THE ASYMMETRIC NEXUS BETWEEN REGIONAL TRADE AND ECONOMIC GROWTH: A CASE FOR NAMIBIA

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ABSTRACT

This paper investigates the nonlinear nexus between trade and economic growth at a country level against that of regional level using Namibia as a laboratory provoked by inconsistent, diverging and polarized evidence in antecedent literature. The study uses a multilayered approach to measure the impacts of trading with regional blocs on Namibia's economic growth compared to that of trading as a sole country and the direction of causality between trade and growth. For country (regional) level analysis, annual time series (panel) data over 1980-2020 (2005-2020) was employed to assess the nonlinear relationship between trade and economic growth in the short and long term for Namibia and its regional blocs partners. The study employs the nonlinear ARDL (NARDL), which allows for a distinction between the effect of positive and negative shocks in the underlying policies. The Wald tests for robustness validity of asymmetric relations was applied. Findings reveals that increased exports are positively related to growth at all levels, while increased imports were found to be contributing to growth only at regional levels. When comparing country level results against regional results, findings show that Namibia benefits more in terms of exports when trading as a sole country. While, in terms of imports, Namibia benefits more by trading with regional blocs. Results show that negative shocks in exports have huge impact than positive shocks at country level, while at regional level, positive shocks have huge impact than negative shocks. Moreover, causality results reveal bidirectional causality between exports and economic growth as well as between exports and imports at regional and country level. To absorb Namibian exports towards accelerated growth benefits more value addition across the SADC, SACU and CMA and structural reforms fostering regional trade are recommended.

Keywords: Trade, Nonlinear Autoregressive Distributed, Economic Growth, Southern African Development Community, SACU, CMA, Ex_pos, Ex_neg, Im_pos, Im_neg

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DEDICATION

This thesis is dedicated to all mothers that could not complete their educational journey due to different circumstances yet were able to provide all kinds of support for their children academic journey. It is with your source of inspirations and discipline that this project has been made possible.

DECLARATIONS

I, Kavaleka Gracianu Dario, hereby declare that the work which is being presented in the thesis entitled "**The Asymmetric Nexus Between Regional Trade and Economic Growth: A Case for Namibia"** in partial fulfillment of the requirement for the award of the degree of **Master of Science in Economics** and submitted at the UNIVERSITY OF NAMIBIA, is an original piece of my research work, under the guidance of Dr. Canicio Dzingirai. The matter embodied in this thesis has not been submitted for a degree in any other institution of higher learning.

I, Kavaleka Gracianu Dario, grant the University of Namibia the right to produce this dissertation in whole or in part, in any manner or format, which the University of Namibia may deem fit, for any person or institution requiring it for study and research; providing that the University of Namibia shall waive this right if the whole dissertation has been or is being published in a manner satisfactory to the University.

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Gracianu Dario Kavaleka Date

LIST OF ABBREVIATIONS AND ACRONYMS

ACFTA	African Continental Free Trade Area
ADF	Augmented Dickey–Fuller
AIC	Akaike information criterion
ARDL	Autoregressive Distributed Lag
CMA	Common Monetary Area
COMESA	Common Market for Eastern and Southern Africa
CSD	Cross-Sectional Dependence
CUSUM	Cumulative Sum of Recursive Residuals
CUSUMSQ	Cumulative Sum of Square of Recursive Residuals
DFE	Dynamic Fixed Effect
EX	Exports
EX_NEG	Exports negative
EX_POS	Exports positive
EPZ	Export Processing Zone
IM	Imports
IM_NEG	Imports negative
IM_POS	Imports positive
MG	Mean Group
NARDL	Nonlinear Autoregressive Distributed Lag
NSA	Namibia Statistics Agency
PMG	Pooled Mean Group
PP	Phillips-Perron
RGDP	Real Gross Domestic Product
SADC	Southern African Development Community
SACU	Southern African Customs Union
SIC	Schwarz information criterion
VECM	Vector Error Correction Model
WB	World bank

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CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The role of international trade in economic growth has been the subject of interest among economists (Keho, 2020). This originates from evidence that there is no country that can produce all goods and services which its population requires for consumption mainly due to resource constraints and differences. Therefore, classical economists like Smith (1776) and Ricardo (1821), contend that international trade plays a vital role in economic growth, through gains from specialisation (Salvatore, 2016). While the mercantilists believe that trade is a zero-sum game, whereby one nation could gain only at the expense of another nation, classical economists believe that all nations would gain from trade by specialising in goods in which nations have absolute and comparative advantages (Salvatore, 2016). Hence international trade through exporting of goods in which countries are most efficient increases productivity, thereby leading to economic growth.

Similarly, the factor endowments and the Heckscher-Ohlin (1933) theory of trade model emphasises the benefits of international trade to countries with factor endowments. This is in line with the Rybczynski (1955) theorem which argues that an increase in the factor endowment lead to an increase in the output of the commodity using that factor intensively, which drives growth (Markusen et al., 1995). These arguments form the basis of the export-led growth hypothesis. However, the advocates of growth-led export hypothesis like (Krugman, 1984) and (Lancaster, 1980) hold a different view claiming that economic growth leads to enhancement of skills and technology which improves productivity, thereby creating reasonable benefits for countries to export.

Contrary to the export-led growth, the import substitution industrialisation (ISI) strategy advocates for import-led growth through import substitution (Salvatore, 2016). The strategy advocates for countries to industrialise rather than continue to specialise in the production of primary commodities (food, raw materials, and minerals) for export, as prescribed by classical economists. Thus, having to decide which strategy to adapt to promote sustainable growth remains one of the predicaments in developing countries.

Testing the two views, Dodaro (1993) finds a bidirectional relationship between economic growth and exports growth, implying that economic growth leads to export growth, and similarly growth in exports leads to economic growth. Therefore, this put many developing countries in a dilemma of whether to attain growth through export-led hypothesis as claimed by classical economist theories, or whether to achieve growth through the import substitution strategies.

Nonetheless, in the pursuit of economic growth, several regional economic blocs were established in Africa, such as the Southern African Development Community (SADC), Common Market for Eastern and Southern Africa (COMESA) and others. In January 2021, the African Continental Free Trade Area (ACFTA) become operational. The empirical question that arises here is whether trade brings growth to all countries in the region as claimed by classical economists or whether some countries are disadvantaged by trading within the regional or continental groupings.

Similarly, in an attempt to promote economic growth, Namibia adopted an export-led growth strategy through value additions by creating the Export Processing Zone (EPZ) regime, together with economic blocs such as SADC, SACU, and CMA. The creation of the EPZ regime is aimed at encouraging exports in the manufacturing sector to increase employment and investment in Namibia, thereby supporting economic growth (Bank of Namibia, 2002). Therefore, various incentives are offered to encourage export performance such as a reduction in corporate tax as well as value-added tax (VAT) exemption on machinery, equipment and raw materials imported for manufacturing purposes. The mind-boggling question is: How effective is the export-led growth or the import-led growth strategies in promoting economic growth in Namibia? Given the continuous advocacy for export-led growth, following the success of countries in South East Asia, which adopted the export-led economic growth strategy during the 1970s and 1980s (Karabou, 2017). Likewise, some economists contended that standard international trade based on comparative advantage was completely irrelevant for developing nations. Therefore, advocating for industrialisation through import substitution (Salvatore, 2016).

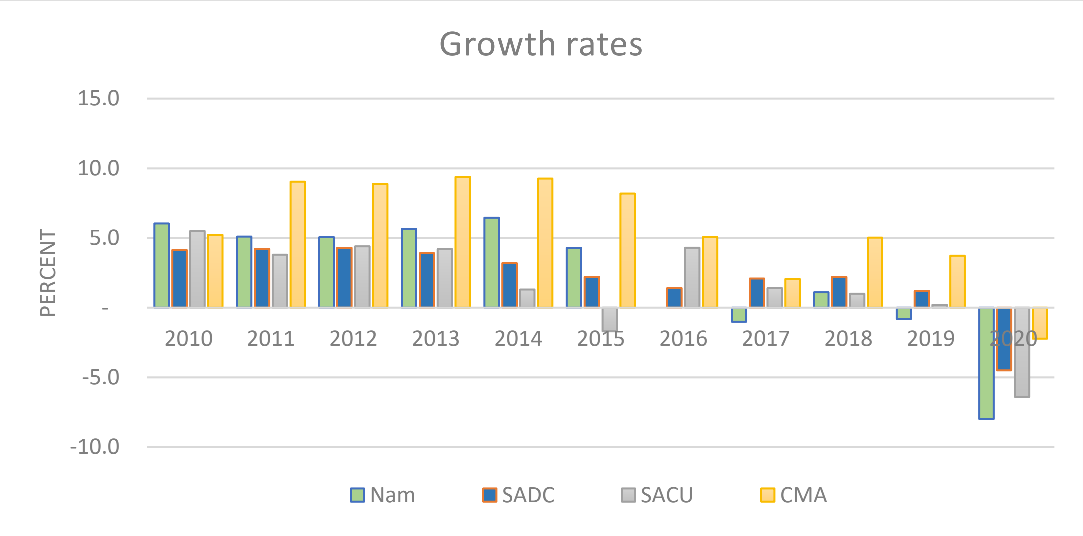


Figure 1.1: ***Evolution of Namibia's Growth Rates Compared to Regional Blocs (2010 – 2020).***

Source: Author's own construction

Prior to 2016, Namibia had been experiencing robust economic growth, with highest growth of 6.4% in 2014 (Figure 1.1). According to the Namibia Statistics

Agency (2014), the robust performance is attributed to the secondary and tertiary industries. However, other countries like Botswana and South Africa continued to experience growth before contracting only in 2020, as a result of the Covid-19 effects on the global economy.

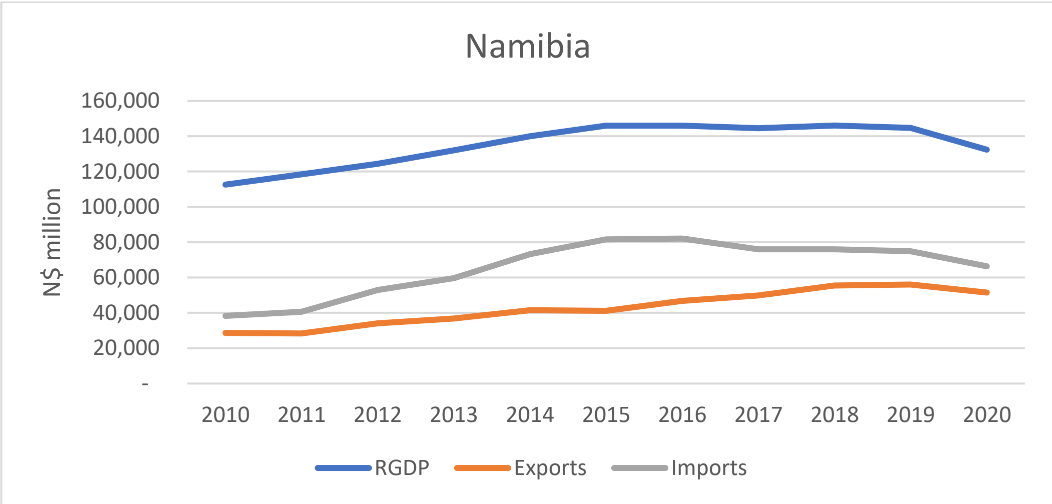


Figure 1.2: ***Evolution of Namibia Exports, Imports and RGDP (2010 - 2020)***

Source: Author's own construction

Figure 1. 2 illustrates that on average, Namibia experienced growth in both exports and imports, from 2010–2020. According to Keho (2020), imports can be a source of economic growth, particularly, the imports of capital goods and machinery, which are used as intermediate input in the production of other goods to help drive economic growth. Similarly, Karabou (2017), argues that exports contribute to raising the productivity of the economy, as a whole as well as maintaining economic growth. "Economic growth depends on an export effect," (Karabou, 2017 p.21). While economic theories such as that of absolute and comparative advantage as well as the Heckscher-Ohlin theory of trade, acknowledge the importance of both exports and imports in driving economic growth, this study provides an empirical investigation of this relationship, given the controversies in literature evidence in different countries.

1.2 Statement of the Problem

Despite the Government efforts to promote growth through export promotion, the Namibian economy continued to be in a down-turn phase, registering contractions on its gross domestic product from 2017–2020 (Figure 1.1), while both exports and imports increased on average between these periods (Figure 1.2). This could imply that Government's export led strategies are unable to support domestic economic growth. Similarly, numerous antecedent literature which investigates the trade-growth nexus in different countries find inconsistent evidence, for example: unidirectional causality from GDP to exports in India, Mehta (2015), no relationship between exports, imports, and economic growth in Panama Bakari & Mabrouki (2017) and unidirectional causality from exports to economic growth in Somalia Ali, Ali & Dalmar (2018). Hence, results of the relationship between exports, imports, and economic growth in paucity extant and mainstream literature, have been inconsistent, diverging and polarised. Which further suggest the ineffectiveness of export and import promotion as a growth strategy in different countries including Namibia. As a result of ineffective growth promotion policies economic growth is unlikely to be attained, in addition the Namibian Government could potentially loose out on revenue collections resulting from the exemption of value-added tax (VAT) on machinery, equipment and raw materials imported for manufacturing purposes.

In Namibia, limited available studies by Jordaan & Eita (2007) and Niishinda & Ogbokor (2013), investigate the export-led hypothesis, however non-linear analysis was not considered. This study differs from previous research in Namibia, mainly in terms of its empirical approach. While scantly available, previous studies focusing on Namibia uses linear models and assumes symmetric relationships between trade and growth. This study extends the literature by employing a new method, Nonlinear Autoregressive Distributed Lag (NARDL) model, which allows not only for a clear distinction between the effects of positive and negative changes in policies, but also examines the non-linear relationship between trade and economic growth in both short- and long-run periods Nuru & Gereziher (2021). Therefore, this study seeks to use a different, yet appropriate approach to measure the impacts of trading with regional blocs on Namibia's economic growth compared to that of trading as a sole country. More precisely, the main research question is whether Namibian short- and long-run asymmetric trade-growth nexus support either the trade-led growth or growth-led trade, or both or none? To sum up, using Namibia as a laboratory, this study empirically investigates how trade exerts asymmetric short-run and long-run effects economic growth and vice versa using a NARDL causality approach. Thus, by allowing the possibility of asymmetric effects of trade on economic growth, this implies that linearity between increasing and decreasing trade (growth) in terms of the magnitude on economic growth (trade) is not guaranteed. In light of these stylised facts, this study seeks to examine the effects of trading as a regional bloc(s) compared to trading as a sole country. If trading as a bloc has greater effects on growth as opposed to trading internationally on its own, which regional group(s) offers it a higher trade-growth or growth-trade benefit?

1.3 Study Objectives

1.3.1 Main Objective

To examine the effects of trade on economic growth of Namibia

1.3.2 Specific Objectives

- To determine the short run and long run effect of trade in Namibia and its regional trading blocs.
- To assess if the direction of asymmetric causality between Namibian trade and economic growth differs in the short term and long term.

1.4 Research Hypotheses

- Ho1: Trade has the same short run and long run effect at country and regional blocs.
- Ha1: Trade does not have the same short run and long run effect at country and regional blocs.
- H02: The direction of asymmetric causality of Namibian trade and economic growth is the same in the short and long term.
- Ha2: The direction of asymmetric causality of Namibian trade and economic growth differ in the short and long term.

1.5 Study Justification

This study investigates the non-linear nexus between trade and economic growth at a country level against that of regional level using Namibia as a laboratory provoked by inconsistent, diverging and polarised evidence in antecedent literature. Therefore, the study applies the NARDL, which allows for a distinction between the effect of positive and negative changes in the underlying policies which is crucial for policymaking. Consequently, the study uses a different, yet appropriate approach to measure the impacts of trading with regional blocs on Namibia's economic growth compared to that of trading as a sole country. Findings of the study unravel the asymmetric nexus between trade and economic growth which assist policymakers, such as the ministry of finance, to evaluate the effectiveness of adopted policies in pursing trade and economic growth. Results from the study can be used by policymakers to scrutinise the impacts of trade blocs such as SADC and SACU on Namibia, which may form the basis of trade negotiations. The study further provides an insight on whether it is advisable for Namibia to trade with regional blocs, compared to trading as a sole country, this further assist policymakers to analyse whether a small country like Namibia might benefit or lose out from the African Continental Free Trade Arrangements. In addition, this study contributes to the controversies shrouded by current literature on the nexus between trade and economic growth, which provides an opportunity for further research in the SADC and SACU regions.

1.6 Limitation of the study

The study focuses on analysing the relationship between trade and economic growth at a country and regional level, however, due to limited availability of data for comparison and consistency between country and regions, not all components of trade are included in the scope of coverage.

1.7 Delimitation of the study

The study is delimited to only tradeable goods that is exports and imports to analyse the nexus between trade and economic growth, provoked by the inconsistent, diverging, and polarized evidence in antecedent literature.

1.8 Organisation of the study

The study is structured as follows: Chapter One provides a background of the study, introduces the statement of the problem, the objectives of the study, the hypotheses, the significance of the study, and the limitations and delimitations of the study. Chapter Two focuses on the theoretical and empirical literature review underpinning the trade-growth nexus. Chapter Three presents the methodology by outlining the data types and sources, measurement of variables and estimation techniques employed in the study. Chapter Four is dedicated to data analysis and the discussion of the empirical findings. Chapter Five highlights the key conclusions, policy implications and provides areas for future research consideration.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter consists of two sections which are theoretical and empirical literature, it focuses on the underlying theoretical framework and empirical studies on the nexus between trade and economic growth by comparing and contrasting theories and empirical findings.

2.2 Theoretical Literature Review

The origins of the theoretical literature relationship between international trade and economic growth started with the classical trade theories of absolute and comparative advantages by Smith (1776) and Ricardo (1821) followed by the Heckscher-Ohlin (1933) model. According to classical trade theories, trade allows a more efficient use of the country's resources, through specialisation. Therefore, specialisation increases the nation's output for exports which drives economic growth (Markusen et al., 1995). This is an advocacy for the export-led growth by classical economists. Similarly, classical economists, also recognise that imports bring gains to certain economies that cannot produce the goods efficiently and are required to import from more efficient nations. For instance, trade enables developing countries to import capital and intermediate goods which are critical to long-run economic growth (Keho, 2020) Here, the classical economists further acknowledge the importance of imports in supporting growth, which is in line with the import substitution industrialisation strategy.

Further on, the Ricardian model (1821) explains the gains from trade, in terms of efficiency, productivity and welfare if each country specialises in producing goods in which it has a comparative advantage. Therefore, "trade is not a zero-sum game in which one country gains at the expense of the others," (Salvatore, 2010, p33).

However, the base of these propositions (absolute and comparative advantage) is that international trade is the way to achieve stable productivity effectiveness and international competitiveness, hence economic growth is only a result of this strategy. Similarly, even though productivity, effectiveness, and transnational competitiveness can be achieved, it is not clear, in the Ricardian model, whether and how transnational trade determines economic growth in the long run. However, Helpman & krugman (1989) framework advocates for growth led-exports, they argue that as economies grow, they realise economies of scales which increases output for exports to other countries.

Contrary to the classical trade theories for growth, Findlay (1984) presents a dynamic Ricardian model in which trade reduces the growth rate for countries which export agricultural goods and import industrial ones. This is similar to the growth problems faced by many countries in the SADC regions, as a result of relying mainly on agricultural exports. Hence, they follow the dynamic form of the Ricardian version, in which trade hurts growth of agricultural economies.

The Heckscher-Ohlin proposition of trade model identifies the difference in factor endowments as cause of trade. According to the model, each country should export products that are intensive in the use of that country's abundant factor of production and import products that are intensive in the use of the country's scarce factors of production (Markusen et al., 1995). However, the model sustains itself under some restricted assumptions essential for its validity. These assumptions, however, show the weak empirical verification of the model in its static version.

Similarly, the new trade theories of imperfect competition advocate for trade based on economies of scales. Arguing that economies of scale allow expansion of output, as a result of decreases in unit costs. This increases output for exports, which drives growth, thereby supporting the export-led growth. However, the neoclassical model of Bhagwati (1958) immiserating growth, shows that national wealth decreases as a result of economic growth pushed by trade, this is caused by a deterioration of the terms of trade. This is contrary to the advocacy of growth through the export and import by classical trade theories, Heckscher-Ohlin theory and new trade theories.

On the other hand, Dodaro (1993), framework, envisaged reverse causality between economic growth and export growth. Implying that economic growth leads to export growth particularly for countries in the early stage of development and vice versa. Hence justifying the import substitution strategies opted by many developing countries, as a way of promoting sustainable growth. Furthermore, Jung & Marshall (1985), argue that the export promotion growth was only effective to certain countries, illustrating the ambiguity of the hypothesis. Therefore, the lack of support for the export promotion hypothesis in all countries casts some doubt on the efficacy of policies designed to enhance development by pushing the export sector.

The theoretical relationship between trade and growth is ambiguous since there is no theoretical consensus among literature. Although some theories advocate for growth through international trade (classical trade theories, Heckscher-Ohlin theory, and new trade theories of imperfect competition), there is no unambiguous evidence about the causal relation between these variables. The literature has been inconsistent, diverging, and polarised given that while some literature supports the export-led growth, others support the import substitution strategies, others remained skeptical on pushing up growth through trade.

2.3 Empirical Literature Review

A study by Bakari (2016) investigates the relationship between exports, imports, and economic growth in Canada using annual time series data from 1990–2015. The Johansen co-integration analysis of the vector autoregression (VAR) model and the Granger causality tests are applied. However, results from the study finds no long-run relationship between exports, imports, and economic growth in Canada, contrary to both the export growth-led hypothesis and the import substitution strategies. On the other hand, the findings reveal bidirectional causality from imports to economic growth and from exports to economic growth. Implying that in Canada, both the export-led hypothesis and the import substitution strategies cause economic growth.

A similar study by Ruranga et al., (2020) investigates the impact of trade on economic growth in Rwanda using annual time series data from 1961–2018. The paper uses exports and imports as proxies for trade, and gross domestic products for economic growth. The Johansen co-integration analysis and the vector autoregression model are used, however, the study finds no long-run relationship between the variables. Implying that export promotion and import substitution strategies do not drive economic growth in the long run for Rwanda. On another hand, a unidirectional causality from exports to economic growth is found, indicating that exports cause economic growth.

Another study, Panta et al., (2022) examines the impact of exports and imports on the economic growth of Nepal using annual time series data from 1965–2020. The Johansen cointegration technique and vector error correction (VEC) models are applied. Results show no evidence favouring the exports-led growth hypothesis in both the short and long run. However, the study finds evidence supporting the imports-led growth, in the short and long run. This implies that in Nepal, the import substitution strategy is effective at promoting economic growth both in the short and long run. While the export-led hypothesis does not hold in promoting economic growth in this country.

Similarly, Mogoe & Mongale (2014) applies the Johansen cointegration test and vector error correction model to study the impact of international trade on economic growth in South Africa. Using quarterly time series data from 1990Q1-2013Q2. In this study, exports, imports, and exchange rates are used as proxies for international trade while economic growth is estimated on GDP. The study finds that exports and exchange rates, have a positive impact on economic growth, while imports have a negative impact on economic growth. Therefore, the results suggest that South Africa could pursue export-led growth strategies to enhance economic growth, while the application of the import substitution strategies will not enhance growth in South Africa.

A similar study by Saaed & Hussain (2015) investigates the impact of exports and imports on the economic growth in Tunisia. The study uses annual time series data from 1977–2012, and the Johansen cointegration approach for long-run relationships is applied. The results provide evidence that growth in Tunisia is propelled by growth-led imports. This suggests the effectiveness of the import substitution strategy at driving growth. Hence, imports are seen as the source of economic growth in Tunisia.

Another study by Hamdan (2016) is on the effect of exports and imports on economic growth in Arab countries. The study uses a panel data approach for 17 countries for the period of

1995–2013. Using panel data methods of Pooled ordinary least squares (POLS) regression model, fixed effect model and random effect model. The study finds that both exports and imports have positive effects on economic growth in Arab countries. This result confirms the validity of both the export-led hypothesis and the import substitution strategy in promoting growth in these countries.

2.4 Chapter Summary

In summary, all literature reviewed, theoretical and empirical, provide some explanations concerning the issue under investigation. Traditional trade theories such the theory of absolute advantage and the Ricardian model, view international trade as a way to attain stable productivity efficiency and international competitiveness through exports and imports, which drives economic growth. The Heckscher-Ohlin theory advocates for international trade in promoting growth based on factor endowments within countries. The new trade theories support the export-led hypothesis based on increasing returns to scales which increases output and drives growth. However, the dynamic Ricardian model by Findlay (1984) finds that trade reduces growth for countries exporting agricultural products and importing industrial products. This is contrary to the continuous advocacy for growth through exports and imports prescribed by the traditional trade theories. Jung & Marshall (1985) conclude that the export-led hypothesis is only effective in certain countries, which is in line with Ziramba (2011) findings that export promotion depends on the composition of the merchandise exports. Literature findings reveal mixed results, while Hamdan (2016) finds that both exports and imports contribute positively to growth. Mogoe & Mongale (2014) find that exports contribute positively to growth while imports have a negative impact on growth, while Panta, et al., (2022) finds evidence supporting only the import substitution strategy. Others remain skeptical as they found no relationship between exports, imports, and economic growth. Some researchers found bidirectional causality between trade and growth, while others found unidirectional causality running from exports to growth. The diverging and polarised findings in literature leave some countries skeptical about promoting growth through trade. Therefore, this study uses a different approach from that of Jordaan & Eita (2007) and Niishinda & Ogbokor (2013) to examine the asymmetric relationship between trade and growth.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

To examine whether Namibia benefits from trading as a regional bloc(s) compared to trading as a sole country, econometric techniques are employed both at regional level and at country level. Therefore, this chapter is divided into part A and B. The first part explains procedures for estimating country-level regression, while the latter focuses on regional blocs' estimation criteria coupled with diagnostic tests.

3.2 Data sources

Variable	Definition	Source
Part A	**Time series data**	
	Dependent Variable	
RGDP	Real Gross Domestic Product growth rate	NSA
	Independent Variables	
Ex	Exports growth rate	NSA
Im	Imports growth rate	NSA`
Part B	**Panel data**	
	Dependent Variable	
RGDP	Real Gross Domestic Product growth rate	World Bank
	Independent Variables	
Ex	Exports growth rate	World Bank
Im	Imports growth rate	World Bank`

3.2- Part A: Country-level Methodology

3.2.2 Macroeconomic Linkages Between Variables

Variables	Expected sign	Rationale
RGDP and EX	Positive	Exports are regarded as an injection into the economy following the Keynesian aggregate demand theory. Therefore, exports are expected

		to be positively related to RGDP.
RGDP and IM	Negative	The Keynesian aggregate demand approach regard imports as leakages from an economy which negatively affects RGDP
RGDP and IM	Positive	Imports can be a source of growth through the import substitution strategy
EX and IM	Positive/Negative	The relationship between exports and imports can be unidirectional, or bidirectional depending on the structure of the economy

3.3 Model Specification-Country NARDL

The country level generic model specification adapted from Bakari & Mabrouki (2017) is specified as:

$$lnRGDP_t = f(lnEX_t, lnIM_t) \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.1)$$

To investigate how trade exerts asymmetric effects on economic growth, NARDL decomposes the variables into the partial sum of positive and negative changes using the methodology by Shin et al., (2014) below:

$$lnEX_t^+ = \sum_{t=1}^{t} \Delta lnEX_i^+ = \sum_{t=1}^{t} max(\Delta lnEX_i, 0)$$

$$lnEX_t^- = \sum_{t=1}^{t} \Delta lnEX_i^- = \sum_{t=1}^{t} min(\Delta lnEX_i, 0)$$

$$lnIM_t^+ = \sum_{t=1}^{t} \Delta lnIM_i^+ = \sum_{t=1}^{t} max(\Delta lnIM_i, 0)$$

$$lnIM_t^- = \sum_{t=1}^{t} \Delta lnIM_i^- = \sum_{t=1}^{t} min(\Delta lnIM_i, 0)$$

$$lnRGDP_t^+ = \sum_{t=1}^{t} \Delta lnRGDP_i^+ = \sum_{t=1}^{t} max(\Delta lnRGDP_i, 0)$$

$lnRGDP_t^- = \sum_{t=1}^{t} \Delta lnRGDP_i^- = \sum_{t=1}^{t} min(\Delta lnRGDP_i, 0)$--------------------- (3.2)

Taking the partial sum of equation 3.2 into consideration, the long-run modified equation of 3.1 is given as:

$\Delta lnRGDP_t = \delta_0 + \delta_1 lnRGDP_{t-1} + \delta_2^+ lnEX_{t-1}^+ + \delta_2^- lnEX_{t-1}^- + \delta_3^+ lnIM_{t-1}^+ +$

$\delta_3^- lnIM_{t-1}^- + e_t$ --- (3.3)

Where the superscripts represent partial sums of positive and negative changes in the regressors. The $\sum_{i=0}^{3} \delta$ are the long run parameters for estimation. To capture both short and long run dynamics equation 3.2 is finally transformed fully into NARDL as:

$\Delta lnRGDP_t = \beta_0 + \sum_{i=1}^{p0}(\beta_{1,i} \Delta lnRGDP_{t-i}) + \sum_{j=0}^{q_2^+}(\beta_{2,i}^+ \Delta lnEX_i^+) +$

$\sum_{j=0}^{q_2^-}(\beta_{2,j}^- \Delta lnEX_i^-) + \sum_{k=0}^{q_3^+}(\beta_{3,i}^+ \Delta lnIM_i^+) + \sum_{k=0}^{q_3^-}(\beta_{3,j}^- \Delta lnIM_i^-) +$

$\delta_1 lnRGDP_{t-1} + \delta_2^+ lnEX_{t-1}^+ + \delta_2^- lnEX_{t-1}^- + \delta_3^+ lnIM_{t-1}^+ + \delta_3^- lnIM_{t-1}^- + e_t)$ ---
------- (3.4)

Where p_0, q_2, q_3 are lag orders, β_i^+ and β_i^- are positive and negative short run coefficients whose corresponding long run coefficients are δ_i^+ and δ_i^- respectively.

3.4 Variables and Model Diagnostic Checks

3.4.1 Unit Root Test

The study applies unit root tests on the variables to determine whether the time series variables are stationarity or nonstationary using the augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests. In addition, to ensure robustness, the Zivot & Andrews (1992) unit root test accounts for possible structural breaks is applied. According to Gujarati (2003) econometric model with nonstationary variables may produce spurious regression results, which may result in wrong conclusions, in turn, leading to wrong policy formulations. Therefore, nonstationary variables are differenced to ensure that at most series integrated of order one [I(1)] are attained. The variables can be either I(0) or I(1) or a mixture of both I(0) and I(1) for the estimation of long-run equations Pesaran (1998). Therefore, if the null hypothesis of nonstationary is not rejected, then the series must be differenced until stationarity is attained provided its order of integration would not exceed I(1). This is important, in order to avoid spurious results, which lead to incorrect conclusions.

3.4.2 Bounds Test for Cointegration

To test the existence of cointegration, the study employs the bounds testing procedure developed by Pesaran (1998) Pesaran et al., (1999) and later advanced by Pesaran et al., (2001). This method can be applied whether the underlying explanatory variables are integrated by order of zero I(0), order one I(1), or both. In addition, the bounds cointegration approach is not data hungry, hence it can provide robust results even in cases of smaller sample sizes (Damane, 2020). The NARDL estimation technique uses the F statistic and critical values to make conclusions on the hypothesis. If the calculated F statistic is greater than the upper bound critical values at all levels of significance, the null hypothesis of no cointegration is rejected at all levels of significance. Therefore, the short- or long-run NARDL model is estimated (Eq 3.4).

3.4.3 Lag Selection Criteria

Identification of appropriate lag length is important in specifying the model. Therefore, various criteria including the Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC), Hannan-Quinn Criterion (HQC), Final

Prediction Error (FPE) and the Bayesian Information Criterion (BIC) are considered. The selection of the optimum lag length is based on the length selected by majority of the criteria.

3.4.4 Asymmetric Test

The study applies the Wald test (Shin et al., 2014) to test the validity of the asymmetric model, using equation 3.4 of the NARDL, short run and long run asymetric can be computed as $\sum_{i=0}^{n} \beta_i^+ = \sum_{i=0}^{n} \beta_i^-$ for short run asymetric and $\delta_i^+ = \delta_i^-$ for long run asymetirc.

The null hypothesis is that the relationship is symmetrical, while the alternative hypothesis states that the relationship is asymmetrical. The null hypothesis is rejected if the p-value is less than the 5% level of significance, implying an asymmetric relationship exist between the variables Qamruzzaman & Jianguo, (2018). This justifies the appropriateness of the NARDL model.

3.4.5 Causality Test

To examine the causal relationship between the variables, the study applies the Wald test approach which identifies the short-run and long-run causality among all variables. Therefore, from equation 3.4, the three models are specified as follows:

$$\Delta lnRGDP_t = \beta_0 + \sum_{i=1}^{p0}(\beta_{1,i}\Delta lnRGDP_{t-i}) + \sum_{j=0}^{q_2^+}(\beta_{2,i}^+\Delta lnEX_i^+) + \sum_{j=0}^{q_2^-}(\beta_{2,j}^-\Delta lnEX_i^-) + \sum_{k=0}^{q_3^+}(\beta_{3,i}^+\Delta lnIM_i^+) + \sum_{k=0}^{q_3^-}(\beta_{3,j}^-\Delta lnIM_i^-) + \delta_1 lnRGDP_{t-1} + \delta_2^+ lnEX_{t-1}^+ + \delta_2^- lnEX_{t-1}^- + \delta_3^+ lnIM_{t-1}^+ + \delta_3^- lnIM_{t-1}^- + e_t)$$ ------------------------- (3.5)

$\Delta lnEX_t = \beta_0 + \sum_{i=1}^{p0}(\beta_{1,i}\Delta lnEX_{t-i}) + \sum_{j=0}^{q_2^+}(\beta_{2,i}^{+}\Delta lnRGPD_i^{+}) +$

$\sum_{j=0}^{q_2^-}(\beta_{2,j}^{-}\Delta lnRGPD_i^{-}) + \sum_{k=0}^{q_3^+}(\beta_{3,i}^{+}\Delta lnIM_i^{+}) + \sum_{k=0}^{q_3^-}(\beta_{3,j}^{-}\Delta lnIM_i^{-}) +$

$\delta_1 lnEX_{t-1} + \delta_2^+ lnRGPD_{t-1}^+ + \delta_2^- lnRGDP_{t-1}^- + \delta_3^+ lnIM_{t-1}^+ + \delta_3^- lnIM_{t-1}^- +$

$e_t)$-- --------------------------------------- (3.6)

$\Delta lnIM_t = \beta_0 + \sum_{i=1}^{p0}(\beta_{1,i}\Delta lnIM_{t-i}) + \sum_{j=0}^{q_2^+}(\beta_{2,i}^{+}\Delta lnRGPD_i^{+}) +$

$\sum_{j=0}^{q_2^-}(\beta_{2,j}^{-}\Delta lnRGPD_i^{-}) + \sum_{k=0}^{q_3^+}(\beta_{3,i}^{+}\Delta lnEX_i^{+}) + \sum_{k=0}^{q_3^-}(\beta_{3,j}^{-}\Delta lnEX_i^{-}) +$

$\delta_1 lnIM_{t-1} + \delta_2^+ lnRGPD_{t-1}^+ + \delta_2^- lnRGDP_{t-1}^- + \delta_3^+ lnEX_{t-1}^+ + \delta_3^- lnEX_{t-1}^- +$

$e_t)$-- (3.7)

The causality effect in the equations above (3.5, 3.6 and 3.7) is measured using the Wald test (F-statistics). Hence, the null hypotheses are rejected if the probability value is less than the 5% significance level otherwise it is not rejected.

3.4.6 Normality Test

This is a goodness -of-fit test that determines whether the residuals are normally distributed using the Jarque-Bera (1987) test. The test measures the difference of the skewness and kurtosis of the series with those from the normal distribution. In this test, a probability value that is less than 5% level of significance, leads to the rejection of the null hypothesis of a normal distribution.

3.4.7 Heteroscedasticity Test

This test indicates whether there is homoscedasticity or not, derived from the Lagrange multiplier test principle. It assesses whether the variance of the error term from the regression is dependent on the values of the regressors. The tests used are White (1980) and Breusch-Pagan (1979) approaches. The null hypothesis of homoscedasticity residuals is rejected when the probability is less than 5% level of significance implying heteroscedasticity in residuals.

3.4.8 Serial Correlation Test

This test helps to determine whether the residual of the period depends on the residuals of period t-1. The study applies the Breusch-Godfrey (1978) test which is based on the Lagrange multiplier test for assessing serial correlation. The null hypothesis of no serial correlation is rejected when the probability value is less than 5% level of significance.

3.4.9 Misspecification of the Model

This test helps to determine whether the model is correctly specified or not using the Ramsey (1969) regression specification error (RESET) test. In this test, if the computed F-value is significant at 5% level, then one fails to reject the null hypothesis of correct specification.

3.4.10 Stability Test

To validate the stability of the model estimates in the short- and long-run, the CUSUM (Cumulative Sum of Recursive Residuals) and CUSUMSQ (Cumulative Sum of Square of Recursive Residuals) tests for residuals following Galpin & Hawkins (1984) are performed.

It is important that the CUSUM and CUSUMQ statistics stay within the 5% critical bound. This ensures that the model is stable and efficient enough in estimating the short and long-run relations of the explained variables under investigation. Hence if the CUSUM and CUSUMSQ cross the 5% significance level, this is evidence against structural stability of the specified model, hence one may reject the null hypothesis of stability.

Part B: Regional Blocs' Methodology

3.5 Model Specification-panel NARDL

The secondary objective of this study is to determine whether Namibia benefits in the short run and long run by trading with regional blocs using the NARDL approach. Following Shin et al., (2014) methodology, NARDL decomposes the variables into partial sum of +positive and -positive changes which allows the estimation of the panel NARDL model as:

$$\Delta lnRGDP_{i,t} = \beta_0 + \sum_{j=i}^{p0}(\beta_{1,ij}\Delta lnRGDP_{i,t-j}) + \sum_{j=i}^{p_1^+}(\beta_{1,ij}^+\Delta lnRGDP_{i,t-j}^+) + \sum_{j=i}^{p_1^-}(\beta_{1,ij}^-\Delta lnRGDP_{i,t-j}^-) + \sum_{j=i}^{p_2^+}(\beta_{2,ij}^+\Delta lnEX_{i,t-j}^+) + \sum_{j=i}^{p_2^-}(\beta_{2,ij}^-\Delta lnEX_{i,t-j}^-) + \sum_{j=i}^{p_3^+}(\beta_{3,ij}^+\Delta lnIM_{i,t-j}^+) + \sum_{j=i}^{p_3^-}(\beta_{3,ij}^-\Delta lnIM_{i,t-j}^-) + \delta_0 lnRGDP_{i,t-j} + \delta_0^+ lnGDP_{i,t-j}^+ + \delta_0^+ lnRGDP_{i,t-j}^- + \delta_1^+ lnEX_{i,t-j}^+ + \delta_1^- lnEX_{i,t-j}^- + \delta_2^+ lnIM_{i,t-j}^+ + \delta_2^- lnIM_{i,t-j}^- + e_t) \ldots\ldots(3.5.2)$$

It is worth noting that the estimation procedure of equation (3.5.2) is the same as the NARDL time series model, as this is an extension of the linear ARDL.

3.6 Variables and Model Diagnostic Checks

3.6.1 Cross-sectional Dependence (CSD) Test

The first test needed to perform on panel data is a cross-sectional dependence test. This test involves analysing the presence of common correlation and shocks among countries or regions, which may arise as a result of macroeconomic interdependence. To check for cross-sectional dependence, the study relies on the Pesaran (2004) CSD test which can be applied to heterogeneous panel models, dynamic models and models having multiple structural beaks (Bhujabal et al., 2021). In addition, for robustness purposes on cross-sectional dependence tests, the Breusch-Pagan (1980) and Pesaran scaled (2004) LM tests are also applied in the study. The CSD decision rule is based on the statistical value, degree-of-freedom, and the associated p-value. The null hypothesis of no cross-sectional dependence is rejected if the p-value is less than the 5% of significance. While if the null hypothesis is not rejected, then the conventional first-generation unit roots tests are unreliable and provide biased results in the presence of cross-sectional dependencies (Bhujabal et al., 2021).

3.6.2 Panel Unit Root Tests

The second test on panel data is to test for stationary within the variables across panels, which is required to avoid spurious results. Thus, the presence of unit roots is checked by applying the cross-sectional augmented Im, Pesaran, and Shin unit root test (CIPS), as developed by Im, et al., (2003) as well as the cross-sectional augmented Dickey Fuller unit root test (CADF) by Pesaran (2007). These tests can control the effect of cross-sectional dependencies and estimate proper results. Decision rules to reject or not reject the null hypothesis is based on the p-value, hence if the p-value is less than the 5% level of significance, then the null hypothesis of unit root is rejected.

3.6.3 Panel Cointegration Test

To examine regional long-run relations among the variables, the studies apply the Kao (1999) cointegration test. The Kao test specifies homogeneous coefficients and intercepts on specific cross section. Decision rules to accept or reject the null hypothesis is based on the p-value selected by the majority methods. Therefore, if the p-value is less than the 5% level of significance in most methods, then the null hypothesis of no cointegration is rejected.

3.6.4 Panel Long-run Estimates

Once the test confirms the long-run relationship between the variables, the study estimates the long-run and short-run relationship by applying a gaggle of panel estimators. Three panel estimators are adopted within the study, namely the Mean Group (MG), Pooled Mean Group (PMG) and Dynamic Fixed Effect (DFE) estimator.

The Mean Group (MG) estimator by Pesaran & Smith (1995) allows model coefficients to be heterogeneous across countries over both the long run and the short run. While the Pooled Mean Group (PMG) by Pesaran et al., (1999), allows homogeneous coefficients across countries over the long run, and heterogeneous coefficients and error-correction terms across countries over the short run. In the Dynamic Fixed Effect (DFE) estimator the slopes are fixed, and the intercepts are allowed to vary across countries (Weinhold, 1999).

3.6.5 Hausman Test

To select between the MG, PMG and DFE estimators, the study applies the Hausman (1978) test, which helps to evaluate the statistical model that corresponds to the data, hence it assists with selecting the most efficient model across sections.

It first compares the MG model against the PMG model, Hausman decision is based on the p-value, if the p-value is less than the 5% level of significance, then the null hypothesis is rejected, implying the PMG model is the most efficient model. Similarly, in the second stage the Hausman compares the PMG model against the DFE model, and decision rule is based on the p-value, whereby if the p-value is greater than the 5% level of significance, then we fail to reject the null hypothesis, implying that the PMG is the most efficient model. Therefore, short- and long-run coefficients are estimated using the selected model across the regions.

3.6.6 Panel Causality Test

The presence of a cointegration relationship between variables, implies that there should be causality in at least one direction Niishinda & Ogbokor (2013). Therefore, the Dumitrescu (2012) panel causality test, complements the panel Wald test causality approach, this is performed to establish the causality and direction of causality between the panel variables.

3.6.7 Chapter Summary

This chapter outlines the data sources for country-level regression as well as for regional blocs. It explains the steps involved in estimating the country-level NARDL and the panel NARDL which involves decomposing the independent variables into partial sums of positive and negative changes for capturing asymmetric relationships. The section further explains the cointegration procedures on time series data for country-level regression as well as for the panel group. The study tests for causation on time series data and on panel data to establish the direction of causal relationships. Furthermore, the section describes diagnostic tests such as heteroscedasticity, serial correlation, model specification and stability tests to assess the adequacy of the NARDL model. Other panel tests such as the cross-sectional dependence test, MG, PMG and DFE estimators as well as the Hausman test for appropriate model sections are explained.

CHAPTER FOUR: RESULTS PRESENTATION AND DISCUSSION

4.1 Introduction

The first part of this section presents empirical results of both country level and regional blocs. While the second part of the section provides a discussion of results through comparing and contrasting country-level findings against regional blocs' findings.

4.2 PART A: Country-level Results

4.2.1 Descriptive Statistics

Table 4.1 provides descriptive statistics for the variables under consideration, using annual time series data from 1980–2020.

Table 4.1 Descriptive Statistics

	RGDP	EX	IM
Mean	12.15	21.96	29.38
Median	9.12	11.83	13.32
Maximum	24.51	65.03	92.97
Minimum	-8.87	-11.13	-13.38
Std. Dev.	5.59	21.45	31.70
Skewness	-0.24	0.71	0.85
Kurtosis	3.42	1.99	2.13
Jarque-Bera	0.71	5.05	6.10

From Table 4.1, on average the Namibian economy grew by 12%, while exports and imports recorded growth of 22% and 29% respectively over the same period. The minimum value of negative 8.9% in RGDP implies the contraction of the economy on average. The widest standard deviation is observed in imports while the lowest kurtosis was observed in exports.

4.3 Diagnostic Checks

The study performs diagnostic tests to assess the adequacy of the model and to ensure that the classical linear regression rules are not violated. The results are reported in tables 4.2–4.5. Firstly, Table 4.2 presents unit root results from ADF, PP and ZA approaches which confirms the suitability of the NARDL approach since there is a mixture of both I(0) and I(1) and no I(2) or higher order series (Pesaran, 1998). Moreover, in order to account for structural breaks that could possibly emanate as a result of external shocks within the data, the ZA approach is applied.

Table 4.2: Unit Root Tests

	ADF test			**PP test**			**ZA test with Structural Break point**			
Variable	Level	1st Diff	I(d)	level	1st Diff	I(d)	level	1st Diff	Break year	I(d)
RGDP	1.31	12.85***	I(1)	1.60	16.06***	I(1)	5.08	9.09***	2009	I(1)
Ex	0.92	3.91***	I(1)	0.79	3.82***	I(1)	3.02	5.08***	1997	I(1)
Im	1.10	4.63***	I(1)	1.19	3.61**	I(1)	2.25	4.82***	1997	I(1)

Note: ***, ** and * denote that a series is stationary at 1%, 5% and 10% level of significance, respectively

Secondly, table 4.3 reports the optimal lag lengths based on the FPE, AIC, SIC and HQ.

Table 4.1: Optimum Lag Length Selection

Lag	LogL	LR	FPE	AIC	SIC	HQ
0	-941.8227	NA	8.88e+21	59.0514	59.1888	59.0969
1	-836.6573	184.0394	2.19e+19	53.0410	53.5907	53.2232
2	-823.4514	20.6342	1.71e+19	52.7782	53.5907	53.0970
3	-781.2503	39.3943*	4.28e+18*	51.2656*	53.0520*	51.8577*

Note: * Indicates lag order selected by the criterion
LR: Sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SIC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

The optimal lag length is selected based on the most chosen method; therefore, three lags have been adopted in this study.

Table 4.4 reports the bound test cointegration results, which confirm the existence of long-run relationships between the variables, since the computed F statistic of 7.39, is greater than the upper bound critical values at all levels of significance. Therefore, the null hypothesis of no cointegration is rejected at all levels of significance.

Table 2.4: Bounds Test Cointegration Results

Dependent: RGDP	**F-Statistic**	**Lower bound**	**Upper bound**	**Outcome**
	7.39^{***}	2.2	3.09	Cointegrated
		2.56	3.49	
		3.29	4.37	

To prove the validity of the asymmetric relations in the model, both in the short and long run, the Wald test is applied. Results from Table 4.5 below confirm the existence of asymmetric relationships in both the short and long run. Therefore, the null hypothesis of symmetric relationships is rejected, justifying the suitability of the NARDL approach in modelling non-linear relationships.

Table 4.3: Wald Test Asymmetric Results

	long run Asymmetric		**short run Asymmetric**	
Test Statistic	Value	P-value	Value	P-value
Ex	3.411	0.0036	4.742	0.0150
Im	5.872	0.0122	4.194	0.0164
RGDP	4.563	0.0060	4.466	0.0266

The study also performs a post estimation diagnostic test reported on the lower part of Table 4.6. Therefore, the Heteroskedasticity test is conducted using the Breusch-Pagan (1979) approach, while that of serial correlation is carried out based on the Breusch-Godfrey (1978) test. Similarly, the Jarque-Bera (1987) normality test and the Ramsey (1969) test are applied. Lastly to check the stability of the model, the CUSUM and CUSUMSQ tests by Galpin & Hawkins (1984) are carried out.

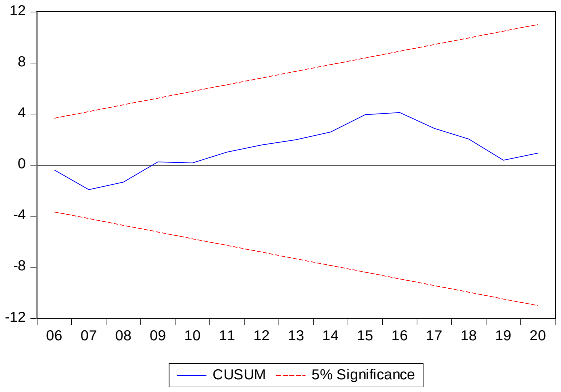
4.4 NARDL Results – Country Level

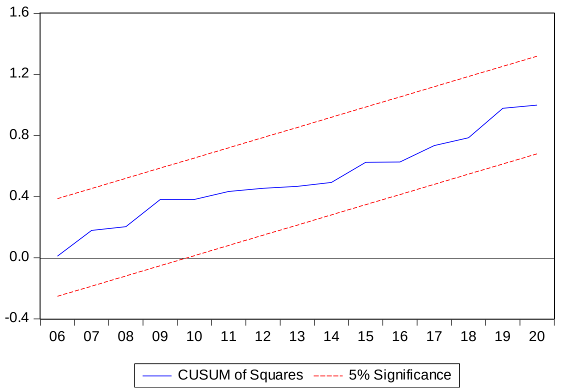
Table 4.6 reports long-run and short-run results from NARDL while Table 4.7 presents the Wald test causality results.

Table 4.4 : Long- and Short-run Estimation of NARDL

Variable: RGDP	Coefficients	T-statistics	P-Value
Part A: Long-run results			
EX_POS	1.501***	4.533	0.0007
EX_NEG	0.189***	2.982	0.0088
IM_POS	-0.972***	3.089	0.0070
IMP_NEG	0.777	1.633	0.1285
Part B: Short-run results			
D (RGDP (-1)	0.016	0.086	0.9331
D (RGDP (-2)	1.452***	3.365	0.0056
D (RGDP (-3)	1.242***	3.321	0.0061
D(EX_POS)	0.109	0.687	0.5050
D (EXPORTS_POS (-1)	0.473**	2.498	0.0280
D (EXPORTS_POS (-2)	0.243	1.219	0.2463
D (EXPORTS_POS (-3)	0.586***	3.449	0.0048
D (EXPORTS_NEG (-1)	0.860***	4.686	0.0005
D (EXPORTS_NEG (-2)	0.897***	5.655	0.0001
D (EXPORTS_NEG (-3)	0.569***	3.782	0.0026
D(IMPORTS_POS)	-0.890***	-3.982	0.0018
D (IMPORTS_POS (-1)	-1.081***	-5.278	0.0002
D(IMPORTS_NEG)	0.246	1.545	0.1483
D (IMPORTS_NEG (-1)	-0.885***	-4.245	0.0011
D (IMPORTS_NEG (-2)	-1.712***	-6.236	0.0000
D (IMPORTS_NEG (-3)	-0.336	-1.899	0.0819

ECM (-1)	-0.621	-7.926	0.0000
Diagnostic tests	**Test Statistic**	**P-value**	**Decision**
Heteroskedasticity	0.420	0.9624	No Heteroskedasticity
Serial correlation	1.008	0.3993	No Serial correlation
Model specification	0.444	0.6630	Model well specified
Normality	3.059	0.217	Residual normally distributed
CUSUM	Stable		Stable
CUSUMQ	Stable		Stable





Panel A of table 4.6 reports long-run coefficients. The results show the asymmetric impact of exports and imports on economic growth, with both positive and negative export shocks as well as positive and negative import shocks having different magnitude effects on economic growth. Results show the existence of asymmetric effects of exports in the long run, whereby a 1% increase in exports leads to 1.5% increase in RGDP, while a 1% decrease in exports leads to only a 0.19% decrease in RGDP. Similarly, asymmetric relations are evident on import results. Precisely a 1% increase on import results to a 0.97% decrease in RGDP in the long run. However, although negative imports were found to be positively related to growth, they remain insignificant at influencing growth in the long run.

Panel B of table 4.6 presents the short-run relation. The sign of the error correction term (ECM) is negative and statistically significant, meaning that any deviation from long-run equilibrium is adjusted in the short run at an adjustment speed of 62%. Results show that positive exports have a lag effect on influencing growth, reflected in the first, second and third lags of positive exports on RGDP. However, negative exports have a significant impact on RGDP, whereby a 1% decrease in exports results in a 0.86% decrease in RGDP. Similarly, the first, second and third lags of negative exports are significant at influencing growth.

Table 4.5: Causality Test Results

Dependent	$RGDP^{+}$	$RGDP^{-}$	EX^{+}	EX^{-}	IM^{+}	IM^{-}
Panel A: Long-Run Causality Results						
RGDP	-	-	3.087*** (0.0071)	3.378*** (0.0038)	2.290** (0.0359)	2.508** (0.0233)
Ex	3.652*** (0.0021)	2.181** (0.0427)	-	-	3.676*** (0.0036)	2.613** (0.0176)
Im	0.875 (0.3933)	1.046 (0.3115)	4.917*** (0.0002)	2.384** (0.0298)	-	-
Panel B: Short- Run Causality Results						
RGDP	-	-	2.613** (0.0176)	10.597*** (0.0003)	0.621** (0.5432)	4.194** (0.0164)
Ex	4.741** (0.0150)	3.129** (0.0443)	-	-	5.881*** (0.0033)	6.443*** (0.0021)
Im	7.454*** (0.0052)	0.065 (0.9483)	2.267** (0.0376)	7.487*** (0.0013)	-	-

Note: ***, ** and * denote significance at 1%, 5% and 10% level respectively

Panel A of Table 4.7 shows bidirectional causality between exports and RGDP, unidirectional from imports to RGDP and bidirectional causality between exports and imports in the long run. While part B of Table 4.7 displays short-run causality, results show bidirectional causality between exports and RGDP, as well as between exports and imports in the short-run. Moreover, negative imports have a causal effect on RGDP, while positive RGDP has a causal effect on imports in the short run.

Part B: Regional Blocs' Results Presentation

4.5 Descriptive Statistics

Regional descriptive statistics (means and standard deviations as well as tests for normality) for the SADC region are provided in Table 4.8 below.

Table 4.6: Descriptive Statistics SADC

	RGDP	EX	IM
Mean	13.49	15.31	35.78
Median	2.85	3.65	4.13
Maximum	31.10	62.45	77.47
Minimum	-36.59	-30.11	-22.39
Std. Dev.	77.46	68.56	42.29
Skewness	7.69	15.35	15.30
Kurtosis	9.08	11.82	13.49
Jarque-Bera	4.5331	2.53	4.18
Observations	240	240	240

On average, the SADC region recorded a growth rate in GDP of 13.49% with a minimum contraction of about 36.59%. Growth in exports and imports have been around 15.31% and 35.78% respectively. The region has recorded a maximum growth rate of 62.45% in exports and 77.47% in imports. While minimum growth of 30.11% and 22.39% has been registered in exports and imports respectively.

The descriptive statistics for the SACU and CMA regions are attached in table A6 and A7 of the appendices.

4.6 Diagnostic Checks

At regional level, diagnostic checks are also carried out to determine the adequacy of the model and the variables in the following sequential order; first, cross-sectional dependence tests are performed using the Breusch-Pagan (1980), Pesaran scaled (2004) and Pesaran CSD (2004) tests. The Pesaran CSD (2004) can be applied to heterogeneous panel models, dynamic models as well as to models with structural breaks. Results from table 4.9 reject the null hypothesis of cross-sectional independence between the regions. Therefore, variables are differenced in the presence of cross-sectional dependence to provide reliable results (Bhujabal et al., 2021).

Table 4.7: Cross-sectional Dependence (CSD) Results

	SADC	SACU	CMA
Breusch-Pagan LM	1123.98*** (0.0000)	116.42*** (0.0000)	37.53*** (0.0000)
Pesaran scaled LM	70.32*** (0.0000)	23.79*** (0.0000)	9.103*** (0.0000)
Pesaran CSD	2.36** (0.0181)	4.49*** (0.0000)	5.71*** (0.0000)

Note: ***, ** and * denote significance at 1%, 5% and 10% level respectively

Second, the presence of unit roots is checked by applying the cross-sectional augmented Im, Pesaran, and Shin unit root test (CIPS), as well as the cross-sectional augmented Dickey Fuller unit root test (CADF). These tests can control the effect of cross-sectional dependencies and estimate proper results. Table 4.10 presents the panel unit root test results, which confirm the suitability of the NARDL since variables are integrated with a mixture of I(0) and I(1) respectively without any variable being integrated with I(2).

Table 4.8: Panel Unit Root Tests Results

Variable	CIPS Level	CIPS 1st Diff I(d)	CADF Level	CADF 1st Diff
SADC				
RGDP	1.3902	4.4213*** I(1)	1.5367	4.6322***
Ex	1.5079	6.6099*** I(1)	1.6822	6.4509***
Im	1.7930	5.0667*** I(1)	1.9183	5.2591***
SACU				
RGDP	1.9302	4.5763*** I(1)	1.4970	4.5040***
Ex	1.5755	4.1855*** I(1)	1.7322	4.0179***
Im	1.5818	2.4645*** I(1)	1.4680	2.5782***
CMA				
RGDP	1.9415	3.9417*** I(1)	1.1594	3.9142***
Ex	1.7180	4.4277*** I(1)	1.1842	4.2319***
Im	1.5207	4.3930*** I(1)	1.2160	4.2872***

Note: ***, ** and * denote that a series is stationary at 1%, 5% and 10% level of significance, respectively

Third, table 4.11 displays the panel cointegration results from the three regions, using the Kao (1999) cointegration approach. Long-run relationships are confirmed between the variables across the regions. Hence the null hypothesis of no long-run relationship is rejected across the regions.

Table 4.9:Kao Panel Cointegration Results

Test	SADC	SACU	CMA
Modified Dickey-Fuller	9.584*** (0.0000)	5.377*** (0.0000)	4.598*** (0.0000)
Dickey-Fuller	11.699*** (0.0000)	3.999 (0.0000)	3.539*** (0.0002)
Augmented Dickey-Fuller	6.652*** (0.0000)	4.515*** (0.0000)	3.887*** (0.0001)
Unadjusted modified Dickey-Fuller	15.475*** (0.0000)	5.443*** (0.0000)	4.811*** (0.0000)
Unadjusted Dickey-Fuller	12.895*** (0.0000)	4.010*** (0.0000)	3.579*** (0.0002)

Note: ***, ** and * denote significance at 1%, 5% and 10% level respectively

The study further applies the Wald test to prove the validity of the asymmetric relations in the short and long run. Results from table 4.12 confirm the existence of asymmetric relationships in both the short and long run across the regions. Therefore, the null hypothesis of symmetric relationship is rejected at 5% level of significance.

Table 4.10: Wald Test Asymmetric Results

	Long run Asymmetric			*Short run Asymmetric*		
	SADC	**SACU**	**CMA**	**SADC**	**SACU**	**CMA**
Ex	16.51*** (0.0000)	20.18*** (0.0000)	4.51** (0.0338)	8.96*** (0.0028)	6.18** (0.0129)	4.04** (0.0445)
Im	7.94*** (0.0048)	17.57*** (0.0000)	8.35*** (0.0039)	5.34** (0.0208)	9.80*** (0.0017)	6.00** (0.0143)
RGDP	17.87*** (0.0013)	19.23*** (0.0007)	6.06** (0.0138)	5.901** (0.0391)	3.997** (0.0104)	5.65** (0.0175)

Note: ***, ** and * denote level of significance at 1%, 5% and 10% respectively

The Hausman test, to select the appropriate model for each region, is implemented. The test selects the most efficient model between MG, DFE and PMG for each region. Table 13 summarises the chosen model for SADC, SACU, and CMA.

Table 4.11: Hausman Test Results

Panel A: Hausman Test SADC Region			
Model	***MG vs PMG***	***PMG vs DFE***	***Chosen Model***
Ho:	Efficient under MG	Efficient under PMG	*PMG*
H1:	Inefficient under PMG	Inefficient under DFE	
Chi^2 p-value	26.39*** (0.0000)	2.71 (0.0996)	
Panel B: Hausman Test for SACU Region			
Model	***MG vs PMG***	***PMG vs DFE***	***Chosen Model***
Ho:	Efficient under MG	Efficient under PMG	*DFE*
H1:	Inefficient under PMG	Inefficient under DFE	
Chi^2 p-value	18.697*** (0.0007)	11.42** (0.0223)	
Panel C: Hausman Test for CMA Region			
Model	***MG vs PMG***	***PMG vs DFE***	***Chosen Model***
Ho:	Efficient under MG	Efficient under PMG	*PMG*
H1:	Inefficient under PMG	Inefficient under DFE	
Chi^2 p-value	7.268*** (0.0000)	0.57 (0.4516)	

Note: ***, ** and * denote the rejection of the null hypothesis at 1%, 5% and 10% significance level respectively

In table 4.14, panel A and B represent the asymmetric results of regional NARDL displayed into long-run and short-run results. The results reveal asymmetric relations between positive and negative exports and imports across the regions. Long-run results displayed in panel A of table 4.14 show asymmetric nexus within the variables as a 1% increase in positive exports, leading to an increase in RGDP by 0.37%, 0.45% and 0.43% receptively in the SADC, SACU and CMA regions. Likewise, a 1% decline in exports leads to lower RGDP by 0.24%, 0.55%, and 1.3% respectively in SADC, SACU, and CMA regions. These results suggest that negative shocks have a higher disruptive impact than positive shocks on economic growth, particularly in the SACU and CMA region. While in the SADC region positive shocks have a huge impact growth compared to negative shocks. Results further show that increased imports are significant at influencing economic growth, a 1% increase in imports results to increased economic growth by 0.32%, 0.34% and 0.35% respectively in the SADC, SACU and CMA. While declining imports are insignificant in affecting RGDP in the SADC and SACU region in the long run.

4.7 Panel NARDL Results

Table 4.12: Long-run and short-run Results of Panel NARDL

Variable: RGDP	SADC	SACU	CMA
Part A: Long run results			
EX_POS	0.365***	0.453***	0.430***
	(0. 078)	(0.132)	(0.088)
EX_NEG	0.242***	0.551***	1.286***
	(0.098)	(0.0834)	(0.382)
IM_POS	0.324***	0.339***	0.348***
	(0.085)	(0.124)	(0.154)
IM_NEG	0.036	0.021	0.566***
	(0.071)	(0.175)	(0.325)
Part B: Short run results			
D(EX_POS)	0.538***	0.347***	0.846***
	(0.214)	(0. 0800)	(0.995)
D(EX_NEG)	0.377***	0.183***	1.397***
	(0.109)	(0. 068)	(0.528)
D(IM_POS)	0.107**	0.201	-0.283
	(0.074)	(0. 137)	(0.149)
D(IM_NEG)	0.374**	0. 500**	0.614***
	(0.1445)	(0. 198)	(0.354)
ECM (-1)	-0.853***	-0.746***	-0.874***
	(0.000)	(0.000)	(0.000)

Note: parentheses are (Std Err), while ***, ** and * denote significance at 1%, 5% and 10% level

Panel B of table 4.14 displays short-run asymmetric results for the regions as illustrated by different magnitude effects of increased and decreased exports and imports on RGDP in the short run. A 1% rise in exports increase RGDP by 0.54%, 0.35% and 0.85% respectively in SADC, SACU, and CMA, while a 1% decline in exports leads to a decline in RGDP by 0.37%, 0.18% and 1.4% in the short run. Increased imports however are found to be insignificant at promoting growth in the short run across the regions, while decreased imports by 1% are found to increase RGDP by 0.37%, 0.50% and 0.61% respectively within the three regions.

The sign of the error-correction term (ECM) is negative and statistically significant across the three regions, implying that any deviation from long-run equilibrium is adjusted in the short run at an adjustment speed of 85%, 75% and 87% for the SADC, SACU and CMA, respectively.

Table 4.13: Panel Causality Results

	Pairwise Dumitrescu-Hurlin Panel Causality Test: SADC					
	Causal relationship			W-Stat.	Z bar-Stat	Prob.
1	EX_POS	↔	RGDP_POS	5.04158	2.77305	0.0056
	RGDP_POS		EX_POS	5.04622	2.77826	0.0055
2	IM_NEG	≠	RGDP_POS	2.22059	-0.39386	0.6937
	RGDP_POS		IM_NEG	2.50492	-0.07467	0.9405
3	IM_POS	↔	RGDP_POS	4.93055	2.64840	0.0081
	RGDP_POS		IM_POS	4.43044	2.08698	0.0369
4	EX_POS	≠	RGDP_NEG	2.40591	-0.18582	0.8526
	RGDP_NEG		EX_POS	2.92399	0.39580	0.6923
5	EX_NEG	→	RGDP_NEG	5.33136	3.09836	0.0019
	RGDP_NEG		EX_NEG	2.72304	0.17020	0.8649
6	IM_NEG	≠	RGDP_NEG	2.63823	0.07499	0.9402
	RGDP_NEG		IM_NEG	3.70352	1.27091	0.2038
7	IM_POS	→	RGDP_NEG	4.46915	2.13043	0.0331
	RGDP_NEG		IM_POS	3.09750	0.59058	0.5548
8	EX_NEG	≠	EX_POS	2.92399	0.39580	0.6923
	EX_POS		EX_NEG	3.72419	1.29412	0.1956
9	IM_NEG	≠	EX_POS	2.33790	-0.26216	0.7932
	EX_POS		IM_NEG	3.46630	1.00460	0.3151
10	IM_POS	↔	EX_POS	14.5255	13.4199	0.0000
	EX_POS		IM_POS	5.40282	3.17859	0.0015
11	IM_NEG	≠	EX_NEG	3.69764	1.26431	0.2061
	EX_NEG		IM_NEG	2.75841	0.20990	0.8337
12	IM_POS	≠	EX_NEG	3.72419	1.29412	0.1956
	EX_NEG		IM_POS	3.96568	1.56522	0.1175
13	IM_POS	≠	IM_NEG	8.17433	6.28996	3.E-10
	IM_NEG		IM_POS	3.86843	1.45604	0.1454

Note: ↔ denotes bidirectional causality, → denotes unidirectional causality and ≠ denotes no causality.

Source: Authors own construct

Table 4.15 presents the Dumitrescu (2012) panel causality results for the SADC region while that of the SACU and CMA regions are presented in table 1 and 2 of the appendices. Bidirectional causality is established in exports and RGDP as well as between imports and exports. While unidirectional causality from negative exports to negative RGDP are found.

4.8 Discussion of Results: Country-level and Regional-level Results

The study investigates the asymmetric nexus of trade on economic growth at a country level and at regional level. Table 4.6 reports long-run and short-run results of the country-level NARDL model. Results from the table, confirm the asymmetric relationship between exports and imports on economic growth, as positive and negative changes in exports and imports are found to have different magnitude effects on economic growth. This confirms the appropriateness of the NARDL model to investigate this relationship. Findings suggest that ignoring non-linearity in modelling the relationship between exports and imports may lead to misleading conclusions (Shin, et al., 2014).

Findings also show that the total asymmetric effects of negative shocks in exports are bigger than positive shocks, as a 1% decrease in exports results in a 2.3% decrease in RGDP, while a 1% increase in exports results in a 1.5% increase in RGDP (Table 4.6). These results suggest that negative shocks have a more significant impact than positive shocks on economic growth. This finding partly explains the severe contraction in the Namibia economy by 8.0% in 2020 as a result of lower export earnings attributed to COVID-19 restrictions and lockdowns

(NSA, 2020). Similarly, asymmetric effects reveal that an increase in imports by 1% results in 1.97% decrease in RGDP, while a 1% decrease in imports results in 2.5% increase in RGDP. This shows that imports are negatively related to growth in Namibia, contrary to Keho (2020), where imports are found to be positively related to growth in Cote d'Ivoire. The inverse relationship in import findings for Namibia suggest the inability of the import substitution strategy in promoting growth for the country. This could be ascribed to the higher imports of consumer goods by the country, which accounts for about 35% of the total merchandise imports as opposed to capital goods Bank of Namibia (2021). These findings are further supported by the Keynesian aggregated demand theories which regard imports as leakages from the economy that reduces economic growth Pressman (2006).

Comparison of country-level results in table 4.6 against regional results in table 4.14, show that Namibia benefits more in terms of positive shocks in exports when trading as a sole country than trading as regional blocs. Precisely a 1% increase in exports leads to 1.5% in Namibia's RGDP, compared to 0.37%, 0.45%, and 0.43% respectively in SADC, SACU and CMA regions in the long run. This could be attributed to the higher exports of Namibian products to other markets like the European Union, China and the United Kingdom as opposed to the SADC, SACU, and CMA region. These findings are aligned with (Namibia Statistic Agency, 2018) publications in which the European Union absorbed about 38% of Namibia's exports. However, results further reveal that negative shocks in exports have a more disruptive impact at country level than at regional level, as a 1% decrease in exports results to 0.24%, 0.55% and 1.2% in the SADC, SACU, and CMA region RGDP compared to 1.2% at country level. These findings suggest that external negative shocks have a more disruptive impact on Namibia's growth than at regional growth. This is further supported by the views that smaller open economies are vulnerable to external shocks Salvatore (2016).

Since correlation does not necessarily imply causation Granger (1969), the study further examines the causal relationship between the variables at country and regional levels. Results show bidirectional causality between exports and RGDP at both country and regional level, signifying exports can be regarded as a source of growth at regional and country level. Likewise, growth in RGDP causes export growth at country and regional level. However, unidirectional causality from imports to RGDP is established at country level, while bidirectional causality between imports and RGDP is established at regional level. Results further find bidirectional relations between exports and imports.

4.9 Chapter Summary

This chapter provided a depth discussion on the empirical findings of trade nexus and economic growth at country and regional level. To assess the adequacy of the model, diagnostic checks were carried out at country level as well as at regional levels. To confirm the appropriateness of the NARDL model to investigate the trade nexus, the Wald test was applied at both country and at regional level. Results reveal asymmetric relations between positive and negative exports and imports at country level and across the regions. Comparison of country level results against regional results, findings show that Namibia benefits more in terms of positive shock in exports when trading as a sole country than trading as regional blocs. Increased imports were found to be inversely related to growth at country level while positively related to growth at regional level. Findings further reveal that negative shocks have severe impact than positive shocks on growth at country level. while at regional level, positive shocks have a higher impact on growth than negative shocks. The chapter further reveals bidirectional causality between exports and RGDP as well as between exports and imports at both country and regional level. while unidirectional causality from imports to RGDP was established at country level.

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CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter begins with the summary of the study outlining major findings, followed by the conclusion and recommendations.

5.2 Summary of the Study

The study investigates the non-linear nexus between trade and economic growth at a country level against that of regional level using Namibia as a laboratory provoked by inconsistent, diverging, and polarised evidence in antecedent literature. The study uses a different, yet appropriate approach to assess the effects of trading with regional blocs on Namibia's economic growth compared to that of trading as a sole country. Annual time series data from 1980–2020 is employed to evaluate the non-linear relationship between trade and economic growth in the short and long term for Namibia. The study further employs panel data from 2005–2020 to compare whether Namibia benefits in the short run and long run by trading with regional blocs. The Wald test for robustness validity of asymmetric relations is applied in the study. Findings reveal that exports are positively related to growth at all levels, while imports are found to be inversely related to growth at country level, while positively related to growth at regional level. Comparing country-level results against regional results, findings show that Namibia benefits more in terms of exports when trading as a sole country. However, in terms of imports, the study finds that Namibia benefits more by trading with regional blocs. The study further reveals that negative shocks in exports have a huge impact on economic growth compared to positive shocks at a country level. While, at regional level, positive shocks in exports have a massive impact on RGDP than negative exports.

Causality results at both country and regional level find bidirectional causality from exports and RGDP as well as between exports and imports.

5.3 Conclusion

The main objective of the study is to examine the effects of trade on economic growth of Namibia. while the specific objectives of the study are twofold firstly to determine whether Namibia benefits by trading with regional blocs. Findings reveal that at a country level, imports are inversely related to growth, while positively related to growth at regional level. These results suggest that Namibia can enhance growth by trading with regional blocs through the effectiveness of the import substitution strategy at regional level. Findings further reveal that negative shocks have more disruptive impact on growth at country level compared to regional level. Therefore, the study rejects the null hypothesis that Namibia does not benefit by trading with regional blocs. Secondly, to assess the direction of asymmetric causality between trade and economic growth in the short- and long-run for Namibia. The study finds long run bidirectional causality between exports and RGDP, unidirectional causality from imports to RGDP and bidirectional causality between exports and imports. Similarly, in the short-run, the study finds bidirectional causality between exports and RGDP, unidirectional causality between imports and RGD as well as bidirectional causality between exports and imports. Therefore, the study fails to reject the null hypothesis that the direction of asymmetric causality of Namibian trade and economic growth is the same in the short and long term.

5.4 Policy Recommendations and/or Implications

Based on the study findings that Namibia benefits more in terms of exports by trading as a sole country compared to regional trade, it is recommended that, to absorb Namibian exports towards accelerated growth benefits more value addition across the SADC, SACU and CMA regions is recommended. Findings further reveal that increased imports have significant impact on growth at regional level, therefore structural reforms fostering regional trade are recommended. At a country level, imports are inversely related to growth, therefore, to support industrialization growth benefits, the study recommends for reductions on Namibia higher import bill particular on consumer goods. Results shows that growth in Namibia and at regional level can further be improved through the import substitution strategy. Therefore, governments of various SADC countries are encouraged to alleviate tariff and non-tariff barriers to trade to foster economic convergence in trade, in line with the goals of the recently launched African Continental Free Trade Area. Findings show that negative shocks have more disruptive impact on Namibia's growth compared to regional level. therefore, policy makers and researchers at the Ministry of Finance are recommended to keep monitoring external factors that may adversely affect the country's trade and develop strategies to mitigate such impacts.

5.5 Area for Further Research

This study mainly focuses on international trade of goods between countries, it does not take into account the non-tradable aspects such as policies, political stability and quotas that may have a significant effect on the volume of trade between countries. Moreover, an accurate analysis of economic growth and trade should include all determinates of trade in which capital stock, and investment play a central role. Therefore, this provides an opportunity for future studies to use different approaches and other control variables for examining tradable and non-tradable factors on economic growth.

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APPENDICES

Table A1: Pairwise Dumitrescu Hurlin Panel Causality Tests: **SACU**

Null Hypothesis:	W-Stat.	Zbar-Stat.	Prob.
RGDP_NEG does not homogeneously cause RGDP_POS	11.5738	5.83487	5.E-09
RGDP_POS does not homogeneously cause RGDP_NEG	1.64452	-0.60077	0.5480
IM_NEG does not homogeneously cause RGDP_POS	3.68220	0.71994	0.4716
RGDP_POS does not homogeneously cause IM_NEG	1.98155	-0.38233	0.7022
IM_POS does not homogeneously cause RGDP_POS	23.1072	13.3102	0.0000
RGDP_POS does not homogeneously cause IM_POS	8.05235	3.55245	0.0004
EX_NEG does not homogeneously cause RGDP_POS	10.6552	5.23947	2.E-07
RGDP_POS does not homogeneously cause EX_NEG	3.18060	0.39484	0.6930
EX_POS does not homogeneously cause RGDP_POS	7.22465	3.01598	0.0026
RGDP_POS does not homogeneously cause EX_POS	7.12207	2.94949	0.0032
IM_NEG does not homogeneously cause RGDP_NEG	2.87609	0.19746	0.8435
RGDP_NEG does not homogeneously cause IM_NEG	4.29040	1.11415	0.2652
IM_POS does not homogeneously cause RGDP_NEG	2.73169	0.10387	0.9173
RGDP_NEG does not homogeneously cause IM_POS	3.44785	0.56805	0.5700
EX_NEG does not homogeneously cause RGDP_NEG	2.59794	0.01718	0.9863
RGDP_NEG does not homogeneously cause EX_NEG	2.45754	-0.07382	0.9412
EX_POS does not homogeneously cause RGDP_NEG	2.94332	0.24104	0.8095
RGDP_NEG does not homogeneously cause EX_POS	3.36473	0.51418	0.6071
IM_POS does not homogeneously cause IM_NEG	2.19265	-0.24550	0.8061
IM_NEG does not homogeneously cause IM_POS	3.43160	0.55752	0.5772
EX_NEG does not homogeneously cause IM_NEG	3.95970	0.89980	0.3682
IM_NEG does not homogeneously cause EX_NEG	4.77117	1.42576	0.1539
EX_POS does not homogeneously cause IM_NEG	3.61718	0.67780	0.4979
IM_NEG does not homogeneously cause EX_POS	4.59280	1.31015	0.1901

EX_NEG does not homogeneously cause IM_POS	2.12847	-0.28710	0.7740
IM_POS does not homogeneously cause EX_NEG	2.90098	0.21360	0.8309
EX_POS does not homogeneously cause IM_POS	0.45211	-1.37363	0.1696
IM_POS does not homogeneously cause EX_POS	3.46086	0.57649	0.5643
EX_POS does not homogeneously cause EX_NEG	1.45379	-0.72440	0.4688
EX_NEG does not homogeneously cause EX_POS	4.27082	1.10145	0.2707

Table A2: Pairwise Dumitrescu Hurlin Panel Causality Tests: **CMA**

Null Hypothesis:	W-Stat.	Zbar-Stat.	Prob.
RGDP_NEG does not homogeneously cause RGDP_POS	2.01054	-0.32516	0.7451
RGDP_POS does not homogeneously cause RGDP_NEG	1.84744	-0.41971	0.6747
IM_POS does not homogeneously cause RGDP_POS	28.7910	15.2000	0.0000
RGDP_POS does not homogeneously cause IM_POS	12.6327	5.83275	0.0028
IM_NEG does not homogeneously cause RGDP_POS	3.90141	0.77102	0.4407
RGDP_POS does not homogeneously cause IM_NEG	2.47651	-0.05503	0.9561
EX_POS does not homogeneously cause RGDP_POS	7.09216	2.62077	0.0088
RGDP_POS does not homogeneously cause EX_POS	7.56024	4.84720	0.0013
EX_NEG does not homogeneously cause RGDP_POS	2.07314	-0.28887	0.7727
RGDP_POS does not homogeneously cause EX_NEG	3.62823	0.61265	0.5401
IM_POS does not homogeneously cause RGDP_NEG	0.40592	-1.25539	0.2093
RGDP_NEG does not homogeneously cause IM_POS	4.20913	0.94941	0.3424
IM_NEG does not homogeneously cause RGDP_NEG	3.19838	0.36346	0.7163
RGDP_NEG does not homogeneously cause IM_NEG	4.57772	1.16309	0.2448
EX_POS does not homogeneously cause RGDP_NEG	3.35026	0.45151	0.6516
RGDP_NEG does not homogeneously cause EX_POS	3.72789	0.67043	0.5026
EX_NEG does not homogeneously cause RGDP_NEG	9.64696	3.08629	0.0003
RGDP_NEG does not homogeneously cause EX_NEG	2.67942	0.06261	0.9501

IM_NEG does not homogeneously cause IM_POS	3.81700	0.72209	0.4702
IM_POS does not homogeneously cause IM_NEG	5.90388	1.93189	0.0534
EX_POS does not homogeneously cause IM_POS	0.40592	-1.25539	0.2093
IM_POS does not homogeneously cause EX_POS	4.23235	0.96287	0.3356
EX_NEG does not homogeneously cause IM_POS	2.58768	0.00942	0.9925
IM_POS does not homogeneously cause EX_NEG	3.41939	0.49158	0.6230
EX_POS does not homogeneously cause IM_NEG	4.47793	1.10524	0.2691
IM_NEG does not homogeneously cause EX_POS	5.14457	1.49170	0.1358
EX_NEG does not homogeneously cause IM_NEG	4.65594	1.20843	0.2269
IM_NEG does not homogeneously cause EX_NEG	5.88963	1.92363	0.0544
EX_NEG does not homogeneously cause EX_POS	4.66612	1.21433	0.2246
EX_POS does not homogeneously cause EX_NEG	2.11256	-0.26602	0.7902

Table A3: SACU Dynamic Fixed Effects Regression Full

	Coef.	**Std. Err.**	**z**	**P>|z|**	**[95% Conf. Interval]**	
LNEX_POS	0.453124	0.132078	3.43	0.001	0.194270	0.711978
LNEX_NEG	0.5509384	0.083756	6.58	0.000	0.386772	0.7150976
LNIM_POS	0.3394013	0.1235895	2.75	0.006	0.09717	0.5816322
LNIM_NEG	0.020676	0.175440	0.12	0.906	0.32318	3645341
SR_ EC	-0.746471	0.189777	-3.93	0.000	-1.1184	-.3745217
D(LNEX_POS)	0.3474102	0.0800865	4.34	0.000	0.504376	0.1904434
D(LNEX_NEG)	0.1828856	0.0678782	2.69	0.007	0.049846	0.3159244
D(LNIM_POS)	0.2010757	0.1378041	1.46	0.145	0.471166	0.0690154
D(LNIM_NEG)	0.5007955	0.1985173	2.52	0.012	0.111708	0.8898823
cons	6.431858	3.148295	-2.04	0.041	12.6024	0.2613136

Table A4: CMA Pooled Mean Group Regression Full

	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
LNEX_POS	0.4303708	0.088393	4.87	0.000	0.2571237	0.6036179
LNEX_NEG	1.286339	0.3820702	3.37	3.37	0.5374951	2.035183
LNIM_POS	0.3475228	0.1536991	2.26	0.024	0.6487675	0.0462781
LNIM_NEG	0.5664927	0.3250322	1.74	0.081	0.0705587	1.203544
C_id_1						
ECM	-0.496742	0.2167958	-2.29	0.022	-0.921653	-0.07183
D(LNEX_POS)	0.4293821	0.1943465	2.21	0.027	0.04847	0.8102942
D(LNEX_NEG)	0.4408971	0.208287	2.12	0.034	0.0326621	0.8491321
D(LNIM_POS)	0.1316984	0.2949769	0.45	0.655	0.4464458	0.7098426
D(LNIM_NEG)	0.2937788	0.2508086	1.17	0.241	0.197797	0.7853546
cons	-2.277624	3.426779	-0.66	0.506	8.993988	4.43874
C_id_2						
ECM	-0.983018	0.1757023	-5.59	0.000	-1.327389	-0.638648
D(LNEX_POS)	0.6341581	0.2909788	-2.18	0.029	1.204466	0.0638502
D(LNEX_NEG)	0.1130954	0.2689928	0.42	0.674	0.4141209	0.6403116
D(LNIM_POS)	-0.514058	0.3162233	-1.63	0.104	-1.133841	0.1057314
D(LNIM_NEG)	0.0813379	0.2469265	-0.33	0.742	-0.565305	.4026292
cons	0.9421003	2.663963	-0.35	0.724	-6.163371	4.279171
C_id_3						
ECM	-0.185724	.083276	-2.23	0.026	-0.348944	-0.022505
D(LNEX_POS)	0.5544675	0.0534744	10.37	0.000	0.4496596	0.6592754
D(LNEX_NEG)	1.009248	0.2461513	4.10	0.000	0.5268001	1.491696
	-					-
D(LNIM_POS)	0.4813226	0.1023622	-4.70	0.000	-0.681947	0.2806964
						-
D(LNIM_NEG)	-1.082024	0.1257674	-8.60	0.000	-1.328524	0.8355246
cons	2.951375	1.617314	-1.82	0.068	-6.121253	0.218502
C_id_4						
ECM	-0.695313	0.1914093	-3.63	0.000	-1.070468	-0.320157
D(LNEX_POS)	0.5894942	0.131231	4.49	0.000	0.8467022	0.3322861
D(LNEX_NEG)	1.354823	0.5644003	2.40	0.016	0.2486185	2.461027
D(LNIM_POS)	-0.266877	.3394728	-0.79	0.432	-0.932232	.3984768
D(LNIM_NEG)	0.5885365	.5584039	1.05	0.292	0.5059149	1.682988
cons	2.660193	1.45836	-1.82	0.068	-5.518527	.1981405

Note: C_id_ 1, 2, 3 and 4 represents: Eswatini, Lesotho, Namibia and South Africa

Table A5: SADC Pooled Mean Group Regression

	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
LNEX_POS	0.3647573	0.078255	4.66	0.000	0.213871	0.2113871
LNEX_NEG	0.2415924	0.098312	2.46	0.014	0.048939	0.4342808
LNIM_POS	0.3242651	0.085563	3.79	0.000	0.15658	0.4919654
LNIM_NEG	0.0360415	0.071122	0.51	0.612	-0.1033	0.1754404
SR_ EC	-0.852921	0.161970	-5.27	0.000	-1.17037	-0.53546
D(LNEX_POS)	0.5381199	0.2141128	2.51	0.012	0.11846	0.9577733
D(LNEX_NEG)	-0.3765552	0.1091013	-3.45	0.001	-0.59038	-0.162720
D(LNIM_POS)	-0.170251	0.0740576	-2.30	0.022	-0.31540	-0.025101
D(LNIM_NEG)	0.3740405	0.1449666	2.58	0.010	0.089912	0.6581697
cons	3.987368	1.314351	3.03	0.002	1.411288	6.563449

Table A6: Descriptive Statistics SACU

	RGDP	EX	IM
Mean	17.06720	26.96376	16.23566
Median	1.706917	2.992568	2.480121
Maximum	20.704023	21.53162	61.77963
Minimum	-34.387171	-23.53196	-15.584402
Std. Dev.	10.204202	24.308624	19.667217
Skewness	5.882436	8.685178	8.485848
Kurtosis	38.93265	76.97444	74.70243
Jarque-Bera	4.76225	9.24149	8.09759

Table A7: Descriptive Statistics CMA

	RGDP	EX	IM
Mean	14.70201	33.14332	18.35519
Median	1.065653	3.037053	1.865005
Maximum	13.7040	20.53231	71.77926
Minimum	-15.38717	-63.53196	-71.58440
Std. Dev.	10.1619	25.5465	13.64183
Skewness	5.609450	7.753746	7.604545
Kurtosis	34.48174	61.43216	59.92485
Jarque-Bera	2.97570	9.74133	9.25014