinforcing
- that dynamism in the regional entity is created by gradual economic integration and institutionalisation of the supranational entity.

Rosamond (2000) describes how the process of neo-functionalist logic leads to a RI and regional area. Consider that two or more national units agree to form an integration starting with the fusion of less politically sensitive economic sectors, say X_a. For this task to be accomplished, the nation states will cede their sovereignty to a supranational entity with increasing authority to guide economic transactions, social order and political devolution. Economic growth in the integrated sector will induce the need to integrate other, politically less sensitive, sectors, say X_i. This impetus will continue until all economic sectors are fully integrated, even attracting more and more countries to join the integration bloc. This dynamic process of economic integration is hypothesised to maximise welfare through increased transactions, though the theory does not examine the issue of economic transaction and welfare. Much as neo-functionalism is intuitive, it has also attracted criticism:

- First, the model's underlying assumptions fail to explain causation between the maximisation of welfare and RI. Welfare is maximised through transactions, yet the model does not examine transactions (Rosamond, 2000).
- Second, the model's predictions fail to explain the economic integration process when it moves into stagnation or even into disintegration. The model was designed with the conviction that societal demands are reflexive (Caporaso, 1998).
- Third, Caporaso (1998) further condemns the model for lacking hypotheses to explain the secular flow of merchandise; capital mobility; and dependence on economic variables.
- Finally, the model cannot fully explain the integration process of developing countries since it was chiefly designed to explain the integration of the European community (Caporaso, 1998; Haas, 1970). Also, Haas (1970) notes that developing countries' integration is symbolic of actors' expectations politicised without incremental bargaining. Further, these countries' economies and security are internally unstable, making them weak partners in the integration process.

Economic integration is concerned with estimating welfare and linkages between factor and product markets, but the neo-functionalist theory does not examine these issues. Welfare is examined by the CU theory (Mattli, 1999), as is discussed in the next subsection.

2.3.1.3 The customs union theory of integration

The CU theory was eventually developed to become the basic theoretical economic framework for analysing RI across its varied spectrum (Jošić & Jošić, 2013; Park, Park &

Estrada, 2009). The theory is a special case of the general theory of tariffs that examines the trade effects of discriminating against other countries' goods flowing into another (Abrego et al., 2005; Corden, 1984; Lipsey, 1960; Viner, 1950). Viner (1950) pioneered developments of the CU theory by examining the impacts of CUs on trade flows. Meade (1955) and Lipsey (1957) extend Viner's analysis of CUs to incorporate both production and consumption. The theory examines the impact of RI focusing on welfare effects (Jošić & Jošić, 2013). It originally examined a one-time change (static effects) in the efficient allocation of resources when RI is actualised. In Viner's framework, when two countries (say country A and country B) integrate, they eliminate discrimination between themselves but maintain it with the ROW. As barriers between country A and B fall, prices of tradables are equalised between the countries, creating two effects. Viner (1950) calls these effects TC and TD.

TC is a situation in which s relatively efficient partner's production crowds out relatively inefficient domestic production, while TD is a situation in which relatively inefficient bloc production replaces relatively efficient production from the ROW. TC is viewed as positive as it improves the allocation of resources (thereby increasing welfare) while TD imposes costs on the efficient allocation of resources (hence reducing welfare). Net static effects of the CU depends on whether TC is greater or less than TD. In this model, if TC is greater (or less than) TD, countries would engage more (or less) in RI. In Viner's model, CUs divert trade more than they create trade, with negative consequences for welfare (Williams, 1972). The Viner model holds under the assumptions of competitive markets; full employment of scare resources; absence of externalities in production and consumption; and redistribution of tariff revenues among consumers. These effects are referred to as static and can be represented in either a partial or general equilibrium form (Corden, 1984). For example, the framing of the Harberger Triangle (Harberger, 1995) is a good way of analysing the welfare effects of RI, seen as a special case of tariff theory (Abrego et al., 2005). Consider Figure 2.1, which incorporates a partial equilibrium analysis in estimating the magnitude of TC, TD and their net effect on national welfare for the importing RI country. The figure represents a small country case to reflect the South–South regional groupings analysed in this thesis.

Consider a case with three countries: efficient producer ROW, country A and importing country B. In a free market equilibrium, country B would purchase its imports from the ROW at P_w^e. As a small country, assume that country B initially introduces a domestic tariff (or specific tariff) t. The domestic price including the tariff would increase to P_w^t. At price P_w^t domestic demand is given as D_w^t and supply as S_w^t. The difference between D_w^t and S_w^t would

be the volume of imports. Now suppose that countries A and B enter RI that gradually reduces tariffs between them from P_w^t to P_d^{RI}. At price P_d^{RI} domestic demand is given by D_d^{RI} and domestic supply by S_d^{RI}.

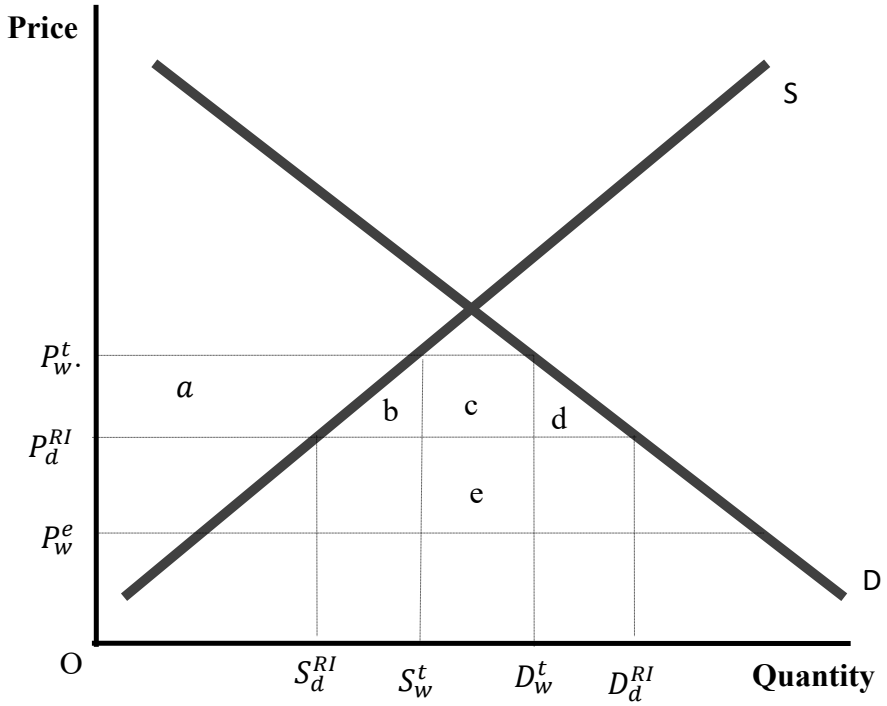

Figure 2.1. Welfare effects of switching imports to a regional partner.

Price P_d^{RI} fixed as a result of the formation of the RI will have both production and consumption distortion, indicated by b and d, respectively. Producers of the importing country B suffer a welfare loss indicated by the size of area a because of the reduction in price. The area (a) is also known as the loss in producer surplus. However, consumer welfare increases by the sum of areas a, b, c and d as a result of the reduction in price. The summed area is also known as the consumer surplus. The government loses revenue as indicated by areas c and e. The net national welfare for the importing country is the sum of consumer supply, producer surplus and loss in government revenues, which is the difference in the sum of area b and d, from e.

Static analysis of RI was originally seen as a masking of free trade, and since free trade maximises welfare, a move to enter RI was thought of as welfare enhancing even if it did not maximise world welfare (Abrego et al., 2005; Lipsey, 1960). However, this position has since been undermined (Viner, 1950). Though the analysis was developed to estimate welfare, its estimates are inherently ambiguous (Abrego et al., 2005). RI effects are both trade creating and

trade diverting and the net effect cannot be determined a priori (Pant & Sadhukhan, 2009). The asymmetry in regional outcomes makes it difficult to deduce possible generalisations of the paradigm, thus bringing the theory into disrepute. Moreover, when the underlying assumptions of the static analysis are relaxed, the analysis crumbles (Plummer, 2004). For example, in the presence of rent seeking (as is normally the case in developing [or South–South] countries), tariff revenues are not often redistributed; hence the failure of the model to explain trade patterns in such countries. Member states are also not keen to share revenues when in higher forms of integration like CUs, CMs and economic unions.

Additional criticisms levelled against static analysis are that the Vinerian analysis relies on partial equilibrium analysis (with its weaknesses) instead of considering general equilibrium analysis, which overcomes such weaknesses (Kowalczyk, 2000, as cited in Abrego et al., 2005); and the anchors of static analysis, TC and TD, do not exhaustively capture the effects of RI on welfare. For example, static analysis considers only production and does not pay attention to consumption patterns, which have welfare effects too (Pant & Sadhukhan, 2009; Robinson & Thierfelder, 2002; Williams, 1972).

The weaknesses in the Vinerian paradigm meant that it could not address both the political and economic issues surrounding RI after World War 2 (Reardon, Kling, McCorkle & Miller, 2002; Robinson & Thierfelder, 2002). Naturally, this RI phase or wave—conventionally referred to as 'old regionalism'—devolved into a second wave, referred to as 'new regionalism' (Ethier, 1998; Hosny, 2013).

2.3.1.3.1 New Regionalism

The failure of static analysis to explain the true aims of RI owing to its weak assumptions partially bred interest in new regionalism as a framework for analysing RI that emerged in the 1960s (Reardon et al., 2002). New regionalism relies on dynamic analysis, which better explains the concept of TC and TD and their influence on welfare when global economic conditions change (Balassa, 1961; Hosny, 2013).

Dynamic effects include any factors that affect the rate of growth of an economy in the medium-to-long term (Schiff & Winters, 1998). These effects stem from any impulse relating to internal and external economies of scale and competition when markets expand; technological change; X-efficiency improvements of the production process; changes in investment and economic growth; and changes in industrial organisation and growth (Balassa, 1961; Jošić & Jošić, 2013; Väyrynen, 2003; Yoo-Duk, 2016).

Broadly, two analytical frameworks have evolved under new regionalism. The first involves extending static estimation to incorporate new possibilities for welfare gains (and losses) in the regional and global economy. For example, Meade (1955) allows for changes in international terms of trade and estimates the Vinerian model using computable general equilibrium. Gehrels (1956), however, incorporates changes in consumption and Cordon (1972) considers the issue of economies of scale to be included in the Vinerian model. Meade (1955) and Lipsey (1957) extend Vinerian modelling to consider assumptions that would theoretically enable the regional bloc to either enhance or worsen welfare.

The second analytical framework involves developing broadly new trade theories incorporating different varieties of goods, and considering monopolistic competition. Balassa (1961) pioneered this school of thought by developing a new instrument to capture the dynamic effects of RI in estimating welfare. Inter-industry trade (IIT) analysis was also developed to allow for trade in different varieties of the same product among members (Yeats, 1998). Krugman (1980) and Helpman and Krugman (1985) introduced the concepts of trade in heterogeneous goods and monopolistic competition to allow RI entities to experience either welfare gains or losses. Economies of scales are also incorporated into the theoretical literature on the dynamic analysis of RI (Corden, 1972).

Generally, the magnitude of estimates from dynamic analysis is greater than those from static estimates, especially for welfare. However, just as in static analysis, there is no consensus on the effect of RI on TC, TD or welfare using these models (Williams, 1972). This is probably because there is no reliable method for quantitatively assessing dynamic effects (Schiff & Winters, 1998).

2.3.2 Theories of trade duration

The conclusion by Besedeš and Prusa (2003) and Besedeš and Prusa (2006a) that international trade engagements are of short duration or are short lived has created interest in two broad questions. First, why are trade relationships short lived? Second, what policy covariates explain such short-lived trade durations? (Fugazza & Molina, 2009). Established trade theories are incapable of providing answers to these questions (Hess & Persson, 2011; Nitsch, 2009). There is no established theoretical explanation for the duration of trade relationships observed in empirical analyses (Hess & Persson, 2011). However, illuminating theoretical contributions and explanations have been sought from the matching model of trade, the search model, the product cycle model, quality ladder theory, firm heterogeneity models, fragmentation theory and the elementary theory of global supply chains. This subsection

focuses on the prominent theoretical contributions of the search theory, product differentiation, sunk market-entry cost and product cycle models to the issue of trade survival. The other theories are not readily linked to established trade theories and are not often explored in trade literature.

2.3.2.1 Rauch and Watson's search model, product differentiation and duration

Rauch and Watson (2003) develop a duration of trade relationships framework based on microeconomics search theory. In traditional search theory, buyers (importers) and sellers (exporters) are matched after a search process is undertaken prior to transacting with each other, because of uncertainity in their trading pontentials.

Rauch and Watson (2003) develop a framework that fuses a trading partnership between suppliers and buyers through a process of search, investment and rematch. The first stage involves the buyer (importer in developed country) searching from an array of foreign suppliers (exporters in developing countries) with differing production capacities. The search enables the importer to be matched with an exporter upon the importer paying the search cost. Even with the matched trading partnership, the importer is still uncertain of the capacity of the exporter to fill large orders that guarantee a surplus. In the second stage, because of uncertainity about the exporter's capacity, the importer moves to deepen or make a permanent investment relationship with the exporters. The importer can either make a lump sum investment with the supplier or place small orders that the exporter is gradually expected to fill to the importer's expectation. The goal is to enable larger supplies since this generates more surplus for the importer. In the final stage, given the importer's observation of the exporter and a more solid matching, the importer can decide whether to continue with the paternership, abandon the current relationship with the exporter or search for another supplier.

In the Rauch and Watson framework, the search, invest and rematch is a costly process. Rauch (1999) explains that search costs are explained by the dichotomy of transactions involving goods that are homogeneous or differentiated. The search cost is lower for homogeneous goods sold in organised markets than for differentiated goods that are sold in less organised markets. Organised markets in which homogeneous goods are sold make it easier (less costly) to match transacting partners than in less organised markets in which differentiated products are sold. In mapping transacting partners, buyers often make supplier-specific investments to build their capacity to supply goods. The Rauch and Watson framework predicts that search costs are lower for homogeneous goods than for heterogeneous goods

because of the lower supplier-specific investment and ease of matching partners in homogeneous goods transactions.

All things being equal, the Rauch and Watson framework predicts that the duration of a trading partnership is directly correlated with the size of the initial order. It also predicts that a decrease in investment and search costs would increase the propensity to start with a large order or switch suppliers, respectively.

Empirical work has been undertaken to test these predictions and found them to hold. For example, Besedeš and Prusa (2003, 2006a, 2006b) find that partnerships last longer when transacting differentiated goods than when trading homogeneous goods. Besedeš (2008) finds that export partnerships grow gradually from small transactions, though small initial transactions are of short duration. This is confirmed by Iacovone and Javorcik (2010), who argue that new exporters embark on exporting small volumes of merchandise originally sold in domestic markets to foreign markets, and these exports are short lived.

2.3.2.2 Sunk market-entry costs theory

Theoretical explanations of persistence or export status hysteresis have been sought from the sunk market-entry costs literature (Gullstrand & Persson, 2015; Impullitti, Irarrazabal & Opromolla, 2013). This model presumes that market entry is a costly venture that involves exporting units meeting costly market-specific standards, regulation requirements and foreign demand conditions; uncertainity in establishing distribution networks; and introducing new products in foreign markets (Bernard & Jensen, 2004; Fugazza & Molina, 2009). Exporting units that incur these sunk market-entry costs tend not to exit the foreign market, thus making trade stable (Fugazza & Molina, 2009; Nitsch, 2009). This export hysteresis persists even when firms incur a loss because the exporting unit is not subject to further market-entry costs (Hess & Persson, 2011).

Trade hysteresis was first observed by Baldwin (1990) when the overvaluation of the US dollar led to additional entry costs by foreign importing firms to the US market in the 1980s. Appreciation in the US dollar resulted in the loss of US competitiveness, allowing foreign firms to make inroads into the market. Even when exchange rates returned to their normal range of purchasing power parity, foreign firms did not exit since they had already incurred an unrecoverable cost. Bernard and Jensen (2004) and Roberts and Tybout (1997) explore the importance of sunk entry costs in exporting decisions and find them to be important. However, in Hess and Persson (2011), the theory of sunk cost is criticised for not providing clear hypotheses regarding the probability of terminating a trading relationship. This is because the

duration literature concludes that trade relationships are cyclic (i.e. trade takes place for a while, is terminated and then re-established), unlike the sunk cost literature that explains that trade is persistent once started upon paying sunk costs (Gullstrand & Persson, 2015). Sunk cost theory is important in explaining the initiation of a trading relationship with the first exporting unit only; not to other partners (Hess & Persson, 2011). In Carrere and Strauss-Kahn (2012), the theory of sunk cost is found to be devoid of an explanation for the high termination rates in export markets.

2.3.2.3 Product cycle theory

Vernon (1966) introduces the product cycle theory to explain the evolution of trade patterns influenced by the introduction of innovation, economies of scale and the roles of ignorance and uncertainitity. The model assumes that (1) there is a dichotomy between countries—as developing and developed—in which new products are innovated; and (2) enterprises in developed countries are homogeneous in terms of access to technical capacity and ability to comprehend the embedded technical capacity. Given these assumptions, the model predicts which country or countries are exporters or importers (Finger, 1975). It also predicts the evolution of a particular pattern of trade relationship to be established (Besedeš & Prusa, 2006a). The evolved pattern of trade could develop either sluggishly or following a logical pattern (Besedeš & Prusa, 2006a). However, the product theory fails to explain or is not consistent with the very short-lived trade relationships reported in the literature (Besedeš & Prusa, 2003, 2006a; Hess & Persson, 2011).

Logically, developed countries with access to superior technology will produce and export products to LDCs. However, as technology becomes standardised in time, it diffuses to LDCs, enabling them to produce and export similar products. The most competitive exporter will be the one that spends the lease (i.e. in labour costs); in this case, the LDCs crowd-out developed countries from producing and exporting the product (Besedeš & Prusa, 2006a; Vernon, 1966). Feenstra and Rose (2000) and Besedeš and Prusa (2006a) explore the underpinnings of the product cycle theory and find them to hold in slowly evolving trade dynamics.

Grossman and Helpman (1991a) develop the quality ladder model, which is a variant of the product cycle theory. The quality ladder model predicts that developed countries develop a quality product that captures the market share, but this market share is gradually eroded by new products produced by LDCs through product imitation.

2.3.3 Theories of the trade–growth nexus

The nexus between trade policy and economic growth is a highly debated topic in the growth and development literature that is far from being resolved. The theoretical literature suggests, at best, a highly complex and ambiguous relationship between trade restrictions and growth (Yanikkaya, 2003). The theoretical literature on growth and development suggests that trade may contribute to long-run economic growth (Kim & Lin, 2009; Yang & Borland, 1991). Policy makers have long asserted that trade liberalisation is good for growth, yet economists have only recently developed tools to evaluate these claims (Baldwin & Forslid, 2000). It is only the canonical theoretical work of Krugman (1980, 1987), Frankel and Romer (1999), Mankiw, Romer and Weil (1992), Rivera-Batiz and Romer (1991a, 1991b), Romer (1986) and Grossman and Helpman (1990, 1991a, 1991b) that supports understanding of the trade–growth nexus (Baldwin & Forslid, 2000).

Ruttan (1998) identifies three waves of interest in growth theory. The first is indicated by the works of Harrod (1939, 1948) and Domar (1947). The second strand of the literature is indicated in the works of Solow (1956) and Swan (1956) with their neoclassical model of economic growth. The third strand of literature on economic growth is represented by the works of Ma, Shi, Luo and Che (2019), Romer (1986, 1990) and Lucas (1988) in the 1980s. However, with reference to the trade–growth nexus, there are two basic approaches to explaining the effect of trade policy on growth, with the first focusing on exogenous technical change as the source of growth, known as neoclassical growth theory (NGT). The second focuses on allowing economic growth to be endogenously determined, as seen in the third wave of the development of growth theories (Yang & Borland, 1991). Consequently, the neoclassical and endogenous growth theories provide channels through which trade openness affects productivity, income and development (Camarero et al., 2016; Setterfield, 2014).

Neoclassical growth models, pioneered by Solow (1956) and Swan (1956), argue that trade patterns are determined by comparative advantage leading to higher total factor productivity (Aghion & Howitt, 2008; Camarero et al., 2016). Trade fosters greater horizontal specialisation, thereby enhancing total factor productivity growth; economies of scale because of increased market size; greater capacity utilisation; increased capital formation rates; and technological changes (Yaghmaian, 1994). Countries, therefore, liberalise trade to take advantage of exogenous differences in their resource endowments, technology, tastes and climate (Singh, 2011). However, NGT fails to account for monopolistic and oligopolistic features of international markets (Singh, 2011). Also, the theory of neoclassical growth treats technical progress as exogenous—unaffected by a country's openness to world trade (Harrison,

1996; Hossain & Joarder, 2014; Izushi, 2008). However, trade is not only in merchandise but also in technology, the flow of ideas and knowledge spillover (Bajwa & Siddiqi, 2011). NGT does not consider dynamic processes interrelated with economic, social, cultural and institutional transformations that change the composition of production and sectoral distribution of resources (Yaghmaian, 1994). Neoclassical growth models support the export-led growth hypothesis (Singh, 2010; Yaghmaian, 1994) though trade openness does not lead to an increase in the long-run rate of growth (Camarero et al., 2016).

Endogenous growth theories, pioneered by Lucas (1988) and Romer (1986, 1990), emerged in the late '80s and '90s to better explain the trade–growth nexus since the reality of world product markets is different from what NGT predicts (Palley, 1996; Sasaki, 2011). Endogenous growth models assume imperfect competition and increasing returns to scale (Lucas, 1988; Romer, 1986, 1990), ultimately reversing the notion of perfect competition and constant returns to scale in neoclassical models (Singh, 2011). Endogenous growth models focus on the productivity effects of trade and explore additional dimensions of the export-led growth hypothesis (Singh, 2010). For example, the models embodying monopolistic and oligopolistic assumptions can now better handle trade and other policy effects of growth (Santos-Paulino, 2005). These modifications to endogenous growth theory (EGT) enable them to account for both static and dynamic gains with the possibility of affecting both incomes and long-run growth (Camarero et al., 2016; Santos-Paulino, 2005; Singh, 2011). The static gains come through improvements in allocation efficiency while the dynamic gains emanate from imported technology or learning-by-doing effects (Camarero et al., 2016; Izushi, 2008). Technical progress is closely associated with foreign trade (Edwards, 1993; Grossman & Helpman, 1991b; Santos-Paulino, 2005), enabling an increase in incomes and long-run growth rates in the economy through economies of scale, allocation, spillover and redundancy effects (Camarero et al., 2016). A higher degree of trade liberalisation is assumed to foster technical progress diffusion, leading to long-run economic growth (Targetti & Foti, 1997). However, theoretical paradigms are characterised by a lack of consensus on the effect of trade openness and RI on growth (Hossain & Joarder, 2014; Singh, 2010).

2.4 Review of the Empirical Literature

This section examines the empirical underpinnings of the impacts of RI on trade, the duration of trade relationships and the trade–growth nexus. The literature review aims to establish the channels through which RI acts to boost trade, the duration of trade relationships

and economic growth. The section examines the empirical literature in Subsection 2.4.1, the duration of trade relationships in Subsection 2.4.2 and the nexus between trade and growth in Subsection 2.4.3.

2.4.1 Review of previous empirical studies on regional integration

RI entities were presumed to be welfare enhancing before the CU theory was proposed in 1950 (Clausing, 2001). Conceptually, as tariffs gradually decrease, one expects production and consumption distortions to trigger efficiencies that improve welfare for bloc and non-bloc participants (Clausing, 2001; Williams, 1972). However, in the 1950s, Viner (1950) challenged this assumption and demonstrates that CUs do not necessarily improve welfare. For example, Viner (1950) argues that if RI leads to the emergence of inefficient trade patterns (i.e. TD), this imposes a cost on consumers, thus reducing welfare. However, if the regional entity is associated with efficient trade patterns emerging (i.e. TC), then this will benefit both consumers and producers, thus improving welfare for the bloc parties. In the Vinerian framework, TC is seen as good, while TD is bad from a welfare perspective. Frankel, Stein and Wei (1995) provide evidence that a positive coefficient for a TC dummy provides evidence of TC and a negative coefficient provides evidence of TD.

This static analytical perspective assumes that RI entities are inherently a helpful array or are welfare enhancing (Ornelas, 2005; Trefler, 2004) for both bloc members and those that are excluded (Panagariya & Krishna, 2002). For example, the elimination of internal tariffs improves global resource allocation (Kennan & Riezman, 1990). Bond, Riezman and Syropoulos (2004) re-enforce this argument when they argue that because world tariffs prevent regional blocs from reducing their common external tariff below the Kemp–Wan level, this triggers the ROW's terms of trade to improve, consequently increasing regional bloc's welfare. For the regional bloc, in the presence of a non-discrete transport vector ranging from zero to prohibitive, welfare is guaranteed (1) the more remote (enhancing TD gains) the bloc partners are from the ROW; and (2) when the regional bloc is formed among natural trade partners (neighbourhood effect leading to the maximisation of TC gains) (Frankel, Stein & Wei, 1996).

Bhagwati (1993) is the first to challenge the static perspective that RI is welfare improving and argues that it is misleading. Frankel et al. (1995) supports this position that RI entities are welfare reducing in the following three scenarios:

- RI arrangements that aim to be supranational entities are welfare reducing when intercontinental transport costs are modelled as neither so high as to be prohibitive nor zero

- fully implemented or liberalised RIs are less welfare improving than partial regionalisation (subcontinental regionalism)
- maintaining membership in multiple regional groupings found in different continents is welfare reducing too.

However, Krugman (1991a, 1991b) provides arguments that regionalism is either welfare enhancing or welfare reducing in a monopolistically competitive framework. The framework demonstrates that in the presence of zero intercontinental transport costs, regionalism is certainly welfare decreasing. However, in the presence of prohibitive intercontinental transport costs, regionalism is certainly welfare enhancing.

Kennan and Riezman (1990) present additional contradictions when arguing that the adoption of a common external tariff by regional members leads to ambiguous resource allocation effects when the union is fully implemented. This contradiction is supported by Freund (2010), who concludes that incorporation of political economy effects (like lobbying) make results from RI analysis ambiguous.

2.4.1.1 Trade diversion and welfare

Panagariya (1999, 2000), Bhagwati and Panagariya (1996), Bhagwati et al. (1998) and Frankel et al. (1995) provide the most extreme case that RIs are pure trade diverting and reduce welfare of member countries. Krishna (1998) notes that welfare reductions affect non-participating countries too and impinge on global free trade. The intuition is simple: preferential treatment leads to higher firm transactions and inefficient resource utilisation, affecting trade and investment flows. These distortions consequently make TD dominant to TC (Bhagwati et al., 1998; Sorgho, 2016). Sorgho (2016) finds that participation in multiple RIs diverts trade more because of the increased transaction costs involved. Urata and Okabe (2014) find that RIs in developing countries give rise to TD, unlike those in developed countries. However, some of the products Urata and Okabe (2014) considers in studying the COMESA (as RI for a developing country) are not necessarily those considered or produced in the COMESA area. Moreover, Freund (2010) argues that when countries with high tariffs form RI, this would certainly be trade diverting and hence negatively affect welfare. Much as a diversion is a concern for high-tariff countries, it is statistically difficult to obtain (Freund, 2010). However, Romalis (2007) reports that Mexico's participation in the NAFTA is trade diverting but with minimal welfare costs. Other studies (e.g. Baldwin & Venables, 1995; Clausing, 2001; Magee, 2016) find that TD is present in RIs but is minimal or even an exception (Robinson &

Thierfelder, 2002). The narrowing of TD is seen when endogeneity of RI external tariffs is accounted for (Ornelas, 2005). Contrary to the Vinerian conclusion that TD is bad, Lipsey (1957) and Gehrels (1956) prove that TD could actually improve welfare rather than reduce it for the diverting country. The welfare improvement of TD on welfare could also benefit the ROW emanating from consumption gains (Haas, 1976).

2.4.1.2 Trade creation and welfare

In forming RI blocs, TC effects are thought of as a rule (Clausing, 2001). These TC effects spillover to excluded members as RI entities induce bloc members to reduce protection through lower external tariffs, thereby generating overall TC (Ornelas, 2005). Nonetheless, intra-bloc TC effects are almost six times larger than extra-bloc TC effects (Geldi, 2012). Moreover, for models that consider whole samples or aggregate trade estimates, significant TC effects and welfare impacts are recorded relative to models that consider disaggregated data analysis (Baldwin & Venables, 1995; Hayakawa et al., 2016). Positive TC effects are more readily observed when modelling commodity or product-level data where tariffs are originally high, than for those products experiencing lower initial tariffs (Clausing, 2001). Also, plurilateral regional entities give rise to TC and therefore are much more welfare enhancing than bilateral trade entities (Urata & Okabe, 2014). Frankel et al. (1995) support the finding that larger regional entities (i.e. continental) are more welfare reducing. For example, Urata and Okabe (2014) find that the EU trade in agriculture is trade creating, yet Thorbecke (1973) finds that TD dominates TC in the agricultural sector in the same regional entity.

2.4.1.3 Trade creation, trade diversion and welfare

Others conclude that RIs are simultaneously trade creating and trade diverting, so that their welfare effects cannot be determined a priori (Baldwin & Venables, 1995; De Melo, Panagariya & Rodrik, 1993). However, Baier and Bergstrand (2004) argue that RIs formed with geographically proximate members are welfare enhancing in net, since overall TC would dominate small intercontinental TD. Baier and Bergstrand (2004) provide additional arguments for the scenario that would enable TC to dominate TD if (1) regional members have more similar economic sizes enabling them to generate and benefit from intra-industry trade; and (2) regional members have a broader range of relative factor endowments enabling them to reap gains from IIT. Frankel et al. (1995), Magee (2016) and Trefler (2004) provide additional evidence that TC dominates TD with positive welfare effects, though Panagariya (2000) recommends that for positive welfare gains, TC must dominate TD and prices must not rise.

However, Baldwin and Venables (1995) argue that, much as RIs generate welfare gains for members, they have negative spillovers to excluded members. Further, Magee (2008) argues that TC dominates TD by around an order of magnitude, though Magee (2016) later argues that RIs generate twice as much TC as TD, yet the overall impact is relatively small. Such empirical contradictions are also found in Thorbecke (1973) and Urata and Okabe (2014). The latter argues that TD dominates TC in agriculture in the EU while the former argues that EU integration leads to TC.

2.4.2 Review of previous empirical studies on the duration of trade

Traditional trade theories ignore the issue of the duration of trade relationships and explore exits from export markets, assuming that trade relationships are static or persist into the future once established (Hess & Persson, 2011; Nitsch, 2009). However, given the conclusions of Besedeš and Prusa (2003) and Besedeš and Prusa (2006a, 2006b) that international trade engagements are far more fragile than previously thought, policy and empirical interest has grown regarding why trade does not grow in new markets and products (Hess & Persson, 2011). Questions have been raised about (1) why trade relationships are short lived or interminttent; and (2) what policy covariates explain such short-lived trade durations (Fugazza & Molina, 2009; Hess & Persson, 2011).

2.4.2.1 Duration of trade

On the issue of volatility or duration of trade relationships, all empirical work (e.g. Cadot, Iacovone, Pierola & Rauch, 2013; Díaz-Mora, Córcoles & Gandoy, 2015; Fugazza & McLaren, 2014; Gullstrand & Persson, 2015) concedes that trade relationships are short lived once established. However, variation in the length of trade relationships is seen. For example, Evenett and Venables (2003) argue that the duration of trade relationships for developing countries is less than that in developed countries. This finding is supported by Fugazza and Molina (2009), who argue that the duration of trade increases with the level of a region's development. Another difference is that long-term survival rates of trade relationships show less variation , but short-term survival rates show great variation (Muraközy & Békés, 2009).

In terms of how long a trade relationship lasts, Besedeš and Prusa (2003, 2006a) find that the duration of US imports is short and of the median order of 2–4 years. However, Besedeš and Prusa (2011), who are the first to specifically tackle the issue of the length of spells, argue that there is no indication in the literature that these relationships systematically last more than 1 year. In fact, they conclude that developing countries' new trade relationships rarely last more

than 2 years. Besedeš and Prusa (2006b) also argue that the median duration of US imports with 4-digit *Standard International Trade Classification* (SITC) is 2 years. However, Lejour (2015) finds that half of Dutch imports are observed after 6 years but a quarter of new products and destinations survive up to 2 years. Using more detailed 8-digit SITC import data from 1995 to 2005, Nitsch (2009) concludes that the median duration of German trade is 2–3 years; though Hess and Persson (2011) find that at the end of the first year, 60% EU imports from the ROW cease and only 10% are observed after 10 years. Hess and Persson (2012) argue that since 1960, 40% of trade relationships survive the first year of service, while Besedeš and Prusa (2006a) report that half of the trade relationships are observed after 2 years and only a fifth can be observed within 5 years. Cadot et al. (2013) report a median duration of 2–3 years for all studies they sampled. Most studies use aggregate trade patterns, masking turnover at product level when a large fraction of suppliers are clearly observed to enter and exit markets annually (Nitsch, 2009). For example, using an 8-digit SITC product categorisation, Nitsch (2009) establishes that a quarter of German imports terminated in the first year and only 10% of trade relationships persist for a decade. Another observation is that, generally, countries export for a few years, exit trading and re-enter later on (Fugazza & Molina, 2009). Alternatively, because of product and country heterogeneity, some trade relationships persist as observed when products are imported from particular countries over time (Nitsch, 2009). It is also observed that the death of trade relationships is worse for developing countries, as 70% of their exports fail within 2 years (Besedeš & Prusa, 2011).

In terms of duration dependence, some empirical studies conclude that there is negative duration dependence (Besedeš & Prusa, 2003, 2006a; EsteveE-Perez et al., 2013). Negative duration dependence implies that the probability of an export relationship being terminated once it has started reduces as export spells grow longer (Cadot et al., 2013). For example, if a country's export relationship survives the first few years, its ability to terminate this relationship and hence to export for the foreseeable future is reduced (Besedeš & Prusa, 2003, 2006a). However, Brenton et al. (2010) contest this finding, arguing that there is no duration dependence when the estimation is improved using Cox regressions adopting the Prentice–Gloecker estimator described in Prentice and Gloeckler (1978).

2.4.2.2 Determinants of duration of trade

Turning to the issue of determinants of trade relationship duration, several variables have been identified to determine the duration of trade: initial values of trade; culture; exporting experience;geographical and product diversification; market size; gravity estimation variables

such as geographical and economic distance; and RI membership (Brenton et al., 2010; Díaz-Mora et al., 2015). These variables closely align to the theories above and are closely related to this study's interests, as discussed below.

2.4.2.2.1 Product categorisation

The duration of trade relationships has been examined in terms of the dichotomy of trading in homogeneous and differentiated goods (Besedeš & Prusa, 2010; Chen, 2012; Shao et al., 2012), and trading in either intermediate or final goods (Obashi, 2010). Differentiated goods have a duration of trade twice as long as that of homogeneous products. The hazard rate of trading in homogeneous goods is around 23% more for homogeneous than for differentiated products (Besedeš & Prusa, 2006b). Chen (2012) confirms that the duration is longer for differentiated products than for homogeneous products and further argues that the duration of trade (exports) increases with innovation. In terms of the dichotomy between intermediate and final products, Obashi (2010) argues that the duration of trade in intermediate products (vertical trade relations) has a hazard rate in the order of one in three, compared with the trade in final merchandise.

2.4.2.2.2 Regional integration

The effect of RI on the duration of trade relationships is mixed. For example, Besedeš (2013) finds that, generally, the NAFTA has no beneficial effects on the duration of intra-trade relationships; rather, it increases the intra-trade hazard rate between Mexico and the US for industries experiencing increasing returns to scale. However, the effects are ambiguous for other industries considered in the study. Further, the study argues that the NAFTA does not affect the hazard of Canada's trade in the short term. Fertő and Soós (2009) support this ambiguous effect scenario for the effects of regional entities when they argue that trade lasts longer for most countries in EU10 than in EU15 markets. However, Fugazza and McLaren (2014) argue that integration or belonging to a global production network, coupled with diversification, improves export performance by one-fifth because of improved effective preference margins. Díaz-Mora et al. (2015) concurs with Fugazza and McLaren (2014), arguing that EU membership is the main underlying determinant of exit probabilities. Shao et al. (2012) reinforce this conclusion, arguing that RI membership (the WTO) is important for longer export duration. However, Kamuganga (2012) argues that regional entities have limited impacts on trade survival.

2.4.3 Review of previous empirical studies on regionalism and economic growth

Regardless of the theoretical contradictions, a growing number of developing country governments have embarked on liberalising trade to spur economic growth since the establishment of the WTO in 1995 (EsteveE-Perez et al., 2013). Nonetheless, economic growth has not kept pace with trade liberalisation, particularly in Africa (Constantinescu et al., 2016; Winters, 2004). The International Monetary Fund (IMF, 2016) notes that the implementation of trade liberalisation policies in the developing world is counter-cyclical during periods of sustained economic growth, though it goes on to argue that the rise and stability of economic prospects depends on creating an effective environment to promote exports.

There are contrasting views in the empirical literature on the impact of trade openness (trade outcomes) on growth (Hossain & Joarder, 2014; Singh, 2010, 2011, 2015). Some empirical studies suggest a significant positive effect of trade openness on productivity and growth (Alcala & Ciccone, 2004; Edwards, 1998; Frankel & Romer, 1999; Vamvakidis, 1998). As countries adopt liberal trade policies, trade expedites market access, technology diffusion and enjoyment of economies of scale and scope (Targetti & Foti, 1997). The scale, allocative and technology spillovers spur productivity and efficiency, thus increasing long-run incomes and growth rates (Yaghmaian, 1994). Other studies argue there is a negative or insignificant effect of trade openness on growth (Harrison, 1996; Rodríguez & Rodrik, 2000; Wacziarg & Welch, 2008) when complementary domestic policies are not implemented (Chang, Kaltani & Loayza, 2009; Freund & Bolaky, 2008). Other studies argue that the impacts of openness on growth are mixed (Greenaway, Morgan & Wright, 1997, 2002). These complex and often contradictory empirical findings stem from the use of a myriad of measures to capture trade liberalisation (Harrison, 1996; Yanikkaya, 2003; Zahonogo, 2016). Further, the impact of trade liberalisation on economic growth depends on the level of a country's absorptive capacity for a new technology and knowledge (Zahonogo, 2016). The growth effects of trade liberalisation relating to trade policy (RI) have received limited attention (Baldwin & Venables, 1995; Liu, 2016) and are generally reported as negative effects of RTAs on growth (Henrekson et al., 1997; Vanhoudt, 1999) that improve when the definition of RI is improved or expanded (Liu, 2016).

Though the theoretical foundations of the trade–growth nexus are argued to have limited relevance to poor countries (Stewart, 1991), a growing number of empirical studies are applying these models to developing countries (Balassa, 1985; Greenaway et al., 1997, 2002;

Santos-Paulino, 2005; Spilimbergo, 2000; Trejos & Barboza, 2015; Yaghmaian, 1994). However, these studies concentrate on developing countries in South Asia and South America, and neglect the case of African developing countries. These studies refute the impact of trade liberalisation on trade in South America. At the same time, they support such a link in the East Asia Sea because East Asian countries had implemented supportive domestic policies by the time they adopted RTAs (Liu, 2016). RTAs are an important development tool and countries enter into RI to increase their economic growth (Hur & Park, 2012; Jalles, 2012; Shahbaz, 2012). However, the development objective of RTAs is doubted since some countries are yet to see the presumed development while other countries, especially in the East Asia Sea, have already observed the development (Liu, 2016). The exact nature of the relationship between openness and growth has not been concretised (Shahbaz, 2012). The EAC provides a unique case to study since the region has experienced the most ambitious trade liberalisation programme in the Global South, with stable macroeconomic policies. This study, therefore, bridges a knowledge gap on the role of EAC trade liberalisation in economic growth and reconciles the lack of consensus on the growth effects of RTAs and openness (Hur & Park, 2012). Also, the study analyses both trade policy. and trade outcomes or volumes simultaneously, unlike previous studies that use only trade volumes, neglecting trade policy (Camarero et al., 2016; Harrison, 1996). This provides robust results on the impact of trade liberalisation and growth (Doyle & Martinez-Zarzoso, 2011).

2.5 Limitations of Previous Studies on the Impact of Regional Trade Agreements on Trade, Trade Duration and Economic Growth

Evaluation of both theoretical and empirical understanding of the concepts of RI, the duration of trade relationships and the trade–growth nexus have been explored in this chapter. In describing, summarising and clarifying these concepts, the review benefitted the study by identifying limitations and gaps, to arrive at appropriate research questions to guide the different empirical studies to be undertaken. These limitations and gaps are discussed in Subsections 2.5.1, 2.5.2 and 2.5.3.

2.5.1 Limitations of previous studies on regional integration

In reviewing the literature on the effects of RI, the CU theory is found to be the basic theoretical framework for analysing the effects of integration across a wide spectrum (Jošić &

Jošić, 2013; Park et al., 2009). Theoretically, the effect of regionalism relies on evaluating the tension between TC and TD to estimate net welfare gains (Baldwin & Venables, 1995). This is the same trend that empirical analyses have pursued (Clausing, 2001; Hayakawa et al., 2016; Magee, 2016). However, in theory, there are conflicting and ambiguous conclusions regarding the effect of RI on welfare, whether one considers static or dynamic analyses. One school of thought argues that RI entities are welfare enhancing since they are pure trade creating (Abrego et al., 2005; Clausing, 2001; Lipsey, 1960). Another school challenges this conclusion, arguing that the welfare effects either cannot be determined a priori or are ambiguous, since regional entities are both trade creating and trade diverting (Abrego et al., 2005; Pant & Sadhukhan, 2009; Plummer, 2004; Viner, 1950; Williams, 1972). The asymmetry in theoretical conclusions emanating from the CU theory makes it difficult to make generalisations regarding their presumed trade effects.

Empirically, too, there are conflicting conclusions on whether RIs are welfare enhancing or reducing; whether their effects are ambiguous; or whether they are welfare enhancing or reducing for both included and excluded members. For example, one school of thought argues that regional entities are welfare enhancing because they lead to the elimination of internal tariffs, consequently creating a reduction in external tariffs and leading to an overall improvement in resources and welfare (Baldwin & Venables, 1995; Bond et al., 2004; Carrere, 2014; Clausing, 2001; Ornelas, 2005, 2008; Williams, 1972). The second school of thought argues that regional entities are welfare reducing since they represent an additional transaction cost that leads to misallocation of resources (Bhagwati, 1993; Bhagwati et al., 1998; Frankel et al., 1995). The third school of thought argues that the effects of regional entities are either welfare enhancing or reducing depending on the scenarios at play (Krugman, 1991a, 1991b), and the fourth argues that the effects of regional entities are ambiguous because of ambiguous resource allocation and the presence of political economy effects (Kennan & Riezman, 1990).

On the issue of TD, some studies find that regional entities are pure trade diverting, and that this affects welfare (Bhagwati et al., 1998; Bhagwati & Panagariya, 1996; Panagariya, 1999, 2000). Other studies argue that TD is present but has a limited influence on welfare (Romalis, 2007) and yet other studies (Clausing, 2001; Magee, 2016) contend that there is a minimal presence of TD with the formation of RI. Robinson and Thierfelder (2002) claim that TD is an exception. Surprisingly, Haas (1976) and Lipsey (1957) dispute the Vinerian notion that TD is negative and welfare reducing, and model TD as welfare enhancing for the global trading system.

There are also conflicting results regarding whether TC dominates TD, or TD dominates TC, and whether the net effect of TC and TD is ambiguous. For example, one school of thought argues that TC dominates TD (Krueger, 1997; Magee, 2016) while another claims that TD dominates TC (Krishna, 1998). However, Carrere (2014) argues that dual-effect is ambiguous unless transport costs are included in the modelling. Baldwin and Venables (1995), Clausing (2001) and Abrego et al. (2005) also argue that the relationship between TC and TD is ambiguous and cannot be determined a priori.

Most studies (Frankel et al., 1995; Freund, 2010; Krugman, 1991a, 1991b) on the effect of RI conclude by registering important caveats in the interpretation of their findings, especially in the presence of political effects. Abrego et al. (2005) claims that there are no generally accepted propositions regarding the effects of RI. The ambiguous effect of RI on trade is an empirical question yet to be resolved (Corden, 1972; Pant & Sadhukhan, 2009). Further, among all of the studies cited above, only one (Urata & Okabe, 2014) tackles African South–South trade agreements. However, it only considers the COMESA and incorporates merchandise analysis that is not reflective of the comparative advantages of such nations. Further, the period 1980–2006 considered in that study corresponds to the period when most goods traded in the COMESA were still in the phase-in period. Methodologically, most studies consider gravity estimation in testing for the effects of regionalism on trade (Baier & Bergstrand, 2007). However, virtually all implement the gravity model in its log-linearisation form; exceptions are Urata and Okabe (2014) and Mujahid and Kalkuhl (2016), who apply the PPML version of the gravity framework. Log-linearisation discards zero trade, which is reflective of African South–South trade as a result of structural rigidity. Also, some studies wrongly estimate Vinerian TC and TD using a two-way dummy of both-in or one-in, instead of the three-way dummy of:

- intra-bloc trade, importer and exporter dummies as used in Carrere (2006)
- importer only, or exporter only and/or both belonging to the integration at each time, as used in Westerlund and Wilhelmsson (2011).

This study addresses these gaps by properly estimating the gravity model in levels (Silva & Tenreyro, 2006; Westerlund & Wilhelmsson, 2011); incorporating the correct specification of the Vinerian RI effect; and testing the CU theory on African South–South RI to resolve both the theoretical and empirical ambiguities of the effects of EAC trade. The key question to resolve is, does the EAC promote trade?

2.5.2 Limitations of previous studies on trade duration

Mainstream international trade theories assume that trade relationships (Besedeš & Prusa, 2003, 2006a, 2006b) are persistent once established and neglect the fact that they are dynamic (Hess & Persson, 2011; Nitsch, 2009). Illuminating theoretical contributions explain the dynamics of trade relationships and their determinants using the search, product differentiation, theory of sunk market-entry costs, product life cycle and quality ladder models. These models have been successful in explaining the determinants of dynamic trade relationships that are affected by; (1) product type; (2) market structure; and (3) exporter characteristics (Nitsch, 2009). The models have also succeeded in explaining the persistence of trade relationships once they are established, but fail to explain the very short-term nature or termination of some trade relationships (Hess & Persson, 2011). This is probably because the literature on duration, or survival or death of trade flows is emerging (Hess & Persson, 2011).

Empirical studies estimating hazard rates produce a large spectrum of termination variances, to competently guide the EAC bloc and its members on how to make their strategies survive. All studies agree that trade relationships are short lived. However, the hazard rates applied are quite wide; for example, Nitsch (2009) argues for a quarter of trade relationships terminating in the first year, while Hess and Persson (2011) argue that 60% of trade relationships end within the first years. In Hess and Persson (2012), only 40% of trade relationships survive the first year, since 1960. However, Besedeš and Prusa (2003, 2006a, 2006b) seem to argue that half of the trade relationships terminate within a year. Termination rates seem even worse for developing countries: 70% of their relationships terminate within 2 years (Besedeš & Prusa, 2011). Surprisingly, Cadot et al. (2013) argues that the median survival for trade relationships is 2–3 years for all sampled studies. Empirical variances in termination of trade relationships are wide and therefore less informative in terms of policy in developing countries, yet their industries are conceptually bound to fail within 6 months in the case of a shock such as trade relationship termination.

Additionally, empirical studies are not congruent in terms of the duration dependence of trade relations. Some authors (e.g. Besedeš & Prusa, 2003, 2006a; EsteveE-Perez et al., 2013) argue that trade relationships exhibit negative duration dependence, though Brenton et al. (2010) refutes this and argues that there is no duration dependence exhibited in trade relationships once a better estimator is applied.

Also, there are mixed and conflicting results of the effects of RI on the duration of trade. For example, Díaz-Mora et al. (2015), Fugazza and McLaren (2014) and Shao et al. (2012)

argue that membership in regional entities is important for longer trade durations, whereas Kamuganga (2012) argues that memberships in regional bloc have limited impacts on trade survival. However, Besedeš (2013) and Fertő and Soós (2009) provide mixed results regarding the effect of regional entities on the duration of trade relationships.

On the issue of product types, researchers such as Besedeš and Blyde (2010), Besedeš and Prusa (2006b) and Shao et al. (2012) argue that trading in differentiated products provides a longer duration of trade than trading in homogeneous products. Chen (2012), in support of this argument, further states that innovation increases the duration of trade. Innovation makes a country's product distinctive or differentiated. However, Obashi's (2010) argument that the duration of trade is longer for intermediate goods than the final product seems to contradict the argument that the duration of trade is longer for differentiated than for homogeneous products. Intermediate goods are more closely homogeneous than they are differentiated.

In the absence of a clear, commonly accepted theoretical explanation for short trade durations, Hess and Persson (2011) recommend that empirical work is undertaken to describe and analyse short durations. However, the empirical literature barely addresses the question of how long trade relationships last (Besedeš & Prusa, 2003) and the few studies that do address the question report ambiguous or even conflicting information on the duration of trade. For example, on the issue of volatility of trade relationships:

- some authors argue that trade relationships terminate and others argue that they are intermittent
- some authors argue that the average termination of a relationship is 2 years. However, early seminal studies, such as that of Besedeš and Prusa (2003, 2006a, 2006b), suggest that termination is within a year, while contemporary studies like that of Lejour (2015) seem to argue for longer termination periods.

Such large variance in the times to termination of relationships is less informative in regard to policy in South–South trade, yet the persistence of trade relationships is critical to the growth in trade of emerging countries, as W. C. Chen (2012) argues. Moreover, though ACP countries are forming new trade relationships since the failure of the DDA, it is argued that maintaining existing trade relationships is more important to long-run export growth than building new relationships (Besedeš & Prusa, 2010). Lejour (2015) argues that there are lower hazard rates for trading in new products and exporting to new destinations. There is a need to undertake empirical work to guide policy formulation.

On the issue of what makes countries stop trading, Besedeš and Prusa (2010) and Hess and Persson (2011) argue that only a limited number of empirical studies (e.g. Besedeš, 2008; Besedeš & Prusa, 2006a, 2006b; Nitsch, 2009) have examined the issue. However, factors that bring an end to existing trade flows are probably impediments to the future growth of trade and to the beginnings of relationships (Hess & Persson, 2011). Moreover, empirical studies provide conflicting recommendations regarding the product types in which a country should specialise for longer trade durations. For example, most studies agree that trade in differentiated goods enhances the duration of trade more than trading in homogeneous goods. However, Obashi (2010) finds that trade in intermediate goods enhances the duration of trade more than does trade in final goods. The effect of RI on the duration of trade is ambiguous and conflicting. Theories used as the basis of analysis of the duration of trade were developed for Western contexts, and it is important to test if they might explain the duration of trade in South–South cooperation countries.

Consequently, this study examines several issues. When South–South countries (whether as a group or individually) trade, how long do their import and export relationships last? Is the trade relationship short-lived or are the products exchanged over a long period into the future? What determines the duration of these trade relationships? What role does RI play in hazard rates? Does 6-digit SITC product classification offer more insight into this duration?

2.5.3 Limitations of previous studies on the trade–growth nexus

Although trade liberalisation has a plausible positive effect on growth, some theoretical studies demonstrate that these gains arise from highly constrained assumptions regarding technology diffusion, strategic behaviour and market information, and as such, are limited in application, especially for developing countries (Deraniyagala & Fine, 2001; Grossman & Helpman, 1991a, 1991b). Other theoretical studies demonstrate and argue that trade liberalisation is not beneficial to growth and produces a negative impact on growth, especially for poor countries in the long run (Rivera-Batiz & Xie, 1993; Spilimbergo, 2000; Stokey, 1991; Young, 1991). For instance, if one invokes political economy arguments (such as rent seeking) (Redding, 1999) and infant industry arguments, then the impact of trade liberalisation is rejected in the case of developing countries (Stewart, 1991).

In addition, the growth effects of trade liberalisation relating to trade policy (RI) receive limited attention (Baldwin & Venables, 1995; Liu, 2016); relevant studies generally find negative effects of RTAs on growth (Henrekson et al., 1997; Vanhoudt, 1999) that improve

when the definition of RI is improved and expanded (Liu, 2016). Trade openness does not capture all the effects of trade liberalisation (Camarero et al., 2016; Harrison, 1996).

Further, studies on the trade–growth nexus concentrate on developing countries in South Asia and South America, and neglect the case of African developing countries. These studies refute the impact of trade liberalisation on trade in South America but support the link in the East Asia Sea because East Asian countries had implemented supportive domestic policies by the time they adopted RTAs (Liu, 2016). RTAs are an important development tool, and countries enter into RI to increase economic growth (Hur & Park, 2012; Jalles, 2012; Shahbaz, 2012). However, the development objective of RTAs is in doubt as some countries are yet to see the anticipated development while other countries, especially in the East Asia Sea, have already observed development (Liu, 2016). The exact nature of the relationship between openness and growth has not been concretised (Shahbaz, 2012).

2.6 Concluding Remarks

This chapter highlights theoretical developments and empirical underpinnings in relation to the broad issues of (1) the effects of RI, (2) the concept of duration of trade, and (3) the nexus between trade and economic growth.

Debate on the effects of RI is ongoing, especially for South–South African RIs and the neglected case of the EAC. In terms of theory, there are generally no acceptable propositions to guide the RI process in Africa. Existing theoretical frameworks are ambiguous regarding the effect of RI on trade and were not designed to explain trade patterns in LDCs (Williams, 1972). The impact of RI on trade clearly depends on the duration of relationships (time), the products traded and the nature of the agreement. Empirically, there are also conflicting and mixed results regarding TC, TD and their effect on welfare. Further, there are few studies on LDC integration and these have a narrow focus on either total trade, a sector or a country, and use spurious estimations of the gravity model. The objective of this study, therefore, was to use existing theoretical improvements to trade data analysis and the gravity framework to explain the membership effect for the South–South African RI process. In so doing, the study makes the following contributions:

- uses comprehensive analysis of RI via a regional analysis (EAC, EU, COMESA), country analysis (EAC partner states), product analysis, and both two-way and three way RI dummies to estimate the impact RI on trade

- utilises sound theoretical and empirical frameworks of the gravity model in modelling the impact of regionalism on trade
- operationalises new developments in trade analysis to include multilateral resistance, distance, border effects, country pair-fixed effects, time effects and country-specific effects
- uses the EAC to test the CU theoretical framework and investigate various integration arrangements such as the EAC, COMESA and WTO blocs
- undertakes an analysis of RI and trade by decomposing them by bloc, country and product.

On the issue of the duration of trade relationships, the empirical literature on South–South trade is limited. Moreover, the effect of South–South RIs is not known, ambiguous or conflicting. The objectives of this study were twofold: (1) to evaluate the role of South–South RIs in enhancing export survival; and (2) to evaluate the role of South–South regional corporation in enhancing export survival in the context of the EAC. The empirical study makes the following contributions to the literature: (1) brings a focus to the duration of EAC trade, which has not been explicitly studied before; and (2) uses econometrically more appropriate discrete-time estimation approaches rather than the continuous-time estimation used in prior studies.

On the subject of the trade–growth nexus, the empirical literature is complex and unresolved. Moreover, the impact of trade liberalisation on economic growth is not settled for developing countries in SSA. Also, previous empirical analyses use only trade openness as an indicator and neglect trade policy or RI. The objective of this empirical study was to provide empirical evidence on the trade–growth nexus for SSA using the context of the EAC.

Chapter 3: Contextualising Regionalism in the East African Community

3.1 Introduction

The purpose of this chapter is to provide a synopsis of regionalism in Africa and the East African region. The chapter highlights the evolution and background leading to the formation of the EAC, describing both inter- and intra-bloc and sectoral patterns of trade of the region. Understanding the evolution and patterns of trade in the EAC provides a contextual agenda for adopting the most appropriate analytical framework for analysing key issues affecting the region.

3.2 Regionalism in Africa

In Africa, particularly in SSA, governments have embarked on policies aimed at ensuring that their participation in RTAs guarantees increased trade and sustainable economic growth (Economic Commission for Africa [ECA], 2012; Soloaga & Winters, 2001; UNCTAD, 2019). These RTAs provide much broader and deeper trade concessions than are available at multilateral and plurilateral levels. The majority of the RI implemented by developing countries goes beyond trade to incorporate peace and coordinated institutional development, democracy, social objectives and environmental sustainability in trade deals (UNCTAD, 2019). The very 'trade-plus' issues that frustrate these countries' participation at the multilateral level are seen to be incorporated in regional trade deals. Despite these efforts, the impact of RTAs on trade and economic growth in Africa is complex because of the lack of a comprehensive dataset on trade and economic growth that can be used in extensive empirical analyses (Jones, 2013; Subramanian & Wei, 2007).

At the 2011 AU Summit, a 2010 recommendation of the AU Ministers of Trade to fast track the establishment of a Pan-African FTA was endorsed (AU, 2016). This economic integration aims at improving the situation of trade in Africa by increasing the variety of items traded in the market. It enables citizens and traders to move between countries and secure start-up capital for business. In 2018, the AU established the Pan-African Free Trade (PAFT). The goal of the PAFT is to boost intra-Africa free trade through the formation of the African Continental Free Trade Area (ACFTA) (AU, 2016). The ACFTA is a landmark achievement in the context of the continent's long and rich history, in its fostering of RI to unify the continent

(ECA, 2012; UNCTAD, 2019). The main objectives of the *Agreement Establishing the ACFTA* are to:

- create a single continental market for goods and services, with free movement of business persons and investments
- expand intra-Africa trade across the regional economic communities (RECs) and the continent in general
- enhance competitiveness and support economic transformation.

Although no empirical study has been undertaken on the ACFTA, anecdotal evidence indicates that the creation of a single continental market that taps into Africa's market of 1.3 billion people with an output of more than 2.2 trillion dollars will enhance intra-Africa trade (ECA, 2017). The future African marketplace potentially involves 54 countries and growing purchasing power (AU, 2016; UNCTAD, 2019). The continental bloc will create overall welfare gains of 16.1 billion USD and boost intra-African trade by 33% in the transition phase alone (UNCTAD, 2019).

RI is the foundation of Africa's future and is a launching pad from which to deepen its integration into the world economy (UNCTAD, 2019). Progress towards full implementation of the ACFTA has begun with strengthening existing RECs and establishing new ones in regions where they do not exist (AU, 2016; ECA, 2012, 2017). Over 14 RECs on the African continent are in various stages of development. However, only eight are officially recognised as building blocks of the ACFTA (ECA, 2012, 2017; Vickers, 2017), namely the:

- EAC
- Economic Community of West Africa (ECWA)
- Southern African Development Community (SADC)
- COMESA
- Arab Maghreb Union (UMA)
- Economic Community of Central African States (ECCAS)
- Community of Sahel–Saharan States (CEN-SAD)
- Intergovernmental Authority on Development (IGAD).

The status of Africa's RECs is much more complicated than is just seen in these eight RECs. All African countries are members of at least one RTA (ECA, 2017). In fact, most countries and RECs in Africa are overlapping (Schiff & Winters, 2003; Vickers, 2017). Multiple membership in regional blocs complicates the distribution of benefits as it leads to the problem of double counting (UNCTAD, 2019). Implementing larger intergovernmental entities

like the ACFTA should eliminate the challenge of multiple and overlapping trade agreements (Bhagwati & Krueger, 1995; ECA, 2017). The ACFTA is currently the largest FTA by membership and population in the whole world (IMF, 2019a).

The complete implementation of the ACFTA should lead to the formation of the African Economic Community (AEC). The ECA (2017) indicates that the AEC is being implemented in stages. The first stage is complete but there is variation in implementation across RECs and countries within RECs (ECA, 2017; Vickers, 2017). The other stages have not been completed because insufficient resources have been directed to addressing production and supply capability inadequacies (Vickers, 2017).

Endeavours towards integrating Africa and the AEC are commendable. The gains are numerous and indicative of progress across all RECs (ECA, 2017). For example, since 2008, Africa has been the only other region in the world with an increasing trend in intraregional trade (UNCTAD, 2019). This stronger continental cooperation in conjunction with a more balanced policy mix at the national level is deemed essential for strengthening economic activity and forestalling domestic risks (IMF, 2020). Also, the ACFTA has led to an expansion of intraregional trade in Africa and enabled African trade to permeate the international trading system, with a few regional hubs having relatively diversified trade flows (IMF, 2019b). Most intraregional trade takes place within the main subregional communities, with an observed tripling of intraregional imports as a share of total imports over the past two decades (IMF, 2019b).

To strengthen, empower and even sustain these modest gains in regionalism, the AU has developed the African Regional Integration Index (ARII) (AU, 2016). This tool tracks the process of RI in the eight RTAs, countries within each RTA and five priority areas. The priority areas to advance the AEC are trade integration, regional infrastructure, productive integration, free movement of people, and financial and macroeconomic integration, in that order. According to the AU's (2016) findings, the ARII shows that all RTAs and countries score higher than average on at least one priority area of integration. The highest average scores are for the first priority area, trade integration, a long-held priority of the ACFTA (AU, 2016; Vickers, 2017). This bodes well for the ACFTA and is a strong basis for each region to build on the and encourage greater policy reforms across the African region (AU, 2016).

Progress towards the formation of the AEC and associated achievements are commendable. Developing countries have adopted free trade as if it is the Holy Grail of economic development (Rodrik, 1992). Despite the considerable progress made by African RECs towards integration, Africa is still the darkest and poorest continent, with 30 of the world'

50 poorest countries being in the region. Inequality in Africa is still very high (IMF, 2019b) and the absolute number of poor people on the continent is increasing, with employment generally remaining a major challenge (Osakwe, 2015). Conceptually, these conclusions imply that trade liberalisation efforts in Africa are not supporting the continent's growth and development processes effectively. UNCTAD (2019) argues that intraregional trade may not necessarily be welfare improving if most such trade displaces cheaper extra-regional trade.

Although trade liberalisation in developing countries has been traditionally so contentious, there is strong evidence that trade reforms perform very poorly (Mishra, 2018; Rodrik, 1992). For instance, Africa is still a marginal player in the global trade in goods (UNCTAD, 2019) even though the first stage of building the AEC (i.e. trade integration) has been fully implemented (ECA, 2017). Levels of intraregional trade are still low even though tremendous resources and strong political will continues to back progress towards implementation of the ACFTA (Vickers, 2017).

Further, product market competition in SSA remains low relative to the ROW, and more than 70% of the countries in Africa are below the median in terms of the global competitive indicators (IMF, 2019a). SSA's ratio of foreign value added to total exports is only around 20%, which is lower than both Europe and Asia (IMF, 2019a). Accumulating evidence indicates that trade reform in the region remains sporadic and is often reversed (Rodrik, 1992). There is a strong policy contradiction. On one hand, tariffs are coming down but on the other, non-tariff barriers are rising (Mishra, 2018). The IMF (2020) argues that cross-border cooperation is needed in multiple areas to address grievances. Progress for RECs and countries within them is still occurring at different rates (Byiers, Vanheukelom & Kingombe, 2015; ECA, 2017; Rodrik, 1992; Schiff & Winters, 2003). The ex-post empirical literature on FTAs provides mixed findings (ECA, 2017). This is probably because African countries' particular features appear to limit their ability to trade after controlling for income, economies of scale and distance (IMF, 2019b). Alternatively, it could be that the reforms are guided by unacceptable propositions, theory and causal empiricism.

Existing theoretical frameworks are ambiguous regarding the effect of RI on trade and were not originally designed to explain trade patterns in developing countries and LDCs (Williams, 1972). Trade theories were formulated prior to the Great Depression of the '30s, to explain European integration (Hooghe & Marks, 2019). There is a need to apply contemporary formulations of these theories to detailed African data.

Ongoing empirical research neglects specific RI blocs, mainly those in Africa. Also, many empirical studies are out of date and do not apply comprehensive datasets; some do not

consider contemporary improvements in trade models. Further, most relevant studies are limited to estimating trade potentiality. As such, they contain a litany of statements claiming how much trade will take place (see AU, 2016; ECA, 2012, 2017; UNCTAD, 2019). Assessing what is happening across the continent is important and commendable (AU, 2016). However, assessments should extend to furnishing robust evidence on the outcome of RI in Africa. This will enable the continent to understand the outcomes of trade reforms and the effects of policy on the trade of different countries and products (Rodrik, 1992). Current trade reforms on the African continent are limited to assessing the process of integration. Policy assessment in the region neglects the thorny issue of the distribution of the aggregate gain hypothetically generated by trade reforms (Rodrik, 1992).

3.3 Regionalism in the EAC

The contemporary EAC has been drafted on ideals that date back over 250 years to the famous East African Long-Distance Trade during the colonialist and imperialist era of Great Britain, and the first failed attempt between 1967 and 1977 to integrate the EAC.

3.3.1 The inception of East African trade relations

The first attempt to bring about collaboration and cooperation in the East African region was made at the dawn of the 19th century. The purpose of collaborating and cooperating was to trade. Bartering was the common form of exchange, with limited adoption of some form of currency. Indian and Arab traders controlled and organised markets across the East African coast and sometimes along the trade routes. They travelled from either India or the Far East when favourable winds known as Monsoon winds pushed their ships carrying guns, gunpowder, metal products, spices, mirrors, cloth, culture and religion to the East African coast (and cities) and back. The coastal centres or cities acted as auction centres.

In the East African hinterland, kings, sultans and other powerful person(s) controlled the routes and exchanged or traded agricultural products such as spices and salt; minerals such as iron ore, gold and copper; and artefacts such as backcloth, beads, pottery and woodcarvings, with Indian and Arabs. Swahili was developed as a language of communication in the region (Gilbert, 2002). Trade was structured in such a way that goods from the hinterland were traded from villages endowed with a specific raw material or merchandise to the next village until they arrived at markets in the coastal cities. To effect the transfer of merchandise, communities would subdue each other either to control trade routes (guaranteeing tax returns and protection

proceeds) or protect their merchandise along the supply chain (Hartwig, 1975; Maxon, 2009; Tracy, 1993).

3.3.2 Pre-1967—British colonial rule

The arrival of the British (colonial administrators) brought to a halt the East African Long-Distance Trade and introduced a new form of collaboration and cooperation not experienced before in the East African region. This occurred at the dusk of the 20th century, in 1897. Britain, driven by colonialist and imperialist convictions, compelled a fusion of the East African region to enable synchronised exploitation of the region's resources. For example, between 1897 and 1901 Britain constructed the Kenya–Uganda Railway and in 1901 established a customs collection centre that formally integrated Kenya and Uganda.

The establishment of the Postal Union and the East African Currency Board in 1905 then followed. This effectively meant that Kenya and Uganda became a currency union belonging to the Sterling Exchange System. In 1919, the East African CU was established to administer customs and tax collection.

In 1927, Tanzania joined Kenya and Uganda. From the outset, Tanzania (1) adopted a common external tariff that was; (2) run jointly with the MU of Kenya and Uganda; (3) amalgamated with Kenya and Uganda into a fiscal integration; and (4) implemented both geographical and occupational mobility of labour. However, by 1945, the economic opportunities of the region were skewed towards benefitting Kenya more than Tanzania and Uganda. To overcome this challenge, the colonial administrators established the East African High Commission (EAHC) in 1948 to specifically: (1) enable the region to form a CU with equalised income tax; (2) enable the bloc to form a common legislative body to enact legislation on common services; and (3) establish a secretariat as an administrative organ with one governor stationed in each of the three countries to effectively coordinate common service provision.

British colonial occupation saw abolition of the slave trade; introduction of new crops intended to meet the resource needs of British industry; and exploitation of East Africa's mineral resources on British terms, which continued into the early 1960s when Tanzania, Uganda and then Kenya acquired their independence in 1961, 1962 and 1963, respectively.

3.3.3 1967–77: The 1967 EAC treaty and regionalism in the EAC

In 1961, the indigenous African governments established the East African Common Services Agreement to succeed the EAHC established by the colonial administrators

(Katembo, 2008), since the distribution of the region's resources was still skewed towards benefitting Kenya. In a quest to further strengthen cooperation, there was a failed attempt to establish a central bank and enter the region into a CM by 1965. The failure to meet these two objectives is attributed to compatibility issues. To resolve the issue, the independent states of Kenya, Tanzania and Uganda—in pursuit of their interest in integrating—signed and enacted the 1967 *Treaty for East African Co-operation*, taking significant lessons from the positives in colonial structures.

The EAC broadens the area of integration and cooperation to tackle economic, investment and social issues. By 1977, the EAC had a fully implemented customs market and had achieved CM status. It also had an elaborate and coordinated institutional framework with a secretariat that coordinated shared institutions including the East African Railways and Harbours; East African Posts and Telecommunications; Directorate of Civil Aviation of the EAC and the East African Civil Aviation Academy; East African Airways Corporation; East African Development Bank; East African Court of Justice (EACJ); and University of East Africa. By the time of the original EAC's dissolution in 1977, it had overseen the most extensive integration progress in the world, with the EACJ as its commanding decision organ. The EAC had become an intricate institutional framework that coordinated tax management, physical infrastructure (e.g. waterways and transport systems) and research in health, medicine, environment and agriculture. The collapse of the first EAC's attempt at formally integrating is attributed by Hazlewood (1979) to:

- the thorny issue of uneven distribution of benefits of the bloc occasioned by disparities in development
- differences in political and economic ideologies of EAC's key stakeholders, with Tanzanian and Ugandan presidents becoming more socialist and Kenya's President Jomo Kenyatta pursuing a more capitalist agenda
- the EAC having become an intergovernmental entity instead of being people centred, civil society promoting and driven by market forces
- inadequate institutional policies to mitigate the compatibility issues and attendant challenges that arose as a result of increased ceding of state powers in relation to sensitive issues such as fiscal policy, trade policy and economic policies.
- The collapse of the first EAC in 1977 occurred because Kenya took the lion's share of the benefits of the EAC (Hazlewood, 1979; Mathieson, 2016).

3.3.4 1977–99: EAC cooperation

In December 1978, Victor H. Umbricht, a Swiss diplomat, was nominated as a mutual mediator to handle EAC affairs since the EAC and its secretariat was non-functional following the September 1977 Council of Ministers Memorandum of Understanding (Katembo, 2008). On 14 May 1984, the *East African Mediation Agreement* was signed to disburse the assets and liabilities of the defunct EAC. This agreement kept the spirit of regionalism alive in Article 14, which provided for former EAC member states to explore and identify areas of future cooperation (Hamad, 2016; Katembo, 2008).

On 30 November 1993, the first Summit of the East African Heads of State was held and the heads of state signed the *Agreement for the Establishment of the Permanent Tripartite Commission* [PTC] *for East African Cooperation*. The PTC was tasked with the responsibility of coordinating economic, social, cultural, security and political issues in the East African region. Operationalisation of the agreement began on 14 March 1996 when a secretariat was established in Arusha, Tanzania. This cooperation enabled EAC member states to (1) sign the *Tripartite Agreement on Avoidance of Double Taxation* on 28 April 1997; and (2), hold the second Summit of the East African Heads of State, on 29 April 1997 in Arusha. The summit mandated the PTC to embark on the process of upgrading the EAC agreement into a treaty and launched the first *East African Cooperation Development Strategy (1997–2000)*, East African flag and East African passport.

On 30 April 1998, at the ninth meeting of the PTC in Arusha, the draft *Agreement Establishing the East African Community* was launched. The treaty was ambitious and extended the provisions of the EAC to include a memorandum of understanding on cooperation in defence and an agreement on road transport and inland waterway development. As part of an agreement to publicise it widely, the agreement was released for public scrutiny and parliamentary approval in the member state countries before being updated to a treaty.

On 30 November 1999, at the fourth Summit of the East African Heads of State in Arusha, the *Treaty for the Establishment of the East African Community* was signed and launched by President Daniel Arap Moi of Kenya, President Benjamin Mkapa of Tanzania and President Yoweri Kaguta Museveni of Uganda.

3.3.5 2000–Present: The 1999 EAC treaty

The new treaty came into force on 7 July 2000, giving birth to new latitude of RI and cooperation for the East African region. To guarantee that its objectives are achieved, an

administrative structure that includes the Summit, Co-ordination Committee, Sectoral Committees, EAC Court, EAC Assembly and Secretariat was adopted.

On 15 January 2001, the EAC Summit held its first meeting of the new EAC era. The summit ratified two protocols: the *Rules of Procedure for the Summit of Heads of States* and the *Rules of Procedure for the Admission of other Countries to the East African Community*. The second of these was instrumental in the admission of Burundi and Rwanda to the EAC as full members on 1 July 2007 and to the EAC CU on 1 July 2009. In 2011, South Sudan—having gained independence from Sudan and upon the invitation of Kenya and Rwanda—also applied to become a member of the EAC. This application was rejected owing to the country's institutional weaknesses that worsened institutional compatibility. However, at the 17th Summit of the Heads of States of the EAC held on 2 March 2007, South Sudan was finally admitted as the sixth full member of the EAC. There is clear interest by the Democratic Republic of Congo (DRC) in joining the bloc, though it is still immersed in military strive. Academics, policy analysts and researchers are lobbying for the admission of Ethiopia to the economic bloc.

The inauguration of the East African Legislative Assembly and EACJ on 30 November 2001 at the third Summit of the EAC represented a milestone in devolving administrative units to guide the EAC RI process. Another key milestone was the establishment of the EAC CU on 2 March 2004: the *Protocol for Establishment of the EAC Customs Union* became operational on 1 January 2005. On 1 January 2010, the EAC CU achieved its key objective of becoming a fully-fledged CU following a 5-year transitional period. The CU protocol also drove the EAC to set a common external tariff. On 20 November 2009, the EAC signed the *Protocol for the Establishment of the EAC Common Market* with the objective of allowing for the free movement of persons, merchandise, labour and capital throughout the bloc (Basnett, 2013). The protocol entered into force on 1 July 2010 after all partner states ratified it. The EAC also signed the *Protocol for the Establishment of the EAC Monetary Union*, on 30 November 2013.

3.4 The Case for the EAC

The main theme of this thesis is in part to provide robust empirical evidence on the role RI plays in country and merchandise trade. This thesis applies models to comprehensive datasets on these aspects to settle contention around the effects of regionalism on trade, trade survival and economic growth. The thesis analyses the first stage of the ACFTA, because all RECs and countries within them have completed this stage of integration and score highly in

all areas that prioritise RI (AU, 2016; ECA, 2017; UNCTAD, 2019). Since the thesis analyses a large disaggregated dataset on country and products, it considers the context of one REC—the EAC—rather than all eight. I analyse the integration of the EAC bloc and its members within the COMESA and WTO markets. The EAC has made the most progress across the board on the AU integration index (ECA, 2017). Successful integration in the EAC is eased by the strong desire of land-locked countries within the region (Burundi, Rwanda and Uganda) for port access (Byiers et al., 2015; Collier & Venables, 2009; ECA, 2017). The EAC is the top-performing REC on RI overall. It has higher-than-average scores across each dimension of integration (ECA, 2017).

The EAC does not perform as well in the area of trade integration. Its revival in 2000 was crafted on ideals traced to the failed attempt at integrating between 1967 and 1977. The dissolution of the EAC in 1977 is attributed to persistent development disparities, divergence in political and economic ideologies of the partner states, and compatibility issues (Hazlewood, 1979; Mathieson, 2016). The new EAC has developed an intricate institutional framework with an elaborate administrative structure and a secretariat to implement the protocol establishing the EAC. However, discrepancies in the size and relative strength of economies create tensions over the perceived distribution of benefits of RI (ECA, 2017). The collapse of the first EAC in 1977 occurred because Kenya took the lion's share of the benefits of the EAC (Hazlewood, 1979; Mathieson, 2016).

Since its establishment, the EAC has established a CU in 2004, a CM in 2009 and a MU protocol, signed in 2013 (Basnett, 2013). The CU became fully fledged in 2010. The EAC expanded by admitting Burundi and Rwanda to the bloc in 2007. The elaborate structure of the EAC aims to support the convergence of exports and development, but Kenya's regional exports still outweigh those of all its partners' exports to the ROW. The strong political orientation of the EAC at the expense of her economic orientation has encouraged this skewed outcome, which may re-ignite plans to exit. For the EAC to benefit its members, its economic orientation requires consideration, yet many aspects of the entity are unresolved. Analysis of the EAC would provide the most meaningful empirical opportunity to generalise outcomes because her integration process follows the textbook model of economic integration propagated by Viner (1950).

3.5 Trends in EAC Trade

In this section, a description of EAC trade performance is presented and discussed using descriptive statistics. The goal is to understand (1) how much the bloc and its partner states trade (i.e. trade openness); (2) what the bloc and its partner states trade; and (3) with whom the bloc and its partner states trade?

3.5.1 EAC trade openness

Since 1988, EAC partner states have experienced varied levels of trade openness, measured as the ratio of the sum of imports and exports (trade) to GDP (see Figure 3.1). For example, from 1990 the combined importance of EAC partner states' exports and imports of goods and services begin picking up, from an average of around 35% in 1988/89 to 55% in 1994. During this period, Kenya's and Rwanda's openness shoots to 70%, with that of Tanzania following close behind. Burundi's and Uganda's trade openness slightly increases to an average of 35% during this period. The spike in trade openness for Kenya, Rwanda and Tanzania, and the slight gradual increase in Burundi's and Uganda's trade openness is attributed to the influence of implementing structural adjustment programmes (SAPs) and economic recovery programmes (ERPs) in the late '80s and early '90s. However, as the influence of these SAPs and ERPs declines, all EAC partner states' trade openness begins reducing between 1994 and around 1998. In the first 2 years, Rwanda experiences a sharp decline because of the 1994/95 civil war in the country. Kenya and Tanzania also experience sharp declines, albeit lower than that for Rwanda.

A gradual rise in EAC partner states' trade openness is observed, from an average of 35% in 1989, peaking at 50% on average in 2008. This gradual increment is explained by the deepening and widening of trade integration in the EAC. In fact, as integration policies seem to deepen through the full implementation of the CU in 2010 and adoption of the CM protocol in 2009, the trade openness of EAC partner states starts to converge in 2015. The 2015 average trade openness of 45% is lower than the peak in 2008 as a result of intricacies in implementing EAC protocols and phasing in of EAC programmes and concessions. Implementing the EAC seems to have allowed EAC partner states' domestic producers to depend on foreign demand for exports, and domestic suppliers to depend on foreign supply of imports; that is, trade openness. Essentially, the combined importance of EAC exports and imports of merchandise and services to the EAC economy has evolved with the development of the EAC protocol.

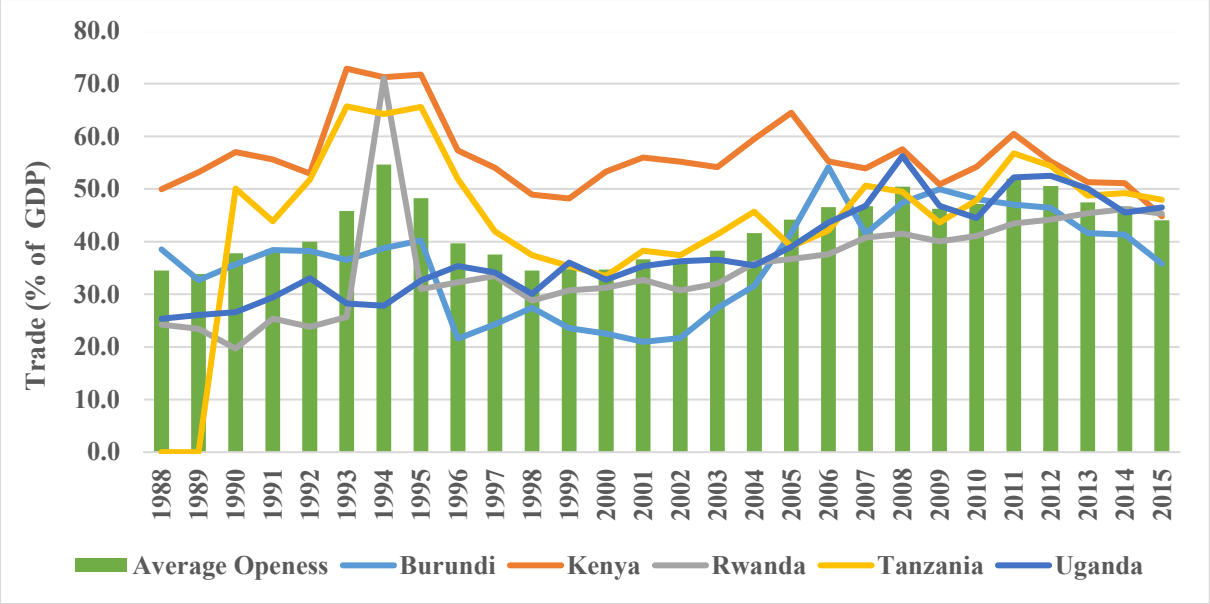

Figure 3.1. EAC partner states' trade openness, 1988–2015. Source: Data from the World Bank's World Development Indicators (WDI) database.

3.5.2 EAC export trends

EAC exports grow from less than 5 billion USD in 1988/89 to as high as 35 billion USD in 2013/2014 (see Figure 3.2). The steep increase from 1999 is sustained until the 2013/14 peak. This period coincides with the evolution of the implementation of the EAC protocol. In 2014 and 2015, there is a radical decline in exports. The contraction of trade in 2014/2015 might be explained by reduction in world demand for merchandise because of reduced activities of major economies like the EU and China. For instance, the EU around this time was experiencing the Eurozone debt crisis and China's growth had contracted, though it rebalanced its economy by focusing on domestic demand. With declining world demand for commodities coupled with increased supply, prices dropped and consequently the value of exports is much lower in 2014/2015.

Kenya remains the major contributor of EAC exports during the period, followed by Tanzania and Uganda. Burundi's and Rwanda's exports have a marginal influence on EAC exports.

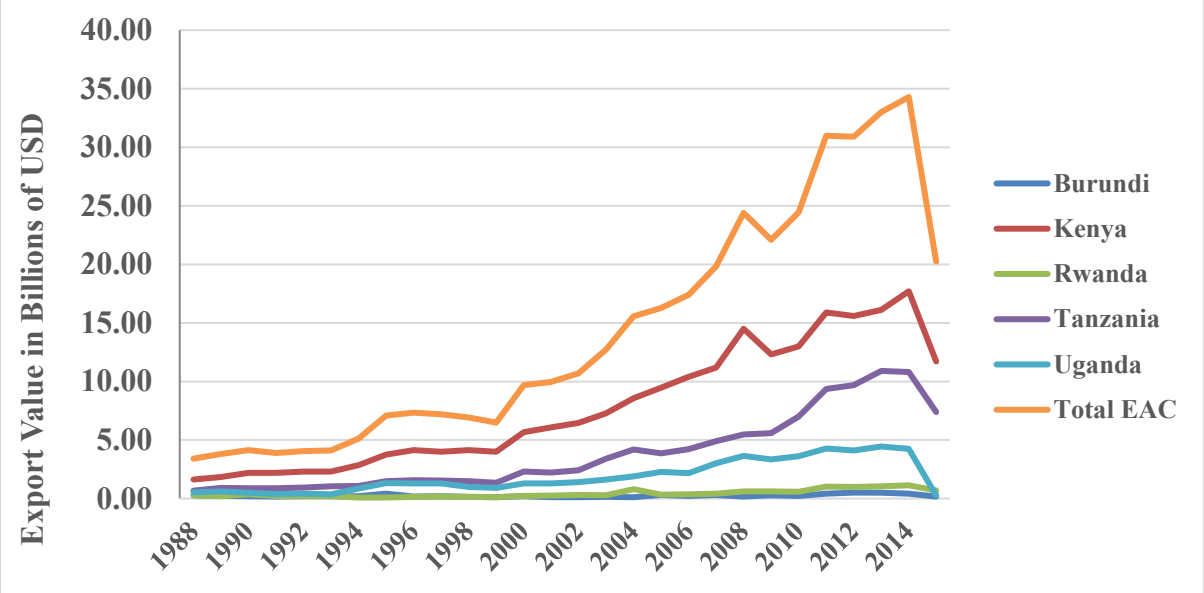

Figure 3.2. EAC exports decomposed by country. Source: Data from the World Integrated Trade Solution (WITS) database.

3.5.3 Sectoral composition and growth of EAC exports

EAC sectoral exports trends increase gradually since 1988 as seen in Figure 3.3. This trend was influenced by exports of agricultural raw materials (AgriRaw), food and manufactured goods. Fuels began having a negligible influence in the mid-1990s with trade in ores and metals (OresMtls) performing similarly at the end of the 21st century. Sectoral trend in exports show dramatic growth coinciding with the implementation of the EAC protocol.

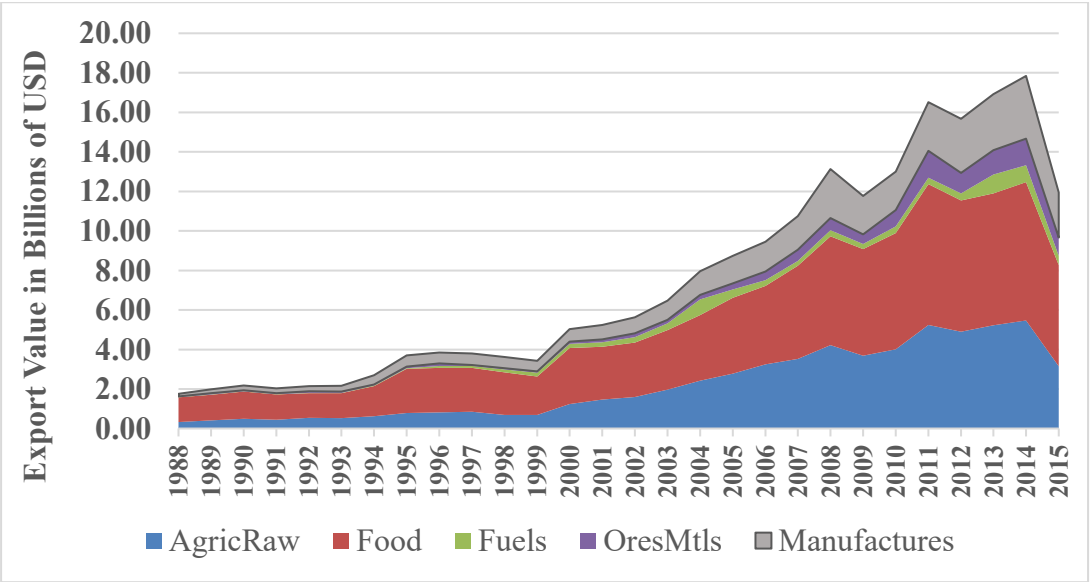

Figure 3.3. EAC exports decomposed by sector. Source: Data from the WITS database.

3.5.4 Trends in EAC bloc exports by country

This subsection describes the decomposition of the EAC export value of selected products by country. The information generated here provides a picture of the data related to products that inform the methodology on the appropriate econometrics process for normalising the data for analysis.

3.5.4.1 Decomposition of Burundi's exports

Generally, the overall value of Burundi's exports is low. The total value of Burundi's exports hardly rises beyond 100 million USD for each year for the period 1988–2004, except for the years 1988 and 1995 (see Figure 3.4). With Burundi's accession to the EAC in 2005, the value of her exports begins to grow beyond 100 million USD to 2015, except for the year 2008. In fact, in 2011 and 2012—after the EAC CU had become fully operational—Burundi's exports exceed 150 million USD. However, this upward trend seems to be eroded by the dynamics in the global world economy, involving contraction of demand and fall in prices. The value of Burundi's exports of food items by far outweighs the value of its exports of the other selected items. Fuels and iron ores make negligible contributions to the total value of Burundi's exports.

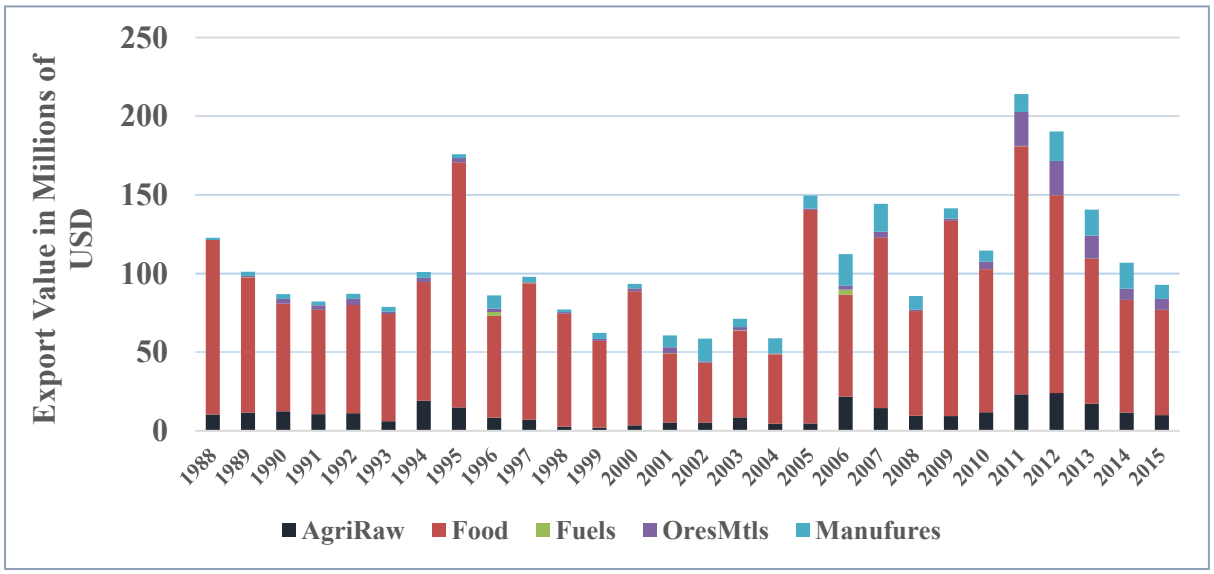

Figure 3.4. Burundi's decomposition of exports to the ROW. Source: Data from the WITS database.

3.5.4.2 Decomposition of Kenya's exports

The value of exports to the ROW from Kenya for the selected products gradually increases, and then surges during the course of implementing the EAC protocol (see Figure 3.5). For example, from 1988 to 1999, none of Kenya's exports of the selected products exceeds 1.5 billion USD in value. However, in the first year of the EAC protocol coming into force in 2000, the values of Kenya's exports of food items, agricultural raw materials and manufactured goods surges and shows sustained growth. The value of food item trade to the ROW surpasses the 1.5 billion USD mark in 2002 and the value of exports of agricultural raw materials exceeds the 1.5 billion USD mark in 2005 and continues to grow. Manufactured goods exports also exceed this value in 2008 after Burundi and Rwanda joined the bloc. Kenya has the highest export growth by value of these three products in 2009 and 2012. Kenya's exports also suffer a sharp decline in demand for its products with the exception of ores and metals in 2014 and 2015 as a result of the Europezone debt crisis, the slump in China's imports and falls in world export prices.

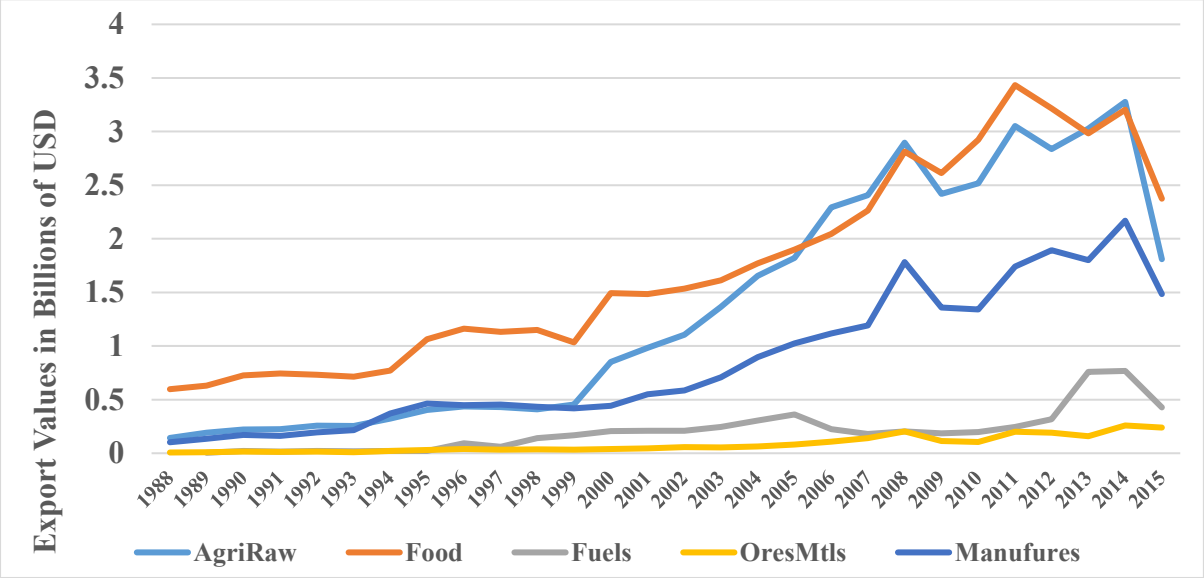

Figure 3.5. Kenya's decomposition of exports to the ROW. Source: Data from the WITS database.

3.5.4.3 Decomposition of Rwanda's exports

The implementation of the EAC protocol is associated with a surge in Rwanda's exports to the ROW, as deduced from Figure 3.6. From 1988 to 2003, overall export value of the selected products from Rwanda is less than 200 million USD. However, as Rwanda embarked

on the process of accession into the EAC in 2005, a gradual growth of her exports is observed, from 200 million USD in 2006 to a peak of over 600 million USD between 2011 and 2014. Unlike other EAC partner states, Rwanda relies on export of ores and metals from 2006 to 2015. Food export trade makes a similar contribution to overall export values from Rwanda. Following closely is the value of exports of agricultural raw materials, which surpasses that of food items between 2011 and 2016. The period 2001–05 sees a spike in exports of fuels from Rwanda to the ROW. Rwanda's exports of manufactured goods is weak for the duration of the sampled period.

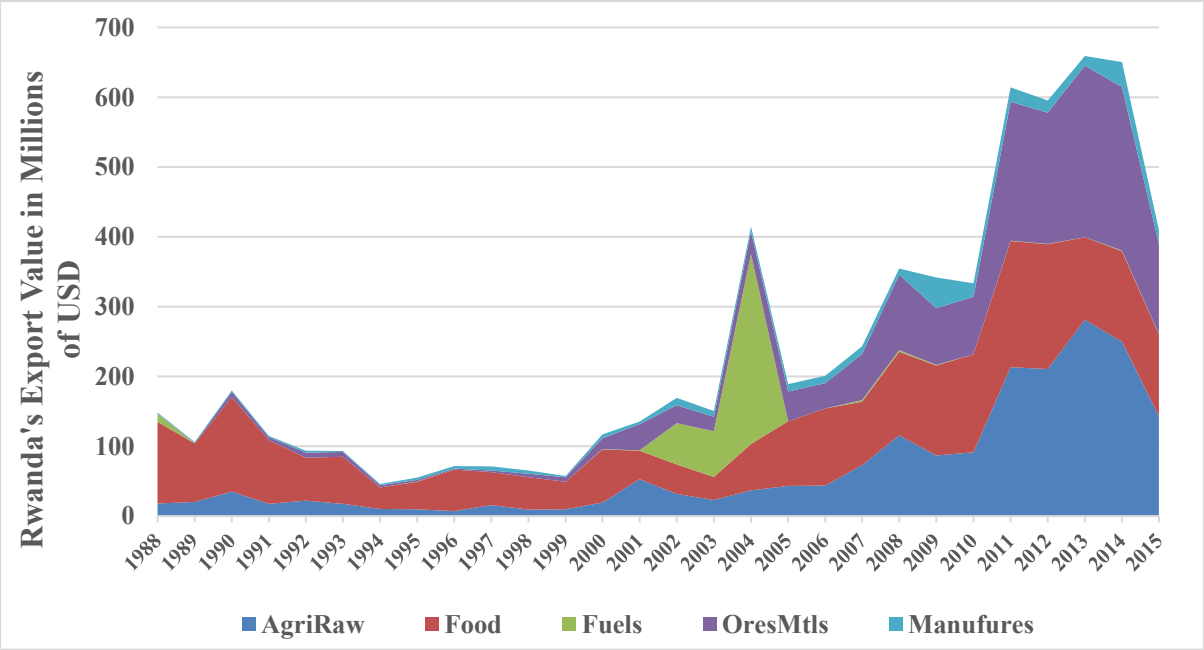

Figure 3.6. Rwanda's decomposition of exports to the ROW. Source: Data from the WITS database.

3.5.4.4 Decomposition of Tanzania's exports

Tanzania's total export value for the selected products to the ROW grows gradually from around 1 billion USD in 2000 to more than 5 billion USD from 2011 and 2014, as seen in Figure 3.7. The gradual increase coincides with its accession to the EAC protocol. Food item trade is the main contributor to the exports of Tanzania from 1988 to 2015. Exports of agricultural raw materials experience similar growth during the implementation of the EAC protocol. For example, agricultural export values grow from less than 1 billion USD when the EAC became a CM, to an average peak of 1.3 billion USD between 2011 and 2014. Exports of ores and metals make a significant contribution to the exports of Tanzania between 2004 and

2015. From 2000, the agricultural raw materials trade picks up gradually to become Tanzania's third most valuable export, unlike fuels, of which Tanzania exports little.

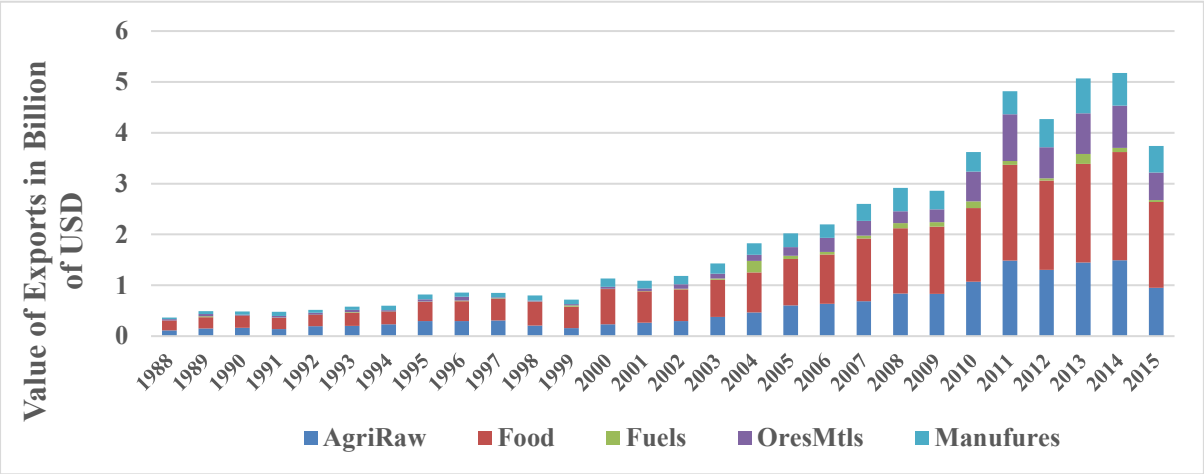

Figure 3.7. Tanzania's decomposition of exports to the ROW. Source: Data from the WITS database.

3.5.4.5 Decomposition of Uganda's exports

The pattern of Uganda's exports to the ROW strongly coincides with the evolution of the EAC (Figure 3.8). By the time Uganda joined the EAC in 2000, the value of her exports are less than 750 million USD. Export value gradually increases to an average of over 2 billion USD between 2010 and 2014. By 2015, the value of Uganda's exports of the selected commodities shows a strong slump to less than 2 billion USD. This slump may be a result of the contraction in world demand and decline in global export prices during 2014–15.

Food item trade is Uganda's main export by value since 1988. Agricultural raw materials trade, followed by export of manufactured goods also increase in importance after 2006. Fuels are Uganda's least valuable export during the sampled period, followed by ores and metals.

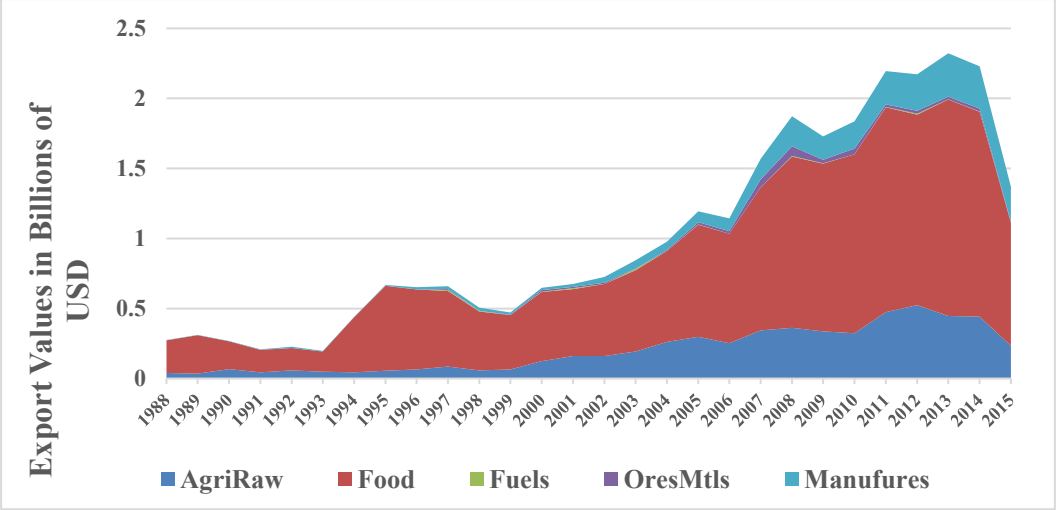

Figure 3.8. Uganda's decomposition of exports to the ROW. Source: Data from the WITS database.

3.5.5 Trends in intra-EAC bloc exports

The subsection describes the decomposition of intra-EAC export values for the selected products. The information generated here provides an overview of data related to export products that informs the methodology on the necessary econometrics processes to adopt when normalising the data for analysis.

3.5.5.1 Intra-EAC exports decomposition by country

Implementation of the EAC protocol coincides with a spur in intra-EAC exports (Figure 3.9). From 1988 to 1993, values of intra-EAC exports are less than 250 million USD. However, after the EAC became a FTA and the PTA was formed in 1992/93, there is a steep and persistent increase in intra-EAC trade from 250 million USD to around 1 billion USD by 1988. When the protocol establishing the EAC came into force in 2000, there is even steeper and more persistent growth in intra-EAC export trade. The export values peak at over 4 billion USD between 2012 and 2014. In 2014, the value of the exports drops significantly because of a fall in global prices.

Kenya is the dominant exporter of products within the EAC region for the period under consideration. Its value of exports averages 2.3 billion USD between 2008 and 2014. Tanzania's exports (followed by Uganda's exports) to the EAC are dwarfed by Kenya's participation in the region. Both Tanzania's and Uganda's exports values are less than 750 million USD on average between 2008 and 2015. Burundi and Rwanda are small and insignificant participants in regional trade.

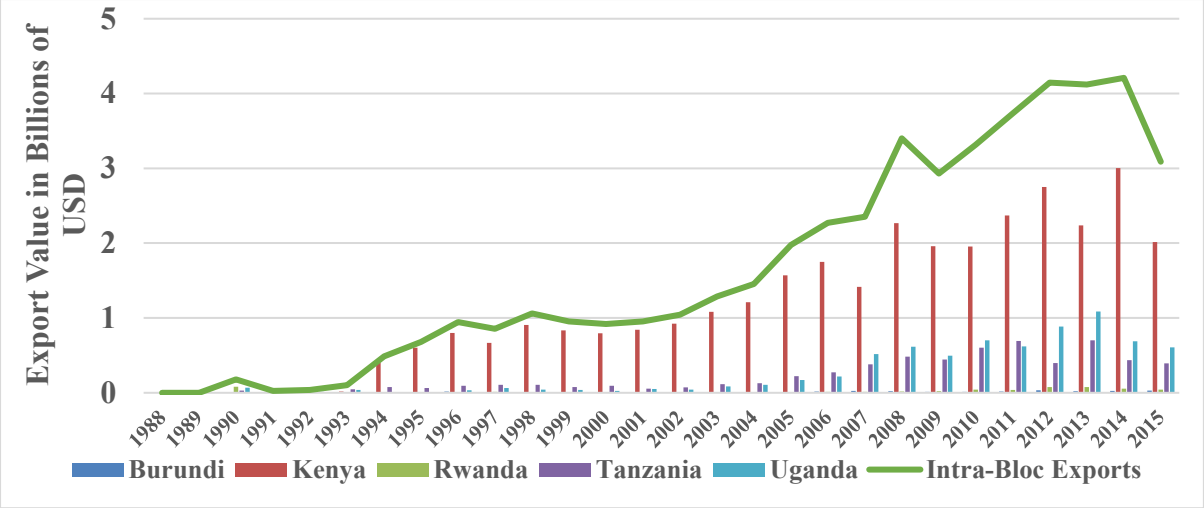

Figure 3.9. Decomposition of intra-EAC exports. Source: Data from the WITS database.

3.5.5.2 Burundi's intra-EAC exports decomposition by country

Burundi's exports to the EAC region pick up after joining the EAC regional bloc (Figure 3.10). In 2003, Burundi's exports are less than 250 thousand USD. However, with its initiation into the EAC in 2005 there is a steep increase in its regional exports to around 25 million USD by 2007. From 2008, Burundi's EAC exports enter a sharp decline to around 13 million USD in 2009. From 2009, an upward trend in her exports begins, and peaks at 35 million USD in 2012. The trend since 2012 fluctuates but shows a general decline.

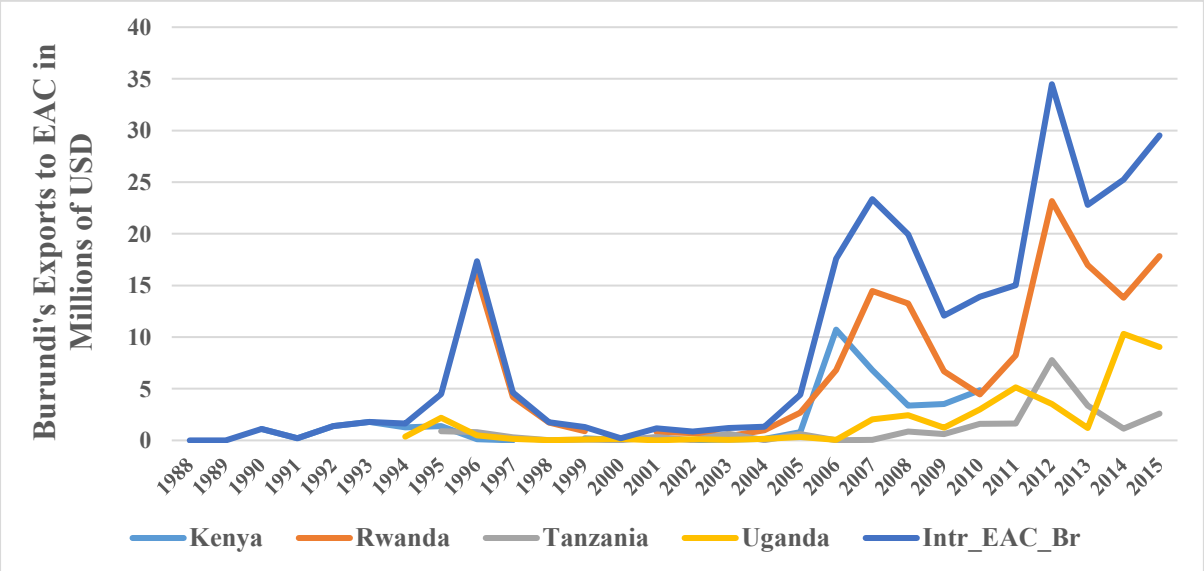

Figure 3.10. Burundi's exports to the EAC. Source: Data from the WITS database.

Rwanda is the main destination of Burundi's exports in the region even before the two countries became EAC partners. However, after 2012, Burundi's exports to Rwanda decline significantly and its exports to Uganda increase proportionately. Tanzania is another relatively important export destination for Burundi's exports, especially since the EAC CM protocol came into force.

3.5.5.3 Kenya's intra-EAC exports decomposition by country

The value of Kenya's exports to the region grows gradually from less than 1 billion USD in 1993/94 to 6 billion USD in 2013/2014. However, the rate of growth in Kenya's exports increases after the country joined the EAC in 2000. For example, her export value approaches 2 billion USD in 2003, and by 2005/06, is more than 3 billion USD. This trend continues to grow gradually to 4 billion USD between 2008 and 2011, and settles at an average of over 5 billion from 2012 to 2015 (see Figure 3.11).

Uganda is Kenya's main export destination over the period, closely followed by Tanzania. Tanzania's role as an export destination for Kenya's exports increases to much that of Uganda from 2009 to 2014. Burundi is the least important destination for Kenya's exports to the region, followed by Rwanda.

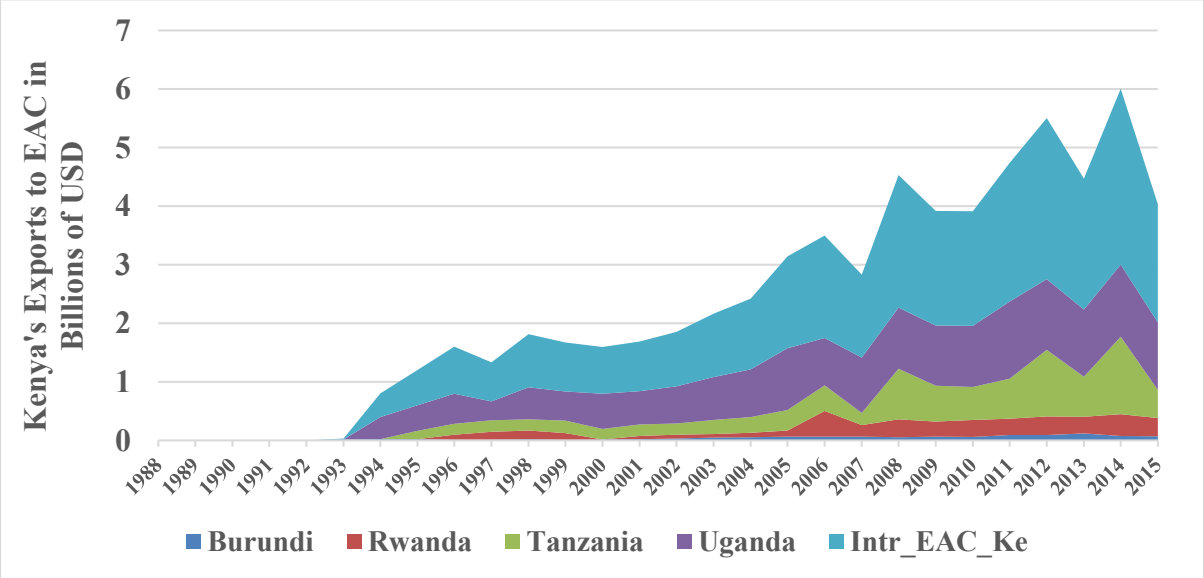

Figure 3.11. Kenya's exports to the EAC. Source: Data from the WITS database.

3.5.5.4 Rwanda's intra-EAC exports decomposition by country

Rwanda's intra-EAC trade is generally low prior to her accession to the EAC protocol (Figure 3.12). The value of her exports to the East African region is generally less than 20 million USD during the period under consideration up to 2006, except for the years 1989 to 1991. Between 1989 and 1991, the value of her EAC exports sharply peaks at 160 million USD. From 2006, there is a gradual increase in her intra-EAC export value, which averages more than 120 million USD between 2011 and 2014. In 2015, Rwanda's intra-EAC exports decline sharply to less than 100 million USD.

Since signing up to the EAC protocol, Burundi and Uganda are Rwanda's main export destinations for the selected products. However, since 2013, Burundi's role as a main export destination is eroded, though still high. The fall in Rwanda's exports to Burundi could be attributed to the political and civil strife that the country was experiencing at the time. In the same period, Rwanda is exporting more to Uganda. Tanzania's role, though small, is picking up as one of Rwanda's export destinations.

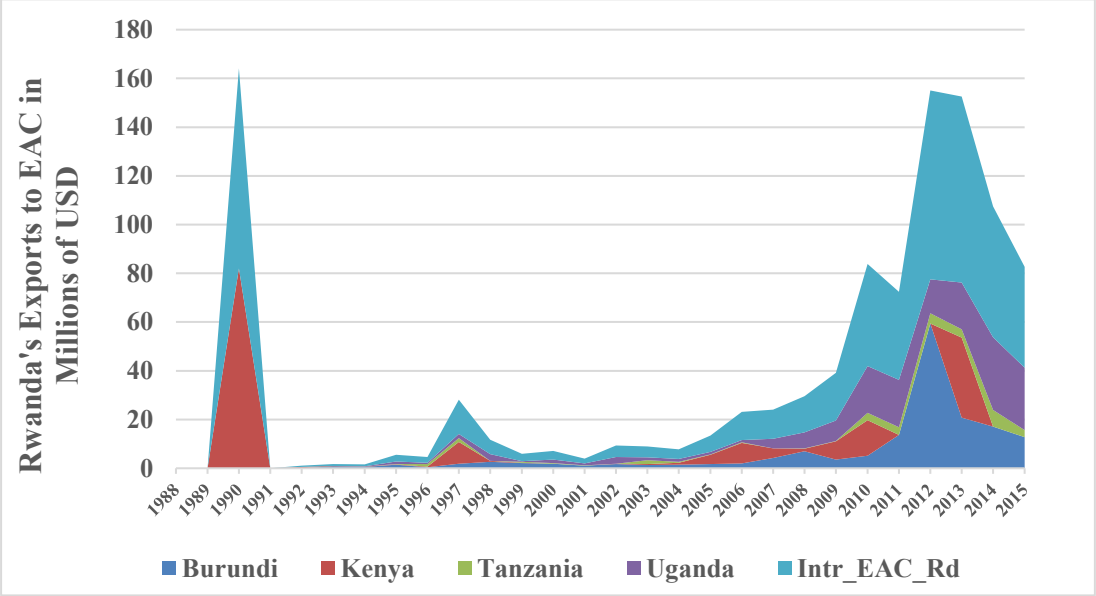

Figure 3.12. Rwanda's exports to the EAC. Source: Data from the WITS database.

3.5.5.5 Tanzania's intra-EAC exports decomposition by country

Tanzania shows a tremendous boost in her intra-EAC exports since joining the EAC. For example, for the years 1988 to 2002, her exports are less than 200 million USD. However, her exports grow to an average of around 1.2 billion USD between 2010 and 2013 (Figure 3.13).

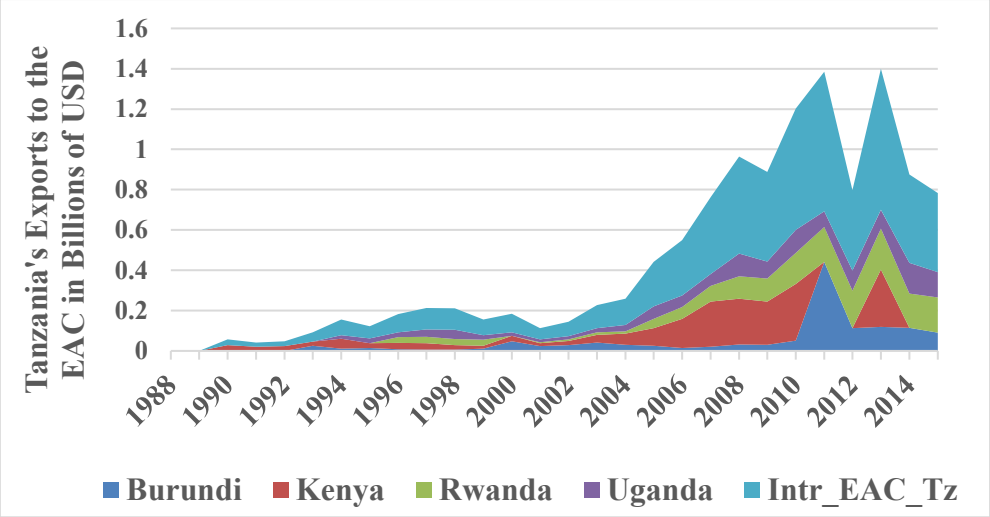

Figure 3.13. Tanzania's exports to the EAC. Source: Data from the WITS database.

Between 2004 and 2010, Kenya is Tanzania's main export destination. Rwanda follows Kenya as Tanzania's second most valuable export destination in the region for the period 2004 and 2010. However, after 2011, Rwanda is the main importer of Tanzania's exports in the region, followed by Burundi. Since 2013, Uganda has been the third largest importer of Tanzania's exports.

3.5.5.6 Uganda's intra-EAC exports decomposition by country

Uganda's intra-EAC exports gradually increase since joining the EAC. For example, from 1988 to 2000, the value of Uganda's exports for the selected products is less than 250 thousand USD (Figure 3.14). This figure gradually increases to reach 500 million USD in 2006 and is over 1 billion USD from 2007 to date. In fact, between 2011/2012 and 2014, the figure climaxes at over 2 billion USD.

Rwanda remains the most important destination for Uganda exports since 2010. Tanzania's and Burundi's roles as export destinations for Uganda's exports, though small, are persistent. Kenya has an intermittent role in importing Uganda's products. It is the second most import export destination after Rwanda between 2006 and 2011. Exports to Kenya seem to cease between 2011 and 2012, pick up between 2012 and 2014, and then cease again.

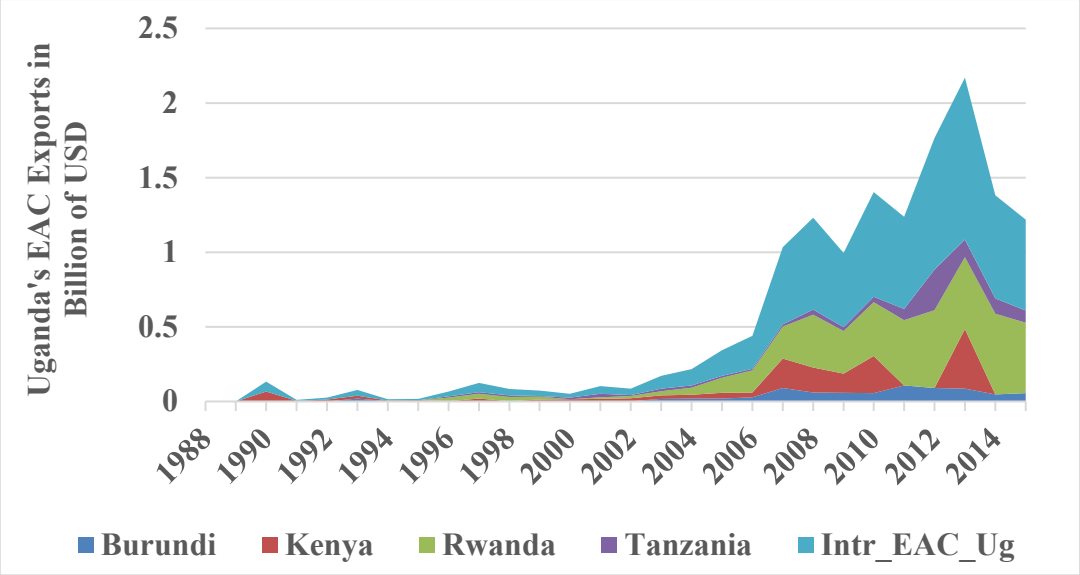

Figure 3.14. Uganda's exports to the EAC. Source: Data from the WITS database.

3.6 Concluding Remarks

The purpose of this chapter is to provide an overview of RI in the East African region and describe trends that have evolved in reference to exports within the region. The main features of regionalism are presented and the influence each feature seems to have on inter- and intra- EAC trade is discussed.

The East African region has made long and protracted attempts at cooperation. First, Arabs, Indians and tribal chiefs cooperated before the end of the 19th century. Established coastal cities received goods from the Far East and India and brought them to the coastal towns. These goods were then transferred to the hinterland via the famous East African Long-Distance Trade. Goods included guns and gunpowder, mirrors, spices and cloth. From the hinterland, slaves, iron and agricultural raw materials were transported from chief to chief until they reached the coastal cities. The coming of colonial administrators in the late 1890s interrupted the dominance of the East African Long-Distance Trade. The colonial administrators introduced to the East African region new forms of cooperation that saw the region deepen and widen her integration. It was on the basis of this integration that future RI initiatives were built. First, the EAC had its first formal attempt at integration under indigenous administrators between 1967 and 1977. Despite substantial achievements towards RI during this period, the venture was halted in 1977 as a result of the economic, political and social ideologies held by EAC leaders at the time. However, in 2000, the EAC was revived with more members and remain a going concern.

The current EAC has boosted the number of EAC partner states and opened up the region to global trade as evidenced by the persistent increase in the openness index over time. Trade openness is high and converging as the level of integration broadens and deepens. However, Kenya remains the dominant participant in both extra-regional and intraregional trade. Tanzania is the second largest exporter of products selected for review in the chapter, followed by Uganda. Burundi and Rwanda are insignificant players in both extra-bloc and intra-bloc exports. Uganda is the second most dominant player in intra-bloc exports.

In terms of products, food items are the dominant trade product of the region, closely followed by agricultural raw materials and manufactured goods. Kenya is the main exporter of manufactured products, both regionally and globally. Burundi's main export to the ROW is food. Kenya's is agricultural raw materials, followed by food items, though manufacture is picking up. Rwanda's key export products to the ROW are ore and metals, followed by agricultural raw materials and then food items. Rwanda is the main exporter of ore and metals in the region. Food and agricultural raw materials form Tanzania's and Uganda's main exports.

In terms of intra-bloc destinations for products, Rwanda is Burundi's main importer. Uganda is becoming a formidable importer of Burundi's exports in the region. Kenya mainly exports to Uganda, and then Tanzania. Rwanda is becoming an important destination for Kenya's regional exports. Rwanda mainly exports to Burundi, followed by Uganda, while Tanzania's main regional exports go to Burundi and Rwanda. Uganda is becoming an important destination for Tanzania's export of the selected products. Uganda's exports mainly go to Rwanda.

Chapter 4: Modelling the Impact of Regional Trade Agreements on Trade in the East African Community

4.1 Introduction

The objective of this chapter is to examine the impact of RTAs on trade in the EAC.

Since the establishment of the WTO in 1995, the question of whether RTAs promote international trade has featured prominently in policy circles globally. This stems from the fact that theoretical and empirical evidence relating to the impact of RTAs on international trade is complex and inconclusive (Brusick, Alvarez & Cernat, 2005; Fiorentino, Verdeja & Toqueboeuf, 2007; Freund, 2010; Freund & Ornelas, 2010; Nguyen, 2019). In his seminal work, Viner (1950) proposes the CU theory for analysis of RI. Two contrasting views have since emerged. Proponents of RTAs argue that they could lead to TC and this has the potential to benefit consumers and producers, and thus impact positively on trade (Frankel et al., 1997; Hayakawa et al., 2016). However, critics of RTAs argue that they could lead to TD and impose costs on consumers, and thus impact negatively on trade (Jošić & Jošić, 2013; Park et al., 2009). Sorgho (2016) argues that inefficiency arises from the introduction of a tariff under a RTA to shield a trading bloc's production or output against imported merchandise, as this could make imports uncompetitive, thereby having an adverse impact on international trade (see also Baldwin & Wyplosz, 2009).

Several theoretical frameworks have been advanced in the international trade literature to explain the impact of RTAs on trade; however, empirical evidence is conflicting and conclusions ambiguous. For instance, one school of thought argues that RI entities are pure trade creating (Abrego et al., 2005; Clausing, 2001; Lipsey, 1960). Another school challenges this conclusion, arguing that trade effects cannot be determined a priori or are ambiguous since regional entities are both trade creating and trade diverting (Abrego et al., 2005; Pant & Sadhukhan, 2009; Plummer, 2004; Viner, 1950; Williams, 1972). The asymmetry in theoretical conclusions emanating from the CU theory makes it difficult to generalise about the EACs' presumed trade effects.

A growing number of theoretical and empirical studies have emerged examining the impact of RTAs on international trade. Studies by Clausing (2001), Hayakawa et al. (2016) and Magee (2016) examine the impact of RTAs on trade and conclude that the effect is either mixed or ambiguous. Some empirical studies suggest that RTAs enhance international trade by hastening and consolidating bargaining power and interests in contentious sectors (Baldwin & Venables, 1995; Head & Ries, 2004; Kessie, 2007), while others find that they impinge on

international trade (Bhagwati, 1993) or that their impact on international trade is ambiguous (Kennan & Riezman, 1990).

Although RTAs have become an important foreign policy ingredient in the Global South context, the increasing scholarship on the effects of RTAs pays less attention to RTAs in Africa, concentrating instead on RI in Europe (Stack, 2009). For example, of all studies cited in this empirical study, only Urata and Okabe (2014) examine RI in Africa. However, they only consider the COMESA, and incorporate a merchandise-specific analysis that does not reflect the comparative advantages of the Global South. Moreover, they do not explore the most ambitious RTA in the Global South—the EAC—as considered in the current study. More importantly, the 1980–2006 period considered by Urata and Okabe (2014) corresponds to the period when most goods traded in the COMESA were still in the phase-in period.

The analysis undertaken in the current study makes four major contributions. First, to the best of my knowledge, this is the first study to apply the most recent gravity estimation framework to the case of African RI, especially the EAC. The incorporation of these new insights of the gravity model allows me to undertake a comprehensive study of the EAC and identify robust outcomes of EAC regional policy for trade. I control for distinct exogenous variables influencing EAC trade, and, more importantly, incorporate best practices and recommendations to estimate theoretically motivated gravity equations, following Baier and Bergstrand (2007), Baier, Yotov and Zylkin (2019), Larch, Monteiro, Piermartini and Yotov (2019), and Piermartini and Yotov (2016). First, following Baier and Bergstrand (2007) and employing Wooldridge's (2010) 'strict exogeneity' test of RTAs, I introduce new variables to test whether country-pair fixed effects properly account for possible 'reverse causality' in EAC regional policy. Second, I introduce lags in the intra-bloc regional dummies to allow for the non-linear effects of EAC regional policy and to capture the process of phasing in (Anderson & Yotov, 2016; Baier & Bergstrand, 2007). Third, I introduce covariates for all years to examine whether the effects of EAC may be biased upwards through the effects of globalisation (Bergstrand, Larch & Yotov, 2015). In so doing, I find that EAC regional policy enhances exports and trading relationships with non-bloc members.

Second, few studies provide empirical evidence on the impact of RTAs on trade in developing countries (see Candau, Guepie & Schlick, 2019; Riedel & Slany, 2019). This study provides new empirical evidence for the trade effects of RTAs on trade in the EAC. The empirical results reveal that RTAs have heterogeneous effects on trade in the EAC across countries and sectors. Where the trade effects of RTAs are positive, the effects of the bloc continue several years into the regional program. This realisation may guide the formation of

new regional entities or the re-negotiation of existing ones to form more coherent regional entities. Moreover, I provide an economic rationale for regionalism in the EAC since research on the increasing tendency to form RTAs (Hur & Park, 2012) in the Global South hinges on strong political orientation and underplays the region's economic pragmatism. The lack of economic credence exacerbates the skewed outcomes for the bloc and thus threatens the coherence of such regional entities.

Third, this is the first study to apply a three-way dummy following Carrere (2006) and Soloaga and Winters (2001) to an African regional entity and thus clarify the effects of the bloc on non-bloc members. In addition, studies estimating the gravity equation predict the effects of RTAs by estimating Vinerian TC and TD effects (Carrere, 2006; Frankel et al., 1997) based on only two dummies that estimate RTAs' intra-bloc and extra-bloc trade (Soloaga & Winters, 2001). The RTA effects from these studies are unreliable because their treatment of TD effects is not consistent with theoretical analyses (Carrere, 2006; Egger, 2002; Soloaga & Winters, 2001). In this empirical study, I capture the true Vinerian trade effects by adopting three-way dummies that indicate that RTAs influence not only intra-bloc trade but also members' export and import flows to non-members. The three-dummy specification was derived by Soloaga and Winters (2001) and used only by Carrere (2006). I adopt the full three-dummy specification and apply it to RI in a Global South setting. I find that much as there are some import and export diversions, the results indicate that the EAC regional programme mostly enhances exports to and imports from non-bloc countries.

Fourth, I undertake a detailed disaggregated product- and country-level analysis on the effect of participating in different regional blocs. I note that the trade literature is mixed and ambiguous on the effects of RI—a situation that cannot guide the liberalisation policy of the new wave of integration in the Global South (Corden, 1972; Pant & Sadhukhan, 2009). In my empirical investigation of sectoral and country asymmetry, I find that the results are far from homogeneous. Much as different regional blocs have differing impacts on EAC countries, the EAC bloc has significantly pure TC effects for all the EAC partner countries. The COMESA mainly enhances intra-bloc trade for all countries except Tanzania. Agriculture, food and manufacturing sectors benefit the most from RI across the bloc. Detailed sectoral analysis within countries provides more illuminating, but differing effects.

The remainder of the chapter is organised as follows. Section 4.2 discusses the theoretical and empirical framework for this empirical study. Section 4.3 presents the results of the empirical analysis, and Section 4.4 concludes the study.

4.2 Theoretical Framework, Empirical Strategy and Data

In this section, I present the theoretical framework of the standard gravity model, a workhorse for analysing bilateral trade. The gravity framework provides the motivation to develop the empirical models to estimate. The gravity equation has been used for 50 years to explain ex-post effects of RI on trade flows (Baier & Bergstrand, 2007; Baldwin & Venables, 1995). It dates backs to Tinbergen (1962) who proposes that the functional form of Newtonian gravitational theory ($F_{ij} = G\, M_i M_j / D_{ij}^2$) can be applied to international trade flows:

$$X_{ij} = G\, Y_i^{\alpha} Y_j^{\beta} / T_{ij}^{\theta} \tag{4.1}$$

The endogenous variable, the gravitational force (F_{ij}), is specified as the value of trade from country *i* to country *j* (X_{ij}), and the exogeneous variables are as follows: (1) the 'masses' ($M_i M_j$) are referred to as economic size ($Y_i^{\alpha} Y_j^{\beta}$); (2) distance (D_{ij}^2) is captured as imposing costs (T_{ij}^{θ}); and (3) trade costs are proxied by common language, colonial link, common currency, island or landlocked. The gravity model is stable with predictive power of 60–90% for both aggregate and sectoral data to explain bilateral trade flows (Bacchetta et al., 2012; Yotov et al., 2016). It incorporates country sizes that previous trade models do not consider (Bacchetta et al., 2012), yet it is argued that countries' volumes of trade are dependent on their economic size and contigency (Feenstra, 2016).

Empirical estimation of the gravity equation predates publication of its theoretical basis, which has been evolving since 1979 (Bacchetta et al., 2012). For example, Anderson (1979) provides the first theoretical economic basis of the model by emphasising the Armington hypothesis; that goods are completely differentitated by source country and consumer preference is defined for the whole vectors of the different products (i.e. constant elasticity of substitution [CES] expenditures). The implication of the context of the model is that economically bigger countries trade more than smaller countries. Bergstrand (1985, 1989, 1990) develops a gravity model that replicates the monopolistic model of trade developed by Krugman (1980), incorporating monopolistic competition and price indices used in practice rather than theoretically suggested ones. The model is based on IIT as consumers are thought to love variations of the same products. Deardorff (1998), using canonical factor proportions elucidation, reaffirms the theoretical foundation of the gravity equation, asserting that almost any plausible model of trade would yield something very much like the gravity model.

Anderson and Van Wincoop (2003) prove that the gravity model is predicted by relative trade costs in a general equilibrium framework and reflects the Armington CES model within a monopolistic competition framework. This solid theoretical basis has led to the development of different gravity equations. For example, Chaney (2008) develops an estimation equation from the canonical model of trade that considers variations in goods from heterogeneous firms. Eaton and Kortum (2002) develops an estimation equation from the traditional supply side of the Ricardian-type model of trade. Anderson, Vesselovsky and Yotov (2016) demonstrate that the structural gravity model can incorporate scale effects and exchange rate passthrough to produce direct effects on the model. Figure 4.1 is adopted from Yotov et al. (2016) and depicts and summarises the theoretical founds of the gravity model.

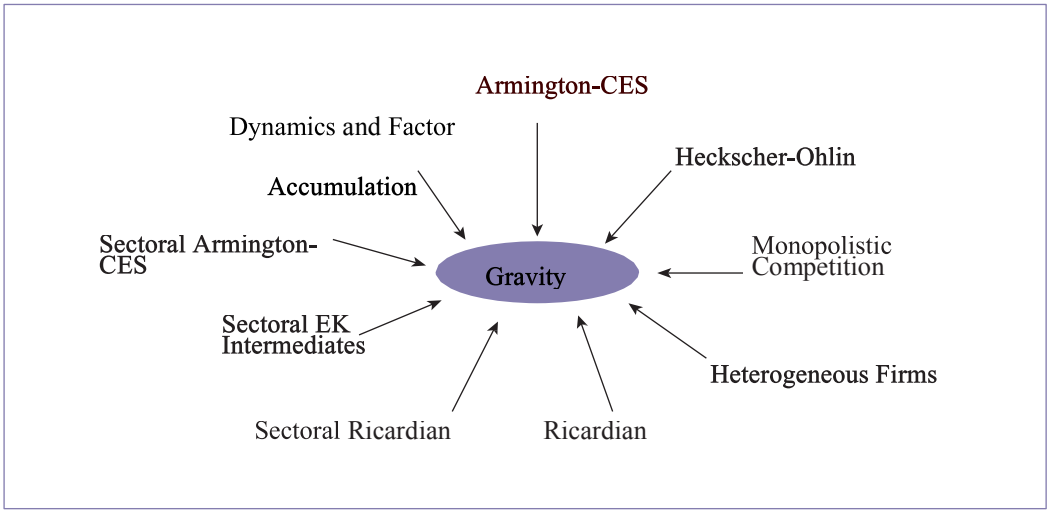

Figure 4.1. The gravity model's strong theoretical foundations.

The basic framework of the augmented stochastic gravity equation takes the following form (Silva & Tenreyro, 2006):

$$X_{ij} = \propto_0 Y_{it}^{\propto_1} Y_{jt}^{\propto_2} D_{ij}^{\propto_3} \varepsilon_{ij} \qquad (4.2)$$

Equation (4.2) states that the value of exports from country i to country j, denoted by X_{ij}, is proportional to the two countries' economic sizes as proxied by their GDPs, denoted by Y_{it} and Y_{jt}, and inversely proportional to the geographical proximity between country i and country j, denoted by D_{ij}. The error term is denoted by ε_{ijt} and is normally distributed, statistically independent of the regressors and expected to be unity. The error term is

decomposed into fixed unobserved bilateral effects (fixed effects) ε_{ij} and V_{ijt} capturing any other unobserved error. This is defined as $\varepsilon_{ijt} = \varepsilon_{ij} + V_{ijt}$ following Egger (2002). The subscripts i and j range from 1 to n and $i \neq j$ as time is continuous from 1 to T; $\propto_0$, α_1, α_2 and α_3 are unknown parameters to be estimated.

Over time, several versions of the gravity model have emerged. This next section concludes with a description of one of the gravity-type models that is adopted for use in this study for the empirical analysis of the impact of RTAs on trade from developing countries using the context of the EAC.

4.2.1 Theoretical Framework

This subsection begins by generating the theoretical framework for bilateral trade between the five EAC partner states and the ROW. The study follows Anderson and Van Wincoop's (2003) exposition of the gravity equation and implements the generalised account of the famous 'gravity with gravitas', where homogeneous consumers in each country maximise utility by consuming a spectrum of products (v). Identical producers in each country aim to maximise profits from a continuum of sectors (k). The Anderson and Van Wincoop (2003) gravity model involves reconciling the consumption expenditures—the production side and trade costs involved in supplying both internal and international markets.

Given an income constraint ($E_i = \sum_{k=1}^{K} E_i^k$), where E_i is aggregate spending in country i and E_i^k is aggregate expenditure in sector k, Shepherd's (2012) exposition of the Anderson and Van Wincoop (2003) gravity model defines consumption expenditure as:

$$x_i^k(v) \equiv \left\{P_i^k(v)/P_i^k\right\}^{-\sigma_k} E_i^k \Big/ P_i^k \tag{4.3}$$

where $x_i^k(v)$ is the aggregate quantity consumed of a particular variety (v) of sector k's output, $P_i^k(v)$ is the unit price of the different varieties, and P_i^k is the CES reflected in the Armington CES model within a monopolistic competition framework. Equation (4.3) defines the demand function. On the production side, if the variable cost of a unit's output is defined as a_i^k, the intra-sectoral elasticity of substitution between varieties is defined as σ_k, and each firm's wage rate is defined as w. The equilibrium in the production side is:

$$P_i^k(v) = (\sigma_k/\sigma_k - 1)wa_i^k \quad (4.4)$$

If resistance to trade, defined as τ_{ij}^k, is assumed to occur when goods are shipped from country i to country j, equation (4.4) could be redefined as:

$$P_j^k(v) = (\sigma_k/\sigma_k - 1)\tau_{ij}^k wa_i^k = \tau_{ij}^k P_i^k(v) \quad (4.5)$$

Creatively combining equations (4.3), (4.4) and (4.5) and invoking the laws of calculus collapses these equations to an Anderson and Van Wincoop (2003) gravity-like equation:

$$X_{ij}^K = \frac{Y_i^k E_j^k}{Y^k}\left\{\frac{\tau_{ij}^k}{\Pi_i^k P_j^k}\right\}^{1-\sigma_k} \quad (4.6)$$

where X_{ij}^k are the exports from country i to country j of sector k's output or product variety, Y^k is sector k's total world output, Y_i^k is the income earned by country i from the sales of sector k, E_j^k is sector k's total expenditure from country i, and P_j^k is the CES reflected in the Armington CES model within a monopolistic competition framework. The intra-sectoral elasticity of substitution between varieties is defined as σ_k.

4.2.2 Empirical strategy

4.2.2.1 Empirical model specification

The traditional gravity model is similar to that specified in equation (4.6). One major limitation of this specification is that it fails to capture sectoral income differences and the resistance to trade (Shepherd, 2016). As noted by Bacchetta et al. (2012) and Yotov et al. (2016), it has certain important features: (1) the sectoral income in country i (Y_i) and j (Y_j), and (2) a proxy for resistance to trade, τ_{ij}^k. Moreover, the term τ_{ij}^k is proxied as bilateral distance, $D_{ij}^{\propto_3}$, only. Equation (4.5) is extended by adopting the true augmented trade costs (t_{ij}) from the trade literature to include dummies for contiguity (C_{ij} or $contig$), common language (CL or Official Language), colonial history (CH or Colony) and liberalisation policies

($\alpha_{intra}RI_{ijt}, \alpha_{exports}RI_{ijt}\ and\ \alpha_{\ imports}RI_{ijt}$). Following Bacchetta et al. (2012), the augmented trade costs take the form:

$$t_{ij} = D_{ij}^{\propto_3}.exp\big(\alpha_6 C_{ij} + \alpha_7 CL_{ij} + \alpha_8 CC_{ij} + \alpha_{intra}RI_{ij} + \alpha_{exports}RI_{ij} + \alpha_{\ imports}RI_{ij}\big) \quad (4.7)$$

In equation (4.7), a three-way dummy ($\alpha_{intra}RI_{ijt}, \alpha_{exports}RI_{ijt}\ and\ \alpha_{\ imports}RI_{ijt}$) is introduced to capture the theoretically correct Vinerian CU effects (Carrere, 2006; Soloaga & Winters, 2001). This feature enables this study to capture not only the trade-creating effects of EAC members, but also the trade-diverting effects via exports from EAC members to the ROW and imports of EAC members from the ROW. This strong restriction placed on the effects of the EAC is relaxed when undertaking sensitivity analysis. The first component ($\propto_{intra}$) captures the increase in intra-bloc trade resulting from forming an RTA, in comparison to the reference (such as trading with the ROW or some other form, such as internal production). This is synonymous with the sum of the Vinerian trade effects. This study presumes that $\propto_{intra}$ represents the effect of country i (EAC exporters) and j (importers) belonging to the same RI—it takes the value 1 if country i and j are in the same regional bloc, and 0 otherwise (for simplicity, I denote the whole component as $\propto_{intra} EAC_{ijt}$—hypothesised as positive).

The other components separate the import effect (import diversion) and the export effect (export diversion) of the regional entity. The import diversion dummy ($\propto_{imports}$) captures the change in intra-bloc imports resulting from entering RI, in comparison to the reference of imports from the ROW. It takes the value 1 if the importing country j belongs to the regional bloc, while the exporting country i belongs to the ROW, and 0 otherwise (for simplicity, it is renamed $\propto_m EAC_{ijt}$). The export diversion with coefficient $\propto_{exports}$ captures the change in intra-bloc exports resulting from entering RI, in comparison to the reference. It captures the effect on the regional entity's export to the ROW. It is equal to 1 when exporting country i is a member of the regional entity and importing country j is a member of the ROW, and 0 otherwise (for simplicity, it is renamed $\propto_x EAC_{ijt}$).

When the intra-bloc trade coefficient is greater than zero ($\propto_{intra}$ >0) but the coefficients of bloc imports and exports are simultaneously positive ($\propto_m$ and $\propto_x \geq 0$), it is concluded that the regional policy has led to a pure TC (imputed to improve welfare). However, even if the

intra-bloc trade coefficient is greater than zero ($\propto_{intra}$ >0), yet the coefficients of capturing bloc imports and bloc exports are negative ($\propto_m$ and $\propto_x$ < 0), this indicates a pure TD in terms of exports (dominant export diversion, since $\propto_x$ < 0) (Carrere, 2006).

Following Carrere (2006), the log of the population of country i (N_i) and j (N_j), is introduced and the study extends the analysis of trade liberalisation policy to consider EAC participation in both the COMESA and WTO blocs. The dependent variable, trade, is modified by introducing a variable or component *S* that captures the sectors of EAC exports. These sectors include agricultural raw materials, food items, manufactured goods, ores and metals, and fuels, which account for over 90% of the exports of the EAC. Equation (4.7) is substituted into equation (4.6), a panel framework following Baier and Bergstrand (2007) is introduced and considering the issues discussed above, the following reduced linear equation is generated:

$$lnX_{ij,t,S}$$
$$= \alpha_0 + \alpha_1 \ln(Y_{it}) + \alpha_2 \ln(Y_{jt}) + \alpha_3 + \ln(D_{ijt}) + \alpha_4 lnN_{it} + \alpha_5 N_{jt} + \alpha_6 C_{ij} + \alpha_7 CL_{ij}$$
$$+ \alpha_8 CC_{ij} + \alpha_{intra} EAC_{ijt} + \alpha_m EAC_{ijt} + \alpha_x EAC_{ijt} + \alpha_{intra} COMESA_{ijt} + \alpha_m COMESA_{ijt}$$
$$+ \alpha_x COMESA_{ijt} + \alpha_{intra} WTO_{ijt} + \alpha_m WTO_{ijt} + \alpha_x WTO_{ijt}$$
$$+ \varepsilon_{ijt} \quad (4.8)$$

The error term could be decomposed into fixed unobserved bilateral effects (fixed effects)—ε_{ij} and V_{ijt}—capturing any other unobserved error. This is defined as $\varepsilon_{ijt} = \varepsilon_{ij} + V_{ijt}$, following Egger (2002). The subscripts i and j range from 1 to *n*, and $i \neq j$, as time is continuous from 1 to *T*. $\propto_s$ is an unknown parameter to be estimated. Except for D_{ij}, all other variables are expected to be positively related to trade.

4.2.2.2 Empirical issues: Extension of the traditional gravity model

In the trade literature, one of the problems associated with the estimation of equation (4.8) is the inclusion of zero trade data. The presence of zero trade data introduces missing data and measurement errors and this prevents the computation of country pair trade relationships (Mujahid & Kalkuhl, 2016; Urata & Okabe, 2014). To address this problem, the approach proposed by Subramanian and Wei (2007) is adopted whereby I use unidirectional merchandise trade data. This ensures that I capture the effect of trade liberalisation aligned to imports rather

than exports, and using exports as the dependent variable is theoretically consistent with the specifications of gravity models, and is not ambiguous.

Another problem associated with traditional gravity model specification is that it fails to account for multilateral trade resistance when countries do not trade (Anderson & Van Wincoop, 2003, 2004; Bacchetta et al., 2012). As noted earlier, this multilateral trade resistance captures all country-specific characteristics and controls for a country's overall level of imports/exports (Bacchetta et al., 2012; Yotov et al., 2016). To account for multilateral resistance within a panel dataset, following Fally (2015) and Adam and Cobham (2007), I apply both exporter-time ($\psi_{i,t}$) and importer-time ($\varrho_{j,t}$) fixed effects as constants with imposing constraints. Exporter-time fixed effects absorb outward multilateral resistance in output (weighting for the demand side of RTAs) values, while importer-time fixed effects absorb inward multilateral resistance in importer expenditure (weighting for the supply side of RTAs)—both observed and unobserved—thereby influencing bilateral trade (Bacchetta et al., 2012; Yotov et al., 2016).

The empirical model is consequently specified as:

$$\begin{aligned} lnX_{ij,t,S} = {} & \alpha_1 \ln(Y_{it}) + \alpha_2 \ln(Y_{jt}) + \alpha_3 \ln(D_{ijt}) + \alpha_4 lnN_{it} + \alpha_5 N_{jt} + \alpha_6 C_{ij} + \alpha_7 CL_{ij} \\ & + \alpha_8 CC_{ij} + \alpha_{intra} EAC_{ijt} + \alpha_m EAC_{ijt} + \alpha_x EAC_{ijt} + \alpha_{intra} COMESA_{ijt} \\ & + \alpha_m COMESA_{ijt} + \alpha_x COMESA_{ijt} + \alpha_{intra} WTO_{ijt} + \alpha_m WTO_{ijt} \\ & + \alpha_x WTO_{ijt} + \psi_{i,t} + \varrho_{j,t} + \varepsilon_{ijt} \end{aligned} \tag{4.9}$$

where the variables are defined as above, and $\psi_{i,t}$ and $\varrho_{j,t}$ refer to the absorbed unobserved outward multilateral resistance and total shipments (exporter or origin fixed effects); and inward multilateral resistance and total expenditure (importer or destination fixed effects), respectively, of Anderson and Van Wincoop's (2003) structural gravity (Dai, Yotov & Zylkin, 2014).

In addition, the traditional model does not prevent bias generated by the heterogeneity across countries (RTA endogeneity) (Bacchetta et al., 2012; Baier & Bergstrand, 2007) since endogeneity is well known in the trade literature (Trefler, 1993). In this case, I apply panel data methods that allow me to control for country heterogeneity (Baltagi, 2005; Yotov et al., 2016). To control for this, I introduce a variable η_{ij}—a set of country-pair fixed effects. The pair fixed

effects absorb all endogeneity of RI not captured by the error ε_{ijt}, thus controlling for potential endogeneity. In addition, they absorb all time-invariant bilateral trade costs. As such, the study drops all time-invariant gravity covariates in equation (4.9) and produces the following econometric specification:

$$lnX_{ij,t,S} = \alpha_{intra}EAC_{ijt} + \alpha_m EAC_{ijt} + \alpha_x EAC_{ijt} + \alpha_{intra}COMESA_{ijt} + \alpha_m COMESA_{ijt} + \alpha_x COMESA_{ijt} + \alpha_{intra}WTO_{ijt} + \alpha_m WTO_{ijt} + \alpha_x WTO_{ijt} + \psi_{i,t} + \varrho_{j,t} + \eta_{ij} + \varepsilon_{ijt} \quad (4.10)$$

Another problem associated with traditional gravity model specification is that it involves dropping zero observed trade flows as the gravity equation is estimated in its log-linearised form. In the log-linearised form, zero trade flows are not observable (Baldwin & Taglioni, 2006; Stack, 2009; Urata & Okabe, 2014; Westerlund & Wilhelmsson, 2011). Such handling of zero trade patterns would enhance the precision of estimates of the presence of zeros in trade when zeros are random and therefore not informative in the analysis (Bacchetta et al., 2012). However, if the zeros in trade data are systematic, dropping them leads to losing vital information (Bacchetta et al., 2012). When estimating fixed effects, the ordinary least squares (OLS) of the gravity equation produce biased and even inconsistent estimates (Santos Silva & Tenreyro, 2006; Sorgho, 2016). To account for zeros in the trade data structure, I apply the PPML estimator. This estimator produces unbiased and consistent estimates, resolves the heteroscedasticity that is rife in trade data (Santos Silva & Tenreyro, 2006), and produces theory-consistent general equilibrium policy outcomes when considering country-pair fixed effects (Larch & Yotov, 2016). Taking all the above econometric issues into account, I transform equation (4.10) into equation (4.11):

$$X_{ij,S,t} = \exp\left[\alpha_{intra}EAC_{ijt} + \alpha_m EAC_{ijt} + \alpha_x EAC_{ijt} + \alpha_{intra}WTO_{ijt} + \alpha_m WTO_{ijt} + \alpha_x WTO_{ijt} + \alpha_{intra}COMESA_{ijt} + \alpha_m COMESA_{ijt} + \alpha_x COMESA_{ijt} + \psi_{i,t} + \varrho_{j,t} + \eta_{ij}\right] + \varepsilon_{ijt} \quad (4.11)$$

Finally, I incorporate best practices and recommendations to estimate theoretically motivated gravity equations enumerated in Baier and Bergstrand (2007), Baier et al. (2019), Larch, Monteiro, et al. (2019), and Piermartini and Yotov (2016). This involves addressing potential globalisation effects of RTAs; testing for potential 'reverse causality' between trade and RTAs; and addressing potential non-linear and phasing-in effects of RI. I follow Bergstrand et al.'s (2015) methodology to address the effects of globalisation on RTAs. I do this by introducing covariates INTL_BRDR_year for all years to examine whether the effects of EAC may be biased upwards because of the effects of globalisation. INTL_BRDR_year is a dummy variable that takes a value of 1 for international trade, and 0 elsewhere for each year from 2002. Incorporating this idea into equation (4.11), I obtain the following specification:

$$X_{ij,S,t} = \exp\Bigg[\alpha_{intra}EAC_{ijt} + \alpha_m EAC_{ijt} + \alpha_x EAC_{ijt} + \alpha_{intra}COMESA_{ijt} + \alpha_m COMESA_{ijt} + \alpha_x COMESA_{ijt} + \alpha_{intra}WTO_{ijt} + \alpha_m WTO_{ijt} + \alpha_x WTO_{ijt} + \sum_{Y=2002}^{2017} \beta_Y INTL\_BRDR\_Y_{ij} + \psi_{i,t} + \varrho_{j,t} + \eta_{ij}\Bigg] + \mathcal{E}_{ijt} \quad (4.12)$$

Following Baier and Bergstrand's (2007) and Wooldridge's (2010) 'strict exogeneity' test of RTAs, I introduce three variables, EAC_Intra_LEAD3, COMESA_Intra_LEAD3 and WTO_Intra_LEAD3 to test whether the country-pair fixed effects properly account for possible 'reverse causality' in EAC regional policy. If EAC regional policy is exogenous to exports, the coefficient of the listed variables should not be correlated with EAC exports.

Next, I introduce lags to the intra-bloc regional dummies to allow for the non-linear effects of EAC regional policy and capture the process of phasing in (Anderson & Yotov, 2016; Baier & Bergstrand, 2007). If phasing in is considered, I should observe that the effects of the EAC decrease over time. The variables measuring this are listed as EAC_Intra_LAG3 to EAC_Intra_LAG12 and the same apply for the COMESA and WTO blocs.

Considering these additional two recommendations, I revise equation (4.12) and derive the following specification, following Piermartini and Yotov (2016):

$$X_{ij,S,t} = \exp\Big[\alpha_{intra}EAC_{ijt} + \alpha_m EAC_{ijt} + \alpha_x EAC_{ijt} + \alpha_{intra}COMESA_{ijt} + \alpha_m COMESA_{ijt}$$
$$+ \alpha_x COMESA_{ijt} + \alpha_{intra}WTO_{ijt} + \alpha_m WTO_{ijt} + \alpha_x WTO_{ijt}$$
$$+ \beta_1 \text{EAC\_Intra\_LEAD3}_{ijt} + \beta_2 comesa\_intra\_LEAD3_{ijt}$$
$$+ \beta_3 wto\_intra\_LEAD3_{ijt} + \beta_4 eac\_intra\_LAG3_{ijt} + \beta_5 eac\_intra\_LAG6_{ijt}$$
$$+ \beta_6 eac\_intra\_LAG9_{ijt} + \beta_7 eac\_intra\_LAG12_{ijt}$$
$$+ \beta_8 comesa\_intra\_LAG3_{ijt} + \beta_9 comesa\_intra\_LAG6_{ijt}$$
$$+ \beta_{10} comesa\_intra\_LAG9_{ijt} + \beta_{11} comesa\_intra\_LAG12_{ijt}$$
$$+ \beta_{12} wto\_intra\_LAG3_{ijt} + \beta_{13} wto\_intra\_LAG6_{ijt}$$
$$+ \beta_{14} wto\_intra\_LAG9_{ijt} + \beta_{15} wto\_intra\_LAG12_{ijt}$$
$$+ \sum_{Y=2002}^{2017} \beta_Y INTL\_BRDR\_Y_{ij} + \psi_{i,t} + \varrho_{j,t} + \eta_{ij}\Big] + \varepsilon_{ijt} \quad (4.13)$$

4.2.2.3 Estimation methods

Following nascent applications of the gravity estimation (Santos Silva & Tenreyro, 2006, 2011), I estimate equation (4.10) and all subsequent specifications described in this study using the PPML. First, I estimate equations (7)–(10) with only the traditional gravity covariates. The applications are primarily for benchmark purposes; therefore, the estimates refrain from including the comprehensive set of EAC RI policies, but rather focus on the effects of specific endogenous variables to emphasise the importance of various econometric developments in estimating the gravity equation. Equation (4.11) is estimated after adjusting the data nomenclature during the sensitivity analysis.

Second, I undertake the analysis of the bloc. The bloc analysis is decomposed and analysis is further undertaken for the five EAC partner states and product categories. In addition, I examine the performance of said products within each country. At each level of analysis, I estimate intra-bloc effects and trade distortion arising from implementing EAC regional policy; that is, TC and TD. This exercise is performed using interval panel data for every 3 years for the trading pairs, products and years. I then relax the assumption that forming the EAC has different effects with the ROW and repeat the bloc analysis with panel data

involving country pairs and year fixed effects as a sensitivity analysis. To further reinforce the results, I repeat the process using 4- and 5-year interval panel data.

4.2.3 Data

Table 4.1 shows the list of countries in the sample. There are 162 countries that from the five EAC partner states (Burundi, Kenya, Rwanda, Tanzania and Uganda). EAC exports are concentrated within Kenya, Tanzania and Uganda, with 34%, 27% and 20% of exports coming from the listed countries. Rwanda and Burundi export 10% of EAC trade. The exporter's trade composition is depicted in Table 4.2. Table 4.3 displays the composition of the EAC product or sector trade. Manufactured goods, food and agricultural raw materials represent concentrations of EAC exports of 34%, 30% and 21%, respectively. Ores and metals, and fuels represent only 11% and 4% of the trade, respectively.

Table 4.1: *Countries in the Sample*

Albania	Chad	Honduras	Mauritania	Slovak Republic
Algeria	Chile	Hong Kong, China	Mauritius	Slovenia
Angola	China	Hungary	Mexico	South Africa
Anguila	Colombia	Iceland	Moldova	Spain
Antigua and Barbuda	Comoros	India	Mongolia	Sri Lanka
Argentina	Costa Rica	Indonesia	Morocco	St. Kitts and Nevis
Armenia	Cote d'Ivoire	Iran, Islamic Republic	Mozambique	St. Lucia
Australia	Croatia	Iraq	Myanmar	Vincent & the Grenadines
Austria	Cyprus	Ireland	Namibia	Suriname
Azerbaijan	Czech Republic	Israel	Nepal	Swaziland
Bahamas, The	Denmark	Italy	Netherlands	Sweden
Bahrain	Djibouti	Jamaica	New Zealand	Switzerland
Bangladesh	Dominica	Japan	Nicaragua	Syrian Arab Republic
Barbados	Dominican Republic	Jordan	Niger	Tanzania
Belarus	DRC	Kazakhstan	Nigeria	Thailand
Belgium	Ecuador	Kenya	Norway	Togo
Belize	Egypt, Arab Republic	Korea, Republic	Oman	Trinidad & Tobago
Benin	El Salvador	Kuwait	Pakistan	Tunisia
Bermuda	Estonia	Kyrgyz Republic	Panama	Turkey
Bhutan	Ethiopia (excludes Eritrea)	Lao, PDR	Paraguay	Uganda
Bolivia	Fiji	Latvia	Peru	Ukraine
Bosnia & Herzegovina	Finland	Lebanon	Philippines	United Arab Emirates
Botswana	Fm Sudan	Lesotho	Poland	United Kingdom
Brazil	France	Lithuania	Portugal	US
Brunei	Gabon	Luxembourg	Qatar	Uruguay
Bulgaria	Gambia, The	Macao	Russian Federation	Venezuela
Burkina Faso	Georgia	Macedonia, FYR	Rwanda	Vietnam

Burundi	Germany	Madagascar	Sao Tome & Principe	Yemen
Cambodia	Ghana	Malawi	Saudi Arabia	Zambia
Cameroon	Greece	Malaysia	Senegal	Zimbabwe
Canada	Grenada	Maldives	Seychelles	
Cape Verde	Guatemala	Mali	Sierra Leone	
Central African Republic	Guinea	Malta	Singapore	

Table 4.2: *Composition of Exporters' Trade*

Country (Exporter)	Frequency	Percentage	Cumulative Frequency
Burundi (BDI)	2,929	9.56	9.56
Kenya (KEN)	9,939	32.44	42.00
Rwanda (RWA)	3,391	11.07	53.07
Tanzania (TZA)	8,134	26.55	79.62
Uganda (UGA)	6,245	20.38	100.00
Total	30,638	100.00	

Table 4.3: *Composition of EAC Exports*

Product	Frequency	Percentage	Cumulative Frequency
Agricultural raw materials (AgrRaw)	6,494	21.20	21.20
Food	9,281	30.29	51.49
Fuels	1,098	3.58	55.07
Ores & metals (OresMtls)	3,273	10.68	65.75
Manufactured goods (Manuf)	10,492	34.25	100.00
Total	30,638	100.00	

I source bilateral trade data from the WITS and use data from the SITC Revision 3 level of classification to enable a comparison of different countries and years. SITC Revision 3 data constitute a complete dataset covering the period before and after the EAC partner states joined the WTO and COMESA markets, and formed the EAC trading bloc. The study includes observations of zero bilateral merchandise trade where relevant. The set of countries represents over 90% of total EAC exports over the period.

The study also uses data on relative levels of income, output and input from the Penn World Tables (PWT 9.1). The specific data include information on population in millions, expenditure-side real GDP in millions (2011) of USD. The PWT 9.1 dataset has data points that mirror the duration of the trade data from WITS. I use data from the CEPII database for language, distance and country-pair similarity dummies, such as contiguity, island and landlocked countries. The WTO RTA database provides information on regional groupings. The study considers three regional groupings: EAC, COMESA and WTO markets or blocs. Descriptive statistics for the variables are displayed in Table 4.4, with a total of 30,638 counts or observations. Table 4.5 displays correlation statistics whose signs and magnitude are within expected directions and ranges, respectively. Table 4.6 provides the definition, nomenclature and source for all the variables used in the study.

Table 4.4: *Summary Statistics for Variables Employed in the Analysis*

Variable	Count (*N*)	Mean	Standard Deviation	Minimum	Maximum
Exportsin1000usd	30638	5129.035	23629.59	0	698263.30
Distance	30638	8.6960	0.8003	1.9000	9.8987
GDP_Importer	30638	12.1058	1.9660	5.5239	16.7277
GDP_Exporter	30638	10.5866	0.9961	8.0071	11.9082
Population_Importer	30638	2.7501	1.74890	4.5035	7.2510
Population_Exporter	30638	3.2664	0.6309	1.6363	4.0217
Contiguity	30638	0.0210	0.1435	0	1
Official Language	30638	0.1793	0.3836	0	1
Colony	30638	0.0123	0.1101	0	1
Common coloniser	30638	0.0954	0.2938	0	1

Table 4.5: *Correlation Coefficients*

Variable	1	2	3	4	5	6	7	8	9	10
Exports (1)	1									
Distance (2)	-0.011	1								
GDP_Importer (3)	0.143***	-0.021***	1							
GDP_Exporter (4)	0.123***	0.025***	-0.103***	1						
Population_Importer (5)	0.150***	0.029***	0.774***	-0.107***	1					
Population_Exporter (6)	0.108***	0.021***	-0.108***	0.963***	-0.106***	1				
Contiguity (7)	0.002	-0.326***	0.048***	-0.004	0.070***	-0.004	1			
Official Language (8)	0.032***	-0.043***	-0.044***	0.006	0.005	0.004	0.194***	1		
Colony (9)	0.034***	-0.047***	0.076***	-0.009	0.055***	-0.009	0.141***	0.140***	1	
Common coloniser (10)	0.017**	0.024***	-0.176***	0.037***	-0.075***	0.036***	0.009	0.362***	-0.036***	1

Table 4.6: *Variable Nomenclature, Description and Source*

Variable(s)	Nomenclature	Description	Source
Trade Indicators			
Exports	Exports	Gross imports in USD from EAC partner states to the ROW (here called exports of the EAC)	WITS/COMTRADE
Canonical Gravity Variables			
Distance	ldist	Log of simple distance (most populated cities, km)	CEPII
Contiguity	conting	1 for contiguity, 0 otherwise	CEPII
Common official language	Official Language	1 for common official or primary language, 0 otherwise	CEPII
Colony	colony	1 for pairs ever in colonial relationship, 0 otherwise	CEPII
Common coloniser	comcol	1 for common coloniser post-1945, 0 otherwise (dummy for origin and destination ever in colonial relationship)	CEPII
Importer real GDP	GDP_Importer	Expenditure-side real GDP at chained PPPs (in mil. 2011USD)	PWT9.1
Exporter real GDP	GDP_Exporter	Output-side real GDP at chained PPPs (in mil. 2011USD)	PWT9.1
Importer population	Population_Importer	Population of destination, total in millions	PWT9.1
Exporter population	Population_Exporter	Population of origin, total in millions	PWT9.1
Regional Dummies			

Variable(s)	Nomenclature	Description	Source
Intra-bloc trade effect	EAC_Intra, COMESA_Intra & WTO_Intra	Measure of the increase in intra-bloc trade resulting from entering RI (EAC, COMESA & WTO intra-bloc trade)	WTO/EAC
Export diversion	EAC_Export, COMESA_Export & WTO_Export	Measure of change in intra-bloc exports resulting from entering RI (EAC, COMESA & WTO intra-bloc trade)	WTO/EAC
Import diversion	EAC_Imports, COMESA_Imports & WTO_Import	Measure of change in intra-bloc imports resulting from entering RI (EAC, COMESA & WTO intra-bloc trade)	WTO?EAC
Contemporary Gravity Variables			
Endogeneity (ENDG)	PAIR_FE*	Addressing the potential endogeneity of RTAs (EAC, COMESA & WTO intra-bloc trade)	(Baier & Bergstrand, 2007)
'Reverse causality'	$\mathrm{RILEAD}_{ij,t***3\ or\ 6\ or\ 9\ or\ 12}$	Captures future level of RTAs (EAC, COMESA & WTO intra-bloc trade)	(Baier & Bergstrand, 2007; Wooldridge, 2010)
Potential non-linear & phasing-in	$RILAG_{ij,t-3\ or\ 6\ or\ 9\ or\ 12}$	Captures the possibility of the effects of EAC changing over time (EAC, COMESA & WTO intra-bloc trade)	(Anderson & Yotov, 2012; Baier & Bergstrand, 2007)
Globalisation	$INTL\_BRDR\_Y_{ij}$	1 for a value of international trade in a particular year	(Yotov et al., 2016)
Distance puzzle	ln_DIST	Captures the role of distance for each year	(Borchert & Yotov, 2017; Piermartini & Yotov, 2016; Yotov, 2012)
Multilateral Resistance			
Exporter fixed effects	Exporter_Time_FE	Absorbs outward multilateral resistance in output (weighting for the demand side of RTAs)	(Fally, 2015; Yotov et al., 2016)
Importer fixed effects	Importer_Time_FE	Absorbs inward multilateral resistance in importer expenditure (weighting for the supply side of RTAs)	(Fally, 2015; Yotov et al., 2016)

4.3 Empirical Results and Discussion

In this subsection, the study proceeds in several steps: first, I comment on traditional gravity estimates to explore the importance of accommodating contemporary considerations in applying the gravity equation. The results for this process are reported in Table 4.7. Having determined a favourable estimator for the gravity equation, the next goal is to obtain estimates of the effects of RTA. I proceed by estimating the bloc effects of EAC trade liberalisation policy; the results are reported in Table 4.8. In Tables 4.9 and 4.10, I decompose the effects of EAC trade liberalisation policy and shed light on the heterogeneous impact of EAC across countries and products, respectively. In the next subsection, I analyse the effects of RTAs in the Global South by country on products. The purpose of this subsection is to explore the impact of EAC merchandise trade by country. The results are displayed in Tables 4.11, 4.12 and 4.13. The sensitivity analysis is discussed in Sections 4.4 and 4.5 and the results are reported in Tables 4.14, 4.15 and 4.16. Section 4.6 justifies the results for the PPML estimates and the chapter concludes in Section 4.7.

4.3.1 Baseline analysis

In this subsection, I obtain a series of gravity estimates of the effects of the traditional gravity variables; for example, bilateral distance (ln_DIST_{ij}), the indicator variable for contiguous border (Contiguity), common official language (Official Language), and colonial ties (Colony). In addition, I introduce variables for the effects of trading partner populations (log of Population_Importer and Population_Exporter) and estimates of exporter output (log GDP_Exporter) and importer expenditures (log GDP_Importer). The purpose of the applications presented here is primarily as benchmarks; therefore the estimates refrain from including the comprehensive set of EAC RI policies and instead focus on the effects of specific endogenous variables to emphasise the importance of various econometric developments in estimating the gravity equations. The estimation results compare the OLS and PPML estimates and are obtained from panel data with intervals. These estimation results are reported in Table 4.7. All models fit the data and perform well since the p-values in F-tests are statistically significant at all levels of significance. This implies that, for all significance levels, the jointly zero hypothesis is rejected for all coefficients. The R^2 keeps increasing from the OLS, fixed effects and PPML models, as reported in Table 4.7. This is because the inclusion of fixed effects in these higher models picks up significant features of the data that probably arise from heteroscedasticity (Shepherd, 2016).

Table 4.7: *Traditional Gravity Estimates*

	OLS	Fixed Effects	PPML
Distance	-0.022	-0.001	-0.128***
	(0.029)	(0.031)	(0.072)
Contiguity	0.070	0.108	0.322
	(0.168)	(0.181)	(0.336)
Official Language	-0.024	-0.037	0.008
	(0.060)	(0.066)	(0.141)
Colony	-0.003	-0.073	-0.364
	(0.183)	(0.199)	(0.413)
GDP_Exporter	0.334*		
	(0.168)		
GDP_Exporter	0.456**		
	(0.071)		
Population_Importer	0.276**		
	(0.075)		
Population_Importer	0.568*		
	(0.286)		
Constant	-7.474**	2.373**	7.974**
	(1.003)	(0.914)	(0.791)
N	10123	10123	10125
R2	18	44	
Fixed effects			
Importer time	No	Yes	Yes
Exporter time	No	Yes	Yes
Country pair	No	No	No

Notes: This table reports a series of gravity estimation results. All estimates are obtained with data for the years 1993, 1996, 1999, 2002, 2005, 2008, 2011, 2014 and 2017.[2] Columns (1) and (2) report OLS estimates. Column (3) reports PPML estimates and controls for multilateral trade resistance by using importer-time and exporter-time fixed effects, whose estimates are omitted for brevity. Standard errors are reported in parentheses; $^{***}\ p < 0.10$, $^{*}\ p < 0.05$, $^{**}\ p < 0.01$.

Overall, this empirical study finds that the importer and exporter populations, and exporter output and importer expenditures, are statistically significant at the 1% and 5% level of significance, respectively. The estimate on the effect of distance carries the expected negative sign through all models but only becomes significant with the PPML estimator. The coefficient of the distance variable is small in absolute terms, reflecting the impact of heteroscedasticity on OLS estimates, and typical of Poisson gravity estimates (Santos Silva & Tenreyro, 2006). These results are standard and supported by the gravity literature (Baier et al., 2019), and thus establish the representativeness of the study sample (Piermartini & Yotov, 2016).

The estimate of the effect of contiguous borders (Contiguity) carries the expected sign in all models but is not significant. The coefficient of ever being in the same colonial

[2] For practical reasons, I drop the year 1990 from the final analysis since renewed EAC regional endeavours were entered into after 1990.

relationship or having ties (Colony) is negative in all models but not significantly so. The estimate of common official language (Official Language) is negative in OLS models but becomes positive in the PPML model, though not statistically significant. This may reflect the fact that I include country-pair effects and implement the PPML estimator. Santos Silva and Tenreyro (2011) argues that Poisson estimators perform strongly in datasets with lower values or with large number of zeros. Based on this application, I adopt the estimation of the PPML for the country and product asymmetries.[3]

4.3.2 Regional bloc analysis

In this subsection and subsequent ones, I include variables measuring the effects of EAC regionalism on the gravity models and a series of fixed effects as presented in Table 4.8. I replicate results of table 3 columns (1), (2), (4) and (7) from Piermartini and Yotov (2016) and Yotov et al. (2016). I begin by estimating the basic OLS specification. This initial gravity estimation includes all standard gravity variables as introduced before, including the logarithm of bilateral distance (log distance) and dummy variables for contiguous borders (Contiguity), common official language (Official Language), and colonial ties (Colony). I also include variables to capture the effects of country populations (i.e. log Population_Importer and log Population_Exporter), and of exporter output (log GDP_Exporter) and importer expenditure (log GDP_Exporter). The estimates of the variables are similar regarding statistical significance, but dissimilar regarding magnitude from the results of the traditional gravity estimation.

In addition, I introduce a set of three-way indicator variables that account for the presence of EAC trade liberalisation policy within the EAC, COMESA and WTO trading blocs. The equations are estimated using panel data to improve efficiency (Yotov et al., 2016) and I use data for every 3 years from 1993 to 2017 following Cheng and Wall (2005), Olivero and Yotov (2012) and Trefler (2004). I note that trade policy changes do not adjust instantaneously (Trefler, 2004) and when using fixed effects, the endogenous variable, trade, cannot fully adjust in a single year (Cheng & Wall, 2005). The estimates of the impact of regional trade integration are all statistically insignificant in column (1). From columns (2)–(6), I introduce importer-time and exporter-time fixed effects to control for multilateral trade resistance, thus dropping from the estimations variables that differ by country. These country-time effects absorb all

[3] Shepherd (2012) argues that the Poisson estimator rather than the OLS estimator should be adopted to analyse policy impacts.

time-varying country-specific observable and unobservable country-specific characteristics (Baier & Bergstrand, 2007; Olivero & Yotov, 2012) and capture exporter and importer multilateral resistance terms (Anderson & Van Wincoop, 2003). One can see from columns (2) and (3) that the inclusion of these effects enables regional policy covariates to become statistically significant. Column (2) adopts OLS fixed effects and column (3) applies the PPML estimator. While the covariates measuring the same effect of RTA remain mostly positive, those from the PPML estimator in column (3) of Table 4.8 are much smaller than those from the OLS fixed effects in column (2) of Table 4.7. Columns (4) and (5) incorporate bilateral fixed effects to control for potential endogeneity concerns in the EAC RTA, following Baier and Bergstrand (2007). In addition, this application reduces potential reverse causality of EAC trade as EAC partner countries might have signed the agreement to secure trade relationships as suggested by Baier and Bergstrand (2007) and Chen and Mattoo (2008). The adoption of country-time fixed effects will also resolve endogeneity arising from the omitted variable problem (Anderson & Van Wincoop, 2003; Baier & Bergstrand, 2007; Head & Mayer, 2014). Upon applying the country-year fixed effects, an interesting finding stands out. That is, the estimates of EAC regionalism remain positive but are now much larger than those from the PPML estimator in column (3), but smaller than those from the OLS fixed effects estimator in column (2) of Table 4.8. In column (5), following Yotov (2012), I evaluate the declining role of distance to solve the distance puzzle by introducing the variable ln_DIST for each year included in the study. I drop the estimates of ln_DIST for periods 1993, 1996 and 1999 because of perfect collinearity, as in Piermartini and Yotov (2016). This uneven effect of globalisation on trade is also indicated by Borchert and Yotov (2017) and Yotov (2012). The estimate is significant in 2002 but this significance disappears in 2005, 2008 and 2011 and reappears in 2017 to then disappear again in 2017. In the periods in which the distance estimate is statistically significant, results in column (5) indicate that the negative impact of distance on bilateral trade marginally increases from 2002 to 2014. This indicates or confirms the presence of the ‘distance puzzle’ or ‘the missing globalisation puzzle’ in the bilateral trade data for the EAC, as in Piermartini and Yotov (2016). EAC liberalisation should lead to a ‘death of distance’ scenario in which average trade increases as transport costs decline, opening up more distant markets (Cairncross, 1997; Friedman, 2005). However, the evidence in this empirical study indicates that distance still exerts strong negative effects on the volume of trade in the indicated years, as argued by Coe, Subramanian and Tamirisa (2007).

Table 4.8: *Effects of Regional Trade Agreement on Trade: EAC Bloc Estimates*

	OLS	Fixed Effects	PPML	ENDG	Globalisation (GLBZN)
	[1]	[2]	[3]	[4]	[5]
Distance	-0.018	0.002	-0.141***		
	(0.036)	(0.037)	(0.082)		
Contiguity	0.150	0.113	0.330		
	(0.194)	(0.198)	(0.354)		
Official Language	0.078	0.072	0.068		
	(0.074)	(0.080)	(0.150)		
Colony	-0.057	-0.041	-0.362		
	(0.186)	(0.213)	(0.458)		
GDP_Exporter	0.762*				
	(0.320)				
GDP_Importer	0.477**				
	(0.074)				
Population_Importer	0.299**				
	(0.077)				
Population_Exporter	0.068				
	(0.579)				
EAC_Intra	0.035	1.273**	0.557*	0.962*	0.964*
	(0.556)	(0.344)	(0.255)	(0.455)	(0.442)
EAC_Exports	-0.068	-0.028	-0.771	-0.846	-2.167
	(0.074)	(0.971)	(0.779)	(0.794)	(2.310)
EAC_Imports	0.526	3.160**	3.350**	1.650***	1.637***
	(0.404)	(0.879)	(0.771)	(0.970)	(0.971)
COMESA_Intra	0.478	0.527	2.906**	2.330**	2.388**
	(0.531)	(0.403)	(0.538)	(0.733)	(0.753)
COMESA_Exports	0.124	-0.903**	-0.622***	-2.432**	-2.490**
	(0.233)	(0.166)	(0.319)	(0.535)	(0.557)
COMESA_Imports	0.314	3.106**	0.030	0.102	-0.068
	(0.197)	(1.138)	(0.879)	(0.944)	(0.937)
WTO_Intra	-1.629	-1.182	-2.348**	-0.313	-0.418
	(1.406)	(0.753)	(0.531)	(0.608)	(0.649)
WTO_Exports	-0.736*	-1.506	-0.958	-3.350**	-1.972
	(0.307)	(0.983)	(0.797)	(0.903)	(2.430)
WTO_Imports	0.074	2.467**	0.527	2.634**	2.463**
	(0.384)	(0.906)	(0.674)	(0.719)	(0.738)
ln_DIST_2002					-0.358**
					(0.081)
ln_DIST_2005					-0.054
					(0.171)
ln_DIST_2008					-0.181
					(0.125)
ln_DIST_2011					0.109
					(0.190)
ln_DIST_2014					-0.398**
					(0.124)
ln_DIST_2017					-0.200
					(0.172)
Constant	-10.832**	3.226**	8.695**	7.389**	9.184**
	(1.565)	(0.969)	(0.833)	(0.553)	(1.615)
N	7807	7807	7809	7809	7809
Fixed effects					

	OLS	Fixed Effects	PPML	ENDG	Globalisation (GLBZN)
	[1]	[2]	[3]	[4]	[5]
Importer time	N0	Yes	Yes	Yes	Yes
Exporter time	No	Yes	Yes	Yes	Yes
Country pair	No	No	No	Yes	Yes

Notes: The table reports estimates of the effects of RTAs. All estimates are obtained with data for the years 1993, 1996, 1999, 2002, 2005, 2008, 2011, 2014 and 2017. Columns (1), (2) and (3) replicate estimates in Table 4.7. Columns (2)–(5) use country–time fixed effects and columns (4)–(5) consider country-pair fixed effects. Estimates of the importer-time, exporter-time and country-pair fixed effects are omitted for brevity. Finally, column (5) accounts for the effects of globalisation. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

The goal of this exercise is to estimate the effect of EAC regional policy on trade within the EAC, COMESA and WTO blocs or markets. The results are homogeneous across these regional blocs. For the purpose of the next subsection, I report results from column (4).

4.3.2.1 Effect of the EAC regional trade agreement on the EAC bloc

The coefficient estimate on the intra-bloc EAC trade (EAC_Intra) is statistically significant and positive for the whole sample. For example, on average over the period 1993–2017, intra-EAC trade was 162% (=100*($e^{0.962} - .96$) above what is predicted. This indicates that EAC partner countries traded between themselves around 14 times more than expected at baseline. This is associated with a propensity to import from the ROW that is 14 times greater than the reference value, implying that the formation of the EAC bloc has enhanced exports (i.e. *export creation*) to the ROW. The net effect of these dummies—the 'net intra-bloc trade' effect—is that EAC bloc members traded 1262%—or 14 times [=100*($e^{(0.962+1.650)}$-1)]—more with each other than at baseline. This indicates that formation of the EAC bloc led to a pure TC. These results are similar, in terms of magnitude and signs, to those reported by Carrere (2006) and Soloaga and Winters (2001).

4.3.2.2 Effect of the EAC regional trade agreement on the COMESA bloc

The intra-bloc parameter for COMESA (COMESA_Intra) is statistically significant and positive, indicating that all else being equal, the EAC traded over nine times more with other COMESA bloc members than at baseline. Nevertheless, this is associated with an overall reduction in exports from the ROW of 91% as indicated by the negative value of the parameter capturing export diversion (COMESA_Exports). This particular result means that the participation of EAC partner countries in the COMESA bloc leads these countries to reduce

their exports from the ROW. Since the enhanced intra-COMESA bloc is associated with a TD, the net effect of the dummies is –10%. This suggests that the intra-bloc trade created is substantially eroded by export diversion, making the participation of the EAC in the COMESA market a pure TD. The finding that the overall COMESA bloc trade effect is trade diverting echoes that from Urata and Okabe (2014), but differs in that I find that intra-COMESA trade is positive, though the export diversion outweighs it to make the bloc pure trade diverting.

4.3.2.3 Effect of the EAC regional trade agreement on the WTO bloc

The participation of EAC countries in the WTO bloc does not enhance their intra-WTO (WTO_Intra) trade. However, the WTO bloc enhanced EAC partner countries' imports from other WTO members (*i.e. import creation*) more than 14-fold during the period under observation. This could imply that the WTO bloc enables EAC partner countries to acquire imports easily from the ROW, though this is associated with a reduction by 100% in exports from the ROW. Overall, the participation of EAC countries in the WTO led to a reduction in trade by 51% compared with the baseline.

To summarise, the analysis indicates that, overall, RI enhances trade in the EAC but reduces it in the COMESA and WTO blocs. In addition, RI enhances imports in the EAC and WTO, though it reduces exports substantially from the COMESA and WTO from the ROW. I now turn to addressing the question: are all country effects of RI on trade alike?

4.3.3 Country-level analysis

I now focus on the question of whether the trade effects of the EAC are alike across EAC member countries. Table 4.9 provides estimates of the disaggregated country effects on exports, using the PPML estimator with country-time and dyadic fixed effects. Results in columns (1), (2), (3), (4) and (5) are for Burundi, Kenya, Rwanda, Tanzania and Uganda, respectively.

The sequential pattern of trade for Burundi under the EAC umbrella is strongly positive for Burundi's intra-bloc trade and exports. This implies that Burundi's trade in the EAC bloc enhanced her intra-bloc trade and led to export creation more than 2.4 times above reference. Overall, Burundi's participation in the EAC bloc has led to a pure TC since 2007. The results indicate that Burundi enhanced her imports with the ROW more than 216 times within the WTO bloc, as the coefficient capturing Burundi's imports within the WTO bloc is statistically significant and positive.

The sequential pattern of trade for Kenya is almost identical to that of Burundi under the EAC umbrella. For instance, results in column (2) of Table 4.9 indicate that Kenya's intra-bloc trade increased by over 13 times above reference. Kenya also increased her exports to the ROW by 577% through participating in the EAC bloc. The overall trade of Kenya, too, in the EAC bloc has led to a pure TC. Just like Burundi, Kenya's trade within the COMESA bloc is not observable.

For Rwanda, it is observable that the country's intra-bloc trade increased above reference as the coefficient measuring Rwanda's intra-bloc trade in the EAC is significant and positive. Rwanda exhibits a negative propensity of over 100% to import from the ROW through its participation in the EAC bloc. The overall effect of Rwanda's membership in the EAC indicates that the country enhanced her trade by more than 11 times compared with if she had not been in the EAC during the period under observation.

The findings in the case of Tanzania indicate that the country enhanced her imports from the ROW by over 8.2 times relative to expectation at reference when trading in the EAC bloc. However, the country experienced an import diversion of over 80% by the time it left the COMESA bloc in 1999. This temporal pattern of trade is almost diametrically opposed to that of the rest of the EAC members. Uganda's intra-bloc trade in the EAC is always below 'normal', to the tune of over 99%. However, the results in column (5) of Table 4.8 indicate that the country's imports and exports performed above expectation during the period. Overall, the country's trade has led to a pure TC of more than 58, despite its intra-bloc trade being below expectation. The EAC enhances Uganda's imports and exports from the ROW. On average, over the period, Uganda's intra-bloc trade in the COMESA increased more than 29 times above expected levels. The coefficient measuring Uganda's imports from the ROW within the WTO indicates that Uganda performed above expectation. This implies that Uganda imported from WTO members more than 91 times above reference.

Table 4.9: *Effects of RTAs on Trade: Country Analyses*

	Burundi	Kenya	Rwanda	Tanzania	Uganda
	[1]	[2]	[3]	[4]	[5]
EAC_Intra	8.648**	2.654*	7.140**	-0.674	-4.957**
	(0.764)	(1.231)	(0.991)	(1.226)	(1.327)
EAC_Exports		-1.041	-4.659**	-0.398	1.881***
		(1.015)	(0.759)	(0.913)	(1.100)
EAC_Imports	1.232*	1.913*	0.118	2.105*	7.150**
	(0.576)	(0.848)	(0.452)	(0.973)	(0.926)
COMESA_Intra	3.063	3.068**	4.786**		3.386**
		(0.992)	(0.759)		(1.064)
COMESA_Imports				-1.600*	
				(0.685)	
WTO_Intra			3.723**		
			(0.759)		
WTO_Imports	5.375**	-0.145		0.888	4.523**
	(0.706)	(0.958)		(0.939)	(0.851)
Constant		8.028**		7.670**	3.082**
		(0.630)		(0.495)	(0.799)
N	720	2467	915	2048	1659
Fixed effects					
Importer time	Yes	Yes	Yes	Yes	Yes
Exporter time	Yes	Yes	Yes	Yes	Yes
Country pair	Yes	Yes	Yes	Yes	Yes

Notes: This table reports estimates of the effects of RTAs by country. All estimates are obtained using data for the years 1993, 1996, 1999, 2002, 2005, 2008, 2011, 2014 and 2017. Columns (1), (2), (3), (4) and (5) indicate the estimates for Burundi, Kenya, Rwanda, Tanzania and Uganda, respectively. All the estimates take into account importer-time, exporter-time and country-pair fixed effects that are omitted for brevity. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

4.3.4 Product-level analysis

I now focus on the question of whether the trade effects of the EAC are alike across EAC trading sectors. This is because I want to believe and expect that the trade effects of EAC trade policy are heterogeneous across sectors. Table 4.10 provides estimates for the disaggregated sectoral effects on exports, using the PPML estimator with country-time and dyadic fixed effects. Results in columns (1), (2), (3), (4) and (5) are for agriculture, food, manufactured goods, ores and metals, and fuels, respectively.

The temporal pattern of agriculture trade is almost identical in the COMESA and WTO blocs. Intra-bloc trade is always above 'normal' and shows a strong positive trend, indicating that EAC trade increased 46 times with COMESA member countries and more than 7.9 times with WTO member countries unlike for the EAC bloc that is not statistically insignificant though positive. The EAC's agricultural imports from the ROW increased by more than 5.4 times within the EAC bloc and by more than 6 times in the COMESA, but reduced by 83%

within the WTO bloc. Agricultural exports to the ROW reduced by 99% in the COMESA. The analysis indicates that the overall EAC effect of agricultural trade led to a pure TC in the COMESA and WTO blocs, of over 257% and 44%, respectively.

The EAC's RI policy increased her intra-bloc food item trade within the EAC, COMESA and WTO blocs by 2.3, 18 and 10.6 times above normal. This is indicated by food item export diversion (reduction of exports) to the ROW of 90%, 88% and 100% within the EAC, COMESA and WTO blocs, respectively. The EAC's food item imports from the ROW increased by 8.3 and 14 times above normal within the EAC and WTO markets, respectively. Overall, the EAC has experienced pure TC for its trade in food items, of 237% and 133% within the EAC and COMESA blocs, respectively, but the regional policy led to a pure TD with performance of 26% below reference.

Considering the export of manufactured goods, I find that the EAC bloc or market leads to export diversion and import creation. However, trade in manufactured goods in both the COMESA and WTO markets led to an increase in intra-bloc trade of these sectoral exports. This is indicated by an expected export diversion in these markets. The trade of manufactured goods in the WTO bloc indicates import creation while the coefficient capturing effects on imports indicates the expected import diversion. Overall, the total effects of these outcomes indicate that trading in manufactured goods in the COMESA and WTO blocs is a pure TD.

The ores and metals sector seems to have experienced the strongest trade effects. Overall, the results indicate that the EAC bloc or market led to a pure TD in the ores and metals trade. Though the EAC bloc has led to a reduction in both intra-bloc trade and export diversion, import creation is not sufficiently large to overcome the negative effects of the former; hence the negative overall trade effect or pure TD in the EAC market. Trading ores and metals within the COMESA has led to pure export creation. In the WTO bloc, the ores and metals trade has had the opposite effect, with exports of products to the ROW being reduced but imports being increased. The fuels trade shows pure TD at a magnitude of 92% below reference. However, trade within the WTO bloc enhanced EAC exports of fuels substantially while trade in the product within the COMESA is indicated by 100% export diversion from normal.

Table 4.10: *Effects of RTAs on Trade: Product Analyses*

	Agriculture	Food	Manufactured Goods	Ores & Metals	Fuels
	[1]	[2]	[3]	[4]	[5]
EAC_Intra	0.725	1.186**	0.368	1.015	-7.272**
	(0.628)	(0.383)	(0.377)	(1.348)	(0.925)
EAC_Exports	0.082	-2.203**	-0.791***	2.388***	-10.031**
	(0.615)	(0.650)	(0.458)	(0.706)	(1.332)
EAC_Imports	1.815**	2.232**	1.138***	3.948**	14.818**
	(0.702)	(0.670)	(0.600)	(1.429)	(1.093)
COMESA_Intra	3.853**	2.961**	2.515*	10.544**	
	(1.024)	(0.916)	(1.072)	(0.757)	
COMESA_Exports	-4.547**	-2.114**	-3.433**	-2.552**	-4.607**
	(0.542)	(0.728)	(0.542)	(0.596)	(0.938)
COMESA_Imports	1.966**	-0.463	-0.779	8.314**	
	(0.709)	(0.730)	(0.722)	(0.593)	
WTO_Intra	2.185***	2.453**	2.326**		
	(1.221)	(0.849)	(0.456)		
WTO_Exports	-0.231	-5.468**	-2.602**	-4.345**	12.615**
	(1.208)	(1.021)	(0.900)	(0.704)	(1.924)
WTO_Imports	-1.817**	2.710**	1.615**	5.991**	
	(0.675)	(0.743)	(0.577)	(0.326)	
Constant	3.329**	7.811**	8.656**	0.087	11.620**
	(0.614)	(0.478)	(0.248)	(0.105)	(0.077)
N	1634	2310	2713	859	293
Fixed effects					
Importer time	Yes	Yes	Yes	Yes	Yes
Exporter time	Yes	Yes	Yes	Yes	Yes
Country pair	Yes	Yes	Yes	Yes	Yes

Notes: This table reports estimates of the effects of RTAs by product. All estimates are obtained from data for the years 1993, 1996, 1999, 2002, 2005, 2008, 2011, 2014 and 2017. Columns (1), (2), (3), (4) and (5) indicate the estimates for agriculture, food, manufactures, ores & metals and fuels, respectively. All the estimates take into account importer-time, exporter-time and country-pair fixed effects that are omitted for brevity. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

4.3.5 Decomposition of EAC products within country

I now focus on the question of whether the trade effects of EAC products are alike across EAC member countries. Tables 4.11, 4.12 and 4.13 provide estimates for the disaggregated sectoral effects on exports by country, using the PPML estimator with country-time and dyadic fixed effects. Table 4.11 displays the results for Kenya and Tanzania with products listed in columns (1)–(10). Columns (1)–(5) show results for agricultural raw materials, food items, manufactured goods, ores and metals, and fuels for Kenya; columns (6)–(10) display estimates for the same products, respectively, for Tanzania. Table 4.12 uses a similar reporting nomenclature for the results for Uganda and Rwanda, and the results for Burundi are reported in Table 4.13.

Estimates for Kenya's trade show that the country had a pure TC for trading its products in the EAC bloc. Kenya's agricultural raw materials, and ores and metals show the most increase in trade, by over 245 and 454 times above reference. Fuels, manufactured goods and food 67, 20 and 11 times more than under 'normal' trade. In addition, I conclude that the COMESA bloc enhances Kenya's exports with COMESA member countries, except in the case of manufactured goods, which performed below expectation by 13%. I deduce that Kenya's ores and metals, and agricultural raw materials traded in the COMESA bloc show the most increase in trade, of 474% and 242%; whereas the food trade increased by only 86 times. When trading in the WTO bloc, Kenya enhanced her imports with the ROW by 63%, 265% and 100% for agriculture, food and manufactured goods, respectively.

I now turn to Tanzania's results, shown in columns (6)–(10) of Table 4.11, which present estimates very similar to those for Kenya, though smaller. Just as in Kenya's case, results for the effect of Tanzania participating in the listed trading blocs indicate that the EAC bloc presents the best opportunity for Tanzania to concentrate her regional endeavours. For instance, Tanzania's trade in the listed products in the EAC bloc led to a pure TC with other EAC members. However, Tanzania's intra-bloc trade in manufactured goods and ores and metals performed marginally below expectation. Tanzania should increase its exports of fuels, agricultural raw materials, and ores and metals to other EAC countries, since these products had the largest impact. Though Tanzania exited the COMESA bloc in 1999, by that time it had increased her imports of agriculture and fuels from the ROW by 5.3 and 29 times above reference, and reduced her imports of food and manufactured goods by 75% and 94%, respectively. In the WTO bloc, Tanzania increased imports of agricultural raw materials and food items but shows a reduction in imports from the ROW of manufactured goods and ores and metal, below expectation. Arguably, agricultural raw materials, food and fuels present the best options for Tanzania to enhance her trade in regional blocs.

Uganda's results indicate a similar pattern of trade to that of Kenya and Tanzania, but with differences among sectors. During this period, agriculture, food and manufactured goods exports led to a pure TC but Uganda's exports of ores and metals, and fuels led to a pure TD with other EAC members. In addition, Uganda's intra-bloc exports of these products performed below expectation with other EAC members. The positive total effects are the result of increases in exports, imports or both. Uganda's intra-bloc trade in the COMESA increased for food items but it performed below reference for manufactured goods, by 23%. Trading in the WTO bloc, Uganda increased her imports from the ROW for all products except fuels and shows a reduction in agricultural raw materials from the ROW, by 33%.

I deduce from the results displayed in columns (6)–(10) of Table 4.12 that Rwanda's intra-bloc trade increased for all products. However, Rwanda's overall trade effect indicates a more negative impact. For example, intra-bloc trade in the EAC bloc of agricultural raw materials, food and fuels indicates a pure TD of 81%, 60% and 98% below expectation. Rwanda's trade in manufactured goods and ores and metals led to a pure TC, and her intra-bloc trade in the COMESA bloc increased for agriculture, food and ores and metals but declined for manufactured goods. Overall, trading in the COMESA bloc led to a pure TD for agricultural products and manufactured goods but to a pure TC for food and ores and metals.

Table 4.13 presents estimates for Burundi's trade in agriculture, food, manufactured goods, ores and metals, and fuels in columns (1)–(5). Burundi's intra-bloc trade increased for all products in the EAC bloc. This was coupled with import and export vagaries. Nonetheless, unlike all other EAC member countries, Burundi's overall trade experienced a pure TC for all products in the EAC bloc. Trading of food in the COMESA bloc also shows a pure TC, while ores and metals show a pure TD. Burundi's food imports from the ROW increased. This may be because the WTO presents a cheaper alternative for Burundi to import a range of products it does not have. In addition, the results show that Burundi reduced its imports from the ROW of manufactured goods and ores and metals below reference during the period.

Table 4.11: *Effects of RTAs on Trade: Product Analysis within Country*

	Kenya					Tanzania				
	Agriculture	**Food**	**Manufactured Goods**	**Ores & Metals**	**Fuels**	**Agriculture**	**Food**	**Manufactured Goods**	**Ores & Metals**	**Fuels**
	[1]	**[2]**	**[3]**	**[4]**	**[5]**	**[6]**	**[7]**	**[8]**	**[9]**	**[10]**
EAC_Intra	2.561**	2.165**	1.327	4.531**	13.260**	3.576**	0.139**	-0.378**	-6.207**	5.418**
	(0.000)	(0.000)	(0.000)**	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EAC_Exports	1.417**	-1.824**	-0.680	-0.834**	-3.518**	-0.628**	-3.940**	0.327**	-0.704**	-16.513**
	(0.000)	(0.000)	(0.000)**	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EAC_Imports	1.528**	2.145**	2.383	2.423**	-5.518**	0.117**	4.858**	1.249**	7.528**	7.292**
	(0.000)	(0.000)	(0.000)**	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
COMESA_Intra	5.495**	4.467**	-0.143	6.164**						
	(0.000)	(0.000)	(0.000)**	(0.000)						
COMESA_Imports						1.854**	-1.385**	-2.801**	3.351**	
						(0.000)	(0.000)	(0.000)	(0.000)	
WTO_Imports	4.153**	0.975**	-6.183			0.018**	1.241**	-3.089**	-4.115**	
	(0.000)	(0.000)	(0.000)**			(0.000)	(0.000)	(0.000)	(0.000)	
Constant	2.252**	7.924**	9.155	3.253**	8.310**	3.976**	8.401**	8.311**	0.005**	11.685**
	(0.000)	(0.000)	(0.000)**	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	630	663	760	289	125	470	601	643	237	97
Fixed effects										
Importer time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Exporter time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country pair	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports estimates of the effects of RTAs on products by country. All estimates are obtained from data for the years 1993, 1996, 1999, 2002, 2005, 2008, 2011, 2014 and 2017. Columns (1), (2), (3), (4) and (5) indicate the estimates for agriculture, food, manufactures, ores & metals and fuels, respectively for Kenya. Columns (6)–(10) indicate estimates for the same products respectively for Tanzania. All the estimates take into account importer-time, exporter-time and country-pair fixed effects that are omitted for brevity. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

Table 4.12: *Effects of RTAs on Trade: Product Analysis within Country*

	Uganda					Rwanda				
	Agriculture	Food	Manufactured Goods	Ores & Metals	Fuels	Agriculture	Food	Manufactured Goods	Ores & Metals	Fuels
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
EAC_Intra	-5.128**	-2.226**	-2.805**	-7.329**	-4.082**	0.098**	14.073**	5.893**	4.777**	5.418**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
EAC_Exports	-1.008**	7.492**	-1.108**	-2.806**	1.593**	0.703**	-10.589**	-3.609**	-1.922**	-16.513**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
EAC_Imports	9.860**	4.526**	7.487**	5.289**	-0.292**	-2.499**	-4.390**	1.274**	2.623**	7.292**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
COMESA_Intra		8.640**	-0.261**			1.769**	6.807**	-3.722**	11.071**	
		(0.000)	(0.000)			(0.000)	(0.000)	(0.000)	(0.000)	
WTO_Intra						-2.347**	5.744**	-8.161**		
						(0.000)	(0.000)	(0.000)		
WTO_Imports	-0.400**	9.432**	2.909**	0.907**						
	(0.000)	(0.000)	(0.000)	(0.000)						
Constant		-1.483**	4.166**	6.827**	4.255**	6.003**	8.616**	4.706**	-2.501**	11.685**
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	334	538	575	171	41	123	260	401	112	97
Fixed effects										
Importer time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Exporter time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country pair	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports estimates of the effects of RTAs on products by country. All estimates are obtained from data for the years 1993, 1996, 1999, 2002, 2005, 2008, 2011, 2014 and 2017. Columns (1), (2), (3), (4) and (5) indicate the estimates for agriculture, food, manufactures, ores & metals and fuels, respectively for Uganda, and columns (6)–(10) indicate estimates for the same products respectively for Rwanda. All the estimates take into account importer-time, exporter-time and country-pair fixed effects that are omitted for brevity. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

Table 4.13: *Effects of RTAs on Trade: Product Analysis within Country*

	Burundi				
	Agriculture	Food	Manufactured Goods	Ores & Metals	Fuels
	[1]	[2]	[3]	[4]	[5]
EAC_Intra	1.310**	9.000**	11.224**	7.764**	4.599**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EAC_Exports	6.340**	-4.134**		1.849**	-3.995**
	(0.000)	(0.000)		(0.000)	(0.000)
EAC_Imports	-3.264**	-3.457**	-0.447**	-4.998**	
	(0.000)	(0.000)	(0.000)	(0.000)	
COMESA_Intra		2.748**		-1.416**	
		(0.000)		(0.000)	
WTO_Imports		1.864**	-0.946**	-0.098**	
		(0.000)	(0.000)	(0.000)	
Constant	-0.498**	8.462**	3.177**		1.378**
	(0.000)	(0.000)	(0.000)		(0.000)
N	77	248	334	50	11
Fixed effects					
Importer time	Yes	Yes	Yes	Yes	Yes
Exporter time	Yes	Yes	Yes	Yes	Yes
Country pair	Yes	Yes	Yes	Yes	Yes

Notes: This table reports estimates of the effects of RTAs on products by country. All estimates are obtained from data for the years 1993, 1996, 1999, 2002, 2005, 2008, 2011, 2014 and 2017. Columns (1), (2), (3), (4) and (5) indicate the estimates for agriculture, food, manufactured goods, ores & metals and fuels, respectively for Burundi. All the estimates take into account importer-time, exporter-time and country-pair fixed effects that are omitted for brevity. Standard errors are reported in parentheses; $^{***}p < 0.10$, $^{*}p < 0.05$, $^{**}p < 0.01$.

4.4 Robustness Checks

In this section, I undertake robustness tests with the dataset modified to include only trade, providing a three-dimensional dataset (of country pair and time) instead of the four-dimensional dataset (country pair, sector and time) used in the previous sections. This new data nomenclature corresponds to that used in other illuminating studies (Borchert & Yotov, 2017; Dai et al., 2014; Larch, Wanner, Yotov & Zylkin, 2019; Piermartini & Yotov, 2016). I also relax the assumption of heterogeneous effects of EAC trade policy in the EAC, COMESA and WTO blocs, dropping all coefficients capturing export and import TDs. The results for application of the 3-year gap are reported in Table 4.14. In column (1) I provide OLS estimates with country-time fixed effects. In columns (4)–(5) I add country-pair fixed effects. I replicate some results from Table 4.8 for the OLS, PPML and GBLN estimates and find similar positive effects of intra-bloc EAC participation in the EAC and COMESA blocs, with minor differences

for the WTO bloc. For example, I now find that the OLS estimator in Table 4.14 produces significant results for the coefficient capturing intra-bloc trade, unlike those from Table 4.8. In addition, from column (5) of Table 4.14 I find that the effect of intra-COMESA trade disappears, as reported in column (5) of Table 4.14, unlike the significant and positive indication from column (5) from Table 4.8. The rest of the results from Table 4.14 are similar to those from Table 4.8 leading to the conclusion that the EAC regional trade policy has enhanced EAC countries' trade in the EAC, COMESA and WTO blocs.

I introduce two new estimates in Table 4.14. First, in column (5), following Baier and Bergstrand (2007), I show the PPML estimates for variables (EAC_Intra_LEAD3, COMESA_Intra_LEAD3 and WTO_Intra_LEAD3) to measure the 3-year lags for participating in the EAC, COMESA and WTO blocs. This captures the additional endogeneity ('reverse causality') between trade and regional policy (Baier & Bergstrand, 2007). Alternatively stated, the variables enable examination of whether the pair fixed effects fully accounted for possible 'reverse causality' between the regional policy and EAC trade in the three blocs (Piermartini & Yotov, 2016). The estimates of EAC_Intra_LEAD3 and WTO_Intra_LEAD3 are not statistically significant and that of COMESA_Intra_LEAD3 is economically meaningless. This suggests that the reverse causality between trade and the regional policies is not present in this analysis. This experiment makes only the intra-bloc effects of the EAC observable. The results indicate that the EAC member countries increased trade by 165% over the period. This echoes results from Tables 4.11, 4.12 and 4.13 showing strong effects of the EAC bloc.

Second, in column (4) I introduce lags of the regional policies for every 3 years for 12 years. My quest is to examine whether the effects of regional entities reduce in time; that is, I address the potential non-linear and phasing-in effects of regional policy (Anderson & Yotov, 2016; Baier & Bergstrand, 2007). I find evidence that the WTO bloc exhibits strong phasing-in effects. In the first 3 years there is actually a negative effect of the bloc that becomes positive in the next 3 years but decreases slightly after 9 years. At the end of 12 years the effects increase close to the level after 6 years. In essence, the effects of WTO are non-monotonic and capture phasing in. The overall outcomes of these lagged effects, reported in the bottom panel of Table 4.14, indicate a positive estimate or index for all regional blocs, though not statistically significant. As such, I cannot make inferences about the effects of EAC regional policies after 12 years.

Table 4.14: *Effects of Regional Trade Agreements on Trade: 3-year Data Gaps*

	OLS	PPML	LEAD	PHSNG	GBLN
	[1]	[2]	[3]	[4]	[5]
Contiguity	-0.371	0.086			
	(0.350)	(0.163)			
Official Language	-0.213**	-0.275**			
	(0.105)	(0.086)			
Colony	-0.180	0.470**			
	(0.293)	(0.176)			
EAC_Intra	1.586**	1.136**	0.974**	0.997**	0.997**
	(0.360)	(0.312)	(0.333)	(0.356)	(0.356)
COMESA_Intra	1.195*	2.661**			
	(0.514)	(0.584)			
WTO_Intra	-1.198**	0.270	0.452	6.148**	6.148**
	(0.384)	(0.378)	(0.374)	(1.472)	(1.472)
ln_DIST	0.005	0.040			
	(0.054)	(0.032)			
EAC_Intra_LEAD3			0.437		
			(0.299)		
COMESA_Intra_LEAD3			-1.467**		
			(0.287)		
WTO_Intra_LEAD3			-0.611		
			(0.466)		
EAC_Intra_LAG3				-0.342	-0.341
				(0.369)	(0.369)
EAC_Intra_LAG6				0.223	0.223
				(0.382)	(0.382)
EAC_Intra_LAG9				-0.522	-0.521
				(0.318)	(0.318)
EAC_Intra_LAG12				-0.351	-0.350
				(0.334)	(0.334)
COMESA_Intra_LAG3				0.155	0.155
				(4.547)	(4.548)
COMESA_Intra_LAG6				-0.568	-0.570
				(5.781)	(5.782)
COMESA_Intra_LAG9				0.553	0.553
				(0.902)	(0.902)
COMESA_Intra_LAG12				0.617	0.619
				(0.479)	(0.478)
WTO_Intra_LAG3				-5.278**	-5.278**
				(1.953)	(1.953)
WTO_Intra_LAG6				6.502**	6.502**
				(1.476)	(1.476)
WTO_Intra_LAG9				4.482**	4.482**
				(1.504)	(1.504)
WTO_Intra_LAG12				5.718**	5.718**
				(1.363)	(1.363)
INTL_BRDR_2002					-2.052**
					(0.491)
INTL_BRDR_2005					1.309*
					(0.517)
INTL_BRDR_2008					2.692**

	OLS	PPML	LEAD	PHSNG	GBLN
	[1]	[2]	[3]	[4]	[5]
					(0.480)
INTL_BRDR_2011					2.043**
					(0.484)
INTL_BRDR_2014					-2.854**
					(0.419)
Constant	5.575**	5.780**			
	(1.157)	(0.495)			
N	3141	3141	3141	3141	3141
Total RTA effects					
EAC_Intra				0.008	0.008
					(0.612)
COMESA_Intra				0.757	0.757
				(0.940)	(0.940)
WTO_Intra				17.572	17.572
				(4.181)	(4.181)
Fixed effects					
Importer time	Yes	Yes	Yes	Yes	Yes
Exporter time	Yes	Yes	Yes	Yes	Yes
Country pair	No	Yes	Yes	Yes	Yes

Notes: This table reports estimates of the effects of RTAs using trade only data for 3-year data gaps. All estimates are obtained from data for the years 1990, 1993, 1996, 1999, 2002, 2005, 2008, 2011, 2014 and 2017 and use importer-time and exporter-time fixed effects that are omitted for brevity. Columns (2)–(5) add country-time pair fixed effects to handle the issue of endogeneity. The estimates of the pair fixed effects are omitted for brevity. Column (1) provides the OLS estimates and columns (2)–(5) show the PPML estimates. Column (3) introduces eac-intra, COMESA_Intra and WTO_Intra lead. Column (4) allows for phasing-in effects of RTAs. Finally, Column (5) accounts for the effects of globalisation. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

4.4.1 Alternative Specifications

In this subsection, I estimate the same specifications shown in Table 4.14 but use a panel of 4-year and 5-year gaps. Previous studies adopt the use of 3-year intervals (Trefler, 2004), 4-year intervals (Anderson, Larch & Yotov, 2015, 2016; Dai et al., 2014) and 5-year intervals (Baier & Bergstrand, 2007; Baier, Bergstrand & Clance, 2018). Olivero and Yotov (2012) argue for the relevance of experimenting with alternative intervals of panels for the gravity model. Tables 4.15 and 4.16 show results for these specifications. Overall, the results from the 4-year panel interval align with those from Table 4.14. However, in Table 4.15, I observe statistically significant effects of the variables addressing potential non-linear and phasing-in effects of the COMESA bloc. The results are in line with the conclusion that the average effects of the COMESA are non-monotonic and capture phasing in.

Table 4.15: *Effects of Regional Trade Agreements on Trade: 4-Year Data Gaps*

	OLS4	PPML4	LEAD4	PHSNG4	GBLN4
	[1]	[2]	[3]	[4]	[5]
Contiguity	-0.720*	-0.037			
	(0.335)	(0.186)			
Official Language	0.014	-0.189*			
	(0.121)	(0.089)			
Colony	-0.348	0.514**			
	(0.373)	(0.143)			
EAC_Intra	1.747**	1.002**	0.878**	0.492	0.492
	(0.473)	(0.303)	(0.314)	(0.385)	(0.385)
COMESA_Intra	1.738**	2.899**			
	(0.445)	(0.818)			
WTO_Intra	0.200	1.747*	1.816**	3.005**	3.006**
	(1.196)	(0.699)	(0.703)	(0.688)	(0.688)
ln_DISTij	-0.061	-0.063***			
	(0.063)	(0.037)			
EAC_Intra_LEAD4			0.406		
			(0.279)		
COMESA_Intra_LEAD4			-1.344*		
			(0.564)		
WTO_Intra_LEAD4			0.043		
			(0.695)		
EAC_Intra_LAG4				0.275	0.275
				(0.407)	(0.407)
EAC_Intra_LAG8				-0.652	-0.652
				(0.417)	(0.417)
EAC_Intra_LAG12				-0.372	-0.372
				(0.318)	(0.318)
COMESA_Intra_LAG4				-4.084**	-4.086**
				(1.222)	(1.221)
COMESA_Intra_LAG8				3.664**	3.664**
				(1.094)	(1.095)
COMESA_Intra_LAG12				0.895*	0.895*
				(0.381)	(0.381)
WTO_Intra_LAG4				0.847*	0.847*
				(0.382)	(0.382)
WTO_Intra_LAG8				1.376**	1.375**
				(0.442)	(0.442)
WTO_Intra_LAG12				1.958**	1.958**
				(0.519)	(0.519)
INTL_BRDR_2001					-3.091
					(0.477)**
INTL_BRDR_2005					1.346*
					(0.526)
INTL_BRDR_2009					2.958**
					(0.316)*
INTL_BRDR_2013					0.416
					(0.316)
Constant	6.098**	6.304**	2.679**	2.679**	2.679**
	(1.194)	(0.581)	(0.001)	(0.003)	(0.002)
N	2563	2563	2563	2563	2563
Total RTA effects					
EAC_Intra					-0.257

	OLS4	PPML4	LEAD4	PHSNG4	GBLN4
	[1]	[2]	[3]	[4]	[5]
					(0.509)
COMESA_Intra					0.473
					(0.948)
WTO_Intra					7.186
					(1.545)
Fixed effects					
Importer time	Yes	Yes	Yes	Yes	Yes
Exporter time	Yes	Yes	Yes	Yes	Yes
Country pair	No	Yes	Yes	Yes	Yes

Notes: This table reports estimates of the effects of RTAs using trade-only data for 4-year data gaps. All estimates are obtained from data for the years 1990, 1993, 1996, 1999, 2002, 2005, 2008, 2011, 2014 and 2017 and use importer-time and exporter-time fixed effects that are omitted for brevity. Columns (2)–(5) add country-time pair fixed effects to handle the issue of endogeneity. The estimates of the pair fixed effects are omitted for brevity. Column (1) shows the OLS estimates and columns (2)–(5) show the PPML estimates. Column (3) introduces eac-intra, COMESA_Intra and WTO_Intra lead. Column (4) allows for phasing-in effects of RTAs. Finally, Column (5) accounts for the effects of globalisation. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

The results for the 5-year panel gap are presented in Table 4.16. The results are still in line with those from the previous subsections. In column (5) of Table 4.16, I observe that the coefficient measuring the effect of the variables addressing potential non-linear and phasing-in effects of the EAC bloc are now statistically significant. The results are in line with the conclusion that the average effects of the COMESA are non-monotonic and capture phasing in.

Table 4.16: *Effects of Regional Trade Agreements on Trade:5-Year Data Gaps*

	OLS5	PPML5	PAIRFE5	LEAD5	PHSNG5	GBLN5
	[1]	[2]	[3]	[4]	[5]	[6]
Contiguity	-0.497	0.248	-0.037			
	(0.423)	(0.210)	(0.186)			
Official Language	-0.232	-0.076	-0.189*			
	(0.153)	(0.114)	(0.089)			
Colony	-0.592***	0.177	0.514**			
	(0.352)	(0.191)	(0.143)			
EAC_Intra	1.788**	1.647**	1.002**	1.696**	1.142*	1.142*
	(0.420)	(0.388)	(0.303)	(0.446)	(0.537)	(0.537)
COMESA_Intra	0.935	2.970**	2.899**			
	(0.899)	(1.139)	(0.818)			
WTO_Intra	-1.441**	-2.740**	1.747*	-1.679*	-3.276**	-3.278**
	(0.460)	(0.943)	(0.699)	(0.781)	(0.903)	(0.903)
ln_DIST	0.029	0.095*	-0.063***			
	(0.068)	(0.047)	(0.037)			
EAC_Intra_LEAD5				1.046*		
				(0.430)		
COMESA_Intra_LEAD5				-1.247**		
				(0.239)		
WTO_Intra_LEAD5				1.176		
				(0.801)		
EAC_Intra_LAG5					0.445	0.445
					(0.486)	(0.486)
EAC_Intra_LAG10					-1.051*	-1.051*
					(0.492)	(0.492)
EAC_Intra_LAG15					-0.700***	-0.700***
					(0.424)	(0.423)
COMESA_Intra_LAG5					-0.507	-0.509
					(0.730)	(0.730)
COMESA_Intra_LAG10					1.079	1.078
					(0.733)	(0.733)
COMESA_Intra_LAG15					1.002**	1.003
					(0.138)	(0.138)**
WTO_Intra_LAG5					3.741**	3.742
					(1.374)	(1.374)**
INTL_BRDR_2002						-1.953
						(0.491)**
INTL_BRDR_2007						2.972
						(0.465)**
INTL_BRDR_2012						2.122
						(0.306)**
Constant	5.346**	5.786**	6.304**		2.679**	2.679**
	(1.214)	(0.753)	(0.581)		(0.001)	(0.002)
N	2094	2094	2563	2094	2094	2094
Total RTA effects						
EAC_Intra					-0.164	-0.164
					(0.977)	(0.977)
COMESA_Intra					1.574	1.571
					(.246)	(0.246)
WTO_Intra					0.465	0.464
					(1.034)	(1.034)

	OLS5	PPML5	PAIRFE5	LEAD5	PHSNG5	GBLN5
	[1]	[2]	[3]	[4]	[5]	[6]
Fixed effects						
Importer time	Yes	Yes	Yes	Yes	Yes	Yes
Exporter time	Yes	Yes	Yes	Yes	Yes	Yes
Country pair	No	Yes	Yes	Yes	Yes	Yes

Notes: This table reports estimates of the effects of RTAs using trade only data for 5-year data gaps. All estimates are obtained from data for the years 1990, 1993, 1996, 1999, 2002, 2005, 2008, 2011, 2014 and 2017 and use importer-time and exporter-time fixed effects that are omitted for brevity. Columns (2)–(5) add country-time pair fixed effects to handle the issue of endogeneity. The estimates of the pair fixed effects are omitted for brevity. Column (1) shows the OLS estimates and columns (2)–(5) present the PPML estimates. Column (3) introduces eac-intra, COMESA_Intra and WTO_Intra lead. Column (4) allows for phasing-in effects of RTAs. Finally, Column (5) accounts for the effects of globalisation. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

4.5 On the Magnitude of the Effects of EAC Regional Policy

I notice that I obtain much larger estimates of the EAC effect than estimates reported with data from developed nations, particularly from results displayed in Tables 4.7–4.10. This is mainly for the overall effects in the trading blocs. A casual inspection of the results in Tables 4.11–4.14 indicates that the estimates of EAC effects are fairly large, but smaller than those from Tables 4.7–4.10 in most cases. I believe that the results hold, since they are consistent between the three- and four-dimensional datasets; whether I use 3-year, 4-year or 5-year interval data; and whether I analyse country or product asymmetry. In addition, similar large estimates are reported by Carrere (2006), Glick (2017) and Soloaga and Winters (2001). More recent studies such as that of Candau et al. (2019) and Riedel and Slany (2019) examining African regional entities find similar-size estimates to mine for the effect of regional entities. I also note the large and similar estimates of the effects of RTA on bilateral trade in Caliendo and Parro (2015) and Egger, Larch, Staub and Winkelmann (2011). It should be noted that Baier and Bergstrand (2007) argue that failure to consider endogeneity of RTAs underestimates trade by as much as 75–85% and that FTAs double trade after 10 years.

4.6 Concluding Remarks

The movement to form RI in the Global South has been politically oriented, with less attention devoted to economic pragmatism, leading to skewed outcomes that threaten the region's coherence. Empiricists neglect the effect of this regionalism of African regional blocs. In this empirical study, I sought to explore whether RTAs promote trade in the Global South, using evidence from the EAC. I specified and applied a panel gravity model to annual EAC exports (inclusive of zero trade observations) to 161 countries representing trading partners

from 1990 to 2017. I uniquely captured the effects of RI policy using dummies that reflect intra-bloc trade, bloc exports and bloc imports of the EAC states in the EAC, WTO and COMESA regional blocs. I extended the analysis from the bloc level to consider asymmetry among countries and products, reflective of the Global South's production and export structure.

Several key conclusions emerged from this study and are worth reiterating. For the bloc-level analysis, I note that the EAC has had strong and consistent overall pure TC among its members. Further to this, when I incorporated contemporary progress in estimating gravity equations, and considered my preferred methodology, I came to a similar conclusion—that the COMESA and WTO blocs have also improved EAC trade, though the different econometric methodologies delivered differing outcomes or results. In addition, although I find some evidence of both export and import diversion, I find stronger evidence that the EAC policy is more reflective of both export and import enhancement, than of reduction in trade as would be expected. This implies that EAC policy has enabled member countries within the bloc to increase their imports of commodities from the ROW and to expand their exports to the ROW. In summary EAC regional policy is enabling member countries to strengthen their trade relationships with the ROW.

Further, results were far from homogeneous in the analysis of the country effects of EAC RI policy. For example, Kenya and Rwanda had a clear pure TC in the EAC bloc. Uganda had a pure TC but her intra-bloc trade effects were below expectation. The COMESA led to the enhancement of trade for Kenya, Rwanda and Uganda. Imports for Burundi and Rwanda from the ROW were increased in the WTO.

Similarly, the sectoral outcomes of participating in regionalism were far from homogeneous. Like Urata and Okabe (2014), I find that the type of product and configuration of RTA influence the effects of regionalism on trade. For example, trading in the EAC bloc indicates that the food sector was pure trade creating while the fuel trade was pure trade diverting. However, the EAC led to overall enhancement of trade in manufactured goods, and ore and metals. While in the COMESA, agriculture, food, and ores and metals trade was a pure TC, the manufactured goods trade in the COMESA resulted in a pure TD, and fuels led to an export diversion. Results for the WTO indicate that the bloc led to a pure TC for agriculture and manufactured goods but a pure TD in the food sector.

Looking at the performance of sectors in the countries, results showed that the agriculture, food, manufactured goods and fuels trade in Kenya and Tanzania led to a pure TC in the EAC bloc. Ores and metals trade experienced an enhancement of trade for Kenya and Tanzania. Burundi trade experienced a pure TC for all these products in the EAC. Kenya

increased her trade in agriculture, food, manufactured goods, and ores and metals in the COMESA. Trading in these products for Uganda and Rwanda paints a gloomier picture. For instance, all of Uganda's intra-bloc trade in the EAC declined. However, the overall trade effect for agriculture, food and manufactured goods was pure trade creating while only trade in fuels, and ores and metals was pure trade diverting. In Rwanda agriculture, food and fuels led to a pure TD. In fact, the manufactured goods trade for Rwanda was consistently trade diverting in all three trading blocs. Burundi's trade outcomes are rosy since overall trade effects for all her exports were trade enhancing in all blocs, with the exception of ores and metals traded in both the COMESA and WTO blocs. However, Burundi's manufactured goods imports from the WTO bloc were import diverting.

Based on these results, if economic arguments are to be considered in forming regional entities, the findings highlight the need to enhance the efficacy of RTAs in the EAC because of the strong trade effects from the bloc. Global South governments need to ensure that the effects of the COMESA and WTO are not eroded. In addition, since the impact of RTAs on trade varies across countries and sectors, the results highlight the need to implement country- and sector-specific policies rather than adopting holistic policies.

In relation to regionalism in developing countries, especially, those from SSA, my findings suggest greater attention is required to encourage widening and deepening of regional blocs of countries in close proximity as this appears central to maximising benefits from regionalism, rather than relying on plurilateral and multilateral entities. The lessons learnt from RI at the regional bloc level should help build momentum and provide the motivation for development of larger intergovernmental entities at the plurilateral level, building gradually to the multilateral level. In addition, further regional negotiations should be based on sectoral or product negotiations accommodating member country heterogeneity in regional outcomes.

The findings raise important questions to be addressed in further research examining the hypothesis that the experience of integrating in a regional bloc provides the rationale for negotiating better outcomes for larger intergovernmental entities. I therefore intend to examine whether the EAC trading bloc performs better than the SADC and COMESA trading blocs in the tripartite FTA of EAC, SADCA and COMESA markets.

Chapter 5: Modelling the Impact of Regional Integration on Trade Duration in the East African Community

5.1 Introduction

This chapter explores the role of EAC regional trade policy in reducing the frailty of partners' trade relationships once they have been established.

Over the last three decades, there has been a shift to forming RTAs with a view to enhance trade outcomes, increase investment and drive economic growth and development. Despite the EAC being in existence for close to two decades and partner countries experiencing high growth rates of over 6% per annum, the region's trade is still small, investment low and development elusive in the region. Regionalism, especially in the EAC, is formed with the faulty understanding that there is hysteresis in trade relationships once started. In addition, the increasingly unpredictable and complex trade and investment environment unfolding regionally and multilaterally each year makes one consider that the expected aims of RTAs resulting from stable trade relationships remain elusive.

Irrespective of whether strengthening regional policy, expanding the range of products traded or increasing the size of bloc members within RTAs enables the enhancement of the longevity of trade relationships, it is important to review EAC regional policy. This review provides a sound understanding of the role of regional trading blocs in enhancing the duration of trade, and helping guide actions.

A critical review of the impact of RI on trade duration and the determinants of trade duration is important and needed. First, traditional trade theories presume that trade relationships, once established, are static or persist into the future, ignoring the issue of the duration of trade relationships or exits from export markets (Hess & Persson, 2011; Nitsch, 2009). However, since Besedeš and Prusa (2003) and Besedeš and Prusa (2006a, 2006b) identified that international trade engagements are far more fragile than previously thought, policy and empirical interest in why trade in new markets and products does not grow has increased (Hess & Persson, 2011). Questions have been raised regarding (1) why trade relationships are short lived or intermittent; and, (2) which policy covariates explain such short-lived trade durations (Fugazza & Molina, 2009; Hess & Persson, 2011).

Second, there is no established theoretical explanation for the duration of trade relationships observed in empirical analyses (Hess & Persson, 2011). Established trade theories are incapable of explaining the short-term nature or fragility of trade relationships (Hess & Persson, 2011; Nitsch, 2009). Nonetheless, illuminating theoretical contributions and

explanations of trade fragility are sought from the application of various theories and models from international trade and business (Finger, 1975; Vernon, 1966; Grossman & Helpman, 1991a; Rauch, 1999; Rauch & Watson, 2003). The models have also been successful in explaining the persistence of trade relationships, once they are established, but fail to explain the very short-term nature or termination of trade relationships (Hess & Persson, 2011). This is likely because the literature on duration or survival or death of trade flows is emerging (Hess & Persson, 2011). In the absence of a clear, commonly accepted theoretical explanation for short trade durations, Hess and Persson (2011) recommend that empirical work is undertaken to describe and analyse these short durations.

Third, the empirical literature barely addresses the question of how long trade relationships persist (Besedeš & Prusa, 2003) though a limited but growing number of studies agree that trade relationships are short lived (Besedeš & Prusa, 2010). The few studies undertaken on the issue of trade duration do not agree on various aspects of trade duration (see Besedeš, 2008; Besedeš & Prusa, 2006a; Besedeš & Prusa, 2006b; Nitsch, 2009). In addition, these studies are rife with contrasting views on different aspects of trade duration and on the effect of RTAs on strengthening the duration of trade relationships. One issue is linked to the volatility of trade relationships: some studies argue that trade relationships terminate (Besedeš & Prusa, 2006a; Nitsch, 2009); others argue that they are intermittent (Fugazza & Molina, 2016); and others that the average termination of a relationship is 2–3 years (W. C. Chen, 2012); though canonical studies such as that of Besedeš and Prusa (2003, 2006a, 2006b) find that termination occurs within a year. Contemporary studies like that of Lejour (2015) seem to report longer termination periods. Such large variance in the persistence times of relationships is less informative for policy, especially in regard to South–South partnership. The length of trade relationships is critical to growth in the trade of emerging countries (Chen, 2012). Maintaining existing trade relationships is even more important to long-run export growth than building new relationships (Besedeš, 2008; Besedeš & Prusa, 2010). Lejour (2015) argues that there are lower hazard rates for trading in new products and exporting to new destinations. Though there are few studies on termination rates of South–South trade relationships for specific countries or groups of countries, some studies find that hazard rates for developing country relationships might be as high as 70% (Besedeš & Prusa, 2011).

The other issue relates to the impact of regionalism on duration of trade relationships. On this issue, there are mixed and conflicting results regarding the impact of regional blocs on the persistence of trade relationships. For example, Díaz-Mora et al. (2015), Fugazza and McLaren (2014) and Shao et al. (2012) argue that membership in regional entities is important

for longer trade durations; while Kamuganga (2012) argues that membership in regional blocs has a limited impact on trade survival. Besedeš (2013) and Fertő and Soós (2009) provide contrasting results for the effect of regional entities on the duration of trade relationships.

In addition, on the issue of what makes countries stop trading, Besedeš and Prusa (2010) and Hess and Persson (2011) argue that only a limited number of empirical studies (e.g. Besedeš, 2008; Besedeš & Prusa, 2006a, 2006b; Nitsch, 2009) examine the issue. These studies make conflicting recommendations on the product type in which a country should specialise for longer trade durations. For example, most studies agree that trade in differentiated goods enhances the duration of trade more than does trading in homogeneous goods. However, Obashi (2010) finds that trade in intermediate goods enhances the duration of trade more than does trade in final goods. However, factors that cause an existing trade flow to die are probably also impediments to future trade growth and constrain the development of new trade relationships (Hess & Persson, 2011).

Motivated by the context in which there is no theoretical guidance on duration analysis, and in which empirical analysis produces ambiguous and conflicting outcomes regarding different aspects of the nature of trade duration, this study addresses the following questions: When EAC partner states (whether as a group or individually) trade, how long do their import and export relationships last? Is the trade relationship short lived or are products likely to be exchanged over a long period into the future? What determines the duration of this trade relationships? What role does regionalism play in hazard rates? The answers to these questions provide rich policy implications for a better understanding of growing trade at the intensive margin for developing countries' exports within a regional context.

The remainder of the chapter is organised as follows: Section 5.2 presents the literature on trade duration; Section 5.3 presents a brief description of the modelling framework; Section 5.4 discusses the results; and Section 5.5 concludes the chapter.

5.2 Trade Duration: Theoretical and Empirical Considerations

In the previous section the objective of the empirical study is provided, a discussion of the motivation for the study undertaken and the structure of the chapter outlined. In this section, an elaboration of the theoretical and empirical underpinnings of the empirical study is undertaken. This provides a basis for contextualisation of the empirical process.

The failure of orthodox trade theories to explain the fragility of trade relationship once established (Hess & Persson, 2011; Nitsch, 2009) has compelled empiricists to seek a

theoretical basis for the duration of trade dynamics among a plethora of theories. These theories include the matching model of trade, the search model, the product cycle model (Finger, 1975; Vernon, 1966), quality ladder theory (Grossman & Helpman, 1991a), firm heterogeneity models (Rauch, 1999; Rauch & Watson, 2003), fragmentation theory and the elementary theory of global supply chains. These models have been successful in explaining the determinants of dynamic trade relationships, as affected by (1) product type, (2) market structure and (3) exporter characteristics (Nitsch, 2009). I provide a brief review of the sunk market-entry cost, product cycle, search and product differentiation theories because they are linked to duration analysis.

The sunk market-entry literature (see Baldwin, 1990; Baldwin & Krugman, 1989; Bernard & Jensen, 2004; Das, Roberts & Tybout, 2007; Grossman & Helpman, 1991b; Roberts & Tybout, 1997) attempts to explain persistence or hysteresis of export status (Gullstrand & Persson, 2015; Impullitti et al., 2013). This model presumes that market entry is a costly venture that involves exporting units meeting costly market-specific standards, regulation requirements and foreign demand conditions; and the uncertainity of establishing distribution networks and introducing new products in foreign markets (Bernard & Jensen, 2004; Fugazza & Molina, 2009). Exporting units that incur these sunk market-entry costs tend not to exit the foreign market, thus making trade stable (Fugazza & Molina, 2009; Nitsch, 2009). This export hysteresis persists even when firms incur a loss because the exporting unit avoids paying another market entry cost (Hess & Persson, 2011). However, the theory of sunk costs is criticised for 1) not providing a clear hypothesis on the probability of terminating trade, explaining only persistence of trade relationships despite them being cyclic and not persistent (Gullstrand & Persson, 2015); 2) failing to explain high failure rates in foreign markets (Carrere & Strauss-Kahn, 2012); and 3) explaining the initiation of a trading relationship with the first exporting unit only and not to other partners (Hess & Persson, 2011). The product cycle theory[4] explains that the evolution of trade patterns may be influenced by the introduction of innovation, economies of scale and the role of ignorance and uncertainity (Vernon, 1966). The model assumes a dichotomy between developing and developed countries with enterprises in developed countries innovating new products that are homogeneous in terms of acess to technical capacity. Given these assumptions, the model predicts which countries are exporters

[4] The quality ladder theory is a variant of the product cycle theory developed by Grossman and Helpman (1991a). It predicts that developed countries will create a quality product that captures the market share, which is gradually eroded by new products developed by LDCs through product imitation.

or importers (Finger, 1975), and the evolution of a particular pattern of trade relationship to be established (Besedeš & Prusa, 2006a). The evolved pattern of trade could either develop sluggishly or in a logical pattern (Besedeš & Prusa, 2006a) depending on the interplay of relative cost initially from developed to developing countries (Vernon, 1966). Empirical analysis finds that the theory holds for slowly evolving trade dynamics (Feenstra & Rose, 2000). The product cycle theory is criticised for failing to explain, or being inconsistent with regard to, very short-lived trade relationships observed in the literature (Besedeš & Prusa, 2003, 2006a; Hess & Persson, 2011).

The search model and product differentiation theories have also been borrowed to explain the persistence of trade. Based on microeconomics search theory, Rauch and Watson (2003) develop a framework that fuses a trading partnership between suppliers (exporters) and buyers (importers) through a process of search, investment and rematch. First, there is a stage that involves the buyer (importer in developed country) searching from an array of foreign suppliers (exporters in developing countries) with differing production capacities. The search enables the importer to be matched with an exporter upon the importer paying a search cost. Even given the matched trading partnership, the importer is still uncertain of the capacity of the exporter to fill larger orders that guarantee a surplus. In the second stage, because of uncertainity about the exporters' capacity, the importer moves to deepen or make a permanent investment relationship with the exporter. The importer can either make a lump-sum investment with the supplier or place small orders that the exporter is gradually expected to fill to the importer's expectation. The goal is to enable larger supplies to be made as this generates more surplus for the importer. In the final stage, given the importer's observation of the exporter and a more solid matching, the importer can decide whether to continue with the paternership, abandon the current relationship with the exporter or search for another supplier. Rauch (1999) expounds that the search costs are explained by the dichotomy of tansacting goods that are homogeneous and those that are differentiated. Search costs are lower for homogeneous goods sold in organised markets than for differentiated goods sold in less organised markets. Organised markets make it easier (less costly) to match transacting partners than to less organised markets. The framework predicts that search costs are lower for homogeneous goods than for heterogeneous goods because of the lower supplier-specific investment and ease of matching partners trading in homogeneous goods. All things being equal, the Rauch and Watson framework predicts that the duration of the trading partnership is directly correlated with the amount of the initial order. It also predicts that a decrease in the investment or search cost would increase the propensity to start large or switch suppliers,

respectively. Empirical work undertaken to test these predictions finds them to hold. For example, Besedeš and Prusa (2003, 2006a, 2006b) find that partnerships last longer when trading differentiated goods than when trading homogeneous goods, and Besedeš (2008) finds that export partnerships grow gradually from small transactions, though small initial transactions are of short duration. This conclusion is supported by Iacovone and Javorcik (2010), who gind that new exporters embark on exporting small volumes of merchandise originally sold in domestic markets.

5.3 Modelling Trade Duration in the EAC: Survival Analysis

This empirical study uses the EAC as a basis to broadly resolve two neglected questions in empirical research: (1) How long do trade relationships last in a regional setting, and are they exchanging products in a short period of time or over longer periods? (Besedeš & Prusa, 2003); and (2) What determines the duration of trade relationships; does regional membership enhance duration of trade or not? (Fugazza & Molina, 2009). These questions are addressed using aggregate data at the EAC level, and data decomposed to the country level for analysis of the five EAC country members. Product-level analysis is undertaken at the EAC level and decomposed at the country level. The use of both country- and product-level data is encouraged by authors like Fugazza and Molina (2009). I am encouraged to use export data, following Besedeš and Prusa (2010), Brenton et al. (2010) and Shao et al. (2012). The next subsections explain the strategy I use to explore these questions.

5.3.1 Duration analysis and trade

Application of duration models and analysis is the most appropriate approach to answering the questions posed above about the duration of trade relationships. Duration models and analysis are anchored in survival analysis, where the duration of interest is the survival of a given subject; for example, the existence of a trade relationship without a break (Cameron & Trivedi, 2005; Marno, 2005; Wooldridge, 2004). Duration models aim to model the period over which a trade relationship lasts, once started, before it is terminated or transitioned to another state (Cameron & Trivedi, 2005). There are two reasons for the interest in duration analysis. First, it can explain the lapse of time until a trade relationship is terminated or transitioned. Since trade flows are measured in years, duration is also measured in years (Besedeš & Prusa, 2010; Chen, 2012). Every full trade relationship (i.e. from initiation to termination) is known as a spell or duration—time spent in a given state—and many such spells is referred to as

multiple spells (Chen, 2012; Marno, 2005). Second, duration analysis can explain how various treatments or characteristics of trade relationships affect survival times (Wooldridge, 2004). This subsection has outlined duration modelling. Extensive and detailed discussions can be found in Cameron and Trivedi (2005), Marno (2005) and Wooldridge (2015). Before delving into the empirical methodologies to resolve the issue of duration of trade relationships and its determinants, I discuss the general framework of survival analysis.

5.3.2 Theoretical framework

Hazard, survival, cumulative distribution (cdf) and density functions, as well as censoring, are central to duration analysis. To understand these concepts, assume that T captures the duration of the initial trade relationship or spell, and is non-negative (i.e. $T \geq 0$); t denotes a particular value of T. T's distribution in the population is defined by a cumulative density function denoted $F(t)$, with its density function defined as $f(t) = {dF(t)}/{dt}$. The probability that the spell or duration of a trade relationship lasts as long as t is:

$$F(t) = P[T \leq t], t \geq 0 \tag{5.1}$$

$F(t)$ is continuous and differentiable, having a density function of T such that $f(t) = F^1(t)$.

5.3.2.1 Survival function

If an assumption is made that the trade relationship survives beyond period t, I obtain a survival function denoted as $S(t)$ and defined as:

$$S(t) \equiv 1 - F(t) = P(T > t) \tag{5.2}$$

The conditional probability of ending the initial relationship or state in the period t until $t + h$ given that the trade relationship has survived up to t, is defined as:

$$P[t \leq T < t + h | T \geq T] \tag{5.3}$$

Cameron and Trivedi (2005) argue that the survival function monotonically declines from 1 to 0 since the cdf monotonically increases from 0. If the trade relationship is terminated then $S(\infty) = 0$, otherwise $S(\infty) > 0$, implying that the distribution is defective.

5.3.2.2 Hazard functions

Shorter and shorter intervals that result in the instantaneous probability of exiting a trade relationship upon surviving to period *t* or per unit of time are captured by the hazard function. This is formally defined as:

$$\lambda(t) = \lim_{h \downarrow 0} \frac{P(t \leq T < t + h | T \geq t)}{h} \tag{5.4}$$

Wooldridge (2004) argues that equation (5.4) can approximate the conditional probability just as the height of the density of *T* can be used to approximate the unconditional probability. Thus as h tends to 0, and I approximate:

$$P[t \leq T < t + h | T \geq T] \approx \lambda(t)h \tag{5.5}$$

Marno (2005) characterises the hazard function (i.e. equation (5.4)) and the survival function (i.e. equation (5.3)) as equivalent to the distribution of *T*, since the cdf is differentiable as *h* approximates 0 (Wooldridge, 2004). Formally this is expressed as:

$$\lambda(t) = \frac{f(t)}{1 - F(t)} = \frac{f(t)}{s(t)} \tag{5.6}$$

Hazard models can be expressed as conditional on time-invariant covariates or conditional on time-varying covariates (Wooldridge, 2004). In conditional time-invariant covariates, the assumption is that there is no observed change in the covariates (X) and thus equation (5.4) is expressed as:

$$\lambda(t;X) = \lim_{h \downarrow 0} \frac{P(t \leq T < t+h | T \geq t, X)}{h} \tag{5.7}$$

While for the conditional time-varying endogenous variables, an assumption is made that the endogenous variable X varies with time such that $X(t)$ for $t \geq 0$ and $X(t)$ differ during the spell (Wooldridge, 2004). This is formally expressed as:

$$\lambda\big(t;X(t)\big) = \lim_{h \downarrow 0} \frac{P\big(t \leq T < t+h | T \geq t, X(t+h)\big)}{h} \tag{5.8}$$

5.3.2.3 Constant hazards function

Wooldridge (2004) introduces another concept important to duration analysis—a constant hazard (i.e. $\lambda(t) = \lambda$), which is the cdf of the exponential distribution. Constant hazards imply that the probability of exiting in the next spell is not dependent on the time spent in the current spell (Marno, 2005). A constant hazard is defined as:

$$F(t) = 1 - \exp(-\lambda t) \tag{5.9}$$

When equation (5.9) is not constant, it exhibits duration dependence, which could be either positive duration dependence when the differential of the exponential component is non-negative or negative duration dependence when the differential is negative. Positive duration dependence signals that the possibility of exiting the initial state increases because of longevity in the initial state, otherwise it is negative dependence (Wooldridge, 2004).

5.3.3 Empirical model specification

In this subsection, I adopt the Kaplan–Meier (Kaplan & Meier, 1958) and Nelson–Aalen (Aalen, 1978; Nelson, 1972, 2000) estimators to estimate the probability of EAC trade terminating. I build on the issues developed in the previous subsection to generate Kaplan–Meier and Nelson–Aalen estimates. These two estimators are widely used in trade duration studies (e.g. Besedeš & Prusa, 2003, 2006a; Brenton et al., 2010; Obashi, 2010; Volpe Martincus & Carballo, 2008). These non-parametric methods are preferred as they do not place

assumptions on the distribution of the baseline hazard and are therefore easy to evaluate and interpret.

5.3.3.1 Non-parametric methods: Kaplan–Meier and Nelson–Aalen

I employ these non-parametric estimators noting the concepts of survival function, hazard function and constant hazards. For detailed discussion of the Kaplan–Meier product-limit method and log-rank test, see Cox and Oakes (1984) and Kalbfleisch and Prentice (2002).

Let $t_k, k = 1, 2,\ldots n$ denote the times at which failure occurs. Let n_k be the time or number at risk of failure just before time t_k, and d_k be the number of failure or relationships that end at time t_k. Then the non-parametric maximum likelihood estimate of the survival function (Kaplan & Meier, 1958) is:

$$\hat{S}(t) = \prod_{k/t_k \leq t} \left(\frac{n_k - d_k}{n_k}\right) \tag{5.10}$$

The non-parametric Kaplan–Meier formulation in equation (5.10) is adopted and used in studies such as that of Besedeš and Prusa (2003, 2006a, 2006b), Nitsch (2009) and Obashi (2010). Where t_k is the survival time within which n_k number of survivals are at risk of failure as k varies from 1, 2,…n. d_k is the number of observed failures by end of time t_k. By convention, $\hat{S}(t)$ is equal to 1 if $k < t_1$.

The estimates of the Kaplan–Meier and Nelson-Alan are analysed for the duration of the study (i.e. 27 years) to capture the duration of EAC persistence and the counterfactual trade before EAC formation in the late '80s and early '90s. The analysis is done at Hymonised System (HS) 6-digit level for the whole sample. The study provides graphical depictions of the survival and cumulative hazard rates corresponding to the decomposition of the bloc, country and product. The failure (or survival) function, $F(t)$, is defined as $1 - \hat{S}(t) = Prob(T \geq t)$. This study adopts the Nelson–Aalen estimator for the cumulative hazard rate function derived from Aalen (1978) and (Nelson, 1972, 2000) for the longest observed time as $\widehat{H}(t) = \sum_{j/t_j \leq t} \frac{d_j}{n_j}$.

5.3.3.2 Estimation methods: Parametric and semi-parametric estimators

In the previous subsection, I develop a framework to employ non-parametric methods. These methods are frequently useful to measure the length of time trade for which relationships persist. In addition, these non-parametric methods are useful for comparing regional policy at the bloc level where analysis is disaggregated by country and products. In this subsection, I extend the previous analysis to describe survival methods that have the ability to adjust for covariates and hence estimate the survival of these trade relationships. Since the non-parametric methods above do not control for other country-, product- and pair-specific characteristics that influence trade duration, I use both parametric and semi-parametric methods (Chen, 2012; Obashi, 2010). Non-parametric methods are only suitable for pairwise comparisons, have difficulty handling heterogeneity in groups and do not consider the effects of continuous variables (Rudi, Grant & Peterson, 2012). Semi-parametric models make no assumptions about baseline hazards over time but assume they are greater than zero. However, estimations from semi-parametric models are only interpreted in terms of relative differences rather than with reference to the baseline. This study uses the popular CPH semi-parametric model for baseline analysis.

I then allow the probability distributions of the survival and hazard models to vary in structure for different spells (parametric models). This allows for smoothing of 'meaningless' data and the inclusion of endogenous policy variables, and a test of different parametric forms to produce more robust results (Rodríguez, 2010).

5.3.3.2.1 Econometric specification of the semi-parametric methods

Following strategies employed in previous studies, in modelling trade duration determinants, this study triangulates and implements both semi-parametric and parametric models. First, the CPH model is estimated and then I estimate parametric models that take care of unobserved heterogeneity not handled by the CPH (Gullstrand & Persson, 2015). A proportional hazards model with explanatory variables was first suggested by Cox (1972). The CPH assumes that the distribution of survival time is unknown and that the baseline hazard at time t ($\lambda_0(t)$) does not need to be known to estimate the hazard ratio. It also assumes that the vector of covariate flows i ($X_i(t)'$) has a proportional impact on the baseline hazard function (Brenton et al., 2010), taking the form:

$$\lambda_i\big(t;\, X_i(t)\big) = \lambda_0(t) exp^{(X_i(t')\beta)} \tag{5.11}$$

where β is a vector of estimation coefficients. The function $exp^{(\chi_i(t')\beta)}$ influences the hazard function to change by the same proportional change in χ_i over time. In this case, the baseline hazard corresponds to the situation when χ_i is equal to null (or zero). Just like in Nitsch (2009), the baseline hazard function varies and this variation creates strata. The model is therefore modified as a stratified CPH. The semi-parametric method is used for baseline purposes to examine the plausibility of the dataset used in this study. In addition, Fugazza and Molina (2016) argue that the CPH is the canonical model to assess the impact of explanatory trade variables on the hazard rate of trade relationships.

5.3.3.2.2 Econometric specification of the parametric methods

This section introduces the basic statistical components of the discrete-time survival analysis, also called parametric analysis. Discrete-time models improve the accuracy of semi-parametric methods by accounting for unobserved heterogeneity (Brenton et al., 2010; EsteveE-Perez et al., 2013; Gullstrand & Persson, 2015; Hess & Persson, 2012). Applications of discrete-time methods are less common in the literature yet most duration events (especially trade relationship) occur in discrete periods (Allison, 1982; Masyn, 2003; Muthén & Masyn, 2005). However, there is a growing trade literature applying discrete-time models (see Beverelli, Rocha & Kukenova, 2011; Cadot et al., 2013; Carrere & Strauss-Kahn, 2012; Díaz-Mora et al., 2015; Fugazza & McLaren, 2014; Fugazza & Molina, 2016; Hess & Persson, 2011, 2012; Socrates et al., 2020). Most studies apply the continuous-time proportional model predicated on the often unrealistic assumption that the effect of a predictor on event occurrence is constant over time (Singer & Willett, 1993). There are three specifications of discrete-time models: logistic (logit), complementary log-log (clog-log) and probit specifications (Hess & Persson, 2012; Lancaster, 1990; Wooldridge, 2004, 2010). For the main regressions, this study implements the discrete-time logit model since it is the most familiar application in the literature and software programs, and Cox (1972) vouches for it (Masyn, 2003). In addition, I apply the discrete-time probit estimator in the main regressions as Fugazza and McLaren (2014) argue that it is the most efficient for handling non-proportionality and tied duration times, and easily treats unobserved heterogeneity. The logit and probit models are very similar as the two estimators do not impose this proportionality assumption (Hess & Persson, 2012). I present results for the clog-log estimator for the sensitivity analysis since the estimator has built-in assumptions of CPH models of the exact grouped duration analogue (Fugazza &

McLaren, 2014; Hess & Persson, 2012; Kalbfleisch & Prentice, 2002, 2011; Prentice & Gloeckler, 1978). In addition, I report results for MESTREG.

The concept behind discrete-time models is similar to that for the semi-parametric models (Allison, 1984) discussed above. Following Allison (1982, 1984) and Jenkins (2005, 2008), I define a discrete-time hazard rate according to Allison (1982) as:

$$P_{it} = Pr[T_i = t \mid T_i \geq t, X_{it}] \tag{5.12}$$

Recall that *T* is defined as a random variable giving the uncensored time of event occurrence with a conditional probability that an event occurs at time *t*, given that it has not occurred before. Notice that the hazard rate can be defined in terms of the period (time) and covariates. I adopt Allison's (1982) definition of the logistic regression function, which takes the form:

$$P_{it} = \frac{1}{[1+ exp(-\propto_t - \beta' X_{it})]} \tag{5.13}$$

Collapsing equation (5.13) into a logit form gives:

$$log[P_{it}/(1 - P_{it})] = \alpha_t + \beta' X_{it} \tag{5.14}$$

Allison (1982) argues that when the assumption is made that the data generation process follows a continuous-time proportional hazard model to fit equation (5.11), Prentice and Gloeckler (1978) demonstrate that the corresponding discrete-time hazard function would be given by:

$$P_{it} = 1 - exp(\propto_t + \beta' X_{it}) \tag{5.15}$$

The coefficient β in equations (5.11) and (5.15) is identical. Consequently, equation (5.15) can be manipulated to yield the complementary log-log function:

$$log[-log(1-P_{it})] = \alpha_t \beta' X_{it} \tag{5.16}$$

To estimate the above logit and clog-log equations, one can define a dummy variable y_{it} equal to 1 when a trade relationship terminates at time t; otherwise it is 0. After necessary manipulations of the equations through pooling the observations, one estimates the maximum log-likelihood estimate for each model or observed data, for the specified dichotomous dependent variable as (Allison, 1982; Hess & Persson, 2012):

$$\log(L) = \sum_{i=1}^{n} \sum_{j=1}^{t_i} y_{it}\, log\left\{\frac{P_{ij}}{(1-P_{ij})}\right\} \sum_{i=1}^{n} \sum_{j=1}^{t_i} log(1-P_{ij}) \tag{5.17}$$

The most commonly encountered functional specifications of equation (5.17) are the normal, logistic and extreme-value minimum distribution, leading to probit, logit or clog-log models, respectively. To save space, I do not specify the functional form of the probit model but indicate that it is similar to the functional specification of the logistic model and refer readers to the literature (including Díaz-Mora et al., 2015; Masyn, 2003; Muthén & Masyn, 2005; Wooldridge, 2015). I then model the logit, probit and clog-log using Stata panel commands *xtlogit*, *xtprobit* and *xtcloglog* with the necessary extensions to handle observed and unobserved heterogeneity (StataCorp, 1985, 2013, 2016).

I include several dummies in the models, including year, spell, country (importer and exporter) and sector or product, to account for endogeneity following Socrates et al. (2020). The other covariates include gravity variables, trade fixed costs, spell 'type' variables and the study's variables of interest capturing RI. The regional variables capture the effect of the EAC in the EAC, COMESA and WTO regional blocs. They are equal to 1 when the EAC countries export products to importers in each of the regional blocs; otherwise they are 0.

5.4 Data and Definition of Variables

This empirical study examines the nature of the duration of EAC trade relationships, emphasising the role of EAC regionalism in enhancing the duration of her trade relationships, using 6-digit SITC data (Revision 3) from COMTRADE. The study considers a composition

of 13 products described in Table 5.1. It is deduced that non-oil (12.81%), agriculture (12.15%), low technology (10.54%), manufactured goods (8.71), agricultural raw materials (8.12%) and resource-based exports (8.01%) represent the bulk of EAC trade or exports, involving around 38,213 (60.34%) tariff lines from a total of 66,948 tariff lines or trade spells. The least represented products in the sample are fuels (1.15%), and ores and metals (3.69%) at 4.84% (66,948) of product lines.

I consider the imports (here referred to as exports of EAC to the ROW) of the five EAC exporters to the ROW for the period 1988–2015. The duration of 27 years is sufficient to undertake a trade duration analysis. No study of the EAC or any group of LDCs uses such a comprehensive dataset containing as many as 171 countries, 13 products and 27 years of trade. Table 5.1 shows the composition of EAC products' and sectors' trade. The exporters' trade composition is shown in Table 5.2. The data are comprised of 172 importers (developed, developing and LDCs) (Table 5.3).

The final sample data includes 15,502 failures or failed trade relationships[5] and 63,494 trade spells.[6] The average number of trade spells is just over 4, with 12,376 being the maximum number of records for any single trade spell. From this, I deduce that there are multiple trade relationships per subject (spells). All trade relationships began in 1988—there is no delayed entry—and the average time to termination of a trade relationship is around 4 years, with a minimum of 1 year and a maximum of 27 years, in 2015. However, when I consider censoring, I notice that the median survival of EAC trade relationships once they start is 2 years. Seventy-five % of the EAC's trade relationships are observed to persist for 5 years and 25% failing after 1 year. There are no missing trade relationships in the data. By 2008, only 777 trade relationships are at risk, as shown in Figure 5.1. The maximum number of failures is 225 and the minimum is 0, indicating the presence of censored observations.

[5] Defined as the product being exported by a particular EAC country to the ROW in a particular year.
[6] Defined as a period of time with an uninterrupted product exported from a particular EAC country to the ROW market.

Table 5.1: *Composition of Products or Sectors Adopted in the Study*

Product or Sector Name	Product or Sector Code	Frequency	Percentage	Cumulative Percentage
Agricultural Raw Materials	AgrRaw	5,155	8.12	8.12
Agriculture	Agriculture	7,715	12.15	20.27
Food Items	Food	4,514	7.11	27.38
Fuels	Fuels	729	1.15	28.53
High Technology Exports	HighTech	4,392	6.92	35.44
Low Technology Exports	LowTech	6,690	10.54	45.98
Medium Technology Exports	MediumTech	5,035	7.93	53.91
Non-Oil Exports	NonOil	8,133	12.81	66.72
Ores & Metals	OresMtls	2,344	3.69	70.41
Primary Products	PrimaryProds	4,051	6.38	76.79
Resource-Based Exports	ResourceBased	5,087	8.01	84.80
Textiles	Textiles	4,116	6.48	91.29
Manufactured Goods	Manuf	5,533	8.71	100.00
Total		63,494	100.00	

Table 5.2: *Composition of Exporters in the Study*

Country	Country Code	Frequency	Percentage	Cumulative Percentage
Burundi	BDI	5,014	7.90	7.90
Kenya	KEN	23,424	36.89	44.79
Rwanda	RWA	5,712	9.00	53.78
Tanzania	TZA	16,965	26.72	80.50
Uganda	UGA	12,379	19.50	100.00
Total		63,494	100.00	

Table 5.3: *List of Importers of EAC's Exports*

Afghanistan	Chad	Greece	Madagascar	Portugal
Albania	Chile	Greenland	Malawi	Qatar
Algeria	China	Grenada	Malaysia	Reunion
Andorra	Colombia	Guadeloupe	Maldives	Romania
Angola	Comoros	Guatemala	Mali	Russian Federation
Anguila	Costa Rica	Guinea	Malta	Rwanda
Antigua & Barbuda	Cote d'Ivoire	Guyana	Martinique	Sao Tome and Principe
Argentina	Croatia	Honduras	Mauritania	Saudi Arabia
Armenia	Cuba	Hong Kong, China	Mauritius	Senegal
Australia	Cyprus	Hungary	Mexico	Seychelles
Austria	Czech Republic	Iceland	Micronesia, Fed. Sts.	Sierra Leone
Azerbaijan	Denmark	India	Moldova	Singapore
Bahamas, The	Djibouti	Indonesia	Mongolia	Slovak Republic
Bahrain	Dominica	Iran, Islamic Republic	Morocco	Slovenia
Bangladesh	Dominican Republic	Iraq	Mozambique	Solomon Islands
Barbados	DRC	Ireland	Myanmar	Spain
Belarus	East Timor	Israel	Namibia	Sri Lanka
Belgium	Ecuador	Italy	Nepal	St. Kitts & Nevis
Belize	Egypt, Arab Republic	Jamaica	Netherlands	St. Lucia
Benin	El Salvador	Japan	Netherlands Antilles	Suriname
Bermuda	Eritrea	Jordan	New Caledonia	Swaziland
Bhutan	Estonia	Kazakhstan	New Zealand	Sweden

Bolivia	Ethiopia (excludes Eritrea)	Kenya	Nicaragua	Switzerland
Bosnia and Herzegovina	Faroe Islands	Korea, Republic	Niger	Syrian Arab Republic
Botswana	Fiji	Kuwait	Nigeria	Thailand
Brazil	Finland	Kyrgyz Republic	Norway	Togo
Brunei	Fm Sudan	Lao PDR	Oman	Tonga
Bulgaria	France	Latvia	Pakistan	Trinidad & Tobago
Burkina Faso	French Guiana	Lebanon	Palau	Tunisia
Burundi	French Polynesia	Lesotho	Panama	Turkey
Cambodia	Gabon	Libya	Papua New Guinea	United Arab Emirates
Cameroon	Gambia, The	Lithuania	Paraguay	United Kingdom
Canada	Georgia	Luxembourg	Peru	
Cape Verde	Germany	Macao	Philippines	
Central African Republic	Ghana	Macedonia, FYR	Poland	

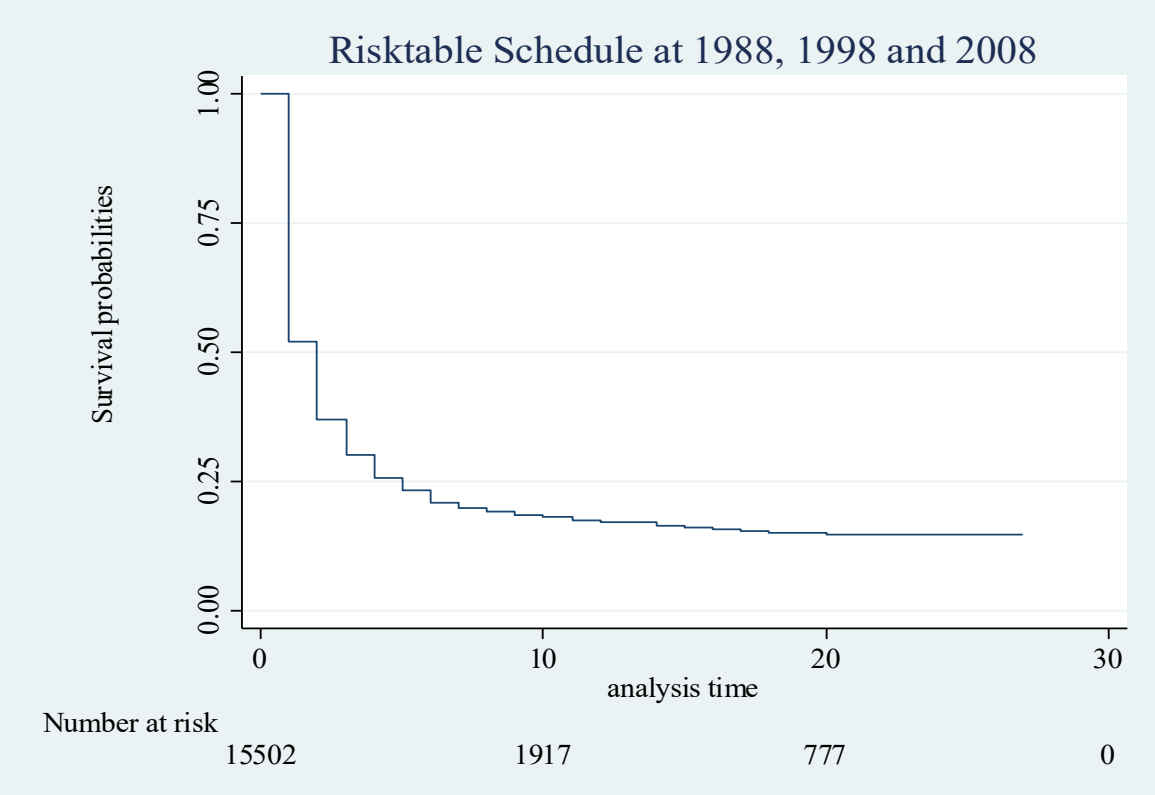

Figure 5.1. Kaplan–Meier survival estimates with risk table.

The data used in this study were mined from two main sources. Trade data were sourced from the WITS. They include the product or sector categories of the gross imports from the five EAC countries to the ROW for the years 1988–2015. The data range is sufficiently wide to cover the process of EAC regionalism in the EAC, COMESA and WTO blocs and it is plausible to undertake an econometric analysis. The other dataset is the CEPII gravity data. The CEPII 'gravdata' constitutes a 'square' gravity dataset including all world pairs with non-missing flows. In addition, the dataset is arranged in such a way that it can easily be merged with other datasets and mapped to data from the WDI and datasets constructed by Frankel et al. (1997), Head and Mayer (2014) and Head, Mayer and Ries (2010). Summary statistics are presented in Table 5.4 and the correlation matrix is provided in Table 5.5. Overall, there is moderate correlation between the variables at all levels. The variables have the expected correlation.

Table 5.4: *Variable Description, Summary Statistics and Sources*

Covariate(s)	Variable Description	Count	Mean	Standard Deviation	Minimum	Maximum	Source
Exports	Gross imports in USD from EAC partner states to the ROW (here called exports of EAC)	63494	3368554.000	14500000.000	1.000	261000000.000	WITS
Initial exports	Gross imports in USD from EAC partner states to the ROW (here called exports of EAC)	63494	3263777.000	6050381.000	1000.000	28800000.000	WITS
Log exporter population	Population of origin, total in millions	63494	3.116	0.537	1.664	3.948	CEPII
Log of importer population	Population of destination, total in millions	63392	2.549	1.800	-4.472	7.218	CEPII
Log of exporter GDP per capita	Output-side real GDP at chained PPPs (in mil. 2011USD)	63494	5.766	0.452	4.682	7.221	CEPII
Log of importer GDP per capita	Expenditure-side real GDP at chained PPPs (in mil. 2011USD)	62685	8.483	1.671	4.682	11.667	CEPII
Log of distance	Simple distance (most populated cities, km)	63494	8.574	0.706	4.199	9.806	CEPII
Contiguity	1 for contiguity; 0 otherwise	63494	0.043	0.203	0.000	1.000	CEPII
Common official language	1 for common official of primary language; 0 otherwise	63494	0.294	0.456	0.000	1.000	CEPII
Common coloniser	1 for common coloniser post-1945; 0 otherwise (dummy for origin and destination ever in colonial relationship)	63494	0.214	0.410	0.000	1.000	CEPII

Covariate(s)	Variable Description	Count	Mean	Standard Deviation	Minimum	Maximum	Source
Exporter entry costs	Cost of business start-up procedures (% of [Gross National Income (GNI)] per capita)	18574	92.435	63.645	4.700	241.200	CEPII
Importer entry costs	Cost of business start-up procedures (% of GNI per capita)	17471	40.022	65.275	0.000	534.800	CEPII
Exporter procurement costs	Start-up procedures to register a business (number)	18574	11.716	3.397	3.000	17.000	CEPII
Importer procurement costs	Start-up procedures to register a business (number)	17471	8.782	3.351	1.000	21.000	CEPII
Exporter entry time	Time required to start a business (days)	18574	28.668	12.342	5.000	60.000	CEPII
Importer entry time	Time required to start a business (days)	17471	33.443	32.170	0.500	690.500	CEPII
Spell number	Identifies the number of the spell (in case there are multiple spells for each time period)	63494	1.921	1.186	1.000	9.000	CEPII
Spell length	Variable measuring the length of each spell	63494	13.520	9.988	1.000	28.000	CEPII
EAC RTA dummy	Measure of the increase in intra-bloc trade resulting from forming the EAC	27291	0.007	0.080	0.000	1.000	CEPII
COMESA RTA dummy	Measure of the increase in intra-bloc trade resulting from forming the COMESA	41238	0.018	0.132	0.000	1.000	CEPII
WTO RTA dummy	Measure of the increase in intra-bloc trade resulting from forming the WTO	39533	0.008	0.087	0.000	1.000	CEPII

Table 5.5: *Correlation Coefficients*

	A	B	C	D	E	F	G	H	I	J	K
A	1										
B	-0.009	1									
C	0.049***	0.055***	1								
D	0.033***	-0.102***	0.081***	1							
E	0.114***	-0.039***	-0.033***	0.032***	1						
F	0.007	0.023**	-0.021**	0.005	-0.010	1					
G	-0.003	-0.008	-0.025**	-0.019*	-0.002	-0.002	1				
H	0.044***	0.027***	0.030***	0.067***	0.019*	-0.035***	-0.028***	1			
I	0.102***	-0.013	0.123***	0.149***	0.053***	0.104***	-0.000	-0.215***	1		
J	0.004	0.070***	0.102***	-0.160***	-0.043***	-0.021**	-0.005	0.643***	-0.229***	1	
K	0.015	0.049***	0.207***	-0.018*	-0.156***	-0.060***	-0.005	-0.085***	-0.256***	0.012	1
L	-0.065***	0.022**	0.016*	-0.051***	-0.351***	-0.064***	-0.004	0.064***	0.054***	0.096***	0.434***
M	0.146***	-0.054***	-0.027***	0.100***	0.625***	-0.016*	-0.003	-0.034***	0.045***	-0.104***	-0.261***
N	0.007	-0.021**	-0.015	0.042***	0.169***	-0.058***	-0.012	-0.114***	-0.115***	-0.064***	-0.112***
O	0.041***	0.040***	0.053***	0.006	0.206***	-0.048***	-0.009	0.243***	-0.219***	0.121***	-0.067***
P	0.018*	-0.052***	-0.121***	0.198***	0.055***	-0.006	0.009	-0.489***	0.163***	-0.747***	-0.040***
Q	-0.028***	-0.043***	-0.118***	0.054***	0.036***	-0.011	-0.001	0.038***	0.057***	-0.036***	-0.625***
R	0.042***	-0.049***	-0.061***	0.221***	0.045***	0.015*	-0.021**	0.564***	-0.065***	0.167***	-0.098***
S	0.015*	-0.034***	-0.093***	0.065***	0.134***	-0.013	0.0141	0.057***	0.274***	-0.085***	-0.455***
T	0.020**	-0.043***	-0.060***	0.319***	0.032***	-0.017*	-0.022**	0.726***	-0.125***	0.350***	-0.182***
U	0.000	-0.045***	-0.146***	0.091***	0.049***	-0.059***	0.006	0.084***	0.119***	-0.065***	-0.260***

Notes: A, Exports; B, Initial exports, C, Spell number; D, Spell length; E, EAC dummy; F, COMESA dummy; G, WTO dummy; H, Exporter population; I, Importer population; J, Exporter GDP; K, Importer GDP; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 5.6: *Correlation Coefficients*

	L	M	N	O	P	Q	R	S	T	U
L	1									
M	-0.559***	1								
N	-0.231***	0.185***	1							
O	-0.277***	0.261***	0.415***	1						
P	-0.090***	0.118***	0.088***	-0.071***	1					
Q	-0.377***	0.164***	0.107***	0.023**	0.064***	1				
R	0.014	0.002	-0.047***	0.164***	-0.07***	0.054***	1			
S	-0.182***	0.118***	-0.093***	0.045***	0.100***	0.282***	0.095***	1		
T	0.050***	-0.012	-0.088***	0.159***	-0.228***	0.141***	0.648***	0.202***	1	
U	-0.041***	0.026***	-0.056***	-0.012	0.087***	0.205***	0.117***	0.570***	0.208***	1

Notes: L, distance; M, Contiguity; N, Common official language; O, Common coloniser after 1945; P, Exporter entry costs; Q, Importer entry costs; R, Exporter procurement costs; S, Importer procurement costs; T, Exporter entry time; and U, Importer entry time; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

5.5 Non-Parametric Analysis

In this subsection, the study proceeds in several steps: first, it describes the overall survival function ($\hat{S}(t)$) and hazard function ($\hat{H}(t)$) using the Kaplan–Meier estimator outlined above. Second, the study undertakes a non-parametric analysis to shed light on the heterogeneous effects of RI across EAC countries. Third, the study explores the differentials in products and concludes by examining the products within the countries themselves.

5.5.1 EAC regional integration: Bloc-level analysis

The survival function, ($\hat{S}(t)$), is graphed in Figure 5.1. The curve presents interesting information about the nature of the duration of exports from the EAC. As expected, ($\hat{S}(t)$) is negatively sloped with a smooth downward-sloping curve. This indicates that countries importing from their EAC partner countries experience a high conditional probability of failure in the early stages of these trading relationships and a smaller probability as relationships mature in subsequent years. After large decreases in the probability of survival in each of the first 5 years of 52, 37, 30, 23 and 21, the survival function levels off and changes little.

The probability of exporting a product from the EAC for more than 7 years is 0.1996, only around six percentage points lower than the probability of exporting for more than 4 years (0.2568). The survival function remains fairly monotonically non-decreasing after 20 years of exporting products from the EAC. The fact that more than 15% of EAC partner countries' exports persisted after 20 years is somewhat surprising; however, only 777 trade relationships or spells were still in place after 20 years whereas more than 15,502 did not persist beyond the first year. Table 5.7 displays these probabilities in the 'Survival Function' column.

The cumulative hazard function is shown in Figure 5.2, together with the 95% confidence intervals. The intervals are quite tight and closely dispersed along the cumulative curve probably because of the large size of the dataset used in this study. The rate of change of the hazard curve is high for the first few years and then declines in subsequent years, up to 20 years. From then on, the curve flattens. These results are consistent with conclusions from the survival curve in Figure 5.1.

Table 5.7: *Survival Function for the EAC Bloc Trade*

Time	Beginning Total	Fail	Net Lost	Survival Function	Standard Error	[95% Confidence Interval]	
1	15502	7423	411	0.5212	0.0040	0.5133	0.5290
2	7668	2203	266	0.3714	0.0039	0.3637	0.3791
3	5199	997	183	0.3002	0.0038	0.2928	0.3076
4	4019	581	139	0.2568	0.0036	0.2497	0.2639
5	3299	321	141	0.2318	0.0035	0.2249	0.2388
6	2837	264	119	0.2102	0.0034	0.2035	0.2170
7	2454	124	109	0.1996	0.0034	0.1930	0.2063
8	2221	86	81	0.1919	0.0034	0.1853	0.1985
9	2054	62	75	0.1861	0.0033	0.1796	0.1927
10	1917	52	75	0.1811	0.0033	0.1746	0.1876
11	1790	47	77	0.1763	0.0033	0.1699	0.1828
12	1666	37	63	0.1724	0.0033	0.1660	0.1789
13	1566	24	81	0.1697	0.0033	0.1633	0.1762
14	1461	59	101	0.1629	0.0033	0.1565	0.1694
15	1301	26	113	0.1596	0.0033	0.1533	0.1661
16	1162	13	163	0.1578	0.0033	0.1515	0.1643
17	986	22	55	0.1543	0.0033	0.1479	0.1608
18	909	16	62	0.1516	0.0033	0.1452	0.1581
19	831	15	39	0.1489	0.0033	0.1424	0.1554
20	777	2	83	0.1485	0.0033	0.1421	0.1551
21	692	1	50	0.1483	0.0033	0.1418	0.1548
22	641	0	62	0.1483	0.0033	0.1418	0.1548
23	579	0	49	0.1483	0.0033	0.1418	0.1548
24	530	0	19	0.1483	0.0033	0.1418	0.1548
25	511	0	26	0.1483	0.0033	0.1418	0.1548
26	485	1	47	0.1480	0.0033	0.1415	0.1546
27	437	0	437	0.1480	0.0033	0.1415	0.1546

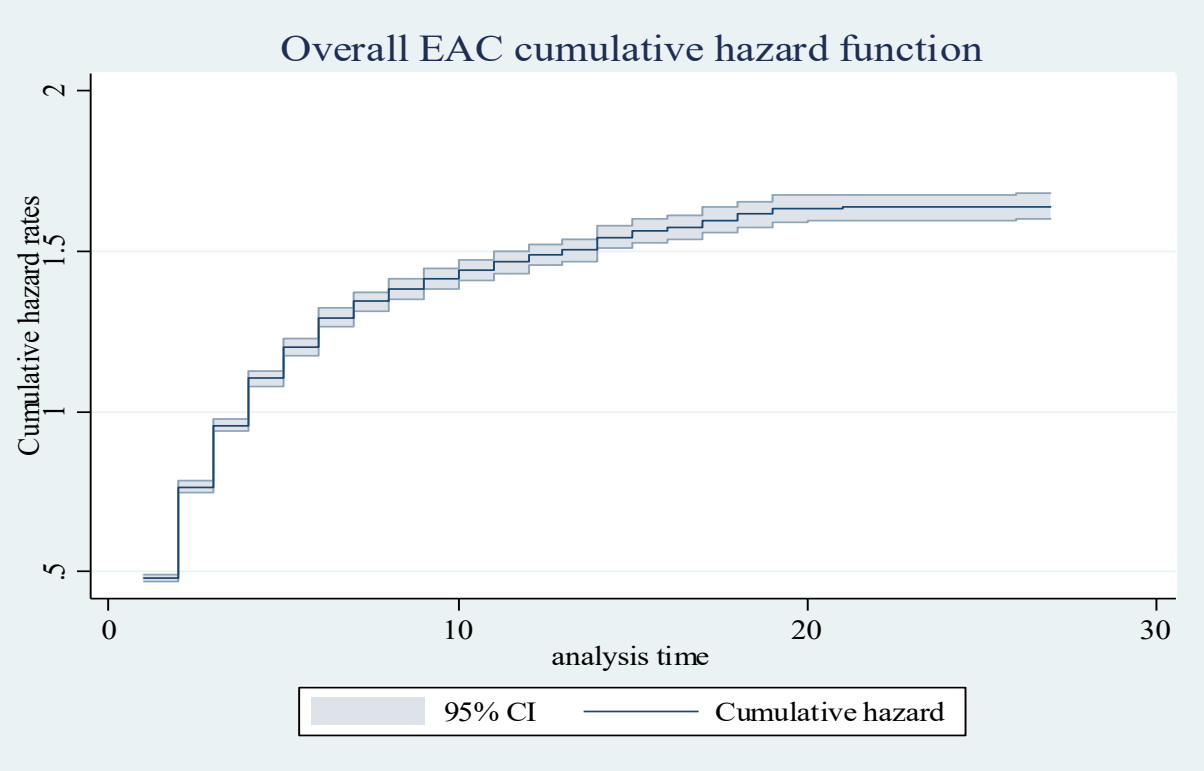

Figure 5.2. Cumulative hazard function with 95% confidence interval.

5.5.2 Comparison of participation across regional blocs

In this subsection, I undertake an analysis of participating or not in RI. This differential analysis of the Kaplan–Meier curves across regional blocs reveals interesting insights based on the results shown in Figure 5.3. The survival curves in panels A, B and C are broadly similar to that in Figure 5.1. For example, the slopes are steep in the first and second years. This indicates that the hazard rates are much higher in this period. However, there are disparities in the slopes of the Kaplan–Meier curves after the first and second years and over time. In Panel A of Figure 5.3, the survival rates when participating in the EAC bloc are much higher than those when not participating in the EAC bloc. This persistence when participating in the EAC bloc continues until 7 years when the survival rates when not participating in the EAC exceed those for staying in the EAC bloc.

Participating in the COMESA bloc shows a similar trend in survival rates as for the EAC bloc. The only difference is that the survival rate when participating in the COMESA bloc no longer exceeds that when not participating in the bloc, by the fourth or fifth year—around 3 years short of the trend indicated for participating in the EAC bloc (see Panel B of Figure 5.3). The expectation is that participation in the EAC and COMESA blocs should return

a better hazard performance than not participating in these blocs, but this is not the case. Several factors may explain this. First, the nature of the curves might be explained by the presence or absence of concessions. When countries join the EAC and COMESA blocs, they are provided concessions that allow concession-receiving members to derogate from implementing the EAC trade policy for a period. For as long as these concessions are in place, belonging to the blocs leads to better performance; otherwise the performance is worse as regional bloc membership has costs for participating countries. Second, and related to this, the concessions are supposed to shield participating countries from competition as these countries build their nascent industries. However, more often than not, countries that secure concessions do not build sufficient capacity. When a concession ends, there is no longer an advantage for the country to belong to the bloc. Third, theoretically, when countries join a regional bloc, this spurs their performance at first, but this heightened performance is not sustained. Finally, by the fourth to seventh years, most trade spells would have ceased.

Participating in the WTO bloc produces a survival curve that is the most similar to those in Figures 5.1 and 5.4 (see Panel C of Figure 5.3). This indicates that once EAC partner states enter the WTO bloc, they will always benefit more than if they are not in the WTO bloc. This trend re-enforces the trade hysteresis that presumes that the benefits of a regional entity persist once they are established. The results for the WTO bloc are similar to those reported in previous studies (Blyde, 2008; Socrates et al., 2020).

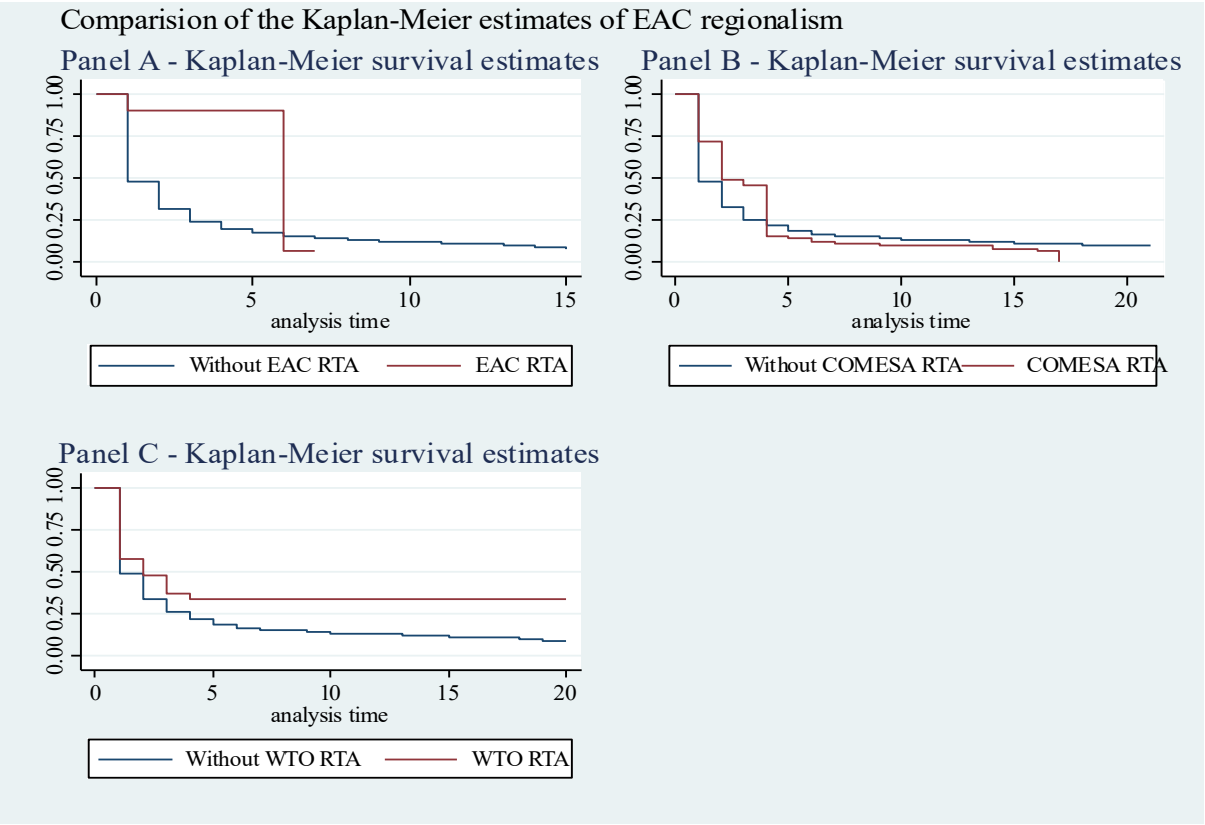

Figure 5.3. Heterogeneity in Kaplan–Meier survival estimates by RTA. *Note*: The curves measure survival probabilities against analysis time in years.

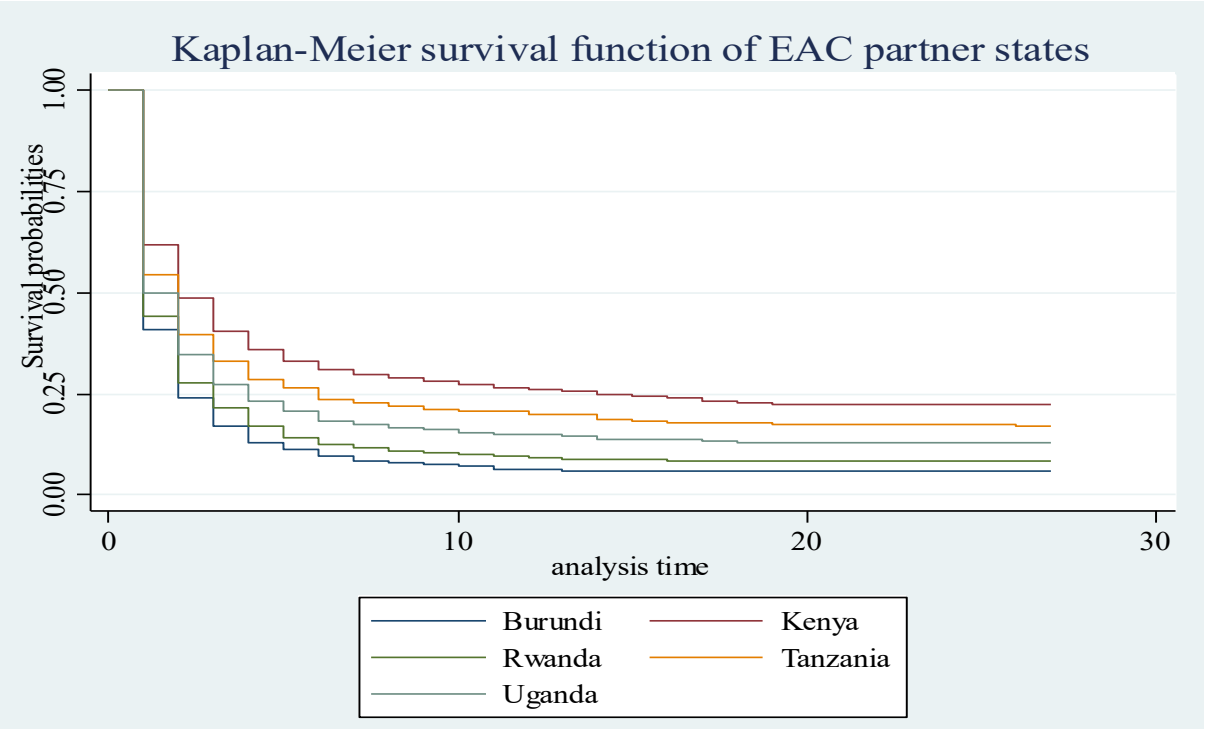

Figure 5.4. Heterogeneity in Kaplan–Meier survival estimates for EAC partner states.

5.5.3 EAC regional integration: Country asymmetry

The Kaplan–Meier country differential analysis reveals some interesting aspects of the nature of EAC partner countries' exporting. The deduction from the analysis indicates that the export spells for the five EAC countries are short lived. This is indicated by the sharp decline in the slopes of their survival curves in the beginning, with approximately 25% of EAC trade relationships ending within a year (see Figure 5.4). This trend is similar for Kenya, Tanzania and Uganda; whereas Burundi and Rwanda experience their median trade relationship terminating after 1 year (see Figure 5.4). The Kaplan–Meier curves for the countries in Figure 5.4 are similar in shape to the bloc-level Kaplan–Meier curve in Figure 5.1. The median survival time for EAC bloc and partner states is just over 2 years. The variation in the longevity of trade relationships increases the longer the relationships last.

As shown in Figure 5.4, Kenya, Tanzania and Uganda's exports have higher survival rates than those of Rwanda and Burundi, in this order. In fact, 75% of Kenya's exports cease after 14 years, while it takes only 6 years for Tanzania's exports to cease, compared with 4, 3 and 2 years for Uganda, Rwanda and Burundi, respectively (see Table 5.8). This might be explained by variation in exports, stability in import demand and preferential market access conditions (Nicita, Shirotori & Klok, 2013). These factors cannot entirely explain the variation in the export relationships of EAC countries, since they are available to all EAC partner countries. The most plausible explanation for this variation emanates from the supply side, including the technical progress and resource endowments that define and enhance each country's economies of scale and scope to influence both comparative and competitive prices. Kenya far exceeds all the other countries' capacity to export, followed by Tanzania, Uganda, Rwanda and Burundi, in order. These results are consistent with previous findings that the duration of EAC trade relationships is short (Besedeš & Prusa, 2006a, 2006b; Blyde, 2008; Martincus & Carballo, 2008; Nicita et al., 2013).

Table 5.8: *Survival Time—Country Asymmetry*

Exporter	Time at Risk	Incidence Rate	Number of Subjects	Survival Time		
				25%	50%	75%
Kenya	23424	0.1242742	4021	1	2	14
Tanzania	16965	0.1680519	3672	1	2	6
Uganda	12379	0.2321674	3525	1	2	4
Rwanda	5712	0.3277311	2192	1	1	3
Burundi	5014	0.3725568	2092	1	1	2
EAC Bloc	63494	0.1949161	15502	1	2	5

5.5.4 EAC regional integration: Product asymmetry

In the previous subsection, the empirical study investigated the duration of trade of EAC exports across countries. In this subsection, the study extends this analysis to investigate how the duration differs across products. The division of products or sectors is shown in Table 5.1.

To investigate cross-product variation, the study estimates survival functions for the products, as shown in Figure 5.5. The estimated survival functions vary substantially across product classifications. The slopes for the products show a sharp decline at the beginning but flatten out over time.

Table 5.9 shows the product or sector distribution of survival times over time. On average, it takes 1 year for a quarter of the EAC product trades to cease. The median survival time is 2 years. At the product level, 75% of product trades are observed to persist after 3–5 years. Among the product classifications, the median survival is 2 years. Variation is observed when survival time is analysed over the span of the whole dataset. For example, agriculture, food and agricultural raw materials have the longest survival times: I find that 75% of these product trades exist after 16, 9 and 7 years, respectively. Ores and metals; low, high and medium technology; and fuels have the lowest survival times, of less than 5 years.

These results indicate that EAC regional policy enhances the survival time of low technology products. Products that require components of technology have a low survival. This indicates that the formation of the EAC has enhanced trade that is protected by developed countries via high tariffs at the multilateral level.

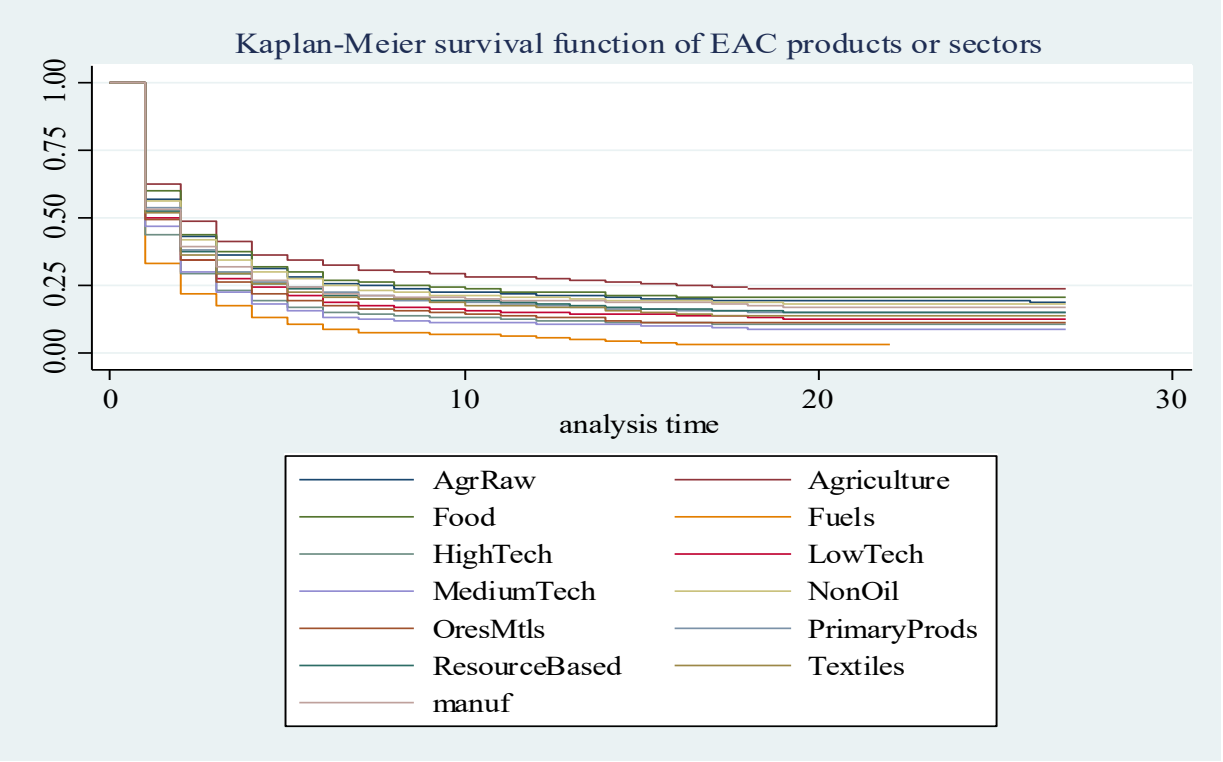

Figure 5.5. Sectoral heterogeneity in Kaplan–Meier survival estimates for the EAC. *Note*: The curves measure survival probabilities against analysis time in years.

5.5.5 Summary of non-parametric analysis results

The study concludes that EAC exports and trade relationships are short lived. Export hazards are quite high at the beginning of trade relationships and stabilise over time, but for very few trade spells. The performance of export relationships varies across regional blocs. The EAC and COMESA blocs facilitate strong performance at the beginning of trade relationships. However, trade stabilisation is over a longer period in the WTO bloc than in the EAC and COMESA markets. This thesis argues that competition in the WTO market enables EAC countries to build export capacity in the long run; hence the trade hysteresis in the medium to long term.

The study also concludes that there is variation in the hazard rates related to EAC regional policy by country and product or sector. However, 25% of EAC country and product relationships end in the first year, once started. Variation is more evident after the first 2–3 years. For example, 75% of Kenya's export relationships are observed after 14 years, unlike the 6 years that one observes for Tanzania's export relationships. Seventy-five % of agriculture export relationships last 16 years compared with 9 and 7 years for food and agricultural raw materials, respectively.

Table 5.9: *Survival Time—Product Asymmetry*

Product/Sector	Time at Risk	Incidence Rate	Number of Subjects	Survival Time		
				25%	50%	75%
Agriculture	7715	0.1214517	1318	1	2	16
Food	4514	0.1510855	918	1	2	9
Agricultural Raw Materials	5155	0.1579049	1075	1	2	7
Non-Oil Items	8133	0.1619329	1706	1	2	6
Primary Products	4051	0.1945199	995	1	2	5
Resource	5087	0.1887163	1202	1	2	5
Textiles	4116	0.2099125	1076	1	2	5
Manufactures	5533	0.1756732	1243	1	2	5
Ores & Metals	2344	0.25	704	1	1	4
Low Technology	6690	0.2195815	1789	1	1	4
High Technology	4392	0.2821038	1466	1	1	3
Medium Technology	5035	0.2885799	1694	1	1	3
Fuels	729	0.4046639	316	1	1	2
EAC Bloc	63494	0.1949161	15502	1	2	5

5.6 Empirical Results

In this section, I present and discuss estimates from parametric and semi-parametric analyses. I explain the duration of EAC regional trade policy for the EAC, COMESA and WTO blocs. In the first subsection, I describe semi-parametric estimations for baseline purposes. I present the results of parametric analyses in the following subsection, for the main regressions. I adopt the use of logit and probit continuous-discrete parametric estimators for the main regressions. In addition, I explore whether there is country and product heterogeneity in the duration of EAC trade policy. For the sensitivity analysis, I use the clog-log continuous-discrete parametric estimator and the multilevel mixed effects estimator.

Continuous-discrete parametric methods allow for smoothing of 'meaningless' data, the inclusion of endogenous policy variables, and tests of different parametric forms to produce more robust results (Brenton et al., 2010; EsteveE-Perez et al., 2013; Gullstrand & Persson, 2015; Hess & Persson, 2012; Rodríguez, 2010). This study uses both country- and product-level data as encouraged by Fugazza and Molina (2009), and adopts the use of export data following Besedeš and Prusa (2010), Brenton et al. (2010) and Shao et al. (2012). Exports refer to imports from the ROW for the 13 products from the five EAC partner countries.

5.6.1 Baseline-level analysis

In determining the influence of regionalism on the duration of developing countries' trade, the study fits the CPH model via maximum likelihood estimation. CPH models handle single or multiple records, and single or multiple-failure survival data (StataCorp, 2016). Accordingly, a CPH model is fitted with explanatory variables as first suggested by Cox (1972). The estimates for these are displayed in Table 5.10. Column (1) of Table 5.10 presents results for the CPH with time-varying covariance that occurs when a covariate changes over time during follow up (Zhang, Reinikainen, Adeleke, Pieterse & Groothuis-Oudshoorn, 2018). I note that the results in column (1) produce conventional estimates for the variance–covariance (VCE) matrix of the coefficients (and hence the reported standard errors). Since the non-parametric data analysis indicated the presence of multiple-failure data, I analyse these multiple-failure data and assume that the baseline hazards remain unchanged as events occur. In essence, the hazard may change with time, but time is measured from 0 and is independent of when the last failure occurs (StataCorp, 2016). The results for this Cox regression with multiple-failure data are displayed in Column (2). In this case, the empirical study specifies a VCE matrix with robust options to switch to the robust variance estimator (Lin & Wei, 1989). These robust calculations use efficient scores for each subject in the data for variance calculations (StataCorp, 2016). In addition, the study resets time to the time since last failure, so Stata considers the subjects as sub-subjects. I estimated the CPH model using stratified estimations too. In stratifying, I allow the baseline hazard functions to differ between groups by employing structural vector autoregressive models. Structural vector autoregressive models fit a vector autoregressive model subject to short- or long-run constraints placed on the resulting impulse–response functions. The stratified estimation is equivalent to fitting separate CPH models under the constraint that the coefficients are equal but the baseline hazard functions are not (StataCorp, 2016). I test for equality of survival functions using the log-rank test, which shows that the survival groups are not equal; that is, the test produces a non-significant value for the equality of survival functions and thus I reject the null that survival groups are equal or proportional. This does not provide a basis to stratify the data and present the results in Table 5.10. I therefore do not display results from the stratified CPH since the proportional assumption was rejected.

Experimentation with alternative estimators indicates whether estimates are robust to alternative duration modelling. From Table 5.10, the estimates of the variables are similar in terms of magnitude, but dissimilar regarding statistical significance (see columns (1) and (2)).

For the purposes of this subsection, I discuss results from column (2) of Table 5.10. I describe four kinds of variables: gravity, trade cost, duration type and, more importantly, RI variables.

5.6.1.1 Gravity variables

In terms of gravity variables, the population of the importing country reduces the hazard rate of trading relationships between the five EAC countries and the ROW. For instance, a unit increase in the population of the ROW reduces the hazard of the trading relationship by 6% ($[e^{-0.0651} - 1]100 = [0.94 - 1]$ 100), all else remaining the same. The coefficient of the variable capturing the exporter population carries a negative sign, indicating that a unit increase in the exporter population decreases the hazard of trading, but the effect is not significant. The exponentiated coefficients on both the exporter and importer GDPs are significant and negative, indicating that both the exporter and importer GDPs reduce the hazard rate of EAC trade or exports terminating with the ROW. For instance, the coefficients indicate that a 1% increase in exporter or importer GDP reduces the hazard by 18% or 8%, respectively. This finding supports the conclusion that GDP, which captures the level of development—which is a proxy for import demand (Exporter GDP)—and supply capacity (Importer GDP) enhances trade duration, consistent with Cui and Liu (2018), Fugazza and Molina (2016) and Hess and Persson (2011). For the purposes of reducing trade frailty, the size of the exporter's GDP is more important than the size of the importer's GDP. The exporter's GDP reduces trade frailty by over 2.25 times the rate at which the importer's GDP does.

The coefficient estimate for the distance variable indicates that the distance variable increases the hazard rate of trade ceteris paribus (i.e. distance increases conditional trade frailty and hence reduces survival times) by a fairly large magnitude. I note that there is a positive (and statistically significant at 1%) coefficient for the distance variable. The estimate implies that, at each survival time, the hazard rate for distance is 12% for every additional kilometre over which the EAC exports are moved to the ROW. This demonstrates the relative difficulty of the EAC exporting or engaging in trade. The finding for the distance variable is consistent with the assertion that the large distances between the EAC and the ROW increase the hazard rates. It also consistent with the Rauch–Watson model—that is, the easier it is to search for new exporters, the lower the hazard rate (Rauch, 1999; Rauch & Watson, 2003)—and with mainstream trade duration evidence such as that provided by Besedeš (2008), Fugazza and Molina (2016), Hess and Persson (2011) and Zhu, Liu and Wei (2019).

The estimate for the effect of contiguous borders carries the expected sign and is significant. The coefficient on the contiguous border variable indicates that trade frailty

declines by 24% at all levels of statistical significance. Common language reduces trade frailty or hazard by a fairly large magnitude, of 10%, ceteris paribus, at all levels of statistical significance. The coefficient capturing the trading pair ever having a common coloniser is positive and significant at 1%. For example, ever having the same coloniser reduces trade duration by 6%. This result might imply that importers have the capacity to import from diverse exporters as they have better trade relationships across countries because of similar colonial history.

5.6.1.2 Exporting fixed costs

Following Fugazza and Molina (2016), the study includes variables acting as proxies for the fixed cost of exporting and importing. Importer procurement costs increase the hazard but by a small magnitude: the coefficient on this covariate is positive and significant at 5%. For example, an increase in importer procurement cost increases the hazard by only 1%. However, shorter export entry time reduces the hazard rate by a fairly small magnitude, but is statistically significant. This latter result is consistent with the trade hysteresis literature and similar to evidence from Fugazza and Molina (2016), Impullitti et al. (2013) and Zhu et al. (2019).

5.6.1.3 'Duration' type variables

The empirical study includes the initial value of exports as proxies or controls for the level of confidence between trading partners, following Nicita et al. (2013). High values indicate a higher likelihood of the exports surviving. The study finds that the initial exports only minimally increase the hazard rate. Therefore, higher initial trade values are not necessarily associated with longer export durations. For instance, for every 1% increase in the initial value, ceteris paribus, export duration increases by close to 0%.

The study also includes the variable spell number to control for the possibility that the first spell in multiple spell relationships is systematically shorter than single-spell relationships, following Fugazza and Molina (2016). The study finds that spell number lowers the hazard by a magnitude of 9%, all else being equal. This might imply that the more the EAC exports terminate and begin, the more EAC countries learn from subsequent failures to prolong every new trade relationship that begins.

5.6.1.4 Regional integration covariates

Considering the effects of EAC RI policy on trade, this study finds that policy increases or enhances the persistence of EAC partner states' trading relationships within the EAC regional bloc and COMESA regional bloc, more than if they were not in the EAC regional trade policy framework. However, the relationship is not statistically significant.

Turning to how the WTO market enhances the EAC's RI policy, this study finds that the WTO bloc enhances the frailty of EAC exports or trade to a large degree. For instance, the study finds that the WTO dummy is positive and significant at 5%. This implies that the WTO bloc increases the hazard rates of EAC exports. The high frailty of EAC exports in the WTO bloc might result from the nature of EAC products traded in the WTO bloc, which face stiff competition from other trading partners trading similar goods. In addition, these goods are subject to high tariffs, especially from North America and Europe.

5.6.2 Bloc-level analysis

The previous subsection presented baseline estimates generated by the CPH model. The results are impressive in indicating that the study estimates are plausible and the data are well structured to undertake a duration analysis. In addition, the subsection proves that the study's conceptualisation of the duration of EAC exports and data explains the survival of EAC exports and conforms to conventional duration analysis. Further, it is advisable to begin by fitting continuous-time or CPH models to derive estimates, and then proceed to fit discrete-time models (Allison, 1982; Prentice & Gloeckler, 1978).

In this subsection, I present results from a discrete-time analysis that improves on the precision of the CPH models. The estimates are a better fit for trade relationships that naturally occur in discrete points, as for many other events (Masyn, 2003). Discrete-time models are theoretically and empirically more appropriate and account for unobserved heterogeneity (Hess & Persson, 2012). In addition, the CPH is only valid when the hazard function is proportional (Brenton, Pierola & von Uexkull, 2009; Cox, 1972). Since the proportionality assumption is rejected in this study, this provides a basis for applying continuous discrete parametric methods (Brenton et al., 2010; EsteveE-Perez et al., 2013; Gullstrand & Persson, 2015). Discrete methods allow for smoothing of 'meaningless' data, inclusion of endogenous policy variables, and tests for different parametric forms to produce more robust results (Brenton et al., 2010; EsteveE-Perez et al., 2013; Gullstrand & Persson, 2015; Hess & Persson, 2012; Rodríguez, 2010).

Table 5.10: *Baseline Regressions—CPHs*

	CPH 1	CPH 2
	[1]	[2]
Exporter population	-0.0494	-0.0494
	(0.0456)	(0.0362)
Importer population	-0.0651**	-0.0651**
	(0.0087)	(0.0064)
Exporter GDP	-0.1967**	-0.1967**
	(0.0452)	(0.0334)
Importer GDP	-0.0816**	-0.0816**
	(0.0123)	(0.0089)
Distance	0.1092**	0.1092**
	(0.0253)	(0.0180)
Contiguity	-0.2853*	-0.2853*
	(0.1444)	(0.1340)
Common language	-0.1066**	-0.1066**
	(0.0350)	(0.0262)
Common coloniser	0.0544	0.0544***
	(0.0421)	(0.0315)
Exporter entry cost	-0.0002	-0.0002
	(0.0003)	(0.0002)
Importer entry cost	0.0000	0.0000
	(0.0003)	(0.0002)
Exporter procurement cost	-0.0011	-0.0011
	(0.0055)	(0.0042)
Importer procurement cost	0.0132**	0.0132**
	(0.0051)	(0.0036)
Exporter entry time	-0.0067*	-0.0067**
	(0.0028)	(0.0023)
Importer entry time	-0.0001	-0.0001
	(0.0005)	(0.0003)
Spell number	-0.0894**	-0.0894**
	(0.0101)	(0.0076)
Initial exports	-0.0000**	-0.0000**
	(0.0000)	(0.0000)
EAC dummy	-0.1867	-0.1867
	(0.2257)	(0.1440)
COMESA dummy	-0.1037	-0.1037
	(0.1473)	(0.0990)
WTO dummy	0.3127	0.3127**
	(0.4103)	(0.0656)
N	17451	17451
Fixed effects		
Time	Yes	Yes

Notes: This table reports estimates from the CPH for baseline purposes. All estimates are obtained using data for the years 1988–2015 and use time fixed effects that are omitted for brevity. Results in column (1) are estimates fitted from the CPH with time-varying covariates. Column (2) displays results fitted with the CPH for multi-failure data. The time-fixed effects absorb some of the endogeneity in the data. I do not show results for the stratified CPH since the proportional assumption was rejected. Standard errors are reported in parentheses; $^{***}\ p < 0.10$, $^{*}\ p < 0.05$, $^{**}\ p < 0.01$.

Accordingly, in this subsection, I apply the panel clog-log that fits random effects in clog-log models for a binary dependent variable, as typically used when one of the outcomes is rare relative to the other (StataCorp, 2013, 2016). This empirical study specifies a robust VCE-type standard error clustered around the panel variable indicator that is derived from theory and allows for intra-group correlation. Clustering enables the panel variable to produce consistent VCE estimates (Arellano, 2003; Stock & Watson, 2008; Wooldridge, 2015, 2020). The results from this process are reported in Table 5.11 in columns (1)–(4). In addition, the study provides estimated results for the panel probit models in column (5) of Table 5.11. The fitted panel probit models are also clustered with a robust VCE-type standard error clustered around the specified panel variable.

Both panel clog-log and probit models are fitted with random variables since there is no command to fit conditional fixed effects models (StataCorp, 2016). Unconditional fixed effects models yield consistent but biased or inefficient estimates (Cameron & Trivedi, 2005, 2009; StataCorp, 2013). Increasingly, studies undertaken on the duration of trade relationships fit random effects models (Cadot et al., 2013; Lejour, 2015).

To control for any endogeneity, the study includes time, exporter, importer, sector and spell fixed effects that are omitted for brevity. These fixed effects absorb the effects of endogeneity as indicated in the broader trade literature (Baier & Bergstrand, 2007; Baier et al., 2019; Larch, Wanner, et al., 2019; Nicita et al., 2013; Socrates et al., 2020).

The estimates displayed in Table 5.11 are similar to those in Table 5.10 in terms of magnitude, but differ in their level of statistical significance. All the results in Table 5.11 are significant with conventionally expected signs, unlike those in Table 5.10. The results displayed in Table 5.11 show that export survival in the EAC is determined by gravity covariates, trade duration-type variables and trade fixed cost variables. For the significance and magnitude of the variables, see results in column (1) of Table 5.11. The results are also similar to those from other studies on trade duration (Fugazza & Molina, 2016; Nicita et al., 2013; Socrates et al., 2020). It seems that accounting for endogeneity and heterogeneity improves on the efficiency and consistency of estimates. In this subsection, my interest is to discuss the effects of EAC partners' membership in the EAC, COMESA and WTO markets using the entire EAC sample dataset.

Results for the effect of EAC membership in the above trading blocs or markets are diametrically opposed to baseline estimates, except for the result for the COMESA dummy. The COMESA dummy has the expected sign, showing that if EAC exporters' main market is the COMESA bloc, this reduces the probability of failure; however, the effect is still not

statistically significant, as indicated in column (3) of Table 5.11. However, results from the probit model displayed in column (5) of Table 5.11 indicate that the COMESA dummy has the opposite sign, albeit still not significant. This consistent insignificant result for the COMESA dummy is not surprising, but does provide some insights. The COMESA bloc offers a narrow range of trade concessions to its bloc members. In addition, bloc members trade similar merchandise and thus are in competition with each other. In essence, the goods traded in the COMESA market, particularly from EAC bloc members, are in substitution.

Turning to the coefficient of the WTO, the study finds that this coefficient too is positive but the magnitude of the marginal effects are miniscule from both the panel clog-log estimate displayed in column (4) and the results from the probit model presented in column (5) of Table 5.11, respectively. Why is it that the WTO market does not improve the survival of EAC exports? First, much as the WTO process has reduced barriers to export, there are still spikes in export barriers for products from the EAC and other developing countries. Second, though EAC exports increasingly reflect their comparative advantage, the competitive advantage of these products is low since they face stiff competition from commodities from other countries, especially other LDCs.

The sign on the EAC dummy is negative and significant at 5%, showing that if the EAC's merchandise is exported to the EAC bloc or market, this reduces the probability of export failure. The EAC market increases the probability of survival of EAC exports by 78%. This result is meaningful since the EAC has widened and deepened her trade concessions on virtually all trade, thus enabling the lengthening of her export duration. Consequently, one could argue that the EAC market is paying off.

Table 5.11: *Discrete Survival Estimates for EAC Regionalism*

	Baseline	EAC Bloc	COMESA Bloc	WTO Bloc	All Blocs
	[1]	[2]	[3]	[4]	[5]
Exporter population	0.035	0.032	0.032	0.037	-0.855**
	(0.075)	(0.076)	(0.075)	(0.075)	(0.039)
Importer population	-0.137**	-0.136**	-0.136**	-0.137**	-0.028**
	(0.015)	(0.016)	(0.015)	(0.015)	(0.008)
Exporter GDP	-0.131***	-0.145*	-0.132***	-0.135***	
	(0.071)	(0.072)	(0.071)	(0.071)	
Importer GDP	-0.143**	-0.143**	-0.144**	-0.143**	-0.050**
	(0.021)	(0.022)	(0.021)	(0.021)	(0.010)
Distance	0.275**	0.265**	0.271**	0.276**	0.053*
	(0.046)	(0.047)	(0.046)	(0.046)	(0.021)
Contiguity	-0.961**	-0.328	-0.971**	-0.959**	0.609**
	(0.210)	(0.240)	(0.210)	(0.210)	(0.152)
Common language	-0.255**	-0.234**	-0.258**	-0.253**	0.052***
	(0.062)	(0.063)	(0.062)	(0.062)	(0.029)
Common coloniser	0.237**	0.237**	0.238**	0.236**	-0.108**
	(0.074)	(0.075)	(0.074)	(0.074)	(0.036)
Exporter entry cost	-0.002**	-0.002**	-0.002**	-0.002**	0.006**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Importer entry cost	0.001*	0.001***	0.001*	0.001*	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Exporter procurement cost	-0.023*	-0.023*	-0.022*	-0.023*	-0.003
	(0.009)	(0.010)	(0.009)	(0.009)	(0.005)
Importer procurement cost	0.022**	0.024**	0.022*	0.022*	0.012*
	(0.008)	(0.009)	(0.008)	(0.008)	(0.005)
Exporter entry time	-0.033**	-0.032**	-0.033**	-0.033**	0.062**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)
Importer entry time	-0.001***	-0.001***	-0.002***	-0.001***	0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Spell number	-0.300**	-0.307**	-0.300**	-0.299**	
	(0.019)	(0.019)	(0.019)	(0.019)	
Initial exports	-0.000**	-0.000**	-0.000**	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EAC dummy		-1.530**			-0.155
		(0.315)			(0.146)
COMESA dummy			-0.256		0.121
			(0.255)		(0.108)
Spell length					-0.615**
					(0.011)
Constant	1.288*	1.466*	1.345*	1.295*	2.746**
	(0.588)	(0.598)	(0.590)	(0.588)	(0.212)
N	17451	17451	17451	17445	17445
Fixed effects					
Time	Yes	Yes	Yes	Yes	Yes
Exporter	Yes	Yes	Yes	Yes	Yes
Importer	Yes	Yes	Yes	Yes	Yes
Product/Sector	Yes	Yes	Yes	Yes	Yes
Spell	Yes	Yes	Yes	Yes	No

Notes: This table reports estimates using the panel clog-log and probit estimators to estimate bloc results. All estimates are obtained from data for the years 1988–2015. All estimates use time, exporter, importer,

sector and spell effects that are omitted for brevity. These fixed effects absorb the effects of endogeneity. Columns (1)–(4) show estimates from the clog-log estimator and column (5) displays results from probit models. Estimates displayed in column (1) are baseline results and those in columns (2)–(4) report are for the EAC, COMESA and WTO blocs respectively. Column (5) displays results estimated using the probit model and captures all regional blocs. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

5.6.3 Country-level analysis

In this subsection, this empirical study turns its focus to the survival of EAC regional trade policy across countries. Table 5.12 provides estimates for the disaggregated country effects on EAC export duration, using the clog-log model with all fixed effects discussed in the previous subsection used to overcome the possibility of any endogeneity. Results in columns (1)–(5) are for Burundi, Kenya, Rwanda, Tanzania and Uganda, respectively.

The coefficients for Burundi and Rwanda carry a negative sign for their participation in the COMESA market. This implies that the COMESA market has increased the survival of Burundi's and Rwanda's trade relationships, though the coefficients are not significant. Why are Burundi's and Rwanda's export durations short lived? Burundi and Rwanda are very small players in the EAC and their exports together constitute less than 17% of EAC exports. Coupled with this, 75% of Burundi's and Rwanda's exports cease within 2 and 3 years, respectively. The EAC is probably only enabling Burundi and Rwanda to build their capacity to export.

The sequential pattern of survival of Kenya's trade is almost identical to that of Burundi in the COMESA market. However, the duration of Kenya's exports is significant, unlike the negative coefficient for Burundi's exports in the COMESA market. For instance, results in column (2) of Table 5.12 indicate that COMESA membership reduced the frailty of Kenya's exports by 64%. These results confirm those of Socrates et al. (2020), who also finds that Kenya's membership of the COMESA market is significantly and negatively correlated with survival of her exports to the ROW. This result confirms that Kenya's increased production capacity and competitive advantage enables the country to enhance her trade in the COMESA market. In addition, the longevity of Kenya's exports in the COMESA market might be due to the country using its capacity to enjoy the greater externalisation that COMESA bloc membership offers. This implies that even if regionalism is recommended to support the survival of trade relationships in the EAC, the type of regional market and nature of the economy of the bloc members should be considered. However, it is puzzling that Kenya's competitive dominance does not support the longevity of her exports in the EAC and WTO markets.

The patterns of export duration for Tanzania and Uganda are similar in the EAC market, as shown in columns (4) and (5) of Table 5.12. According to the results, the EAC market significantly increased survival or reduced frailty of the exports of Tanzania and Uganda. For instance, the probability of failure of Tanzania's and Uganda's exports declined by 63% and 76%, respectively. Tanzania and Uganda are enjoying the benefits of having been involved in the EAC bloc the longest.

The pattern of duration discussed above confirms theoretical and empirical predictions that survival rates vary significantly with the level of development of an economy (Fugazza & Molina, 2016). In addition, different markets experience different impacts on the survival of their country trade duration.

Table 5.12: *Effects of RTAs on Duration of EAC Trade: Country Analysis*

	Burundi [1]	Kenya [2]	Rwanda [3]	Tanzania [4]	Uganda [5]
Exporter population	2.530	3.265	8.436**	1.305	-2.937
	(3.597)	(2.243)	(2.582)	(2.099)	(2.714)
Importer population	-0.147**	-0.035	-0.145**	-0.068*	-0.172**
	(0.025)	(0.022)	(0.029)	(0.029)	(0.022)
Exporter GDP	0.181	0.359	-2.990	-0.451	0.862
	(1.413)	(0.487)	(1.939)	(0.587)	(0.621)
Importer GDP	-0.140**	-0.041	-0.128**	-0.165**	-0.068*
	(0.033)	(0.033)	(0.041)	(0.038)	(0.030)
Distance	0.129	0.212**	0.030	0.538**	0.235**
	(0.078)	(0.075)	(0.090)	(0.089)	(0.068)
Contiguity	-2.154**	1.180**	-1.737**	0.259	1.101**
	(0.434)	(0.356)	(0.645)	(0.350)	(0.361)
Common language	-0.114	-0.094	-0.256*	-0.132	-0.205*
	(0.110)	(0.111)	(0.102)	(0.115)	(0.091)
Common coloniser		0.214*		0.457**	-0.023
		(0.102)		(0.113)	(0.091)
Exporter entry cost	0.000	0.024	-0.025	0.001	-0.007
	(0.002)	(0.015)	(0.019)	(0.002)	(0.007)
Importer entry cost	0.000	0.001*	0.002	0.000	0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Exporter procurement cost	-1.465*	-0.056	1.025	-0.232	-0.167***
	(0.603)	(0.081)	(0.730)	(0.191)	(0.085)
Importer procurement cost	0.025	0.003	0.003	0.024***	0.024***
	(0.017)	(0.014)	(0.018)	(0.014)	(0.014)
Exporter entry time	0.863*	0.006	0.043	-0.066	-0.048*
	(0.384)	(0.007)	(0.059)	(0.073)	(0.022)
Importer entry time	0.002	-0.001	0.005*	-0.002*	-0.000
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)
Spell number	-0.062*	-0.284**	-0.177**	-0.287**	-0.253**
	(0.027)	(0.039)	(0.035)	(0.037)	(0.033)
Initial exports	-0.000**	-0.000**	-0.000**	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EAC dummy				-1.006**	-1.445**
				(0.284)	(0.310)
COMESA dummy	-0.068	-1.017*	-0.062		0.407
	(0.247)	(0.426)	(0.397)		(0.295)
Constant	-5.857***	-16.332*	-6.168	-0.806	9.005
	(3.544)	(7.320)	(7.422)	(6.700)	(8.867)
N	2080	4389	2550	4045	4359
Fixed effects					
Time	Yes	Yes	Yes	Yes	Yes
Exporter	Yes	Yes	Yes	Yes	Yes
Importer	Yes	Yes	Yes	Yes	Yes
Product/Sector	Yes	Yes	Yes	Yes	Yes
Spell	Yes	Yes	Yes	Yes	No

Notes: This table reports estimates from the panel clog-log estimator. All estimates are obtained from data for the years 1988–2015. All estimates use time, exporter, importer, sector and spell effects that are omitted for brevity. These fixed effects absorb the effects of endogeneity. Results in columns (1)–(5) are estimates for

Burundi, Kenya, Rwanda, Tanzania and Uganda respectively. Standard errors are reported in parentheses and significance are *** $p < 0.10$, * $p < .05$, ** $p < .01$.

5.6.4 Product-level analysis

In this subsection, I focus on whether there is heterogeneity in the duration of EAC regional policy across the products the EAC trades with the ROW. Tables 5.13, 5.14 and 5.15 display disaggregated sectoral or product estimates. Thirteen products are considered, as displayed in Table 5.13, 5.14 and 5.15. Columns (1), (2), (3) and (4) of Table 5.13 display results for non-oil items, manufactured goods, agriculture and agricultural raw materials respectively. Results displayed in Table 5.14 columns (1), (2), (3) and (4) present estimates for food, textiles, high technology and medium technology and results displayed in Table 5.15 columns (1), (2), (3), (4) and (5) provide results for low technology, primary products, resource-based items and ores and metals, respectively.

The coefficient on the EAC dummy carries the expected negative sign for all products except manufactured goods and agriculture. However, the coefficient is only significant for non-oil items and high technology trade. The results indicate that the EAC market increased the survival of trade in non-oil items and high technology by 90% and 88%, respectively.

The sign on the COMESA dummy is negative as expected for all products in the sample, except that agricultural raw materials, food and high technology have a positive sign when traded in the COMESA market. However, agricultural raw materials and food are the only products for which the coefficient is significant, showing that, if the EAC's main market is the COMESA, this increases the probability of failure by more than 14 and 16 times, respectively.

The results indicate that the WTO market increases the frailty of all EAC products but only by a very small magnitude and the effect is not significant for any of the products. This result could be due to the very small percentage of products exported from the EAC bloc to the WTO market.

Table 5.13: *Effects of RTAs on Duration of EAC Trade: Product Analysis*

	Non-oil items	Manufactured Goods	Agriculture	Agricultural Raw Materials
	[1]	[2]	[3]	[4]
Exporter population	-0.368	0.054	0.177	-0.578***
	(0.258)	(0.241)	(0.289)	(0.344)
Importer population	-0.241**	-0.214**	-0.197**	-0.151***
	(0.057)	(0.052)	(0.054)	(0.081)
Exporter GDP	-0.196	-0.682**	-0.077	-0.453
	(0.232)	(0.235)	(0.261)	(0.329)
Importer GDP	-0.198**	-0.291**	-0.401**	-0.135
	(0.076)	(0.074)	(0.088)	(0.092)
Distance	0.390**	0.244	0.455**	0.605**
	(0.142)	(0.152)	(0.171)	(0.218)
Contiguity	2.547***	-0.656	-0.104	-0.918
	(1.442)	(0.871)	(0.959)	(0.827)
Common language	-0.187	-0.380***	-0.051	0.094
	(0.213)	(0.208)	(0.214)	(0.276)
Common coloniser	0.136	0.234	0.483***	0.686*
	(0.279)	(0.233)	(0.268)	(0.335)
Exporter entry cost	-0.001	-0.005**	-0.001	-0.002
	(0.001)	(0.002)	(0.002)	(0.002)
Importer entry cost	0.002	-0.001	0.000	0.003
	(0.001)	(0.001)	(0.001)	(0.002)
Exporter procurement cost	-0.025	-0.032	-0.064***	-0.001
	(0.032)	(0.030)	(0.035)	(0.042)
Importer procurement cost	0.016	0.043	0.005	0.035
	(0.025)	(0.028)	(0.033)	(0.038)
Exporter entry time	-0.018	-0.020	-0.049**	-0.029***
	(0.012)	(0.013)	(0.015)	(0.017)
Importer entry time	0.001	-0.002	0.003	-0.010*
	(0.002)	(0.003)	(0.004)	(0.004)
Spell number	-0.171**	-0.303**	-0.228**	-0.280**
	(0.061)	(0.059)	(0.075)	(0.088)
Initial exports	-0.000**	-0.000**	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
EAC dummy	-2.321***			-1.159
	(1.299)			(1.268)
COMESA dummy	-0.144	-1.164	-1.800	2.745***
	(0.950)	(0.810)	(1.276)	(1.462)
Constant	1.545	6.313**	0.986	1.944
	(1.850)	(2.019)	(2.110)	(2.732)
N	1873	1430	1406	1242
Fixed effects				
Time	Yes	Yes	Yes	Yes
Exporter	Yes	Yes	Yes	Yes
Importer	Yes	Yes	Yes	Yes
Product/Sector	Yes	Yes	Yes	Yes
Spell	Yes	Yes	Yes	No

Notes: This table reports estimates from the panel clog-log estimator. All estimates are obtained from data for the years 1988–2015. All estimates use time, exporter, importer, sector and spell effects that are omitted for brevity. These fixed effects absorb the effects of endogeneity. Columns (1)–(4) display estimates for non-oil items, manufactured goods, agriculture and agricultural raw materials respectively. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

Table 5.14: *Effects of RTAs on Duration of EAC Trade: Product Analysis*

	Food	Textiles	High Technology	Medium Technology
	[1]	[2]	[3]	[4]
Exporter population	-0.492	0.051	-0.058	-0.213
	(0.382)	(0.270)	(0.251)	(0.217)
Importer population	-0.119	-0.170**	-0.241**	-0.215**
	(0.093)	(0.058)	(0.054)	(0.044)
Exporter GDP	0.012	-0.647*	0.063	0.113
	(0.352)	(0.274)	(0.230)	(0.194)
Importer GDP	-0.040	-0.278**	-0.235**	-0.166**
	(0.113)	(0.076)	(0.074)	(0.059)
Distance	0.374	0.078	0.615**	0.088
	(0.282)	(0.163)	(0.158)	(0.123)
Contiguity	-0.739	-1.293	1.053	0.144
	(0.881)	(0.822)	(1.106)	(0.927)
Common language	0.195	-0.550**	-0.501*	-0.407*
	(0.300)	(0.213)	(0.206)	(0.174)
Common coloniser	0.332	0.330	0.054	-0.163
	(0.347)	(0.246)	(0.250)	(0.212)
Exporter entry cost	0.000	-0.005**	0.001	-0.001
	(0.002)	(0.002)	(0.001)	(0.001)
Importer entry cost	-0.000	-0.003***	0.002	-0.000
	(0.002)	(0.002)	(0.002)	(0.001)
Exporter procurement cost	-0.067	-0.007	-0.015	-0.034
	(0.047)	(0.033)	(0.031)	(0.026)
Importer procurement cost	0.033	0.042	0.077**	0.022
	(0.044)	(0.034)	(0.030)	(0.024)
Exporter entry time	-0.010	-0.039**	-0.031**	-0.018***
	(0.018)	(0.013)	(0.012)	(0.011)
Importer entry time	-0.005	-0.006	-0.007	0.001
	(0.005)	(0.003)***	(0.003)*	(0.003)
Spell number	-0.348**	-0.315**	-0.273**	-0.190**
	(0.100)	(0.068)	(0.059)	(0.050)
Initial exports	-0.000**	-0.000**	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
EAC dummy	-1.508	-1.429	-2.095***	-1.286
	(1.247)	(1.096)	(1.266)	(1.067)
COMESA dummy	2.840***	-0.362	1.092	-0.896
	(1.531)	(0.769)	(0.920)	(0.730)
Constant	0.055	7.838**	-2.053	2.496
	(3.103)	(2.279)	(1.940)	(1.632)
N	1089	1364	1711	1849
Fixed effects				
Time	Yes	Yes	Yes	Yes
Exporter	Yes	Yes	Yes	Yes
Importer	Yes	Yes	Yes	Yes
Product/Sector	Yes	Yes	Yes	Yes
Spell	Yes	Yes	Yes	No

Notes: This table reports estimates from the panel clog-log estimator. All estimates are obtained with data for the years 1988–2015. All estimates use time, exporter, importer, sector and spell effects that are omitted for brevity. These fixed effects absorb the effects of endogeneity. Columns (1)–(4) display estimates for food, textiles, high technology and medium technology respectively. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

Table 5.15: *Effects of RTAs on Duration of EAC Trade: Product Analysis*

	Low Technology	Primary Products	Resource-based Items	Ores & Metals	Fuels
	[1]	[2]	[3]	[4]	[5]
Exporter population	0.287	-0.007	-0.054	0.441	0.253
	(0.217)	(0.274)	(0.243)	(0.308)	(0.357)
Importer population	-0.259**	-0.049	-0.199**	-0.316**	0.016
	(0.046)	(0.064)	(0.051)	(0.087)	(0.077)
Exporter GDP	-0.696**	-0.019	0.139	-0.034	0.720***
	(0.212)	(0.273)	(0.239)	(0.308)	(0.379)
Importer GDP	-0.216**	-0.217*	-0.242**	-0.190***	-0.100
	(0.064)	(0.089)	(0.074)	(0.103)	(0.112)
Distance	0.252*	0.417*	0.333*	0.232	0.551*
	(0.126)	(0.206)	(0.151)	(0.252)	(0.260)
Contiguity	-0.795	-1.612*	0.273	-0.830	-0.598
	(1.084)	(0.728)	(0.902)	(0.731)	(0.488)
Common language	-0.394*	-0.628**	-0.447*	-0.264	-0.132
	(0.183)	(0.230)	(0.211)	(0.258)	(0.259)
Common coloniser	0.047	0.761**	0.257	0.365	0.018
	(0.217)	(0.249)	(0.237)	(0.299)	(0.296)
Exporter entry cost	-0.003*	-0.005**	-0.001	-0.002	-0.001
	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)
Importer entry cost	-0.001	0.004	-0.001	0.002	-0.002
	(0.001)	(0.002)	(0.001)	(0.002)	(0.003)
Exporter procurement cost	-0.013	0.018	0.050***	-0.079***	0.080
	(0.028)	(0.032)	(0.030)	(0.042)	(0.056)
Importer procurement cost	0.020	0.042	0.044	-0.003	0.002
	(0.023)	(0.033)	(0.029)	(0.046)	(0.057)
Exporter entry time	-0.046**	-0.063**	-0.059**	-0.031**	-0.067**
	(0.011)	(0.014)	(0.012)	(0.015)	(0.021)
Importer entry time	-0.002	0.003	-0.002	0.003	0.014***
	(0.002)	(0.004)	(0.003)	(0.004)	(0.008)
Spell number	-0.258**	-0.254**	-0.271**	-0.362**	-0.196**
	(0.056)	(0.071)	(0.058)	(0.088)	(0.114)
Initial exports	-0.000**	-0.000**	-0.000**	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EAC dummy	-0.253	-0.325	-1.722	-1.666	-1.006
	(1.184)	(1.130)	(1.172)	(1.059)	(0.993)
COMESA dummy	-0.970	-0.631	-0.208	-0.025	
	(0.704)	(0.887)	(0.818)	(0.890)	
Constant	5.543**	0.097	-0.151	1.435	-7.469*
	(1.703)	(2.335)	(2.115)	(2.908)	(3.078)
N	1992	1097	1212	847	333
Fixed effects					
Time	Yes	Yes	Yes	Yes	Yes
Exporter	Yes	Yes	Yes	Yes	Yes
Importer	Yes	Yes	Yes	Yes	Yes
Product/Sector	Yes	Yes	Yes	Yes	Yes
Spell fixed	Yes	Yes	Yes	Yes	No

Notes: This table reports estimates from the panel clog-log estimator. All estimates are obtained from data for the years 1988–2015. All estimates use time, exporter, importer, sector and spell effects that are omitted for brevity. These fixed effects absorb the effects of endogeneity. Columns (1)–(4) display estimates for low technology, primary products, resource based items, ores and metals and fuels respectively. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

5.7 Robustness Tests

In this subsection, this empirical study performs robustness tests by examining EAC exports using two alternative estimators. First, following Socrates et al. (2020), the study implements an alternative logistic discrete duration model as described by Cameron and Trivedi (2005). The estimates from this process are reported in Table 5.16 columns (1)–(4). Second, the study estimates the MESTREG model and report the results in column (4) of Table 5.16. Baseline results are presented in column (1) and columns (2)–(4) display estimates for the EAC, COMESA and WTO markets, respectively.

The results from the sensitivity analysis are consistent with those in Table 5.11 in terms of the direction of the signs. For example, the coefficient on the COMESA market dummy is negative but not significant. The coefficient on the WTO dummy is positive with a very small magnitude and also is not significant. Only the coefficient on the EAC dummy is significant, and negative. This indicates that the EAC market enhances the survival of EAC partners' exports. However, the effect of the EAC market on trade survival is more pronounced with panel logit estimates (87%) than with those from the panel clog-log model (78%). This indicates that the results are robust to alternative estimation, confirming that the EAC market enhances the duration of exports from the EAC bloc.

Table 5.16: *Discrete Survival Estimation for EAC Regionalism*

	Baseline	EAC Bloc	COMESA Bloc	WTO Bloc	All Blocs
	[1]	[2]	[3]	[4]	[5]
Exporter population	-0.042	-0.053	-0.046	-0.039	-0.194**
	(0.103)	(0.105)	(0.103)	(0.103)	(0.027)
Importer population	-0.194**	-0.194**	-0.192**	-0.194**	0.042**
	(0.022)	(0.022)	(0.022)	(0.022)	(0.005)
Exporter GDP	-0.281**	-0.307**	-0.282**	-0.285**	-0.148**
	(0.099)	(0.101)	(0.099)	(0.099)	(0.027)
Importer GDP	-0.191**	-0.193**	-0.193**	-0.192**	0.043**
	(0.030)	(0.030)	(0.030)	(0.030)	(0.007)
Distance	0.396**	0.382**	0.391**	0.397**	-0.073**
	(0.064)	(0.066)	(0.065)	(0.064)	(0.015)
Contiguity	-1.182**	-0.378	-1.197**	-1.179**	0.210*
	(0.281)	(0.315)	(0.281)	(0.281)	(0.101)
Common language	-0.353**	-0.326**	-0.358**	-0.351**	0.108**
	(0.086)	(0.088)	(0.086)	(0.086)	(0.020)
Common coloniser	0.319**	0.319**	0.319**	0.318**	-0.076**
	(0.102)	(0.104)	(0.102)	(0.102)	(0.024)
Exporter entry cost	-0.002**	-0.002**	-0.002**	-0.002**	0.001**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Importer entry cost	0.002*	0.001*	0.001*	0.002*	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Exporter procurement cost	-0.033*	-0.034*	-0.033*	-0.033*	-0.003
	(0.013)	(0.013)	(0.013)	(0.013)	(0.003)
Importer procurement cost	0.034**	0.037**	0.033**	0.033**	-0.005***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.003)
Exporter entry time	-0.038**	-0.036**	-0.038**	-0.038**	0.031**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.002)
Importer entry time	-0.002***	-0.002***	-0.002***	-0.002***	0.001**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Spell number	-0.433**	-0.446**	-0.434**	-0.432**	0.058**
	(0.026)	(0.027)	(0.026)	(0.026)	(0.006)
Initial exports	-0.000**	-0.000**	-0.000**	-0.000**	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EAC dummy		-2.062**			0.649**
		(0.374)			(0.135)
COMESA dummy			-0.351		0.141
			(0.349)		(0.089)
WTO dummy					-0.086
					(0.219)
Constant	3.043**	3.370**	3.124**	3.048**	1.306**
	(0.814)	(0.829)	(0.818)	(0.814)	(0.221)
N	17451	17451	17451	17445	17451
Fixed effects					
Time	Yes	Yes	Yes	Yes	Yes
Exporter	Yes	Yes	Yes	Yes	Yes
Importer	Yes	Yes	Yes	Yes	Yes
Product/Sector	Yes	Yes	Yes	Yes	Yes
Spell	Yes	Yes	Yes	Yes	Yes

Notes: This table reports estimates for the sensitivity analysis. All estimates are obtained from data for the years 1988–2015. The estimates use time, exporter, importer, sector and spell effects that are omitted for brevity. These fixed effects absorb the effects of endogeneity. The logit model was used to produce the estimates

in columns (1)–(4) and the results in column (5) were estimated using MESTREG models. Baseline results are presented in column (1) and columns (2)–(4) display estimates for the EAC, COMESA and WTO blocs, respectively. Column (5) displays results for the MESTREG. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

5.8 Concluding Remarks

This study examines whether the EAC RTA has increased the duration of EAC partners' exports in the EAC, COMESA and WTO markets. It also sheds light on the factors that determine the duration of this trade. The purpose of this exercise is to reconcile apparent inconsistencies in predictions regarding the RTA's role in reducing trade frailty in the EAC. The study replicates other studies on regionalism in other parts of the world and first estimates non-parametric methods using the Kaplan–Meier and Nelson–Aalen estimators. The estimates enable determination of the probability of an EAC trading relationship terminating. This analysis is augmented by implementing parametric and semi-parametric estimations that control for country-, product- and pair-specific characteristics of trading that is not possible using non-parametric methods (Chen, 2012; Obashi, 2010). For semi-parametric methods, the empirical analysis implements the CPH as the baseline. For the parametric model, the study implements the clog-log and probit models for the main regressions. Alternative models—the logit or logistic and MESTREG models—are estimated for robustness purposes.

Several key conclusions emerge from this empirical study and are worth reiterating. First, the study concludes that RTAs do enhance the duration of trade relationships in the EAC market. However, EAC RTA policy does not enhance the survival of exports in the COMESA and WTO markets. Second, the bloc results mask the heterogeneous effects of regional policy on trade duration. Accordingly, this study concludes that Tanzania's and Uganda's trade frailty is reduced when their merchandise is exported to the EAC market. The COMESA market is more responsive to prolonging Kenya's exports. Third, the study concludes that there is heterogeneity in the duration of EAC exports across the exported products or export sectors. For instance, the EAC market increases the survival of non-oil items and high technology trade, while the COMESA market increases the frailty of trade in agricultural raw materials and food exports. The WTO bloc demonstrates clear frailty in her enhancement of the duration of exports from EAC trading partners. Fourth, one-quarter of EAC trade relationships cease after 1 year, with 50% of the relationships ceasing within 2–3 years once initiated. The hazard rates for EAC trade are highest in the first and second years. Relationships that survive 5–7 years have very low levels of exit but only a very few of them are observed to survive to that point. Qualitatively, when the survival rates when belonging or not to the EAC, COMESA and WTO

blocs are considered, this study concludes that the EAC and COMESA blocs provide better rates of survival for export relationships than the rates when belonging or not to the WTO bloc. However, these rates are only better for 5–7 years. The WTO bloc provides better rates of survival for EAC exports throughout the period of study when belonging than not belonging to the WTO.

Overall, a quarter of the EAC countries' relationships cease after the first year, and 50% in 2–3 years. However, there is asymmetry when country survival rates are compared. For instance, Kenya's trade is the least frail, with 75% of the country's trade still observed after 14 years; unlike Tanzania, which has 75% of her trade relationships observed only up to 6 years. Uganda, Rwanda and Burundi have the least survival of their trade in the EAC. It takes only 4, 3 and 2 years for 75% of Uganda's, Rwanda's and Burundi's exports to cease, respectively.

Considering products, the study concludes that a quarter of the sectoral relationships cease within 1 year, and half within 2 years. However, asymmetry is apparent when product survival rates are compared. For example, fuels, high technology, low technology, medium technology, and ores and metals have the lowest survival rates. Of all these products' trade partnerships, 75% cease within 4 years. Agriculture has the highest survival rates: 75% of agricultural trade is still observed after 16 years. It takes 9, 7 and 6 years for 75% of food, agricultural raw material and non-oil item trade to cease.

Finally, this study concludes and confirms the theoretical prediction that EAC trade relationships are mostly of short duration. When an export or product relationship survives beyond the first or second year of trade, the probability of success grows significantly over time. Gravity covariates, fixed trade costs and 'duration-type' variables contribute to explaining the duration of EAC exports.

Based on these results and conclusions, the study recommends that South–South countries consider substantially liberalising all trade in RTAs involving geographically, politically and/or economically similar countries, to maximise the duration of their trade relationships. Caution should be used in regard to participating in plurilateral and multilateral trading relationships. Specific products like food, non-oil, primary and manufactured items should be considered when participating or negotiating in higher intergovernmental regional entities.

Chapter 6: Modelling the Impact of Trade Liberalisation on Economic Growth in the East African Community

6.1 Introduction

The objective of this chapter is to examine the impact of trade liberalisation on economic growth in the EAC.

RTAs feature prominently in policy debates as an important centrepiece of economic development agendas, and countries enter into RI to increase economic growth (Hur & Park, 2012; Jalles, 2012; Shahbaz, 2012). From 2005, empirical debate has intensified because many developing countries are entering into RI to spur development. Such debate is also driven by the availability of broader datasets that facilitate sound econometric analysis of the trade–growth nexus as RTAs entered into more than 25 years of their revived states in the developing world, yet their presumed effects are either not seen or modest. Despite increasing research on the impact of RTAs on growth, the situation remains complex and not well understood. Consequently, theoretical and empirical investigations produce mixed evidence on the trade–growth nexus, especially for developing countries and even neglected the analysis of other countries (Alcala & Ciccone, 2004; Deraniyagala & Fine, 2001; Edwards, 1993; Hossain & Joarder, 2014).

Although NGT provides a theoretical basis for explaining the channels through which trade influences economic growth (Solow, 1956; Swan, 1956), it treats trade as exogenous (Izushi, 2008) and fails to establish the dynamic process by which trade affects long-term growth (Camarero et al., 2016; Fine, 2000). EGT, while providing a contemporary solution to the weaknesses of NGT (Palley, 1996; Sasaki, 2011), is characterised by a lack of consensus on the growth effects of trade liberalisation (Hossain & Joarder, 2014; Singh, 2010). For instance, the trade–growth nexus exists and it is a beneficial nexus when viewed through the lenses of the neoclassical trade and 'new trade' theories (Deraniyagala & Fine, 2001; Singh, 2010). The growth and income effects arise from the fact that trade enhances productivity and efficiency by enabling countries to benefit from economies of scale; facilitate allocative efficiency, diffuse knowledge spillovers; and reduce redundancy effects (Grossman & Helpman, 1991b; Lucas, 1988; Romer, 1986, 1990). Despite trade liberalisation's potentially positive effect on growth, some theoretical studies demonstrate that these gains arise out of highly constrained assumptions regarding technology diffusion, strategic behaviour and market information, and are therefore limited in application, especially for developing countries (Deraniyagala & Fine, 2001; Grossman & Helpman, 1991a, 1991b). Other theoretical studies

demonstrate or argue that trade is not beneficial to growth and indeed has a negative impact, especially for poor countries, in the long run (Rivera-Batiz & Xie, 1993; Spilimbergo, 2000; Stokey, 1991; Young, 1991). For instance, if one invokes political economy arguments (such as rent seeking) (Redding, 1999) and infant industry arguments, the impact of trade on economic growth is rejected in the case of developing countries (Stewart, 1991).

Regardless of these theoretical contradictions, since the establishment of the WTO in 1995, a growing number of developing country governments has embarked on trade liberalisation, especially through regional trade integration, in an effort to spur economic growth (EsteveE-Perez et al., 2013). However, economic growth has not kept pace with this trade liberalisation, particularly in Africa (Constantinescu et al., 2016; Winters, 2004). The IMF (2016) notes that the implementation of trade liberalisation policies in the developing world is countercyclical during a period of sustained economic growth, although it goes on to argue that the rise and stability of economic prospects depends on creating an effective environment to promote exports. This trade liberalisation is indicated in terms of trade openness or openness (trade outcomes) and regional trade integration or RTAs (trade policy).

There are contrasting views on the impact of trade openness (trade outcomes) on growth in the empirical literature (Hossain & Joarder, 2014; Singh, 2010, 2011, 2015). Some empirical studies suggest a significant positive effect of trade openness on productivity and growth (Alcala & Ciccone, 2004; Edwards, 1998; Frankel & Romer, 1999; Vamvakidis, 1998). As countries adopt liberal trade policies, trade expedites market access, technology diffusion, and enjoyment of economies of scale and scope (Targetti & Foti, 1997). Scale, allocative and technology spillovers spur productivity and efficiency, thus increasing long-term incomes and growth rates (Yaghmaian, 1994). Conversely, some scholars argue that there is a negative or insignificant effect of trade openness on growth (Harrison, 1996; Rodríguez & Rodrik, 2000; Wacziarg & Welch, 2008) when complementary domestic policies are not implemented (Chang et al., 2009; Freund & Bolaky, 2008), and others argue that the impact of openness on growth is mixed (Greenaway et al., 1997, 2002). These complex and often contradictory empirical findings stem from the use of a myriad of measures to capture trade liberalisation (Harrison, 1996; Yanikkaya, 2003; Zahonogo, 2016). Further, the impact of trade on economic growth depends on the level of a country's absorptive capacity in regard to new technology and knowledge (Zahonogo, 2016).

The growth effects of trade on economic growth relating to regional trade integration (trade policy) have received limited attention (Baldwin & Venables, 1995; Liu, 2016; Vamvakidis, 1998). Relevant studies generally find negative effects of RTAs on growth

(Henrekson et al., 1997; Vanhoudt, 1999), which improve when the definition of RI is enhanced or expanded (Liu, 2016). Generally, little is known about the impact of RTAs on economic growth in the developing country context.

Although theoretical foundations of the trade–growth nexus are argued to have limited relevance to poor countries (Stewart, 1991), a growing number of empirical studies is applying these models to developing countries (Balassa, 1985; Greenaway et al., 1997, 2002; Santos-Paulino, 2005; Spilimbergo, 2000; Trejos & Barboza, 2015; Yaghmaian, 1994). However, such studies concentrate on developing countries in South Asia and South America, neglecting the case of African developing countries. They refute the idea that there is an impact of trade liberalisation on trade in South America, but support such a link in the East Asia Sea because East Asian countries had implemented supportive domestic policies by the time they adopted RTAs (Liu, 2016). RTAs are an important development tool, and countries enter into RI to increase economic growth (Hur & Park, 2012; Jalles, 2012; Shahbaz, 2012). However, the development objectives of RTAs are doubted because some countries are yet to experience any such development while others, especially in the East Asia Sea, have experienced development (Liu, 2016). The exact nature of the relationship between openness and growth has not been concretised (Shahbaz, 2012). The EAC provides a unique case to study because the region has experienced the most ambitious trade liberalisation programme in the Global South, with stable macroeconomic policies. This study therefore bridges the existing knowledge gap on the role of RTAs in the EAC in economic growth and reconciles the lack of consensus on the effects of RTAs and openness on growth (Hur & Park, 2012). In addition, the study analyses both trade policy (or RI) and trade outcomes (or trade volumes) concurrently, unlike previous studies that use only trade volumes, neglecting trade policy (Camarero et al., 2016; Harrison, 1996). This provides robust results on the impact of trade liberalisation on growth (Doyle & Martinez-Zarzoso, 2011).

This study contributes to the trade–growth nexus literature in four respects. First, it provides empirical evidence on the growth effects of trade integration in Africa's LDCs. Empirical studies on the growth effects of RI neglect African LDCs. I use the case of the EAC regional trade liberalisation programme and find an indication that this programme is more growth enhancing for RTAs in the same region or involving similar countries, than for the more intergovernmental regional groupings with dissimilar country members-the COMESA and then the WTO markets. This implies that the effect of trade liberalisation on growth decreases the greater the intergovernmental trade liberalisation policy programme, thus cementing the argument for forming RTAs with countries in the same region or with countries that are similar,

and for which concessions are strongest. Nonetheless, there are heterogeneous effects of trade integration across countries and in different regional trade integration blocs.

Second, this empirical study takes into consideration the growth effects of regional trade liberalisation using both regional trade integration and trade openness, unlike previous studies that consider only trade openness (or trade outcomes measures). Trade openness does not capture all the effects of trade liberalisation (Camarero et al., 2016; Harrison, 1996). This study augments trade openness and experiments with different measures of openness by using the ratios of exports and of imports to GDP (i.e. export openness and import openness, respectively) rather than using the ratio of the sum of exports and imports to GDP only. I find that the trade–growth nexus holds for trade policies or RTAs. In addition, the empirical results indicate that the aggregate measure of openness is not growth enhancing; however, when I adopt export openness as an alternative measure of trade openness, I find that export openness is growth enhancing and robust to alternative model specifications. The findings show that outward trade orientation qualitatively contributes to economic growth more than does inward trade orientation in EAC countries. The impacts of regional trade integration and trade openness (even in their variant indications) on economic growth are heterogeneous across countries. Nonetheless, RI is a more reliable and consistent growth-enhancing measure than is openness to trade.

Third, in a bid to reconcile the lack of consensus on the growth effects of trade liberalisation, this empirical study investigates the trade–growth nexus in different regional groupings (such as the EAC, COMESA and WTO) and with different compositions of EAC membership. In terms of the composition of the regional entity, the study finds that a reconstitution of the EAC with more similar countries is more growth enhancing than when more developed countries are part of the bloc. Further, these countries can use this membership to negotiate more growth-enhancing measures from larger intergovernmental RI formations. Openness is more growth enhancing the longer the countries in the regional bloc have been together in the regional group.

Fourth, I investigate the case of a regional entity with a complex data structure containing a longer series (29 years) and multiple panels (five EAC countries), and estimate it using the PCSE estimator, unlike most studies (even those cited in this study) that use Generalised Method of Moments, instrumental variables regression models and time series with alternative data structures. To use alternative estimators and methods, RTAs with fewer members are utilised to provide more cross-sections and shorter time series. This aggregation of countries obscures the impact of RTAs and openness on growth. For example, Kali, Méndez

and Reyes (2007) find that the impact of trade openness on growth is insignificant for aggregate samples and for rich countries but significant for samples including poor countries only. In the current study, after controlling for heteroscedasticity, cross-panel correlations and serial correlations, I find that RTAs and openness enhance economic growth, though the impact varies across countries, similar to Campos, Coricelli and Moretti (2019) and Irwin (2019); levels of integration; numbers of bloc members, as in Kali et al. (2007); and periods of integration. In terms of the impact of policy measures, the COMESA (a plurilateral bloc) has significant impacts across countries, while the EAC RTA benefits the original EAC member countries. In addition, for the openness measure, I find that trade openness benefits the original EAC members only.

The remainder of this chapter is organised as follows: Section 6.2 reviews the literature on the trade–growth nexus; and Section 6.3 provides the modelling framework for the trade–growth nexus. Data are described in Section 6.4. The main results are presented and discussed in Section 6.5. The final section concludes with policy recommendations.

6.2 Literature on the Trade–Growth Nexus: Theoretical and Empirical Considerations

RTAs are an important development tool, and countries enter into RI to increase economic growth (Hur & Park, 2012; Jalles, 2012; Shahbaz, 2012). However, the development objectives of RTAs are doubted because some countries are yet to experience the expected development, yet others, especially in the East Asia Sea, have already experienced development (Liu, 2016). Studies also fail to pin down the exact nature of the relationship between openness and growth (Shahbaz, 2012).

NGT and EGT provide channels through which to explain how trade openness affects productivity, income and development (Camarero et al., 2016; Setterfield, 2014). Neoclassical growth models, pioneered by Solow (1956) and Swan (1956), argue that trade patterns are determined by comparative advantage leading to higher total factor productivity (Aghion & Howitt, 2008; Camarero et al., 2016). Trade fosters greater horizontal specialisation, thereby enhancing total factor productivity growth, economies of scale due to increased market size, greater capacity utilisation, increased capital formation rates and technological changes (Yaghmaian, 1994). Countries thus liberalise their trade to take advantage of exogenous differences in resource endowments, technology, tastes and climate (Singh, 2011). However,

NGT fails to account for the monopolistic and oligopolistic features of international markets (Singh, 2011). In addition, NGT treats technical progress as exogenous—unaffected by a country's openness to world trade (Harrison, 1996; Hossain & Joarder, 2014; Izushi, 2008). However, trade is not only merchandise but also technology, flow of ideas and knowledge spillover (Bajwa & Siddiqi, 2011). NGT does not consider dynamic processes interrelated with economic, social, cultural and institutional transformations that change the composition of production and the sectoral distribution of resources (Yaghmaian, 1994). Neoclassical growth models support the export-led growth hypothesis (Singh, 2010; Yaghmaian, 1994), although trade openness does not lead to increases in the long-term rate of growth (Camarero et al., 2016).

EGT, pioneered by Lucas (1988) and Romer (1986, 1990), emerged in the late '80s and '90s to better explain the trade–growth nexus because the reality of world product markets differs from NGT predictions (Palley, 1996; Sasaki, 2011). Endogenous growth models assume imperfect competition and increasing returns to scale (Lucas, 1988; Romer, 1986, 1990), ultimately reversing the notion of perfect competition and constant returns to scale under neoclassical models (Singh, 2011). Endogenous growth models focus on the productivity effects of trade and explore additional dimensions of the export-led growth hypothesis (Singh, 2010). For example, models considering monopolistic and oligopolistic assumptions can better handle trade and other policy effects of growth (Santos-Paulino, 2005). These modifications brought by EGT enable models to account for both static and dynamic gains, with the possibility of affecting both incomes and long-term growth (Camarero et al., 2016; Santos-Paulino, 2005; Singh, 2011). The static gains come through improvements in allocation efficiency, while the dynamic gains emanate from imported technology or learning-by-doing effects (Camarero et al., 2016; Izushi, 2008). Technical progress is closely associated with foreign trade (Edwards, 1993; Grossman & Helpman, 1991b; Santos-Paulino, 2005), facilitating an increase in incomes and long-term growth rates in the economy through economies of scale, allocation, spillover and redundancy effects (Camarero et al., 2016). A higher degree of trade liberalisation is presumed to foster technical progress diffusion, leading to long-term economic growth (Targetti & Foti, 1997). However, theoretical paradigms are characterised by a lack of consensus on the effects of trade openness and RI on growth (Hossain & Joarder, 2014; Singh, 2010).

Increasingly, empirical studies suggest a significant positive effect of trade on productivity and growth (Alcala & Ciccone, 2004; Edwards, 1998; Hausmann, Hwang & Rodrik, 2007; Vamvakidis, 1998); yet the openness–growth nexus is unsettled (Camarero et

al., 2016; Singh, 2011, 2015). Empirical findings on the effect of trade openness and income differences are either positive or negative (Hossain & Joarder, 2014; Huang & Chang, 2014; Ulaşan, 2015). For example, some scholars argue in favour of a causal link between trade and convergence by using a variant of openness measures (Brueckner & Lederman, 2015; Dollar & Kraay, 2004; Edwards, 1998; Frankel & Romer, 1999; Musila & Yiheyis, 2015; Nowbutsing, 2014; Wacziarg & Welch, 2003), while others argue for a negative or insignificant effect of trade openness on growth (Harrison, 1996; Rodríguez & Rodrik, 2000; Wacziarg & Welch, 2008). If complementary domestic policies are undertaken, the growth effects of openness are observed to be positive and significant (Chang et al., 2009; Freund & Bolaky, 2008). However, other studies find that the impacts of openness on growth are mixed (i.e. the effect is positive, negative or non-existent because of the use of different proxies for liberalisation and different methodologies) (Greenaway et al., 1997, 2002).

The growth effects of RTAs receive limited empirical attention (Baldwin & Venables, 1995; Liu, 2016). The use of dummy variables in cross-country studies identifies insignificant growth effects of RTAs (Henrekson et al., 1997; Vamvakidis, 1998; Vanhoudt, 1999). However, when the RTA proxy is improved, sizable effects of openness or RTA on growth are observed (Liu, 2016).

6.3 Theoretical Framework, Empirical Strategy and Data Design

This section presents the theoretical framework for the standard growth model. The framework is based on an endogenous growth model that allows for the incorporation of additional variables explaining trade liberalisation. The framework provides the motivation to develop the empirical estimation models described in Subsection 6.3.2. Subsection 6.3.3 describes some econometric issues. The section concludes in Subsection 6.3.4 with a description of the data sources and design.

6.3.1 Theoretical framework of the trade–growth nexus

This empirical study adopts a Cobb–Douglas production function for the versions of the models of Mankiw et al. (1992) and Shahbaz (2012), in which domestic production output Y at time t is given by:

$$Y(t) = A(t)K(t)^{\alpha}L(t)^{1-\alpha} \quad 0 < \alpha < 1 \tag{6.1}$$

For this study, *Y* captures growth rate in real GDP or real Gross National Product as a proxy for growth (Ehigiamusoe & Lean, 2018; Le Gallo & Fingleton, 2019; Litschig & Lombardi, 2019). *K* is capital, which in this study uses *INV* as a proxy; that is, the ratio of investment to GDP is used as a proxy for growth in capital stock, following Yaghmaian (1994). *L* captures the growth rate in the labour force and *A* captures technological progress.

Following the idea of Shahbaz (2012), the study extends the Cobb–Douglas production function in equation (6.1) in the following way. I note that technology is partly determined by financial development (*DCF*) and partly by international trade or trade openness (*OP*). These two covariates enhance economic growth through increasing trade and capital formation economy wide. This implies that the notation component $A(t)$ of equation (6.1) becomes:

$$A(t) = \vartheta . DCF(t)^{\delta} OP(t)^{\alpha} \tag{6.2}$$

where *OP* is a measure of real openness as a ratio of the sum of exports and imports to GDP in PPP USD. It is based on the volume of trade and relates to trade outcomes (Doyle & Martinez-Zarzoso, 2011). *DCF* is calculated as domestic credit provided by the financial sector as a percentage of GDP, which also captures the effect of the development of a country's financial sector. The variable measures distortions in international macroeconomics dynamics and captures the degree of trade protection. Substituting equation (6.2) into equation (6.1), we obtain:

$$Y(t) = \vartheta . DCF(t)^{\delta_2} OP(t)^{\delta_1} K(t)^{\beta} L(t)^{1-\beta} \tag{6.3}$$

If we divide both sides of equation (6.3) by population and linearise equation (6.3) by taking logs, the equation can be estimated as:

$$lnY_t = \varphi_1 + \varphi_2 lnOP_t + \varphi_3 lnDCF_t + \varphi_4 lnINV_t + \varphi_5 lnL_t + \mu_i \tag{6.4}$$

Equation (6.4) is the primarily model guiding the study. $\varphi_1 = log\varphi$ is a constant term and μ_i is an error term assumed to be constant. *INV* is the ratio of investment to GDP, as proxy for growth in capital stock (Yaghmaian, 1994).

6.3.2 Empirical strategy: Model specification

To achieve the study's empirical aims, I adopt the theoretical framework in equation (6.4) and modifies it to explain the impact of trade liberalisation on economic growth. Equation (6.4) lacks some important features that are pertinent to this empirical study; accordingly, Model 4 is augmented. First, I include three dummies representing EAC regional policy in the EAC (eac_i), COMESA ($comesa_i$) and WTO (wto_i) blocs, equal to 1 if country i (Burundi, Kenya, Rwanda, Tanzania or Uganda) is an EAC, COMESA or WTO member and 0 if not, following Henrekson et al. (1997). The study adds RTA variables because the *OP* variable does not exclusively capture all the effects of trade liberalisation (Doyle & Martinez-Zarzoso, 2011; Hossain & Joarder, 2014). Second, I decompose investment into foreign direct investment (FDI_i) and domestic investment ($dominvest_i$). *FDI* is measured as net inflows, while $dominvest_i$ is measured as gross fixed capital formation. Third, instead of measuring labour as growth in the labour force, I modify it and capture this indication as an index measuring years of schooling and return to education, following Katusiime, Agbola and Shamsuddin (2016). Fourth, I include time fixed effects μ_t and country-specific fixed effects ϑ_i to capture all other unobserved effects, along with the normal error term (ε_{it}) (Doyle & Martinez-Zarzoso, 2011). Taking into account all these modifications, the panel version of equation (6.4) is written as:

$$\ln Growth_{it} = \propto_0 + \propto_1 FDI_{it} + \propto_2 \ln dominvest_{it} + \propto_3 \ln DCF_{it} + \propto_4 \ln hc_{it} + \propto_5 eac_{it} + \propto_5 comesa_{it} + \propto_6 wto_{it} + \propto_7 openness_{it} + \mu_t + \vartheta_i + \varepsilon_{it} \quad (6.5)$$

Equation (6.5) is estimated using the PCSE estimator for both the baseline and main estimations. I adopt panel estimations to exploit time series and cross-sectional dimensions of the data to provide more efficient estimates (Bajwa & Siddiqi, 2011). I reduce equation (6.5) to obtain equations (6.6) and (6.7), which are those actually estimated in the study:

$$\ln Growth_{it} = \propto_0 + \propto_1 FDI_{it} + \propto_2 \ln dominvest_{it} + \propto_3 \ln DCF_{it} + \propto_4 \ln hc_{it} + \propto_5 eac_{it} + \propto_5 comesa_{it} + \propto_6 wto_{it} + \mu_t + \vartheta_i + \varepsilon_{it} \quad (6.6)$$

$$\ln Growth_{it} = \propto_0 + \propto_1 FDI_{it} + \propto_2 \ln dominvest_{it} + \propto_3 \ln DCF_{it} + \propto_4 \ln hc_{it} + \propto_7 \sum_1^3 openness_{it} + \mu_t + \vartheta_i + \varepsilon_{it} \quad (6.7)$$

I estimate equation (6.6) to capture the influence of RI on economic growth, and equation (6.7) to capture the influence of openness on economic growth. The summation sign includes trade openness, export openness and import openness. Equations (6.6) and (6.7) are also implemented using the FGLS for robustness tests.

6.3.3 Econometric issues

The implementation of the study proceeds by checking the characteristics of the data to avoid estimating spurious regression as argued by Wooldridge (2010). This takes note of the fact that the number of cross-sectional units in the dataset used in this empirical study is five and the time element is 29 years long. This dataset nomenclature is considered moderate in size and structure; thus the panel structure is likely to be characterised by a complex error structure (Reed & Ye, 2011). The study then proceeds to testing for (1) cross-sectional dependence using the Breusch–Pagan LM test; (2) heteroscedasticity using Stata's xttest 3 test, and (3) serial correlation using Stata's xtserial test. This process reveals that the data suffer from all three problems, which calls for the adoption of an estimator that can handle contemporaneous correlation, heteroscedasticity and first-order autocorrelation. The study employs the PCSE for the main regressions because its primary concern is constructing accurate confidence intervals (Beck & Katz, 1995; Moundigbaye et al., 2018; Reed & Ye, 2011). The PCSE produces heteroscedastic-consistent standard errors and controls for cross-sectional and temporal dependence (Hoechle, 2007). The study estimates equation (6.3) to examine the impact of RI on economic growth, independent of openness. This analysis is undertaken at three levels. First, the effect of RI on economic growth is estimated via three steps. In the first step, I examine the impact of RI on economic growth at the bloc level. In the second step, I examine the same impact by decomposing the bloc effects and examining country asymmetry. In the third step, I explore similar impacts for different compositions of the EAC bloc to provide evidence in support of aspirations of changing the membership of the bloc.

Second, the study estimates the effect of openness on economic growth at the bloc level. This analysis is also undertaken at three levels. In the first step, I examine the impact of openness (trade, export and import openness) on economic growth at the bloc level. In the

second step, I examine the same impact by decomposing the bloc effects and examining country asymmetry. In the third step, I explore similar impacts for different compositions of the EAC bloc to provide evidence in support of aspirations of changing the membership of the bloc.

Third, the study undertakes robustness checks and a sensitivity analysis. I apply the FGLS for this empirical exercise primarily because it enhances the efficiency of estimates (Reed & Webb, 2010; Reed & Ye, 2011). I simultaneously examine the impact of RI and different measures of openness or trade liberalisation.

6.3.4 Data

The study uses annual data covering the period 1988–2017 for the five EAC countries (i.e. Burundi, Kenya, Rwanda, Tanzania and Uganda). The data for *Growth*, *DCF*, *FDI* and *dominvest* were obtained from the WDI database because of its completeness over the period. The data on growth and the Human Capital Index were mined from the Penn World Tables (PWT 9.1). Trade data used in constructing the trade openness, export and import ratios or openness were obtained from the WITS. The time period of the trade data includes the evolution of EAC trade policy reforms. I present summary statistics in Table 6.1 and the correlation matrix in Table 6.2. Overall, there is moderate correlation between the variables at all levels. I find a strong and significant correlation between variables capturing openness and GDP growth (Growth 1) as expected. The same is true for the correlation between Growth 1 and human capital and domestic investment. This correlation reduces to expected ranges when I redefine the definition of growth to Growth 2 from the WDI.

Table 6.1: *Data Sources, Definitions, and Descriptive Statistics*

Variable	Description of Variables	Count	Mean	SD	Min	Max	Data source
Growth 1	Log of GDP	150	9.981	1.144	7.945	11.898	PWT9.1
Growth 2	Annual GDP growth	149	4.463	6.388	-50.248	35.224	WDI
Domestic investment	Capital formation	147	-1.749	0.426	-3.582	-1.020	WDI
Foreign direct investment (FDI)	FDI net inflows	145	-5.399	2.557	-16.089	-2.736	WDI
Financial development	Domestic credit	146	2.894	0.583	1.477	3.811	WDI
Human capital	Human Capital Index	150	0.447	0.194	0.119	0.844	PWT9.1
Trade openness	Share of trade in GDP	140	14.008	1.017	12.142	16.165	COMTRADE
Export openness	Share of exports in GDP	140	12.853	1.046	10.724	14.693	COMTRADE
Import openness	Share of imports in GDP	140	13.603	1.045	11.498	15.904	COMTRADE
EAC dummy	EAC membership	90	0.844	0.364	0	1	EAC website
COMESA dummy	WTO membership	120	0.85	0.359	0	1	COMESA website
WTO dummy	WTO membership	150	0.76	0.429	0	1	WTO website

Notes: Growth 1 is defined as the log of expenditure-side real GDP at current PPPs (in mil. 2011USD); Growth 2 is defined as GDP growth (annual %); Domestic investment is the domestic investment defined as the gross fixed capital formation in logs; FDI is the foreign direct investment, net inflows logs; Financial development (proxy of domestic credit by financial institutions [DCF]) is defined as domestic credit provided by financial sector (% of GDP); Human capital is defined as the log of Human Capital Index, based on years of schooling and returns to education; Trade openness, Export openness and Import openness are the log of trade, exports and imports as share of GDP per capita, PPP (constant 2011 international USD), respectively; EAC, COMESA and WTO dummies are indicator variables defining membership of EAC partner countries in the EAC, COMESA and WTO trading blocs, respectively.

Table 6.2: *Correlation Statistics*

	Growth 1	Growth 2	Domestic Investment	FDI	Domestic Credit	Human Capital	Trade Openness	Export Openness	Import Openness
Growth 1	1								
Growth 2	0.186*	1							
Domestic Investment	0.700***	0.318***	1						
FDI	0.522***	0.428***	0.534***	1					
Domestic Credit	0.213*	-0.302***	-0.0985	-0.341***	1				
Human Capital	0.851***	0.188*	0.523***	0.494***	0.270**	1			
Trade Openness	0.938***	0.163	0.669***	0.491***	0.261**	0.814***	1		
Export Openness	0.932***	0.106	0.573***	0.454***	0.271**	0.784***	0.961***	1	
Import Openness	0.920***	0.189*	0.703***	0.502***	0.247**	0.807***	0.992***	0.918***	1

Note: $^{*}\ p < 0.05$, $^{**}\ p < 0.01$, $^{***}\ p < 0.001$

6.4 Empirical Results and Discussion

To account for the effects of EAC trade liberalisation policy on economic growth, the analysis estimates equation (6.3) to include trade policy (regional dummies) variables, and equation (6.4) to include trade outcome (trade openness) variables. Given the panel heteroscedastic assumption, I begin the discussion by estimating equation (6.3) using PCSE for benchmark determination. Column (1) of Table 6.3 displays the estimates from this process and includes both country fixed effects and time fixed effects; the estimates control for heteroscedasticity and cross-panel correlation. In addition, the model uses an Autoregressive Order (AR) (1) autocorrelation structure whose coefficient is common across panels, thus producing more efficient estimates. I further adopt the method used to estimate the autocorrelation in times series and changes the method of estimating the autocorrelation parameters, enabling me to control for both cross-panel correlation and autocorrelation. The variables in Model 1 of Table 6.3 explain around 99.8% of the variation in economic growth during the period. All coefficients in the model are statistically significant at the 1% level in a Wald test.

The study measures investment as a dichotomy of FDI (ln*fdi* or *FDI*) and domestic investment (ln*dominvest*). The estimated coefficient measuring FDI is significantly positive at the 5% level. The value of this coefficient is 0.009, implying that a 1% increase in FDI yields an increase in economic growth rate of 0.009%, all else remaining constant. This result indicates that increased levels of FDI within the EAC would lead to proportionate increases in the level of annual growth rate per capita GDP. The estimated coefficient measuring domestic investment carries the expected positive sign and is statistically significant at the 5% level. The value of this coefficient is 0.125, implying that a 1% increase in domestic investment increases the annual rate of economic growth by 0.125%. Comparing the contribution of domestic investment and FDI to the rate of growth, I deduce that domestic investment makes a stronger contribution to the annual economic growth rate than does FDI.

The direction of the coefficient quantifying the influence of human capital on the average rate of economic growth is positive and statistically significant at the 1% level. This implies that a 10% increase in human capital increases the average annual rate of economic growth by 23.31%. This suggests that a higher stock of human capital leads to higher annual average rates of economic growth through the expansion of knowledge and skills of the population generating the growth. Economic growth is associated with external conditions or environment, and better or stable macroeconomic variables or policies lengthen the spell of

growth once it has started (Gonzalez-Garcia, Willems & Yenice, 2017), as in the EAC. The positive and statistically significant coefficient of the effect of human capital on economic growth is similar to the findings of Ahmad and Khan (2019) and Katusiime et al. (2016). However, this differs from results reported by Benhabib and Spiegel (1994), who argue that human capital has a typically adverse effect in explaining economic growth. The results also differ from those reported by Čadil, Petkovová and Blatná (2014), who argue that growth in human capital does not necessarily spur economic growth if human capital growth is not reflected in the economic structure of countries to foster growth, an argument that does apply to the EAC's economic structure.

The coefficient measuring the effect of domestic credit provided by the financial sector as a percentage of GDP (ln*DCF*) has a negative sign and is statistically significant at 1%. In particular, the estimate indicates that a 100% expansion of credit by the financial sector leads to a reduction in economic growth by 12%. This implies that an increase of domestic credit by the financial sector in the EAC constrains economic growth.

Trade liberalisation is measured using both trade outcomes and trade policy. Regarding the trade outcome (trade openness) policy measure, I find that the coefficient carries the expected positive sign for the models in Table 6.2, but the effect is statistically significant only at the 10% level for Models 1 and 3. This result signifies that a percentage increase in the level of openness leads to a much higher level of rate of growth for Model 1, of 0.564%, than the 0.359% for Model 3. This result is similar to those reported in the 1990s (Dollar, 1992; Edwards, 1998) and more recently, by Fetahi-Vehapi, Sadiku and Petkovski (2015) and Musila and Yiheyis (2015), who argue that openness has a significant positive relationship with the rate of economic growth.

6.4.1 Impact of regional integration on economic growth in the EAC

To measure the impact of EAC RI on economic growth, I use regional dummies. The dummies are indicator variables (carrying a value of 1 when a country is a member of a particular regional bloc and 0 otherwise) of the EAC participating in the EAC bloc, COMESA bloc and WTO bloc. The following subsections discuss the estimates.

6.4.1.1 EAC bloc analysis

Table 6.3 reports EAC bloc results or estimates for the impact of EAC regional endeavours on economic growth. Column (2) displays estimates for the impact of the EAC

bloc. Columns (3) and (4) display results for the impact of EAC partner states or countries participating in the COMESA and WTO blocs, respectively.

The results indicate that participating in the EAC bloc has positively influenced economic growth. However, EAC partner state participation in the COMESA and WTO blocs has had negative impacts on economic growth. For instance, the results indicate that the EAC bloc increased economic growth by 5.6% (100 × 0.056) for every year that the EAC partner states remained in the bloc compared with if they were not members of the bloc. The results indicate that the COMESA bloc had a larger influence in terms of a reduction in economic growth (13.7%) than the WTO bloc, which only reduced economic growth by 7.9%.

The EAC bloc's positive contribution to the rate of economic growth arises from the fact that it allows for trade liberalisation in substantially all trade. Moreover, the bloc's trade liberalisation has allowed tariffs to decline to less than 0% on average for all goods traded. Contravention of this requirement is enforceable within the EAC bloc, unlike in the COMESA bloc, where tariff and non-tariff barriers are continually introduced without stringent and timely enforceable measures. Moreover, the COMESA trade liberalisation policy only covers a narrow range of merchandise trade and does not consider trade in services, unlike the EAC and WTO blocs. Services liberalisation stimulates trade in merchandise. The negative but marginal contribution of the WTO bloc to trade could be explained by most EAC countries having lost support for transacting through the WTO since the collapse of the DDA. The DDA collapsed because it did not pay interest or reduce tariffs on commodities of interest to LDCs, such as the EAC partner states.

The finding of a positive impact of RTAs on economic growth is qualitatively similar to the findings of Jalles (2012) and Te Velde (2011). However, the finding that RI positively and significantly influences economic growth in an African LDC is more powerful than the arguments of Jalles (2012) and Te Velde (2011) that regionalism in developing countries has a limited, weak and unclear link to their rate of economic growth. These results clearly imply that examining the level of intergovernmental regional bloc would produce different results. In this case, RI with similar countries has a more positive impact on trade than do plurilateral RTAs (COMESA bloc) and multilateral integrations (WTO bloc).

Table 6.3: *Impact of Regional Trade Agreements on Economic Growth—EAC Bloc*

Variable	Baseline	Regional Bloc		
		EAC Bloc	COMESA Bloc	WTO Bloc
	(1)	(2)	(3)	(4)
Domestic investment	0.125*	0.059	0.087*	0.170**
	(0.051)	(0.036)	(0.038)	(0.041)
FDI	0.009*	0.008***	0.005***	0.009**
	(0.004)	(0.005)	(0.003)	(0.003)
Financial development	-0.120**	0.048	-0.049	-0.070***
	(0.045)	(0.038)	(0.031)	(0.040)
Human capital	2.331**	4.220**	4.270**	3.808**
	(0.504)	(0.220)	(0.160)	(0.199)
EAC dummy		0.056*		
		(0.028)		
COMESA dummy			-0.137***	
			(0.083)	
WTO dummy				-0.079*
				(0.039)
Constant	8.772**		8.750**	
	(0.197)		(0.187)	
N	140	86	116	140
*r*2	0.998	0.999	0.996	0.996
Fixed effects				
Country	Yes	Yes	Yes	Yes

Notes: This table reports estimates for the effects of RTAs on economic growth. All estimates are obtained from data for the years 1988–2017. All equations are estimated with the PCSE. Column (1) estimates the baseline model with country and fixed effects. Columns (2) and (4) replicate estimates of Column (1) with addition of the effect of EAC regionalism in the EAC, COMESA and WTO blocs. Columns (2)–(4) use country fixed effects but eliminate the time fixed effects since the use of the testparm command in Stata indicated that there is no need to run time fixed effects when running the fixed effects model. The estimates for the country and time fixed effects are omitted for brevity. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

6.4.1.2 Country analysis

This subsection analyses the impact of RI by shedding light on the heterogeneous impact of RTAs across countries in the EAC bloc. The study implements equation (6.3) for each of the five EAC countries. The results from this process are reported in Tables 6.4 and 6.5. Columns (1)–(3) display the results of Kenya's participation in the EAC, COMESA and WTO blocs, respectively. The same process is repeated for Tanzania and Uganda's estimates in Columns (4)–(6) and Columns (7)–(9), respectively. Table 6.5 displays results for Rwanda in Columns (1)–(3), and Burundi in Columns (4)–(6). I only discuss results relating to RI across countries.

I deduce from the results that Kenya's participation in the EAC and COMESA blocs increases her economic growth but that participation in the WTO bloc reduces growth. For instance, the EAC and COMESA increased economic growth by 742.8% and 835.9%

(significant at 1%), respectively, relative to what would have been the case had Kenya not been involved in the RI; whereas Kenya's participation in the WTO reduced economic growth by 15.8%. These results indicate that Kenya is paying more attention to regional (EAC bloc) and plurilateral integration (COMESA) than to multilateral integration (the WTO bloc). This is because Kenya is using its manufacturing prowess to overcome the incumbencies at the WTO and gain preference in the region.

Tanzania's participation in the EAC has a positive impact on economic growth for the EAC and COMESA blocs, but the influence is only significant for the EAC bloc. The influence of Tanzania's participation in the WTO bloc was negative but not significant. The EAC bloc increased Tanzania's economic growth by 712.5%. Clearly, aggregating the EAC bloc masks the economic benefits for any given country as the bloc only contributes 5.6% at the aggregate level but appears to have had a much higher impact on Kenya and Tanzania: 724.8% and 712.5%, respectively.

I find Uganda's participation in the EAC has had a significant positive effect on economic growth, by over 1031.3%. The COMESA bloc also had a significant (at the 5% level) positive effect on economic growth, of 972.3%. However, the WTO had a significant negative effect on economic growth, of 7.7%. For Burundi and Rwanda, the results suggest that only the COMESA had a significant positive effect on economic growth: 745% and 694%, respectively. In fact, Burundi's participation in the WTO bloc led to a reduction in her economic growth by 22.6%, ceteris paribus.

Clearly, the EAC bloc is more important to Uganda's and Tanzania's economic growth whereas the COMESA bloc is more important to Kenya's economic growth. In addition, though the aggregate data indicate that the COMESA bloc has a negative impact on economic growth, the country asymmetry indicates that the COMESA has a significant positive impact across all the countries. Aggregate data clearly mask the impact of RI on economic growth. As does Irwin (2019), I conclude that trade reforms affect economic growth, although the effect is heterogeneous across countries.

Table 6.4: *The Impact of Regional Trade Agreements on Economic Growth: Country Analysis*

	Kenya			Tanzania			Uganda		
Regional Integration→	EAC	COMESA	WTO	EAC	COMESA	WTO	EAC	COMESA	WTO
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Domestic investment	0.007	0.040	0.096	0.222**	0.125**	0.238**	0.795	0.412**	0.726**
	(0.112)	(0.170)	(0.104)	(0.062)	(0.044)	(0.065)	(0.127)**	(0.111)	(0.100)
FDI	0.008	0.007	0.003	0.004	-0.011	-0.046**	0.030	0.094**	0.053**
	(0.007)	(0.014)	(0.006)	(0.024)	(0.015)	(0.005)	(0.043)	(0.034)	(0.020)
Financial development	0.028	0.099	0.115	0.103**	0.138**	0.147**	-0.073	0.029	-0.089*
	(0.129)	(0.198)	(0.119)	(0.047)	(0.021)	(0.024)	(0.045)	(0.032)	(0.039)
Human capital	5.452**	3.745**	3.853**	8.895**	8.944**	8.420**	2.869**	2.826**	3.014**
	(0.342)	(0.368)	(0.273)	(0.618)	(0.281)	(0.348)	(0.175)	(0.204)	(0.185)
EAC dummy	7.248**			7.125**			10.313**		
	(0.507)			(0.248)			(0.229)		
COMESA dummy		8.359**			0.009			9.723**	
		(0.883)			(0.029)			(0.261)	
WTO dummy			-0.158**			-0.004			-0.077**
			(0.051)			(0.055)			(0.039)
N	18	24	30	18	24	28	18	24	26
*r*2	0.999	0.993	0.997	0.999	0.999	0.993	0.988	0.996	0.998
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table displays country asymmetry in the effect of RTAs on economic growth. All estimates are obtained from data for the years 1988–2017. All equations are estimated with the PCSE. Columns (1)–(3) present Kenya's estimates for the EAC, COMESA and WTO bloc respectively. This is replicated for Tanzania in columns (4)–(6) and Uganda in columns (7)–(9), respectively. All models use country fixed effects but results are omitted for brevity. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

Table 6.5: *The Impact of Regional Trade Agreements on Economic Growth: Country Analysis*

	Rwanda			Burundi		
Regional Integration→	EAC	COMESA	WTO	EAC	COMESA	WTO
	[1]	[2]	[3]	[4]	[5]	[6]
Domestic investment	0.027	-0.325*	0.151	-0.007	0.009	0.041
	(0.098)	(0.153)	(0.285)	(0.018)	(0.043)	(0.031)
FDI	-0.002	0.031*	0.078**	0.009**	0.000	0.006***
	(0.016)	(0.012)	(0.023)	(0.003)	(0.004)	(0.003)
Financial development	-0.121**	-0.217**	0.051	0.143	0.010	0.079
	(0.026)	(0.057)	(0.116)	(0.102)	(0.136)	(0.098)
Human capital	4.719**	5.710**	3.402**	5.495**	4.572**	4.148**
	(0.210)	(0.367)	(0.639)	(0.617)	(0.685)	(0.496)
EAC dummy	-0.007			0.041		
	(0.036)			(0.032)		
COMESA dummy		6.940**			7.466**	
		(0.357)			(0.361)	
WTO dummy			-0.155			-0.226**
			(0.111)			(0.047)
N	18	24	30	14	20	26
*r*2	0.997	0.984	0.953	0.995	0.995	0.997
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table displays country asymmetry in the effects of RTAs on economic growth. All estimates are obtained with data for the years 1988–2017. All equations are estimated with the PCSE. Columns (1)–(3) present Rwanda's estimates for the EAC, COMESA and WTO bloc respectively. This is replicated for Burundi in Columns (4)–(6). All models use country fixed effects but results are omitted for brevity. Standard errors are reported in parentheses; $^{***}\ p < 0.10$, $^{*}\ p < 0.05$, $^{**}\ p < 0.01$.

6.4.1.3 EAC bloc composition analysis

This subsection provides evidence to assuage any concerns that recomposing the EAC bloc is good or entertained. Table 6.6 presents results for the impact of a recomposed regional bloc on the annual average economic growth. Columns (1)–(3) report the results for the EAC, COMESA and WTO blocs in the EAC composition without Kenya. Columns (4)–(6) display results for the original EAC composition, while columns (7)–(9) display estimates for an EAC composition with the new members (Burundi and Rwanda) only, for the EAC, COMESA and WTO blocs, respectively.

The study finds that an EAC composition without Kenya—a developing country, unlike the other countries, which are LDCs—would lead to a significant positive effect of the EAC bloc on economic growth. The results portend that the EAC bloc would increase economic growth by 7.1%, while the COMESA and WTO blocs would have negative but non-significant impacts on economic growth. The original EAC bloc of Kenya, Tanzania and Uganda would lead to significant negative growth of 27.9% in the COMESA bloc. However, should the new EAC members decide to form themselves into an economic bloc, this would lead to a significant positive effect on economic growth, of 79.1% in the COMESA. If the influence on economic growth is the only argument for recomposing the bloc, then the new members would be better off forming a regional grouping among themselves. The study also deduces that expansion of the bloc is more beneficial for economic growth. The original EAC formation is not tenable. If the bloc were to be recomposed, then Kenya is the only country that should be left out of the bloc.

Table 6.6: *Impact of RTAs on Economic Growth— EAC Bloc Composition Analysis*

	Composition without Kenya			Original EAC Composition			New Membership Composition		
Regional Integration →	EAC	COMESA	WTO	EAC	COMESA	WTO	EAC	COMESA	WTO
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Domestic investment	0.072***	0.087*	0.170**	0.448**	0.303**	0.305**	0.011	-0.006	0.116*
	(0.040)	(0.040)	(0.044)	(0.116)	(0.108)	(0.092)	(0.033)	(0.042)	(0.045)
FDI	0.009	0.006	0.011**	0.014	0.016	-0.001	-0.002	-0.000	0.017**
	(0.007)	(0.003)	(0.004)	(0.011)	(0.014)	(0.007)	(0.004)	(0.004)	(0.005)
Financial development	0.063	-0.053	-0.068	0.045	0.031	-0.063	-0.073*	-0.203**	-0.114
	(0.043)	(0.032)	(0.043)	(0.038)	(0.039)	(0.043)	(0.033)	(0.051)	(0.092)
Human capital	3.932**	4.346**	3.797**	3.921**	3.595**	3.765**	4.621**	5.432**	4.047**
	(0.275)	(0.190)	(0.239)	(0.192)	(0.219)	(0.202)	(0.187)	(0.267)	(0.503)
EAC dummy	0.071*			0.000			0.029		
	(0.034)			(.)			(0.023)		
COMESA dummy		-0.122			-0.279**			7.910**	
		(0.080)			(0.089)			(0.164)	
WTO dummy			-0.068			-0.037			-0.151*
			(0.044)			(0.043)			(0.063)
Constant	7.581**	8.069**	9.885**	9.108**					8.507**
	(0.149)	(0.165)	(0.176)	(0.313)					(0.257)
N	68	92	110	54	72	84	32	44	56
*r*2	0.998	0.996	0.995	0.998	0.996	0.997	0.999	0.998	0.997
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table displays estimates of the effect of EAC bloc composition and RTAs on economic growth. All estimates are obtained from data for the years 1988–2017. All equations are estimated with the PCSE. Columns (1)–(3) present estimates for the EAC without Kenya for EAC, COMESA and WTO bloc, respectively. This is replicated for the original EAC bloc composition and for a bloc composition with new members only, respectively, in columns (4)–(6) and columns (7)–(9). All models use country fixed effects but results are omitted for brevity. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

6.4.2 Impact of openness on economic growth in the EAC

To capture the impact of openness on economic growth, the study adopts three measures: trade openness, export openness and import openness. The variables measure the ratio of trade, exports and imports, respectively, to GDP. A vast number of empirical studies only use the ratio of trade to GDP. The results are displayed in Table 6.7. Column (1) reports baseline results, and Columns (2)–(4) display results for trade openness, export openness and import openness, respectively, as discussed in the next subsections.

6.4.2.1 EAC bloc analysis

The variables of primary interest are those measuring openness, reported in columns (2)–(4). The results indicate that the influence on economic growth of the ratio of trade to GDP (trade openness) and the ratio of imports to GDP is negative but not significant. However, the ratio of exports to GDP has a significant positive effect on GDP. The results displayed in column (3) indicate that a 1% increase in the level of export openness increased economic growth by 0.064%. This result indicates that unmasking the component of trade reveals that encouraging export through RI enhances economies. This result is similar to results reported in the 1990s (Dollar, 1992; Edwards, 1998) and more recently to those of Fetahi-Vehapi et al. (2015) and Musila and Yiheyis (2015), who argue that openness has a significant positive relationship with the rate of economic growth.

Table 6.7: *Impact of Trade Openness on Economic Growth: Bloc Analysis*

		Export Openness Indicators		
	Baseline	Trade Openness	Export Openness	Import Openness
	[1]	[2]	[3]	[4]
Domestic investment	0.125*	0.191**	0.160**	0.196**
	(0.051)	(0.044)	(0.041)	(0.045)
FDI	0.009*	0.008*	0.008*	0.008*
	(0.004)	(0.004)	(0.004)	(0.004)
Financial development	-0.120**	-0.069***	-0.048	-0.065***
	(0.045)	(0.038)	(0.040)	(0.037)
Human capital	2.331**	3.801**	3.593**	3.929**
	(0.504)	(0.230)	(0.220)	(0.229)
Trade openness		-0.016		
		(0.048)		
Export openness			0.064***	
			(0.036)	
Import openness				-0.054
				(0.044)
Constant	10.501	9.477		
	(0.206)**	(0.674)**		
N	140	134	134	134
*r*2	0.998	0.998	0.997	0.998
Fixed effects				
Country	Yes	Yes	Yes	Yes

Notes: The table reports estimates for the effects of merchandise openness on economic growth. All estimates are obtained with data from the years 1988–2017. All equations are estimated with the PCSE. Column (1) estimates the baseline model with country and fixed effects. Columns (2) and (4) replicate estimates of Column (1) with the addition of variables capturing trade openness, export openness and import openness, respectively in Columns (2)–(4). Columns (2)–(4) use country fixed effects but eliminate the time fixed effects since the use of the testparm command in Stata indicated that there is no need to run time fixed effects when running the fixed effects model. The estimates for the country and time fixed effects are omitted for brevity. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

6.4.2.2 Country asymmetry analysis

This subsection analyses the impact of openness by shedding light on its heterogeneous impact across countries in the EAC bloc. I implement equation (6.4) for each of the five EAC countries (see Tables 6.8 and 6.9). Columns (1)–(3) of Table 6.8 display the results for Kenya's trade openness, export openness and import openness, respectively. The same structure is repeated for Tanzania in columns (4)–(6) and Uganda in columns (7)–(9). Rwanda and Burundi's estimates are displayed in Table 6.9 columns (1)–(3) columns (4)–(6), respectively. I only discuss results relating to openness across countries.

For Kenya, the results indicate that the level of export openness increased the level of economic growth in that the coefficient capturing export openness is positive and significant

at the 10% level. For example, the results indicate that for every 1% increase in the level of export openness, economic growth increased by 0.226%. In Tanzania, all variables capturing openness show that it had a positive influence on economic growth, but was significant for only trade openness and import openness. For instance, a 1% increase in trade openness and import openness increased economic growth by 0.087% and 0.084%, respectively. In Uganda, trade openness, export openness and import openness had a significant positive influence on economic growth. The results in columns (7)–(9) indicate that every 1% increase in Uganda's trade openness, export openness and import openness increased economic growth by 0.146%, 0.091%, and 0.135%, respectively. Meanwhile in Rwanda, import openness had a significant negative impact on economic growth, and in Burundi, export openness had a significant positive influence on economic growth. Every 1% decrease in import openness led to a decrease of 0.336% in economic growth in Rwanda, and 1% increase in export openness led to a 0.083% increase in economic growth in Burundi. I deduce from these results that trade, export and import openness have heterogeneous effects on countries.

Table 6.8: *Impact of Trade Openness on Economic Growth: Country Analysis*

Openness Indicators→	Kenya			Tanzania			Uganda		
	TO	EO	IO	TO	EO	IO	TO	EO	IO
	1	2	3	4	5	6	7	8	9
Domestic investment	0.097	0.166	-0.003	0.211**	0.242**	0.199**	0.578**	0.638**	0.541**
	(0.166)	(0.140)	(0.178)	(0.054)	(0.051)	(0.057)	(0.098)	(0.102)	(0.103)
FDI	0.006	0.008	0.007	-0.050**	-0.048**	-0.050**	0.057**	0.058**	0.053**
	(0.010)	(0.010)	(0.010)	(0.005)	(0.005)	(0.005)	(0.019)	(0.020)	(0.019)
Financial development	0.099	0.174	0.092	0.115**	0.121**	0.114**	0.018	0.008	0.002
	(0.155)	(0.153)	(0.153)	(0.025)	(0.023)	(0.026)	(0.040)	(0.042)	(0.037)
Human capital	3.493**	4.570**	2.755**	7.717**	7.749**	7.767**	2.409**	2.536**	2.486**
	(0.841)	(0.563)	(0.843)	(0.438)	(0.469)	(0.413)	(0.247)	(0.253)	(0.228)
Openness	-0.001	-0.226*	0.093	0.087***	0.076	0.084***	0.140**	0.091*	0.135**
	(0.115)	(0.100)	(0.102)	(0.047)	(0.047)	(0.045)	(0.050)	(0.041)	(0.050)
N	28	28	28	28	28	28	26	26	26
*r*2	0.994	0.993	0.994	0.995	0.995	0.994	0.997	0.995	0.998
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: TO, EO and IO denote trade, export and import openness, respectively (see note for Table 6.3). The table displays country asymmetry in the effects of openness on economic growth. All estimates are obtained with data from the years 1988–2017. All equations are estimated with the PCSE. Columns (1)–(3) presents Kenya's estimates for the EAC, COMESA and WTO bloc respectively. This is replicated for Tanzania, Uganda, Rwanda and Burundi, respectively. All models use country fixed effects but results are omitted for brevity. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

Table 6.9: *Impact of Trade Openness on Economic Growth: Country Analysis*

	Rwanda				Burundi	
Openness Indicators→	EO	EO	IO	TO	EO	IO
	[1]	[2]	[3]	[4]	[5]	[6]
Domestic investment	0.540**	0.338	0.863**	0.048	0.077***	0.048
	(0.305)	(0.274)	(0.296)	(0.046)	(0.042)	(0.046)
FDI	0.040	0.053*	0.014	0.002	0.004	0.002
	(0.025)	(0.021)	(0.028)	(0.005)	(0.005)	(0.004)
Financial development	0.055	0.074	-0.032	0.117	0.104	0.079
	(0.103)	(0.100)	(0.097)	(0.149)	(0.162)	(0.132)
Human capital	3.122**	2.954**	3.734**	2.456*	2.663**	2.725**
	(0.532)	(0.484)	(0.501)	(1.010)	(0.739)	(0.991)
Openness	-0.098	0.073	-0.336**	0.094	0.083*	0.066
	(0.120)	(0.060)	(0.113)	(0.084)	(0.040)	(0.082)
N	28	28	28	24	24	24
*r*2	0.975	0.977	0.962	0.995	0.989	0.996
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Note: See notes for Table 6.8.

6.4.2.3 Bloc composition analysis

This subsection provides evidence to assuage the fear of recomposing the EAC bloc and estimate the impact of openness variables. Table 6.10 displays results for the impact of a recomposed regional bloc on the annual average economic growth. Columns (1)–(3) report results for measures of the effects of trade, export and import openness for an EAC composition without Kenya. Columns (4)–(6) display results for the original EAC composition, while columns (7)–(9) display estimates for the same variables for an EAC composition with the new members (Burundi and Rwanda), respectively.

The measure capturing export openness in an EAC composition without Kenya suggests a significant positive effect on economic growth. The coefficient measuring the influence of export openness shows increased economic growth by 0.078% for every 1% increase in export openness. Considering integration of the new EAC members only, I find that this composition would have a significant negative effect of import openness. The magnitude of this reduction is that every 1% increase in import openness would lead to a reduction in economic growth by 0.18%. The original EAC composition may have the maximum impact on economic growth because the variables measuring trade, export and import openness are positive and significant. For instance, every 1% increase in trade openness, export openness and import openness would increase economic growth by 0.183%, 0.189% and 0.156%, respectively.

Table 6.10: *Impact of Trade Openness on Economic Growth: Bloc Composition Analysis*

	Composition without Kenya			Original EAC Composition			New Membership Composition		
	1	2	3	4	5	6	7	8	9
Domestic investment	0.199**	0.165**	0.200**	0.295**	0.323**	0.279**	0.193**	0.138**	0.226**
	(0.049)	(0.044)	(0.049)	(0.087)	(0.093)	(0.088)	(0.056)	(0.050)	(0.059)
FDI	0.008*	0.009*	0.009*	-0.004	-0.001	-0.004	0.014*	0.014*	0.016**
	(0.004)	(0.005)	(0.004)	(0.008)	(0.008)	(0.008)	(0.006)	(0.006)	(0.006)
Financial development	-0.058	-0.040	-0.061	-0.046	-0.021	-0.059***	-0.080	-0.114	-0.038
	(0.040)	(0.042)	(0.039)	(0.037)	(0.039)	(0.036)	(0.097)	(0.094)	(0.090)
Human capital	3.796**	3.617**	3.946**	3.053**	3.105**	3.131**	4.075**	3.550**	4.425**
	(0.257)	(0.241)	(0.254)	(0.237)	(0.237)	(0.228)	(0.508)	(0.417)	(0.473)
Trade openness	-0.007			0.183**			-0.104		
	(0.055)			(0.049)			(0.076)		
Export openness		0.078*			0.189**			0.059	
		(0.038)			(0.048)			(0.042)	
Import openness			-0.060			0.156**			-0.180**
			(0.053)			(0.045)			(0.068)**
Constant	9.909**	8.720**	10.626**						10.560
	(0.779)	(0.505)	(0.737)						(0.837)
N	106	106	106	82	82	82	52	52	52
*r*2	0.997	0.995	0.998	1.000	0.998	1.000	0.987	0.995	0.991
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table displays estimates for the effect of EAC bloc composition and openness on economic growth. All estimates are obtained from data for the years 1988–2017. All equations are estimated with the PCSE. Columns (1)–(3) present estimates for the EAC without Kenya, for the EAC, COMESA and WTO bloc respectively. This is replicated for the original EAC bloc composition and for a bloc composition with new members only, respectively, in columns (4)–(6) and columns (7)–(9). All models use country fixed effects but results are omitted for brevity. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

6.5 Robustness Checks

For the sensitivity analysis, I employ an alternative but comparable estimator—the FGLS—and estimate both equations (6.)3 and (6.4). The study adopts the FGLS primarily because it enhances the efficiency of estimates (Reed & Webb, 2010; Reed & Ye, 2011), unlike the PCSE, whose primary concern is constructing precise confidence intervals (Beck & Katz, 1995; Moundigbaye et al., 2018; Reed & Ye, 2011). Unlike for the PCSE estimation, I include both time and country fixed effects in the FGLS estimates. Table 6.11 displays results from this process in terms of the impact of trade liberalisation on economic growth. All estimates are obtained using data for the years 1988–2017. Column (1) provides estimates for the baseline model. Columns (2)–(4) display results for the effect of RI on economic growth for the EAC bloc, COMESA bloc and WTO bloc, respectively. This structure is replicated for the effect of openness on economic growth, respectively, in columns (5)–(7). All models use both country and time fixed effects, but results are omitted for brevity.

Results for the baseline estimates in Column 1 of Table 6.3 are similar to the results displayed in Column 1 of Table 6.11. For instance, the results indicate that the coefficients measuring domestic investment, FDI and human capital are positive and significant, while that measuring the contribution of domestic credit by the financial sector is negative and significant.

The results measuring the impact of RI are presented in Columns 2–4. The estimates differ slightly from those of the PCSE. For instance, although the results in Table 6.3 indicate that the EAC has positive effects, the sensitivity results indicate that the effect is not significant. The magnitude and direction of the coefficient measuring the impact of EAC countries participating in the COMESA are similar, although the sensitivity analysis is slightly significant, confirming that FGLS estimators enhance efficiency. In this case, the coefficient indicates that the COMESA bloc enhances economic growth by 41.8% compared with the baseline. The coefficient measuring the influence of the EAC partner states participating in the WTO bloc displayed in Column 4 of Table 6.11 is still significant as in Column 4 of Table 3, but it is now positive, unlike the previous estimate, which is negative. The results indicate that economic growth increases by 38.6% for every year that the states remain in the WTO bloc.

Turning to the results measuring the effects of openness on economic growth, the thesis finds that the sensitivity analysis results reported in Columns 5–7 of Table 6.11 are similar to those displayed in Columns 2–4 of Table 6.7. In essence, the magnitude and direction of the estimates of the coefficient measuring trade openness are robust to the PCSE and FGLS estimators.

Table 6.11: *Impact of RTAs and Openness on Economic Growth: Sensitivity Analysis*

	Baseline	RI Bloc			Openness		
	Baseline Model	EAC	COMESA	WTO	Export Openness	Export Openness	Import Openness
Variable	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Domestic investment	0.128*	0.042	0.114***	0.123*	0.191**	0.160**	0.196**
	(0.064)	(0.047)	(0.063)	(0.062)	(0.044)	(0.041)	(0.045)
FDI	0.015*	0.015*	0.013***	0.016*	0.008*	0.008**	0.008*
	(0.007)	(0.007)	(0.008)	(0.007)	(0.004)	(0.004)	(0.004)
Financial development	-0.165**	0.091**	-0.034	-0.153**	-0.069***	-0.048	-0.065***
	(0.043)	(0.034)	(0.043)	(0.042)	(0.038)	(0.040)	(0.037)
Human capital	2.538**	0.014	1.882**	2.540**	3.801**	3.593**	3.929**
	(0.357)	(0.217)	(0.368)	(0.355)	(0.230)	(0.220)	(0.229)
EAC dummy		0.015					
		(0.035)					
COMESA dummy			-0.418**				
			(0.068)				
WTO dummy				0.386**			
				(0.138)			
Openness dummies					-0.016	0.064***	-0.054
					(0.048)	(0.036)	(0.044)
Constant	8.952**	7.939**	8.777**	8.912**	9.477**		
	(0.194)	(0.202)	(0.230)	(0.191)	(0.674)		
N	140	86	116	140	134	134	134
*r*2					0.998	0.997	0.998
Fixed effects							
Time	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table displays estimates for the impact of trade liberalisation on economic growth. All estimates are obtained from data for years 1988–2017. All equations are estimated with the FGLS estimator. Column (1) provides estimates for the baseline model. Columns (2)–(4) display results for the effect of RI on growth economic for the EAC, COMESA and WTO bloc, respectively. This is replicated for the effect of openness on economic growth, respectively, in columns (5)–(7). All models use both country and time fixed effects but results are omitted for brevity. Standard errors are reported in parentheses; *** $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

6.6 Concluding Remarks

While considerable research has been undertaken on the trade–growth nexus, the empirics remain unresolved, especially for LDCs in Africa. Further, little attention has been paid to the issue of RI as a component of trade liberalisation or integration. This study provides novel empirical evidence regarding the impact of trade liberalisation—with a focus on regionalisation—on economic growth in one of the emerging regional blocs in the developing world, the EAC. Using a comprehensive export dataset spanning the period 1988–2017, I empirically investigate the impact of trade liberalisation by using both trade policy and trade outcomes measures. To this end, the study applies an endogenous growth model in which firms maximise profits in discrete time and the function is estimated using the PCSE. This methodology enables the regressions to produce heteroscedastic-consistent standard errors and control for cross-sectional and temporal dependence (Hoechle, 2007) on different indicators of trade liberalisation.

The results indicate that RTAs have strong beneficial effects on EAC member states' economic growth at the EAC bloc level but a negative influence on economic growth at the plurilateral and multilateral levels. However, the EAC regional programme has had a heterogeneous influence on economic growth across countries. The results indicate that the participation of Kenya, Tanzania and Uganda (the original EAC member states) has seen a significant positive effect of trade integration on economic growth. The participation of all the countries in the COMESA has had significant positive effects on economic growth, with the exception of Tanzania. It should be noted that Tanzania left the COMESA bloc in 2000. This implies that any negative and significant bloc results are masked by Tanzania's inclusion. The consistent positive contribution across EAC countries from the COMESA bloc is probably a result of the bloc's stronger externalisation of the acceded trade liberalisation policy. Participation in WTO RTAs has had a negative influence on economic growth for all EAC countries but only significantly so for Kenya, Uganda and Burundi.

The empirical results indicate that the aggregate measure of openness (trade openness) is not growth enhancing. However, when I implement alternative measures of openness (export openness and import openness), I find that export openness is growth enhancing; this result is robust to alternative model specifications and estimations, while the result for import openness is not. The findings include that outward trade orientation qualitatively contributes to economic growth more than does inward trade orientation for the EAC countries. Interestingly, while trade openness has a significant negative influence on economic growth at the aggregate level

across countries, Tanzania and Uganda bring a positive and significant influence on economic growth. In the case of the heterogeneous effects of import openness on trade across countries, I deduce that Tanzania and Uganda still introduce a significant positive influence, but inclusion of Rwanda has a significant negative influence on economic growth. Though the coefficient measuring export openness is significant, the country-level results are positive and significant only for Uganda and Rwanda, and negative and significant for Kenya, in terms of these countries' influence on economic growth.

These findings highlight the need for EAC member states to undertake greater trade liberalisation in terms of both trade outcomes and trade policy. This study contends that the policy ambition should be orienting EAC member states to an outward-looking rather than inward-looking trade structure. In addition, the study recommends that greater attention be paid to strengthening regional policy, with a focus on liberalising substantially more trade within the WTO and COMESA, because trade policy is more growth enhancing than are trade outcomes. In addition, there is a need for policies for the EAC to be reinforced, to increase the bloc's contribution to economic growth.

Chapter 7: Summary, Conclusion and Policy Implications of Empirical Findings

7.1 Summary of Empirical Results

The key objective of this thesis was to examine the role of RTAs in enhancing trade, the duration of trade and economic growth, using the context of the EAC. Countries enter into RI blocs to increase their trade and investment, and spur economic growth. Regionalism is undertaken with the faulty presumption that trade relationships formed will persist into the future. Consequently, anticipated outcomes may not be achieved. This is probably because of the lack of research on the listed aspects of the RI of specific regional entities, such as the EAC, which motivated this research. Empirical investigation of these issues provides economic evidence to support the hastened process of forming regional trading blocs in the EAC, rather than relying on the politically motivated administrative statements, strong statements, unacceptable propositions and casual empiricism driving the current wave of forming RTAs. In this regard, this thesis addresses three specific research questions to achieve its main objective:

1. Do RTAs promote trade in the EAC?
2. What is the role of RTAs in enhancing the duration of trade in the EAC?
3. Does trade liberalisation impact on economic growth in the EAC?

These research questions are further developed and answered in three empirical studies in Chapters 4, 5 and 6 of this thesis. The thesis uses the context of the EAC, as it is the top-performing REC in Africa in RI overall, and has higher-than-average scores across each dimension of integration (ECA, 2017). The EAC is the only RTA in Africa that is closely anchored to the evolution of theoretical predictions around forming regional trade integrations. As such, findings from analysis in its context can easily be generalised to guide the regional endeavours of other regional blocs in Africa. In addition, the EAC is the most ambitious regional bloc in the developing world, having been a PTA and now progressing towards a MU in less than 20 years.

Much as trade liberalisation in the EAC is commendable, there is strong evidence that trade reform performs very poorly (Mishra, 2018; Rodrik, 1992). For instance, the EAC is still a marginal player in the global trade in goods (UNCTAD, 2019). Moreover, the EAC's intraregional trade is the least among all African RTAs, implying that the EAC does not perform as well as it does in the area of trade integration (ECA, 2017). These low levels of intraregional trade are still observed even though tremendous resources and strong political

will continue to back progress towards implementation of the bloc (Vickers, 2017). In addition, there are still discrepancies in the size and relative strength of economies in the ECA, creating tension over the perceived distributions of the benefits of RI (ECA, 2017).

The strong political orientation of the EAC at the expense of her economic orientation has encouraged skewed monetary outcomes that may re-ignite plans to exit from the bloc. For the EAC to benefit its members, its economic orientation requires consideration, yet many aspects of the entity are unresolved. Analysis of the EAC provides the most meaningful empirical opportunity to generalise results since the EAC integration process most closely follows the textbook model of economic integration propagated by Viner (1950).

The thesis analyses the imports of the ROW from the five EAC member countries using annual bilateral trade data since these are readily available from the WITS, WDI and Penn World Tables 9.1.

7.1.1 The impact of regional trade agreements on trade in the EAC

The first empirical study in the thesis examines the impact of RTAs on trade in the EAC. It adopts and extends the traditional gravity model by accounting for zero trade, endogeneity and heterogeneity, and employs the PPML estimator. The gravity model is estimated using a comprehensive panel dataset of the EAC for the period 1990–2017. The empirical results are summarised here. First, although RTAs enhance trade in the EAC market, the impact varies across the COMESA and WTO markets or regional blocs. Second, although RTAs enhance trade at the bloc level, the results vary by country. For instance, Kenya, Rwanda and Uganda experience a pure TC in the EAC market while Uganda's intra-bloc trade is below expectation. Third, the results indicate asymmetry across products/sectors. For example, the food trade leads to a pure TC in the EAC and COMESA markets, but a pure TD in the WTO market. Fourth, there is variation in the performance of products within countries, though the EAC market indicates a pure TC and increased trade for all products. The empirical findings are robust to alternative gravity model specifications.

7.1.2 The impact of regional trade agreements on the duration of trade in the EAC

The second empirical study examines the impact of RTAs on the duration of trade relationships in the EAC. The study employs non-parametric methods (i.e. the Kaplan–Meier and Nelson–Aalen estimators) for baseline purposes. The main regressions are estimated using semi-parametric (CPH model) and parametric (or discrete) methods, thus controlling for country-, product- and pair-specific characteristics of trading (Chen, 2012; Obashi, 2010). For

the semi-parametric method, the study implements the CPH model as the baseline. For the parametric methods, the empirical study implements the clog-log and logit models. Alternative models, the probit and MESTREG models, are estimated for robustness purposes. Endogeneity is controlled in various ways, using time, country and spell dummies. The empirical results are summarised here. First, the study finds that RI increases the duration of trade relationships but this differs across regional blocs in the bloc-level analysis. Second, the impact of RTAs on the duration of trade varies across countries in the EAC. For instance, the EAC market enhances the duration of Tanzania's and Uganda's trade, while the COMESA increases the duration of Kenya's trade. Third, the study shows that the effects of RTAs on the duration of exports vary across products. For instance, the EAC market enhances the duration of non-oil and high technology exports while the COMESA bloc prolongs exports of agricultural raw materials and food. Fourth, the study indicates that the exports of the EAC are short lived: around 25% of exports cease within 1–3 years of establishment, at the bloc, country and product levels. These empirical results are robust to alternative model specifications.

7.1.3 The impact of trade liberalisation on economic growth in the EAC

The third empirical study examines the impact of RTAs on economic growth in the EAC. This study specifies an endogenous growth model and estimates the model using the FGLS and PCSE estimators. The empirical results are summarised here. First, RTAs and trade openness enhance economic growth in the EAC. Second, RTAs have a more significant impact on economic growth in the EAC than trade openness measures do have, quantitively. Third, the impact of trade liberalisation varies across regional markets. For instance, the EAC regional market has a more significant impact on economic growth than do either the plurilateral (COMESA market) or multilateral (WTO market) trade agreement. Fourth, the impact of RTAs on economic growth varies across countries in the EAC. These empirical results are robust to alternative model specifications.

7.2 Conclusions

This section presents the conclusions that emerge from the empirical findings relating to the role and impact of RTAs in trade, the duration of trade relationships and economic growth in the EAC.

7.2.1 Empirical Study 1

The empirical findings of empirical Study 1 lead to four main conclusions. First, for the bloc results, the empirical evidence shows that the impact of EAC regional policy is not homogeneous across regional blocs. The EAC market enhances intra-bloc trade, with significant export creation. The COMESA market enhances the EAC's intra-bloc trade with an observable export diversion. The WTO market does not lead to any intra-bloc enhancement though the results for the bloc indicate an import creation and export diversion. I conclude that the EAC market has leads to a strong and consistent overall pure TC among its members. I come to a similar conclusion for the COMESA and WTO markets; that they also improve EAC trade though different econometric methodologies deliver differing outcomes or results. I conclude that despite evidence for both import and export distortions, there is stronger evidence for distortion, reflecting export and import enhancement rather than reduction of trade with the ROW. I conclude that EAC regional policy is enabling member countries to strengthen their trade relationships with the ROW. In addition, I find that EAC exports exhibit a phasing in of these RTA effects, with impacts persisting 12 years after the bloc's formation. However, the effect is limited and inconsistent for larger intergovernmental entities such as the COMESA and WTO blocs.

Second, the disaggregated country results indicate that the impact of RTAs on trade is far from homogeneous when country asymmetry is considered. Bloc results mask the effects of RTAs. I conclude that Burundi's and Kenya's trade shows a pure TC with strong intra-bloc trade and export creation in the EAC market. Surprisingly, I conclude that the WTO market leads to Burundi and Uganda experiencing an import creation. This implies that Burundi's and Uganda's participation in the WTO bloc increases their imports from the ROW. Uganda's membership in the EAC leads to a pure TC, though her intra-bloc trade effects are below expectation with both import and export TC effects. The EAC market leads to an import creation while the COMESA market leads to Tanzania experiencing an export diversion. These results confirm the theoretical prediction that larger economies benefit the most from regionalism and that small economies experience massive trade gains when they join a regional group. This is especially true when the small country is landlocked.

Third, the disaggregated sector results indicate that the impact of RTAs on trade are far from homogeneous when sector/product asymmetry is considered. In the EAC market, I conclude that food trade leads to a pure TC but that fuel trade leads to a pure TD. However, the EAC market enhances intra-bloc trade for manufactured goods, and ores and metals. The COMESA market leads to a pure TC in the food, and ores and metals trade. However, the bloc

leads to a pure TD in the manufactured goods trade. The WTO market leads to a pure TC in the agriculture and manufactured goods trade but to a pure TD in the food sector. Primary products are driving trade enhancement in the regional blocs, except that the food item trade is highly protected in the WTO market.

Fourth, the study explores the performance of these products within the five countries and leads to five conclusions. For Kenya, I conclude that all products considered in this study experience a pure TC with increased intra-bloc trade in the EAC market. In the COMESA market, Kenya's exports are increased in all products except for manufactured goods, that perform below expectation. Trade in ores and metals, and agricultural raw materials is enhanced in the bloc. The WTO market leads to an import creation for agriculture, food and manufactured goods in Kenya from the ROW. The EAC market leads to pure TC in all sectors with marked export diversion and import creation with the ROW. The COMESA market enhances Tanzania's agriculture, and ores and metals trade but reduced the country's imports of food and manufactured goods before she exited the regional bloc. The WTO market increases Tanzania's agriculture and food imports but reduces her manufactured goods, and ores and metals imports from the ROW.

The study concludes that the EAC leads to a pure TC for Uganda's trade in agriculture, food and manufactured goods but to a pure TD for ores and metals, and fuels. However, the EAC leads to all Uganda's intra-bloc trade performing below expectation with a clear export diversion in all sectors expect for the food sector, in which Uganda increases her exports from the ROW. I conclude that the EAC enhances Uganda's imports of agriculture products, food, manufactured goods, and ores and metals but leads to an import diversion for the fuels sector from the ROW. The COMESA market increases Uganda's trade in food but reduces her manufactured goods trade. For the WTO bloc, I conclude that the WTO market increases Uganda's imports from the ROW for food, manufactured goods, and ores and metals but reduces her imports from the ROW in the agriculture sector. For Rwanda, the EAC market leads to a pure TC for food, manufacture good, and ores and metals but to a pure TD in the agriculture and fuel trade. The COMESA market leads to an increase in the agricultural, food, and ores and metals trade from Rwanda but a reduction in manufactured goods trade. Burundi experiences a pure TC in all sectors with mixed results for export and import distortions.

Overall, qualitatively, the EAC market is the most suitable bloc for EAC trade destinations. Agriculture and food trade offer the best opportunities to maximise exports in this regional setting.

7.2.2 Empirical Study 2

The empirical findings of Study 2 point to six main conclusions. The first is that trade relationships involving the EAC are short lived. The hazard rates are the similar at the bloc, country and product level: 25% of trade relationships cease within 2 years. Second, export hazards are quite high at the beginning of relationships but this stabilises in time, with the exception of a few trade spells. Third, trade relationships vary across countries and products and the longer relationships lasts the lower the hazard rates. However, relationships last longer each time they restart after previously failing. In addition, EAC trade policy reduces Kenya's trade the most in the EAC, followed by Tanzania's trade. Food and agriculture trade are the products or sectors that experience the highest reduction frailty because of implementation of EAC policy. Fourth, trade relationships vary across regional markets. The EAC and COMESA markets substantially reduce frailty in the short run but in the medium to long run there is no variation in frailty associated with belonging or not belonging to these blocks. The WTO market enables long-run frailty to be constrained through membership of the bloc. In essence, the WTO market builds trade hysteresis in the long run. Fifth, evidence from discrete estimations indicates that the EAC market lengthens the duration of EAC product trade more than does the COMESA. The WTO consistently fails to report its effects on frailty for bloc exports. However, there is variation in the effect of regionalism on trade frailty (and longevity) within countries and products in the WTO market.

Finally, the study concludes that the use of some traditional gravity model covariates biases the estimates of trade duration downwards. The cost of business start-ups has a pronounced effect on the duration of export relationships involving the Global South whether considered an exporting cost or import measure. Further, the study estimates alternative duration models and finds that CPH estimates performs similarly to other discrete duration models and explain the duration of EAC exports.

7.2.3 Empirical Study 3

The empirical findings of Study 3 point to two broad conclusions. First, the evidence shows that trade liberalisation enhances economic growth in the EAC. This is more strongly indicative of RTA or trade policy than of trade openness or trade outcome measures. However, this growth effect is only observed at the EAC bloc level, since the COMESA and WTO trade blocs are growth reducing. When data are disaggregated, asymmetry is observed in the impact of RTAs on economic growth. The old and dominant economies in the EAC (i.e. Kenya, Tanzania and Uganda) experience growth enhancement. All countries in the EAC except

Tanzania experience increases in economic growth when they trade in the COMESA regional bloc. Tanzania exited the COMESA bloc in 1999, which likely explains the Tanzania result. The EAC's participation in the WTO bloc does not generally support economic growth. The study concludes that Kenya's, Rwanda's and Uganda's participation in the WTO bloc reduces economic growth.

The second conclusion is that openness or outcomes measures are only growth enhancing when openness is defined as export openness (i.e. the ratio of exports to GDP). This implies that an outward trade orientation is qualitatively more growth enhancing than an inward trade orientation for the EAC regional bloc. When I consider country asymmetry, I conclude that Tanzania and Uganda are the only two countries in the EAC whose trade openness (ratio of sum of export and imports to GDP) and import openness (ratio of imports to GDP) are growth enhancing. Growth in Rwanda's imports leads to a reduction in her economic growth.

7.3 Policy Implications of Empirical Findings

This section discusses the policy implications of the empirical findings reported in this thesis, four of which emerge from each of the three empirical studies.

7.3.1 Empirical Study 1

The conclusions that emerge from empirical Study 1 enable me to identify four broad policy implications. First, the study examines the role of RTAs in enhancing trade in the EAC and concludes that the EAC enhances trade, more so in the EAC bloc than in the COMESA and WTO blocs. These results highlight that if economic arguments are to be considered a basis for forming regional entities, there is a need to enhance the efficacy of RTAs in the EAC because of the strong trade effects of the bloc. However, since the COMESA and WTO blocs lead to inconsistent trade outcomes, the findings suggest that the EAC should extend and broaden her trade concessions in these blocs too. The lessons learnt from RI at the EAC regional market level should seize the moment and create larger intergovernmental entities at the plurilateral level, gradually building to a multilateral level. In addition, the heterogeneity in the impact of the EAC on her member countries and products traded highlights that the EAC and her member countries should consider implementing country- and sector-specific policies rather than adopting holistic policies, to consolidate their regional endeavours.

Second, this study sought to determine whether or not the CU theory and the tenets of the gravity model support the evolution of EAC regional policy. The first issue prompted

identification of the correct Vinerian CU effects using EAC trade data. Adopting the three-way dummy following Carrere (2006) and Soloaga and Winters (2001) provides new insights into Vinerian effects in the EAC. EAC impacts on non-bloc members are better understood and there is need to separately clarify effect on non-members' export and imports. The second issue relates to testing the predictions of gravity theory and models on EAC trade data. These predictions do explain EAC trade and the results are comparable to those of other studies as discussed in Chapter 4. The application of the gravity model with contemporary considerations as in this empirical study add to the importance of its findings given that it is the only comprehensive application of the gravity equation to EAC trade data.

Third, the study applies a comprehensive dataset of EAC exports to the ROW to test the theoretical positions and predictions of empirical Study 1. The data are disaggregated by country and product over the period 1990–2017. When data are aggregated, the effects of the RTA are masked. However, disaggregating the data clarifies the effects of EAC trade policy. The thesis then comes to the conclusion that the EAC has heterogeneous effects across country and products. For example, the agriculture, food and manufacturing sectors benefit the most from RI across the blocs. Detailed sectoral analysis within the countries also reveals more illuminating but differing effects requiring policy intervention. In addition, the study experiments with 3-year, 4-year and 5-year gaps in data. I find that the EAC data confirms theoretical and Monte Carlo simulations and predictions that form the 3-, 4- and 5-year data gaps that produce roughly similar estimates.

Fourth, the results imply that EAC regional policy enables EAC member countries to strengthen their trade relationships with the ROW. Further, there is a 'distance puzzle' or 'missing globalisation puzzle' in bilateral EAC trade, meaning that distance still exerts a powerful negative effect on the volume of trade for EAC exports (Cairncross, 1997; Coe et al., 2007; Friedman, 2005).

7.3.2 Empirical Study 2

The conclusions that emerge from empirical Study 2 have four policy implications. First, the study examines the role of EAC RI policy in enhancing the duration of trade and concludes that RTAs do enhance the duration of trade relationships in the EAC, supporting the idea that developing countries should continue to form RTAs to enhance trade within the EAC. However, there is variation in the impact of RTA policy on the duration of trade relationships with respect to regional bloc; that is, EAC, COMESA and WTO markets. For example, the EAC bloc enhances the duration of trade for its long-term members that have larger economies

more so than for new countries with smaller economies. Participation in the COMESA bloc generally increases the duration of trade across all member countries of the EAC involved with the COMESA bloc. The COMESA bloc effect might be due to the greater externalisation of her policies and of her trade to benefit all bloc countries' trade survival. This pattern of duration confirms theoretical and empirical predictions that survival rates will vary significantly with the level of development of an economy (Fugazza & Molina, 2016). This implies that even if regionalism is promoted to support the survival of trade relationships in the EAC, the type of regional bloc and nature of the economy of bloc members should be considered.

Second, the study finds heterogeneity in the impact of RTAs on products. The longevity of certain products, mainly primary products like agriculture, agricultural raw materials and food items, is enhanced relative to other products. This implies that the EAC should consider negotiating deeper and wider integration policies at the sectoral level to allow all countries to benefit. The view taken here is that even if RI enhances the survival of trade relationships, the nature of the regional bloc and the countries in that regional entity will determine the size and magnitude of the effect of the regional programme.

Third, EAC exports persist longer within the EAC and COMESA blocs than in the WTO bloc in which there is increased observed frailty. The EAC and COMESA blocs are regional entities in which trade has deepened and widened more than so in the WTO. This is probably what drives EAC member countries to revert to regionalism. However, to make the WTO bloc more responsible in supporting the longevity of EAC exports, there is a need for EAC member countries to compel other WTO member countries to consider reducing their hold on sectors of interest to EAC members.

Fourth, the findings confirm the theoretical predictions of the trade duration analysis in that EAC trade relationships are mostly of short duration. However, relationship and product survival beyond the first and second years of trade is low but then grows significantly over time. The growth in longevity is confined to a few products and countries within the bloc over time. Policy interventions should consider supporting products and countries to prolong their trade.

7.3.3 Empirical Study 3

The conclusions that emerge from empirical Study 3 enable point to three policy implications. First, the study examines the role of EAC trade liberalisation policy in enhancing economic growth and finds that trade liberalisation enhances economic growth in the EAC. This growth is indicated by both openness (outcome measures) and RTAs (policy measures).

Canonical theoretical and empirical trade–growth nexus analyses typically utilise trade outcome measures to explore this relationship. I follow the same tradition and find that trade openness (measured as the sum of exports and imports to GDP) has no effect on economic growth in the EAC. I then redefine the measure of openness and derive two measures for the ratio of imports (exports) to GDP (i.e. import (export) openness) and find that the import openness measure returns no effect on growth. However, the export openness returns a positive and significant impact on growth. This indicates that for policy purposes the composition of exports in trade should be substantial to support economic growth.

Second, not all of the effects of trade liberalisation are absorbed by trade outcome measures alone. Some of the effects of trade liberalisation are seen in trade policy or regional trade measures as well. I find that EAC RI policy has a strong and significant positive effect on economic growth in the EAC, COMESA and WTO blocs at the EAC level. However, there is variation in impacts at the country level, especially for Burundi and Rwanda. These two countries are very small economies with very low capacity to export to the EAC bloc and benefit via economic growth.

Third, the findings highlight the need for EAC member states to undertake greater trade liberalisation in terms of both trade outcomes and trade policy. I contend that the policy ambition should include orienting EAC member states to an outward-looking rather than inward-looking trade structure. In addition, greater attention needs to be paid to strengthening regional policy, with a focus on liberalising substantially more trade within the WTO and COMESA because trade policy is more growth enhancing than are trade outcomes. In addition, there is a need for EAC policy to be reinforced to enhance the bloc's contributions to economic growth.

7.4 Limitations and Suggestions for Future Research

This thesis investigates the impact of RTAs on trade, duration of trade and economic growth in the EAC. Utilising comprehensive trade data and sophisticated econometric techniques to account for endogeneity, heteroscedasticity, zero trade flows, censoring and spells, the thesis provides new insights into the role of RTAs in influencing trade, trade duration and economic growth in the EAC. One limitation of empirical Study 1 is the assumption of a constant tariff regime within EAC countries' trade. Although EAC countries implemented a declining intraregional tariff, which reduced to zero in 2014, the lack of reliable data on the intraregional tariff regime across countries means that it was not possible to incorporate the

declining trend of tariffs into the modelling. Future research may extend the analysis by examining the impact of concessional tariff regimes on trade and trade duration in the EAC. Another limitation relates to empirical Study 2, where because of the lack of reliable firm-level data, product-level data by country were employed in analyses of the impact of RTAs on duration of trade. Future research could explore extending the modelling by using firm-level data that have the potential to introduce dynamics in trade duration in the EAC. A final limitation relates to empirical Study 3. Because of the lack of reliable data to capture the incremental change in trade liberalisation through RTAs, this study assumed a constant effect of liberalisation on economic growth. Future research could explore obtaining measures of trade liberation that capture incremental changes and incorporate this into modelling of the impact of trade liberalisation on economic growth in the EAC. Despite these limitations, several robustness checks undertaken indicate that the empirical results reported in this thesis are robust, and provide new and exciting insights into the dynamics of the impact of RTAs on trade, trade duration and economic growth in the EAC.

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