

**FACTORS INFLUENCING INTRA INDUSTRY TRADE BETWEEN
MALAWI AND SOUTHERN AFRICAN DEVELOPMENT COMMUNITY
(SADC) COUNTRIES**

MASTER OF ARTS (ECONOMICS) THESIS

TEDDIE GOMANI

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(SADC) COUNTRIES**

MA (Economics) Thesis

By

TEDDIE GOMANI

B.Soc.Sc. (Economics) - CUNIMA

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Governance, in partial fulfillment of the requirements for a Master of Arts Degree
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DECLARATION

I hereby declare that this thesis is a result of my own original work and effort, and that to the best of my knowledge, the findings have never been previously presented to the University of Malawi or elsewhere for the award of any academic qualification. Where other information was sought, it has been rightfully acknowledged.

Full Legal Name

Signature

Date

CERTIFICATE OF APPROVAL

The undersigned certify that this thesis is a result of the author's own work and that to the best of our knowledge, it has not been submitted for any other purpose and where other peoples' work has been used, acknowledgements have been made.

Signature:_____ **Date:**_____

Regson Chiweza, PhD, (Lecturer)

Supervisor

DEDICATION

This thesis is dedicated to my parents, Tony and Jessie Gmani, whose unwavering support and encouragement have been my guiding light. To my family and friends, who have always believed in me and stood by me through every challenge. And to my brothers, Kenneth and Lewis Gmani, whose wisdom and inspiration have been invaluable. This work is a testament to your love, patience, and faith in my abilities.

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ABSTRACT

Intra-industry trade (IIT) is prominent to have potential benefits to improve the economic prospects of countries and has gradually been pivotal in understanding developing countries' trade, including those in Southern African Development Community (SADC) region. Malawi undertakes trade with other countries in the SADC and most of this trade involves the exchange of differentiated products that belong to the same industry. This study therefore, tries to establish the factors influencing IIT between Malawi and its trading partners in the SADC region and to identify the extent of IIT between Malawi and its trading partners in SADC. The study uses the gravity model of international trade. The gravity equation is augmented to include some additional explanatory variables that are expected to influence the factors influencing Malawi's IIT. The study also incorporates dummy variables which were not included in the traditional gravity model. The study incorporates secondary data from the World Bank reports, the National Statistics Office, and the Reserve Bank of Malawi (RBM) to estimate the factors influencing intra-industry trade (IIT) between Malawi and other SADC countries from 2010 to 2020. The key findings underscore the significance of economic size, geographical proximity, and existing trade relationships in fostering IIT. Larger economies, shared borders, and established trade flows all create a fertile ground for deeper intra-industry exchange. The unexpected positive influence of exchange rates on IIT warrants further investigation to understand the underlying mechanisms and inform potential policy responses. This research offers valuable insights for policymakers aiming to unlock the full potential of regional trade integration within SADC. Exploring the potential benefits of a common language environment and fostering continuous monitoring and evaluation of trade policies can further strengthen regional economic integration efforts. The pursuit of deeper IIT within SADC presents a promising pathway towards a more prosperous and interconnected region. By harnessing the insights gleaned from this research and implementing targeted policies, SADC member states can empower businesses, create jobs, and ultimately enhance the collective economic well-being of the region.

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ABBREVIATIONS

COMESA	Common Market for East and Southern Africa
DRC	Democratic Republic of Congo
FGLS	Feasible Generalized Least Squares
FTA	Free Trade Area
GDP	Gross Domestic Product
HIIT	Horizontal Intra Industry Trade
IIT	Intra Industry Trade
MV2063	Malawi Vision 2063
NSO	National Statistics Office
OLS	Ordinary Least Squares
RBM	Reserve Bank of Malawi
RSA	Republic of South Africa
SADC	Southern Africa Development Community
SDG	Strategic Development Goals
TI	Trade Intensity
VIIT	Vertical Intra Industry Trade
WB	World Bank

CHAPTER ONE

INTRODUCTION

1.1 Background

International trade involves the exchange of various commodities between countries. There are two types of trade: intra-industry and inter-industry trade. Intra-industry trade (IIT) is the simultaneous import and export of products belonging to the same group, such as the two-way exchange of differentiated textiles or vehicles while inter-industry trade refers to trade in products that belong to different industrial groups, for instance the import of textiles and the export of maize.

On the other hand, a great deal of international trade involves the exchange of differentiated products of the same industry or broad product group (Puah, H.C. 2020). There is vertical integration where products are ranked according to the levels of all characteristics being augmented or lowered for some others, for example, cars of different series. Horizontal integration between two products involves ranking products according to levels of characteristics being augmented while it is lowered for others, for example different versions of a car. Inter-industry trade involves trade in commodities that are completely different; and belong to different industries, such as textiles and motor industries. Since the Southern African Development Community (SADC) region is composed of countries of almost the same economic structure, trade among these countries is mainly IIT (Chidoko, 2006).

It should also be noted that comparative advantage plays a crucial role in stimulating IIT within the SADC region by allowing countries to specialize in the production of specific varieties of goods within the same industry. Differences in technology, skilled labor, and production efficiency enable countries to trade differentiated products while maintaining competitiveness. This specialization enhances IIT as countries exchange similar but

distinct goods, such as different models of vehicles or textile products, thereby fostering regional economic integration (Ekanayake, 2001).

Intra-industry trade is notable to have potential benefits to improve the economic prospects of countries and has gradually been pivotal in understanding developing countries' trade, including those in Southern African Development Community (SADC) region. Malawi undertakes trade with other countries in the SADC and most of this trade involves the exchange of differentiated products that belong to the same industry. The SADC region is composed of 14 Southern African states, namely Zimbabwe, Botswana, Zambia, Tanzania, Angola, Mozambique, Swaziland, Namibia, Republic of South Africa (RSA), Malawi, Lesotho, Seychelles, Mauritius and Democratic Republic of Congo (DRC).

Malawi's economy largely depends on trade. The country has a diverse range of products mainly in the agricultural sector. Malawi's exports are dominated by four agricultural commodities namely tobacco, sugar, tea and cotton. Over the past five years, exports of coffee and pulses have been rising as a result of efforts towards diversifying into non-traditional crops in order to broaden export base. Imports are dominated by machinery, fuels, transport equipment, chemicals and other intermediate inputs. During years of drought, Malawi's food imports rise significantly. In recent years, the direction of Malawi's foreign trade has diversified with South Africa emerging as a major trading partner.

However, when it comes to intra African trade, in 2022 Malawi's intra-African trade (imports and exports) was US\$808 million, accounting for 32% of Malawi's total trade. According to African Growth and Opportunity Act 2023, Malawi's main intra-African trading partners include South Africa, Tanzania, Kenya and Zambia. These four countries account for approximately 70% of Malawi's intra-African trade. The value of Malawi's 2022 intra-African exports is US\$395 million, 42% of Malawi's total exports. Between 2021 and 2022, Malawi's intra-African exports increased by 3%. The main export products to other African countries include groundnuts, unmanufactured tobacco, and oil

cake. Malawi's main destination markets are SADC and COMESA countries. In 2022, 27% of Malawi's total imports were intra-African (i.e. sourced from African countries). The main intra-African imports are fertilisers and food preparations. Malawi's intra-African imports are mainly sourced from SADC and COMESA countries, except for Nigeria and Morocco. Between 2021 and 2022, Malawi's intra-African imports declined by 55%.

While there are a number of studies on developing countries' IIT, previously most trade studies placed greater emphasis on a country's comparative advantage as the basis of trade rather than on economies of scale. This tendency however, ignored the IIT theories which are important in understanding and analysing trade patterns between countries which are relatively similar and produce relatively similar products. IIT arises from the fact that countries try to take advantage of economies of scale in production and because of this it has generally been regarded as a way in which countries involved in trade stand to benefit. This can be achieved through increasing trade among them, and it is in this vein that many countries in the Southern African Development Community (SADC) have realized the potential benefits and have therefore advocated for its expansion.

This study therefore, seeks to establish the factors influencing IIT between Malawi and its trading partners in the SADC region and to identify the extent of IIT between Malawi and its trading partners in SADC.

1.2 Problem Statement

The degree of specialization in IIT is assumed to be correlated with the level of development of the country. It is therefore perceived that IIT is mostly a feature of the industrialized countries. However, there are indications that much of the trade in the SADC region is intra industry trade. Generally, SADC countries are poor and cannot influence world terms of trade. The region is mainly dependent on primary commodity exports and highly dependent on the western countries for their industrial machinery and equipment and economic survival. Why then has IIT been predominant between Malawi and its trading partners within the SADC region?

On the other hand, several studies (Enakanayake, 2001; Chidoko, 2006) on intra-industry trade suggest that IIT is more prevalent among countries with similar economic structures. One thing to note from theoretical and empirical studies involving the factors influencing IIT among developing countries is that bilateral trade depends primarily on three variables; the size of an economy, the level of development and the geographical distance between economic centres (Verdoorn, 1960, Kimura & Lee, 2004).

Despite the economic challenges faced by SADC nations, particularly their dependence on western countries for industrial machinery and equipment, IIT remains pronounced in trade relations, especially between Malawi and its SADC partners. This raises questions about the factors driving IIT within the region. Additionally, since existing studies emphasize that IIT is common among countries with similar economic structures, therefore, understanding the prevalence of IIT in the context of Malawi's trade with SADC countries necessitates a comprehensive examination of these factors.

1.3 Study Objectives

1.3.1 Main objective

The main objective of this study is to identify the significant factors influencing the level of IIT between Malawi and its trading partners in SADC.

1.3.2 Specific objectives

- i. To establish the extent of existence of IIT between Malawi and its trading partners in the SADC region.
- ii. To examine if geographical location has influence in IIT between Malawi and its trading partners in the SADC region.
- iii. To investigate if IIT takes place among countries with similar economic size and level of development.

1.4 Research Hypothesis

The study will be based on the following null hypotheses:

- i. Ho: IIT does not necessarily take place between Malawi and its trading partners in the SADC region.
- ii. Ho: Geographical location has no influence in IIT between Malawi and its trading partners in the SADC region.
- iii. Ho: IIT does not necessarily take place among countries with similar economic size and level of development.

1.5 Significance of the study

Malawi Vision 2063 emphasizes the need for economic diversification and industrialization to achieve sustainable development and improve the quality of life for all Malawians. Studying the factors influencing IIT can support this vision by identifying key industries where Malawi has a comparative advantage and promoting intra-regional trade partnerships to enhance industrial growth and competitiveness. Furthermore, analysing the factors influencing intra-industry trade aligns with SDG 9 by supporting the development of resilient infrastructure, promoting inclusive and sustainable industrialization, and fostering innovation. By enhancing regional connectivity, streamlining trade facilitation processes, and attracting investment in key industries, Malawi can strengthen its industrial base and improve its competitiveness within the SADC region.

Therefore, studying the factors influencing IIT between Malawi and its SADC trading partners holds significant implications for economic development, regional integration and trade policy formulation. It can provide valuable insights for policymakers, businesses, and researchers striving to promote sustainable economic growth and prosperity in the region.

1.6 Scope of the study

The research limits itself to factors influencing intra industry trade in Malawi. Basing on the period of study of about eleven years 2010-2020. The choice of this period has been done according to the availability of the data for most of the variables that will be used in the research. It should be noted that most of the review from the previous researchers that

conducted the similar study analysed mostly the variables like the real exchange rate, trade intensity and dummies of common language and common borders.

1.7 Organisation of the study

The study is organised in five chapters. The foregoing chapter gave the background of the study and its objectives. Chapter Two is devoted on the review of the relevant literature both empirical and theoretical. Chapter Three highlights the research design and the methodology. Chapter Four explains the research methodology. Chapter Five represents data analysis results and interpretation. The final chapter, Chapter Six offers the conclusion and recommendation.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides review of literature on the factors influencing IIT between Malawi and other trading partners in SADC. This chapter is divided into theoretical and empirical literature.

2.2 Theoretical Literature Review

In this section, a review of the major theoretical arguments regarding the linkages between IIT and economic size is done. Thus, the following sections look at the Gravity Model of Trade, The Linder Hypothesis and the Heckscher-Ohlin Theory which are some of the theories explained, respectively.

2.2.1 The Gravity Model of Trade

The general idea behind the model stems from and derives its name from the theory of gravity as it is studied in physics. The model is referred to as the gravity model because it identifies forces that encourage and discourage countries in their trade with each other. In other words, the gravity model consists of pull and push factors (akin to gravitational and other physical forces) that influence bilateral trade flows. Newton's law of gravity in the field of physical mechanics states that two bodies attract each other with a force that is proportional to the product of each body's mass (in kilograms) divided by the square of the distance between their centers of gravity (in meters).

The gravity model was first applied to the analysis of international trade by Tinbergen (1962) and Poyhonen (1963). In their basic formulation of this model of trade, the volume of trade between two countries was assumed to be positively related to their size, as measured by their national incomes, and negatively related to the transport costs of

trade, as measured to the transport costs of trade, as measured by the distance between their economic centers.

Despite its widespread and successful empirical application, the gravity model was initially criticized because it lacked theoretical foundations (Tinbergen, J. 1962). However, this is certainly no longer true today because there are several theoretical developments that have provided support for the model. The theoretical basis for the gravity model framework is found on a set of general equilibrium models that derive specific predictions for bilateral trade. Examples include Anderson (1979), Bergstrand (1985, 1989, 1990), Deadorff (1984, 1995, 1998), Helpman and Krugman (1985), Keller (1998, 2002), Anderson and Wincoop (2001), Harrigan (2001), Hansson and Xiang (2002), and Cheng and Wall (2004). The common elements in each of these contributions are complete specialization and identical preferences. Their differences, though, help to explain the variety of specifications and some of the diversity of the results that have appeared in empirical applications.

What the preceding discussion shows, then, is that using the gravity model in the present study is advantageous for two main reasons. Firstly, the application of gravity equations is consistent with the main objective of the study, that of identifying variables that act to encourage or discourage Malawi's involvement in IIT with its partner countries. Secondly, the gravity equations emanate from a general equilibrium theory of trade; in other words gravity equations are consistent with many general equilibrium trade models, including those of Bergstrand (1985, 1989, and 1990), Helpman and Krugman (1985).

2.2.2 The Linder Hypothesis

Linder's theory of trade, proposed by Staffan Burenstam Linder in 1961, offers a unique perspective on international trade patterns based on consumer preferences and income levels among countries. At its core, the theory suggests that countries with similar levels of per capita income are more likely to engage in trade with each other due to shared demand structures and preferences for similar types of goods and services (Linder 1975). This contrasts with traditional trade theories like the Heckscher-Ohlin model, which

emphasize differences in factor endowments as the primary factors influencing trade (Chauvin & Gaulier, 2002). According to Linder, the crux of his theory lies in the concept of demand similarity. Countries with comparable income levels tend to exhibit more homogeneous consumer preferences. This similarity in demand encourages intra-industry trade, where countries exchange differentiated products that cater to these shared preferences. Linder argues that such trade dynamics are driven by the production of goods that meet the quality and sophistication levels demanded by consumers in economically similar countries.

Empirically testing Linder's theory involves analyzing trade patterns between countries with similar income levels and comparing them with trade flows between countries with varying income disparities. This approach helps researchers understand how income levels influence the types of goods traded and the intensity of intra-industry trade relationships.

From a policy perspective, Linder's theory underscores the importance of fostering trade relationships among countries with comparable income levels. Policies that promote product differentiation and enhance production capabilities can facilitate greater intra-industry trade, benefiting economic growth and international cooperation.

While Linder's theory provides valuable insights into consumer-driven trade patterns, it has faced scrutiny for its oversimplified focus on demand-side factors. Critics argue that it overlooks supply-side determinants such as factor endowments and comparative advantages that also shape trade dynamics. Recent extensions of Linder's theory have incorporated factors such as technological advancements, global supply chains, and trade agreements, which have reshaped international trade dynamics in the contemporary global economy. These extensions highlight the evolving nature of trade relationships and the need for nuanced approaches in understanding trade patterns.

2.2.3 The Heckscher-Ohlin Theory

The Heckscher-Ohlin theory, formulated by Eli Heckscher and Bertil Ohlin, explains international trade patterns based on differences in factor endowments among countries. It posits that countries specialize in producing goods that utilize their abundant factors of production (such as labor or capital) and import goods that require factors in which they are relatively scarce (Chauvin & Gaulier, 2002). This theory contrasts with earlier models by emphasizing comparative advantage derived from factor endowments rather than technological differences alone.

Empirical testing involves analyzing trade patterns to observe whether countries export goods aligned with their factor endowments. From a policy perspective, the theory suggests that countries can enhance their competitiveness by investing in factors that are abundant domestically, thereby fostering specialization and comparative advantage in global markets Kimura, F. & Lee, H. (2004).

Critics argue that the theory oversimplifies trade dynamics by neglecting factors like economies of scale, technological innovation, and consumer preferences. Nonetheless, the Heckscher-Ohlin theory remains a foundational framework for understanding how factor endowments influence trade specialization and economic development in an interconnected global economy.

2.3 Empirical Literature Review

Kien and Thao (2016) investigated the factors influencing intra-industry trade (IIT) in Vietnam's manufacturing sector, discovering that IIT is positively affected by GDP and GDP per capita, while it is negatively impacted by distance and trade imbalances. Furthermore, the Free Trade Area (FTA) dummy variable was not statistically significant, suggesting an unclear effect of regional economic integration participation on the proportions of horizontal, vertical, and total IIT. This may also indicate that the tariff reductions between Vietnam and its major trading partners are not substantial enough to significantly influence the volume of IIT. Additionally, the study found that economies of scale boost the share of IIT and that the share of trade between two parties increases with

their proximity. Similarly, Thorpe and Zhaoyang (2005) also find a positive relationship between economies of scale and IIT.

Additionally, Fainštein and Netšunajev (2011) showed that market size was positively related to IIT in the Baltic States. However, a negative relationship between distance and the share of IIT was found, together with a negative correlation between difference in human capital and IIT. Ambroziak (2012) found that FDI stimulated not only VIIT in the Visegrad countries but also HIIT. Differences in country size and income were positively related to IIT as is FDI, while distance and IIT showed a negative relationship. Jám bor (2014) and Fertő and Jám bor (2015) analysed country-specific factors influencing IIT for agri-food products for the post-socialist EU Member States and found that factor endowments are ambiguously related to HIIT and VIIT in agri-food products. Economic size was found to be positively and significantly related to both types of IIT, while distance and IIT were found to be.

By utilizing the Grubel-Llyod index to measure the degree of IIT, they assessed the dynamic effects of integration by analyzing growth rates in trade and IIT, .Veeramani and Ahlström (2009) investigated the influence of the ASEAN Free Trade Area (AFTA) on intra-industry trade (IIT) across various commodity groups among ASEAN member countries from 1993 to 2002. Their hypotheses were derived from factors believed to increase IIT: economies of scale, product differentiation, higher and similar per capita income, larger and similar economic size, and open trade policies. They compared IIT within ASEAN to IIT with the rest of the world to measure economic integration. While the trade data generally supported the hypotheses, the results indicated that the positive impact of integration within ASEAN on IIT was only marginal.

Sunde et al (2009) examined the determinants of intra industry trade between Zimbabwe and its trading partners in the Southern African Development Community (SADC) Region. The study wanted to prove the hypothesis that similarity in per capita income is not the main determinant of IIT between Zimbabwe and its SADC trading partners and that intra industry trade does not necessarily take place among countries with similar

economic structures and level of development. The study used the Modified Standard Gravity Equation that has intra-industry trade index as its dependent variable. The model was regressed using Ordinary Least Squares in excel. The results of the study show that per capita income, trade intensity, distance, exchange rate and gross domestic product explain intra-industry trade between Zimbabwe and its SADC trading partners.

Chidoko (2006) investigated the factors influencing intra-industry trade (IIT) between Zimbabwe and its trading partners within the Southern African Development Community (SADC) region. The study aimed to identify the types of goods traded between Zimbabwe and its SADC partners and to test the hypothesis that similarity in per capita income is not the primary factors influencing IIT. Additionally, it sought to determine whether IIT occurs between countries with differing economic structures and development levels. Using the Modified Standard Gravity Equation, with the Intra-Industry Trade Index as the dependent variable, the model was regressed through Ordinary Least Squares in Excel. The findings revealed that per capita income, trade intensity, distance, exchange rate, and gross domestic product significantly influence IIT between Zimbabwe and its SADC partners. The study also found that many SADC countries trade similar goods, a situation attributed to the colonial-era development that established comparable economic structures and per capita incomes. Consequently, these countries produce and trade similar products. Both hypotheses tested in the study were disproven.

Using the standard Grubel Lloyd index, Veeramani (2004) analysed the effects of trade liberalisation, multinational involvement and other industry specific factors influencing IIT. India's trade and investment regime was of the most restrictive in the world. Since 1991, however, the country had been undertaking significant liberalisation measures. The objective of the study was to demonstrate that the removal of Quantitative restrictions and the decline in tariff rates had given a great boost to intra-industry trade. The data comprised of a panel of 81 manufacturing industries in India for the period 1988 to 1999. The standard Grubel Lloyd index was used to estimate the intensity of IIT with World Total and with various trading partners, namely, USA, EU, Japan and East Asia & Pacific.

The regression analysis provided strong support to the hypothesis that trade liberalisation causes higher levels of IIT.

Furthermore, Ekanayake (2001) measured the extent of Mexico's IIT patterns so as to identify the determinants of IIT between Mexico and her trading partners. He used the non-linear least squares of the logit function to estimate the model and found that the signs and significance of the explanatory variables were in conformity with his expectations. The results showed that the extent of IIT is positively correlated with per capita income, average country size, trade intensity, trade orientation existence of common border, Common Language and participation in a regional integration scheme. While IIT is negatively correlated with income differences and differences in country size.

Musonda (1997) used available bilateral trade data between members of the Common Market for Eastern and Southern Africa (COMESA) formerly PTA to estimate the extent of Intra-industry trade and the factors that determine this trade in the region. The hypothesis was that intra-industry trade exists in this region. The results of the study showed that indeed this trade does exist and it is determined by the same factors as those found in other regions. The principal determinant was distance, which had a negative significant relationship with intra-industry trade. Other factors included per capita income and language. The study also revealed that trade is more significant in bordering countries that are relatively more developed in terms of their manufacturing sectors. Improved communication networks will enhance this trade within the region.

Linder (1975) posits that differences in per capita income influence a country's capability to produce differentiated products. Countries with similar economic sizes are more likely to engage in trade with one another. Per capita income reflects demand-side factors, such as the demand structure and the sophistication of products (Loertscher & Wolter, 1980), while on the supply side, it indicates the capital-labor ratio (Helpman & Krugman, 1985). The impact of economic size differences on intra-industry trade (IIT) is unclear. A positive correlation might indicate differing capital endowments between trading partners,

fostering IIT. Conversely, a negative correlation might suggest that similar characteristics between trading partners lead to increased IIT (Hu & Ma, 1999).

2.4 Conclusion

Theoretical literature reviewed in this Chapter is of relevance to this study as it has shown the background to the emergence of interest in studying factors influencing IIT. Review of the theoretical and empirical literature reveals that IIT is explained by differences in taste patterns, diversified demand structure, trade integration, market size, level of development among others. The present study will employ the augmented gravity model but differs from other studies in that will use the most recent data on trade between Malawi and the SADC Countries. The estimation techniques employed will address the problems of heteroskedasticity and zero trade flows mentioned above.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Intra-industry trade, the exchange of similar goods between countries, plays a crucial role in shaping trade patterns and regional economic integration. This chapter describes the methods that will be used in order to find the factors influencing IIT and specifically if geographical location and economic size have any impact on IIT. As such, the current chapter discusses the statistical and econometric tools used to analyse data for the purpose of answering the research questions. It also includes the approach adopted to examine data for the chosen variables and the construction of empirical models.

3.2 Data Type and Data Sources

The data used will be secondary data in nature. The data in reference and usage on GDP will come from the World Bank reports, data on Trade Intensity, Distance, common language and common border will come from National Statistics Office and lastly the Exchange Rate from Reserve Bank of Malawi (RBM). The study will estimate the factors influencing IIT between Malawi and other SADC countries for the years 2010-2020. The model will be estimated using a panel data framework in stata.

3.3 Estimation Methods

There is a distinction in the literature between static and dynamic panel data models. Static Panel data models include pooled estimation, the fixed effects and the random effects methods, while dynamic panel data models are those that include a lagged dependent variable as an explanatory variable. This study, however, considers the static panel data models as opposed to the dynamic panel data models because in the dynamic panel data models, the lagged dependent variable is correlated with the error component

which complicates estimation and therefore yields to biased and inconsistent estimates (Woodridge, 2002).

Static panel data regression models can be estimated using pooled estimation, fixed effects and random effects (Asteriou, 2006). This study uses the random effects model as opposed to pooled and the fixed effects estimation methods. The reasons for this model choice are the following: Firstly, the pooled estimation method has a tendency of giving biased results by ignoring country effects. Secondly, the fixed effects estimation method does not take time invariant variables such as distance, common border and common language into account therefore rendering the Hausman Specification test inappropriate to this study. Lastly, the use of a dummy for each cross-sectional unit in the fixed effects model creates losses in degrees of freedom.

3.3.1 Pooled Estimation

Pooled estimation is the most straightforward method, assuming a single set of slope coefficients and a single overall intercept, without accounting for country or time effects. This method applies the ordinary least squares (OLS) regression and can be expressed as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \dots + \beta_7 X_{7it} + \mu_{it} \quad (1)$$

where;

i stands for the country (i=1,2,3,4.....14)

t stands for time period (t=1,2,3.....11)

$\mu_{it} \sim N(0, \sigma^2)$ is the error term which captures the difference across countries and overtime. it is normally distributed with zero mean and a constant variance.

For ordinary least squares (OLS) to be correctly applied, the error terms must be independent and homoskedastic. However, these conditions are infrequently met, making it unrealistic to expect OLS to consistently provide efficient and unbiased estimates (Davidson and Mackinnon, 1993).

3.3.2 Fixed Effects Estimation

The fixed effects approach accounts for individual and time effects by allowing the intercept to vary through the introduction of different intercept dummies for each country and time period, while keeping the slope coefficients constant (time-invariant). The fixed effects estimation approach assumes that the country-specific effects in the disturbance term (μ_i) are correlated with the regressors. The fixed effects model can be expressed as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \dots + \beta_7 X_{7it} + \mu_{it} \quad (2)$$

Where;

$\mu_{it} \sim iid(0, \sigma^2)$ means that the error term is independently and identically and identically distributed across countries and over time with zero mean and constant variance.

3.3.3 Random Effects Estimation

To address the limitations of the fixed effects model, many researchers have utilized the random effects estimation approach. The random effects model treats the intercept as a random variable, assuming that the unobserved country effects (μ_{it}) are randomly distributed and not correlated with the regressors. The random effects model can be formulated as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \dots + \beta_7 X_{7it} + \mu_{it} \quad (3)$$

where;

$$\mu_{it} = \varepsilon_i + \omega_{it}$$

ε_i denotes the unobservable and time invariant country specific effects that are not included in the regression

ω_{it} denotes idiosyncratic errors, these are errors which change across countries and over time.

3.4 Model Specification

To analyse the country-specific factors influencing intra-industry trade between Malawi and selected SADC countries, the study uses the gravity model of international trade. This study employs the gravity model because it is widely used model to identify the factors influencing Intra-industry Trade. According to Armstrong 2007, the gravity model

was derived from the gravity law of Physics that was postulated by Issac Newton, which states that two physical bodies will experience gravitational pull that is proportionate to the distance between them. Accordingly, the gravity model of international trade proposes that the volume of trade between two countries is determined by the product of their GDP divided by the distance between them (Armstrong, 2007). The gravity model of trade used to estimate bilateral trade flows on the basis of economic size and distance between two countries (Tinbergen, 1962). Therefore, the following formula explained the mathematical traditional gravity model:

$$T_{ijt} = \beta_0(GDP_i\beta_1 * GDP_j\beta_2/DIST_{ij}\beta_3) \quad (4)$$

Where;

T_{ij} is the dependent variable representing trade flow between country I and j

β_0 is the intercept of the gravity model

GDP_i and GDP_j stands for GDP/economic size for country i and j;

$DIST_{ij}$ is Distance between country i and country j

3.5 Augmented Gravity Model

The gravity equation is augmented to include some additional explanatory variables that are expected to influence the factors influencing Malawi's IIT. The study also incorporates dummy variables which were not included in the traditional gravity model. Therefore, establishing the factors influencing IIT this study applies the Gravity model which is a variation of the standard gravity model used by Chidoko, et al., (2006) augmented by adding an extra dummy variable for common language. The theoretical foundation of the model is the Linder hypothesis which predicts that patterns of trade will be determined by the aggregated preferences for goods within countries. Matyas and Harris (1998) observed that the gravity model has performed particularly much better than other trade models in analysing trade flows between countries and therefore has been deemed appropriate for policy analysis by most economists. The Model is given as;

$$\begin{aligned} \log ITT_{ijk} = & \beta_0 + \beta_1 \log GDP_{kt} + \beta_2 \log RER_{kt} + \beta_3 \log PCI_{jkt} + \\ & \beta_4 \log DIST_{jk} + \beta_5 \log TI_{jk} + \beta_6 \log DPCI_{jk} + \beta_7 D_1 + \varepsilon_{ik} \end{aligned} \quad (5)$$

where;

Log ITT_{ijk} is the logarithm of Intra-Industry Trade (IIT)

LogGDP_{kt} The logarithm for gross domestic product

LogPCI_{jkt} is the logarithm for consumer price index

LogRER_{kt} The logarithm of exchange rate

LogDPCI_{jk} The logarithm of dissimilarity in per capita income

Log DIST_{jk} The logarithm of distance

LogTI_{jk} is the logarithm of Trade Intensity

D_1 is the dummy for common borders

ε_{ik} is the error term

The dummy is in linear form. The dummy assumes values of zero and one, so the natural log of zero is undefined

In estimating the factors influencing IIT, a log-linear function is employed so as to make the estimates less sensitive to extreme observations as well as to enable interpretation of the coefficient terms as elasticities. In estimating the model, the dependent variable is always a trade variable which in this study, is the proportion of IIT in total trade.

In terms of the explanatory variables, this study adopts the augmented gravity model used by Chidoko(2006) and it incorporates six explanatory variables. These include; Gross Domestic Product (GDP), Real Exchange Rate (RER), Distance between country j and k ($DIST_{jk}$), Trade Intensity between country j and k (TI_{jk}) and a dummy variable of Common language (D_1), Landlocked (D_2). The logarithmic transformation of the estimated model is as follows;

$$\text{Log ITT}_{jk} = \beta_0 + \beta_1 \text{LogGDP}_{kt} + \beta_2 \text{LogRER}_{kt} + \beta_3 \text{Log DIST}_{jk} + \beta_4 \text{LogTI}_{jk} + \beta_5 D_1 + \beta_6 D_2 + \varepsilon_{ik} \quad (6)$$

Where;

j is the trading country, which in this study is Malawi.

k is the partner country.

The dummies D_1 (common language) and D_2 (landlocked) are in linear form because they assume the values of zero or one.

β stands for the country coefficients.

3.6 Variable Expected Signs

Table 1: Variable Expected Signs

Name of Variable	Expected Sign(s)
Gross Domestic Product	+
Distance	-
Exchange Rate	-
Trade Intensity	+
Common Language	+
Common Border	+

3.7 Defining Variables

3.7.1 *Dependent variable*

Intra industry trade (which is the simultaneous import and export of similar commodities), is the dependent variable. The present paper employs the widely used Grubel and Lloyd (1975) measure of intra industry trade, expressed as;

$$IIT_{jk} = [1 - \frac{|X_{jk} - M_{jk}|}{(X_{jk} + M_{jk})}] \times 100 \quad (7)$$

Where;

IIT_{jk} is the intra industry trade between Malawi and country k

X_{jk} are exports to country K

M_{jk} is Malawi's imports from country K

3.7.2 *Gross Domestic Product*

The GDP represents the total value of output produced by an entire economy over a given period, typically a year. This metric serves as an indicator of market size. The hypothesis is that IIT between countries is substantial when the average market size is large. Larger markets can support the production of a wide range of differentiated goods under

economies of scale. Concurrently, in SADC, there is significant demand for foreign differentiated goods, thereby increasing the potential for IIT (Loertcher and Wolter, 1980). Consequently, it is expected that GDP is positively correlated with IIT, as increased trade volume between countries tends to enhance IIT.

3.7.3 Distance

This represents the geographical distance between Malawi's capital city and its trading partner's capital. The proxy of trading partners is likely to lower search and transaction costs hence boosting bilateral trade. This measure is therefore expected to be negatively related to IIT.

3.7.4 Common Border

This is a dummy variable that takes the value of 1 if Malawi shares a common border with the trading partner and 0 otherwise. The dummy variable represents SADC countries with a common border with Malawi. Countries that share common borders are likely to trade more than countries which do not share borders. This is expected to be positively related to IIT.

3.7.5 Exchange Rate

This captures the exchange rate between the Malawian Kwacha and the currency of the trading partner. The study makes use of cross-exchange rates to calculate the nominal exchange rate. The cross-exchange rate is defined as the exchange rate between two countries; say the Malawian Kwacha (MK) and the Tanzania Shilling (Tsh) calculated with reference to United States Dollar (US\$).

Suppose

\$1 = MK 4700 and

\$1=Tsh 152

then,

$$E_{jk} = \frac{4700}{152} = MK 30.921053/Tsh \quad (8)$$

where;

E_{jk} is the nominal exchange rate between Malawi and trading partner k .

To determine the real exchange rate between trading partners, the nominal exchange rate is then multiplied by the GDP deflator for the trading partner and divided by Malawi's GDP deflator. The real exchange rate can be calculated as follows;

$$RER_{jk} = E_{jk} \times \frac{P_k}{P_j} \quad (9)$$

where;

RER_{jk} Is the real exchange rate between Malawi and partner k .

E_{jk} is the nominal exchange rate between Malawi and trading partner k .

P_j is Malawi's GDP deflator.

P_k GDP deflator of the trading partner

The real exchange rate is used because it gives a measure of an economy's competitiveness in terms of exports and imports and it also takes into account the real as well as the nominal price changes. empirically, it has been shown that the exchange rate in gravity type studies has been significant in explaining trade variations among countries involved in trade. The effect of the real exchange rate in this study is expected to be negatively related to IIT because an appreciation of the Malawi Kwacha makes exports to be more expensive while imports become cheaper thereby discouraging IIT.

3.7.6 Trade Intensity

This variable represents the existing trade flow (measured by the output traded) between Malawi and its trading partner. This factor measures how intense trade is between countries. As a result, trade intensity is expected to be positively or directly related to IIT. We have measured the factor using the following formula;

$$TI_i = \frac{X_{jk} + M_{jk}}{GDP} \quad (10)$$

Where;

TI_i is trade intensity,

X_{jk} exports to the other country

M_{jk} imports from the other country

GDP the economic mass of the trading country

3.7.7 Common Language

This is another dummy variable similar to "Common Border." It takes the value of 1 if Malawi and its trading partner share a common language (which is English in this case) and 0 otherwise. As such we expect common language to be positively related to IIT.

3.8 Diagnostic tests

Before diving into the model's results, it's crucial to ensure its robustness through diagnostic testing. This safeguards against misleading interpretations and strengthens the validity of our findings.

3.8.1 Heteroskedasticity Test

We employed the Breusch-Pagan test [Breusch, T. S., & Pagan, A. R. (1979). A simple test for heteroscedasticity and random effects. *Econometrica*, 47(5), 1287-1294.] to check for unequal variance of the residuals. The test confirmed heteroskedasticity, a potential issue addressed by transforming the data using natural logarithms and utilizing robust standard errors.

3.8.2 Multicollinearity Test

Potential for high correlation among independent variables, a concern known as multicollinearity, was assessed using the Variance Inflation Factor (VIF). According to Menard, S. (2002), VIF values below 10 indicate no significant multicollinearity. The VIF test results in our study confirmed this, alleviating concerns about multicollinearity.

3.8.3 Autocorrelation Test

Serial correlation refers to correlation between the errors in different time periods. An explanation of serial correlation in the errors of panel data models is that the error in each time period contains a time constant omitted factor (woodridge, 2002). In most cases, serial correlation is considered as a serious problem because it usually has a larger impact

on standard errors and the efficiency of the estimators than does heteroskedasticity. The Wooldridge Test for autocorrelation in panel data is used to detect the presence of Autocorrelation. It tests the null hypothesis of no first-order autocorrelation. A significant test statistic indicates the presence of autocorrelation.

3.8.4 Normality Test

The reason why normality test will be tested is to check whether the data set is well modelled to suit the normal distribution and to compute how likely it would be for a random variable underlying the data set to be normally distributed. Razali, Nornadiah; Wah, Yap Bee (2011). Therefore, checking for outliers in data would reveal if the data exhibited outlier thus significant skewness and kurtosis coefficient. Hence, skewness and kurtosis coefficient was used to test normality. The Jacque Bera test combines both the skewness and kurtosis coefficient into a concrete measure of normality was also used. Brani Vidakovic (2011). The null hypothesis under Jacque bera test was that the distribution of the data was not significantly different from that of a normal distribution. In case the variables were not normally distributed under the Jacque bera test the most conclusive was the normality of error term resulting from the regression.

CHAPTER FOUR

DATA ANALYSIS RESULTS AND INTERPRETATION

4.1 Introduction

This chapter provides a comprehensive analysis of the study's data by presenting descriptive statistics, which summarize key variables, followed by diagnostic test results that assess the validity and reliability of the model. Additionally, it includes detailed interpretations of the estimated model, explaining the relationships between variables and their implications for the study's objectives.

4.2 Descriptive Statistics

Table 2: Descriptive Statistics Table

Variable	Obs	Mean	Std.dev	Min	Max
IIT	154	5.86e+07	1.26e+08	0	5.79e+08
GDP_product	154	4.73e+20	9.67e+20	9.56e+18	5.34e+21
Distance	154	1620.929	654.2203	531	2510
CommonLang~e	154	.7142857	.4532279	0	1
Commonbord~s	154	.2142857	.4116647	0	1
Ex_rate	154	26.32266	22.2258	.071415	75.04972
TI	154	8.98e+07	8.61e+08	0	1.10e+10

Source: STATA estimates from research data

The table of descriptive statistics above showcase the summary of factors that influence IIT. The data has almost 154 observation and 7 variables, of which 5 were continuous variables and 2 were binary variables. The mean of common language and common boarder has been interpreted in percentage because the two variables are binary in nature. The results above indicate that on average the IIT of Malawi and its trading partner in

SADC was 5.86×10^7 and their standard deviation was 1.26×10^8 . On average the product of two GDPs between Malawi and its trading partner in SADC was 4.73×10^{20} and their standard deviation was 1.26×10^8 . On average the geographical distance between Malawi and its trading partner in SADC was 1620.929 and its standard deviation was 654.2203. Mean of .7142857 for common language means that 71.4% of SADC countries share common language which is English. Mean of .2142857 for common boarder means that 21.4% of SADC countries share a common boarder. An average value of 26.32266 for exchange rate means that on average the exchange rate between Malawi and its trading partner was 26.32266 and their standard deviation was 22.2258. On average the intensity of trade between Malawi and its trading partner in SADC was 8.98×10^7 . The high standard deviations for IIT (1.26×10^8) and GDP product (9.67×10^{20}) suggest significant differences in trade intensity and economic size among SADC countries. In contrast, the lower standard deviations for common language (0.45) and common border (0.41) reflect less variation, indicating that most country pairs do not share these characteristics.

4.3 Diagnostic Tests

4.3.1 Heteroskedasticity Test

The data was tested for heteroskedasticity. According to Gujarati (2004) if heteroskedasticity is present in the data the estimates are no longer best linear unbiased estimates. The data was tested using Breusch-Pagan test. The Breusch-Pagan test evaluates the null hypothesis of a constant variance in the data. The results indicate a chi-square of 116.10 and p-value of 0.000. Therefore, the null hypothesis was rejected and conclude that there was presence of heteroskedasticity in the data. Hence the data was transformed using natural log and robust standard error was used to solve the problem. Therefore, in order to obtain consistent and efficient estimators the model will be estimated by Feasible Generalized Least Squares (FGLS) in the random effects model.

The output of heteroskedasticity test

hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of IIT

chi2(1) = 116.10

Prob > chi2 = 0.0000.

4.3.2 Normality

Normality test was carried out to check whether the data set is well modelled to suit the normal distribution and to compute how likely it would be for a random variable underlying the data set to be normally distributed. GDP Product (figure 1) and Intra industry Trade (figure 3) were found not to follow normal distribution.

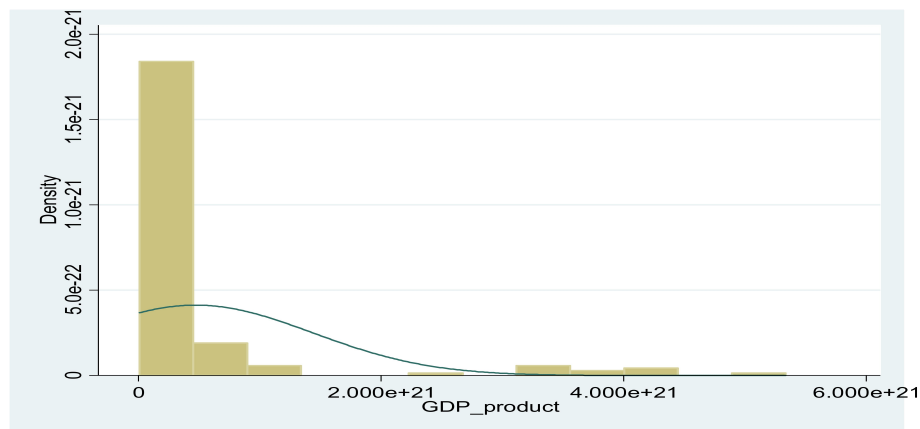


Figure 1: GDP Product

Source: STATA estimates from research data

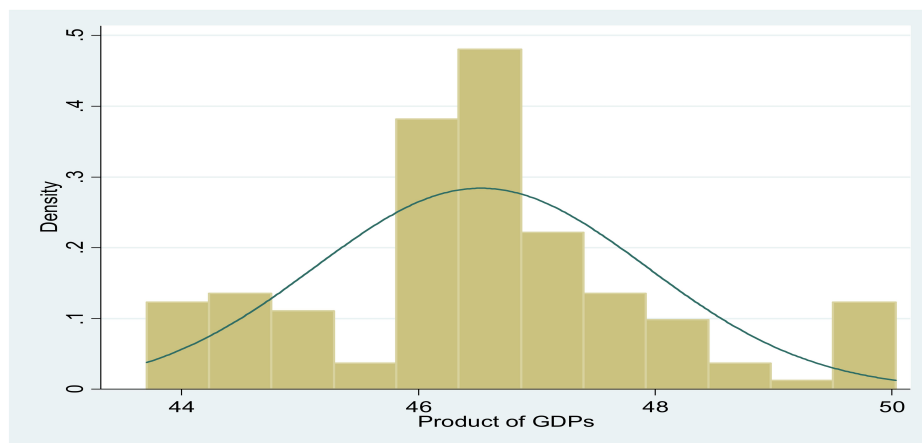


Figure 2: GDP Product corrected

Source: STATA estimates from research data

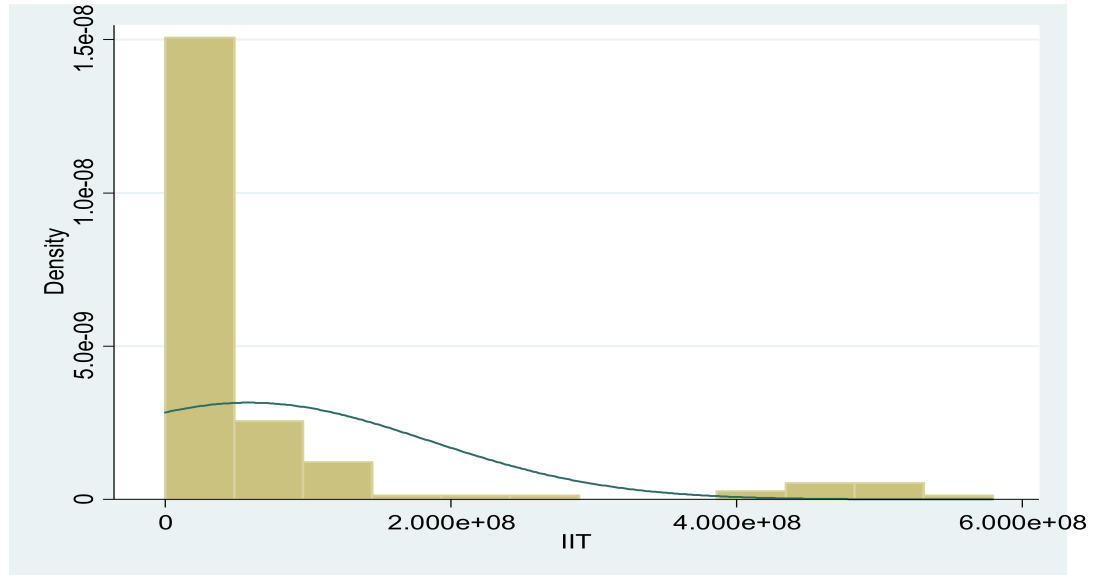


Figure 3: Intra-industry Trade

Source: STATA estimates from research data

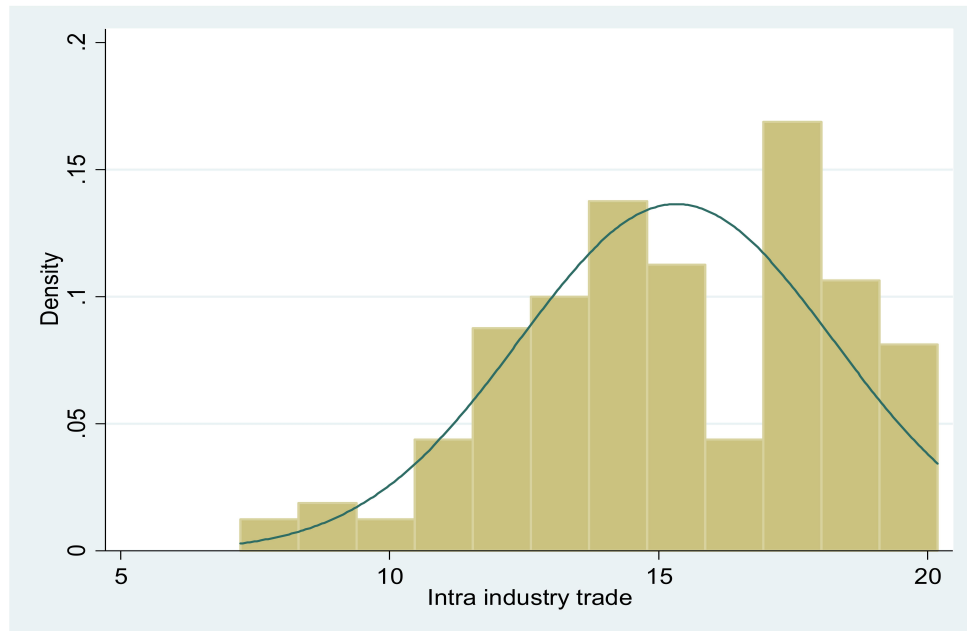


Figure 4 : Intra-Industry Trade Corrected

Source: STATA estimates from research data

Upon identifying significant skewness, a logarithmic transformation was applied to the skewed variables, which is particularly effective for right-skewed data. This transformation involved creating a new variable by taking the natural logarithm of the

original values for GDP Product(Figure 2), and Inta Industry Trade (Figure 3) . Post-transformation, the normality of the adjusted data was reassessed through the same visual and statistical methods. The transformed data exhibited a distribution much closer to normal, thus ensuring the validity of subsequent parametric analyses. This approach not only improved the normality but also enhanced the robustness and reliability of the inferential statistics used in the study.

4.3.2 Autocorrelation Test

The study tested for Autocorrelation using the Wooldridge test for Autocorrelation in panel data and the results are presented below. The null hypothesis of no first order Autocorrelation was rejected at all levels of significance in favor of the alternative hypothesis of first order Autocorrelation. Since Autocorrelation is regarded as a very big problem it has to be corrected (Woodridge, 2002), in this study autocorrelation is corrected by estimating Feasible Generalized Least Squares (FGLS) in the random effects model.

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

$$F(1, 10) = 34.691$$

$$\text{Prob} > F = 0.0002$$

4.3.3 Multicollinearity

The occurrence of high intercorrelation between two explanatory variables is what is known as multicollinearity (Hayes, 2021) . The presence of multicollinearity causes ordinary least squares estimates and standard errors to be more sensitive to data (Gujarat, 2004). To test for multicollinearity in the study Variance Inflation Factor (VIF) was used. According to Gujarat (2004) a variance inflation factor of less than 10 indicates absence of multicollinearity. The table below shows variables that had variance inflation factor of less than 10 indicating an absence of multicollinearity.

Table 3: Diagnostic Results for Multicollinearity

Variable	VIF	1/VIF
Distance	1.63	0.614765
Common boarder	1.51	0.663454
Exchange rate	1.22	0.821921
GDP product	1.14	0.877090
Trade intensity	1.12	0.892782

Source: STATA estimates from research data

Following the diagnostic test gravity model was analyzed using log-linear model. The overall model was significant at 1% significant level. This implies that explanatory variables are jointly significant in explaining the dependent variable at 1% significant level. The R-squared is at 0.83 indicating that 83% of variation in the dependent variable are explained by the explanatory variables.

4.4 Factors that influence intra-industry trade between Malawi and other countries within SADC

Given the results of Heteroskedasticity and serial correlation, which show that the disturbance variance of the country-specific effects varies across countries (Heteroskedastic) and the errors are serially correlated over time, it is important to control for both Heteroskedasticity and Autocorrelation. Therefore, in order to obtain consistent and efficient estimators the model is estimated by Feasible Generalized Least Squares (FGLS) in the random effects model. The assumption behind FGLS is that all aspects of the model are completely specified; here that includes that the disturbances have different variances for each panel and are constant within panel. reason for applying the FGLS estimation in the random effects model is that it is able to handle both Heteroskedasticity and serial correlation.

Table 4: Factors influencing intra-industry trade between Malawi and SADC countries

Variables	Coefficient	Std. Err.	P> t
LTI	.1282567	0.325876	0.0430**
LGDP_product	.6291237	.0563496	0.0001***
Ldistance	-2.293731	.3269047	0.000***
Commonboarder	1.629922	.4382912	0.000***
EX_rate	.0234825	.0069685	0.001***
F-value	2129.53		
Prob>F	0.0000		
R-squared	0.9871		
F-value	2129.53		
Prob>F	0.0000		
R-squared	0.8341		

***, **, * imply level of significant 1%,5% and 10% respectively.

Source: STATA estimates from research data

4.4.1 GDP Product

The GDP product of two countries between Malawi and its trading partners were found to positively influence the intra industry trade of Malawi and its counterpart within SADC. The effect was significant at 1% significance level. The coefficient of GDP product was 0.63 implying that if product of two GDPs of Malawi and other SADC countries increases by 1% the trade between two countries increases by 0.63%, holding other factors constant. These results are in line with Aggarwal (2023) who found that the product of GDP of two developing countries positively influence the trade between them. According to the findings of the researcher the larger the size of the economy the larger the intra-industry trade to be conducted. Similarly, Ghaderi et al, (2015) the size of GDP

of two countries had a positive significant impact on Iran's intra-industry trade in pharmaceutical.

4.4.2 Distance

Distance between Malawi and any other country within SADC was found to negatively influence trade between them. The influence was significant at 1% significant level. The coefficient of distance was -2.29 implying that Malawi intra-industry trade is less or not pronounced with its trade partners that are geographically further, so much so that 1% increase in distance between Malawi's capital and its trading partner's capital in SADC decreases the trade between them decline by 2.29%, holding other factors constant. These results were similar to the findings of Clerk & Stanley (1999). The researchers found that distance exerts a negative effect on intra-industry trade. The results also concurs with findings of Van et al (2020). The results of the study revealed that 1% increase in distance between Vietnam and its counterpart decreases the intra industry trade between them by 0.12%.

4.4.3 Common Border

The variable was significant at 1% significance level. The results show that countries that share common border tend to trade more because the distance between the countries sharing the common boarder is shorter. The estimated coefficient of the study is 1.63 indicating that countries that share boarder with Malawi has 1.63% trade higher that those that do not share boarder with Malawi holding other factors constant. Mulenga (2012) states that countries that share same boarder tend to trade more because the transportation cost of goods is reduced.

4.4.4 Exchange Rate

The study postulated a negative influence of exchange rate on Malawi's intra-industry trade with its trade partners in SADC. High volatility in exchange rate tend to discourage trade between countries. However, the results of the study show that exchange rate influence trade between Malawi and its trade partners positively, holding other factors constant. The results imply that 1% increase in exchange rate increases intra-industry trade between Malawi and other trading partners in SADC by 0.02%. Puah (2020) argues

that exchange rate negatively influence intra-industry trade between countries. Hence the researcher results are in line with the hypothesized results of the study. An appreciation of Malawi kwacha would make export goods expensive and import goods cheaper for domestic citizens.

4.4.5 Trade Intensity

Trade intensity between Malawi and its SADC trade partners was found to have a positive and statistically significant influence on intra-industry trade (IIT) at the 5% significance level. The results indicate that a 5% increase in trade intensity leads to a 0.13% rise in IIT, holding other factors constant. This finding suggests that stronger trade ties and higher volumes of exchange between Malawi and its regional partners create an enabling environment for IIT. Consistent with Mulenga (2012), the results highlight that countries with higher trade intensity tend to engage more in intra-industry trade. The implication is that policies aimed at enhancing trade flows—such as reducing trade barriers, improving trade infrastructure, and fostering regional economic cooperation—can further strengthen IIT within SADC, ultimately promoting economic integration and industrial diversification.

4.5 Factors that influence the intensity of trade between Malawi and other trading partners

Log-linear model was used to analyze the factors that influenced the intensity of trade between Malawi and its trade partners. The intensity of trade was measured by using the output of each SADC partners traded with Malawi as shown in *equation 10*.

In the table below log-linear regression results show that out of 5 explanatory variables 3 were statistically significant in explaining the dependent variable. GDP Product was significant at 1%, distance between two countries was significant at 1% and common borders was significant at 1%. While common language and exchange rate were not significant.

Table 5: Factors that Influence Trade Intensity between Malawi and SADC countries

Variables	Coefficient	Std. Err.	P> t
LGDP_product	.7834071	.1380384	0.000***
Ldistance	-3.383868	.8453793	0.0001***
Commonboarder	3.22124	1.222486	0.009**
Commonlanguage	2.176575	1.355148	0.110
EX_rate	-.0163404	.0289256	0.573
F-value	224.01		
Prob>F	0.0000		
R-squared	0.8889		

***, **, * imply level of significant 1%,5% and 10% respectively

Source: STATA estimates from research data

4.5.1 GDP Product

The product of GDP of two countries which is between Malawi and its trade partner in SADC positively influence the ITT between them. The variable was significant at 1% significance level. The results show that 1% increase in GDP product increases the trade between Malawi and its trade partners by 0.78%, holding other factors constant. Shi & Sun (2022) found that GDP product between two countries increases the intensity of trade between countries. Shi & Sun cemented that GDP product is the key driver of bilateral embodied energy trade. Countries with larger GDP have greater economic mass, implying they produce more goods and services and have larger markets for consumption. This economic mass makes them significant players of trade.

4.5.2 Distance

Distance between Malawi and its trade partner in SADC negatively influence the trade intensity between them. The results have significantly shown the outcome that concurs with the null hypothesis of the study. The results are significant at 1% significant level. The coefficient of distance was -3.38 implying that 1% increase in distance between Malawi's capital and its trade partner in SADC decreases the trade intensity by 3.38%. The reason being longer distances tend to increase transportation cost and time it takes to deliver the goods. Ganbaatar et al (2021) found that longer geographical distance between countries tend to put the two countries at risk and also increase transportation cost. The higher risk and cost are not advantageous for realization of trade collaboration among countries.

4.5.3 Common Border

Common border was found to positively influence the intensity of trade between Malawi and its trade partner and the variable was significant at 1%. The results indicate SADC countries with common border with Malawi trade more than countries that are not bordering Malawi. The findings of the study are in line with Ozer & Doru (2022) who found that having common border between countries significantly increases the intensity of trade due to factors such as reduced cost, ease of logistics and ease communication and coordination.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter aims to provide a comprehensive conclusion of the study by summarizing key findings, highlighting their significance, and linking them to the research objectives. Additionally, it presents well-grounded recommendations and policy implications, offering guidance for policymakers and stakeholders on enhancing intra-industry trade within the SADC region.

5.2 Conclusion

This research embarked on a journey to elucidate the factors shaping intra-industry trade (IIT) between Malawi and its trading partners within the Southern African Development Community (SADC). By employing the gravity model framework and incorporating variables like common borders, exchange rates, and trade intensity, we were able to paint a more nuanced picture of the forces driving IIT in the region.

The key findings of the study align closely with its specific objectives. The results confirm the existence of intra-industry trade (IIT) between Malawi and its SADC trading partners, addressing the first objective. Additionally, the study highlights the significant role of geographical proximity in influencing IIT, as countries sharing borders tend to engage in higher levels of IIT, thereby addressing the second objective. Furthermore, the findings reveal that economic size plays a crucial role in fostering IIT, supporting the third objective by showing that larger economies with similar levels of development are more likely to trade within the same industries. The unexpected positive influence of exchange rates on IIT suggests the need for further research to explore its implications and inform appropriate policy responses.

The pursuit of deeper IIT within SADC presents a promising pathway towards a more prosperous and interconnected region. By harnessing the insights gleaned from this research and implementing targeted policies, SADC member states can empower businesses, create jobs, and ultimately enhance the collective economic well-being of the region.

5.3 Recommendations (Policy implications)

Based on the findings of this research on factors influencing intra-industry trade (IIT) between Malawi and its SADC partners, policymakers gain valuable insights to enhance regional trade integration. These insights lead to several key policy implications and recommendations that can help enhance IIT and regional economic cooperation.

First, leveraging the combined economic size and cooperation within the region can significantly boost IIT. Policymakers should encourage regional economic cooperation initiatives that promote joint ventures and production-sharing agreements between member states. By doing so, the SADC region can maximize its collective economic potential and create more opportunities for IIT.

Addressing distance barriers is another critical aspect. Infrastructure development projects that improve transportation networks and reduce logistical costs across borders should be prioritized. Investments in road, rail, and air connectivity within the SADC region can facilitate smoother and more efficient trade flows, thus enhancing IIT.

Harnessing the benefits of shared borders is also essential for boosting IIT. Streamlining customs procedures and facilitating cross-border trade by simplifying regulations and documentation requirements, particularly for countries sharing borders, can significantly reduce trade barriers and encourage more robust IIT.

Moreover, the unexpected positive influence of exchange rates on IIT observed in this study warrants further investigation. Understanding the specific mechanisms at play can inform potential policy responses, such as regional currency harmonization efforts. This

can help stabilize exchange rates and promote a more predictable trading environment within the region.

Lastly, promoting a common language environment, although not statistically significant in this study, remains a valuable consideration. Initiatives that encourage the use of common languages within SADC, potentially through educational programs and language exchange initiatives, can improve communication and reduce transaction costs over time. This, in turn, could enhance IIT by fostering better understanding and cooperation among trading partners.

By implementing these recommendations, policymakers can create a more conducive environment for IIT within the SADC region. These efforts will ultimately contribute to stronger economic integration and growth, benefiting all member states.

5.3 Limitations and Areas for further Research

The major limitation that was faced in this study was the non availability of data as a large part of the trade in SADC is informal and therefore goes unrecorded. Therefore, the sample used in this study only included those countries that portrayed IIT and those for which information was readily available; the lack of appropriate data has limited this study. Therefore, future research on this subject may include a higher level of industry aggregation.

In addition, by considering that literature identifies two groups of factors determining IIT (country and industry specific). This research only focused on country characteristics due to time and data limitations as outlined. In this case, future research in this area should analyse separately the factors influencing Vertical and Horizontal Intra Industry Trade.

REFERENCES

- Aggarwal, S. (2023). *The Empirical Measurement and Determinant of Intra-industry Trade for a Developing Country. Journal of Applied Economic Science*, 182-189.
- Clrk, D.P & Stanley, D.L. (1999). *Determinant of Itra-industry Trade Between Developing Countries and the United States. Journal of Economic Development*, 79-95.
- Chauvin, S. and Gaulier, G. (2002). *Prospects for Increasing Trade among SADC Countries Annual Report. Trade and Industrial Policy Strategies. Muldersdrft*
- Chidoko, C., Zivanomoyo, J. and Sunde, T. (2006). *Determinants of Intra-Industry Trade between Zimbabwe and its Trading Partners in the Southern African Development Community Region (1990-2006). Journal of Sciences*, 5(1), 16-21.
- DeRosa, D.A. and Roningen, V.O. (2003). *Zambia in Regional and Extra-Regional Free Trade Agreements: Estimates of the Trade and Welfare Impacts. VORSIM/ Potomac Associates*.
- Do, T. T. (2006). *A Gravity Model for Trade between Vietnam and Twenty-Three European Countries. (Unpublished Thesis). Department of Economics and Society, Hanoi*.
- Ekanayake, E. M. (2001). *Determinants of Intra-Industry Trade. The case of Mexico. The International Trade Journal*, 15(1), 89-112.
- Fainštein, G. and Netšunajev, A. (2011). *Intra-Industry Trade Development in the Baltic States. Emerging Markets Finance and Trade*, 47 (3).
- Flam, H., and E. Helpman, (1987), —*Vertical Product Differentiation and North-South Trade*. *American Economic Review*, 77(5), 810-822.
- Ganbaatar, B. (2021). *Empirical Analysis of Factors Affecting the Bilateral Trade Between Mongolia and China. Journals of Sustainability*, 56-61.
- Ghaderi, H. et al. (2015). *Assessing the Factors Associated with Iran's Intra-industry Trade in Pharmaceuticals. Global Journal of Health Science*, 34-40.

- Grubel, H. and Lloyd, P. (1975). *Intra-Industry Trade: The Theory and Measurement of International Trade in Differentiated Product*. McMillan Publishers.
- Gujarat, N. D. (2004). *Basic Econometrics*. (4th ed.). McGraw-Hill.
- Hayes, A. (2021, February 25). investopedia.com/terms/m/multicollinearity.asp
- Hu, X. and Ma, Y. (1999), —International Intra-industry Trade of China. *Weltwirtschaftliches Archiv*, 135(1), 82-101.
- Kien, T. and Thao, T. (2016). Determinants of Intra-Industry Trade for Vietnam's Manufacturing Industry. *Journal of Economic and Development*, 18(1), 5- 18.
- Kimura, F. and Lee, H. (2004). The Gravity Equation in International Trade in Services. *Review of World Economics Journal*, 142(1), 92-121.
- Kocyigit, A. and Sen, A. (2007). The Extent of Intra-Industry Trade between Turkey and the European Union: The Impact of Customs Union. *Journal of Economics and Social Research*, 9(2), 61-64.
- Linder, S. (1961). *An Essay on Trade and Transformation*. John Wiley & Sons.
- Loertscher, R. and Wolter, F. (1980). Determinants of intra-industry trade: Among countries and across industries. *Weltwirtschaftliches Archiv*, 116 (2), 280-293.
- Mulenga, C. (2012). An Investigation of the Determinants of Intra-industry Trade Between Zambia and its Trading Partners in the Southern African Development Community (SADC). *Trade and Industrial Policy Strategies*, 20-25.
- Musonda, F. M. (1997). Intra-Industry Trade between Members of the PTA/COMESA Regional Trading Arrangements. *AERC Research Paper No. 64*, pp. 10-17.
- Ozer, O. & Doru, O. (2022). An Econometric Analysis on Factors Affecting Intra-industry Trade in Turkish Automotive Industry. 23-26.
- Puah, H.C. (2020). Vertical Intra-industry Trade and Economic Size: The Case of Malaysia. *The Journal of International Trade & Economic Development*, 15-24.

- Shi, Q. & Sun, X. (2022). Factors Influencing Embodied Energy Trade Between the Belt and Road Countries: A Gravity Approach. Environmental Science and Pollution Research, 1-16.*
- Thrope, M., and Zhaoyang, Z. (2005). Study on the measurement and determinants of intra-industry trade in East Asia. Asian Economic Journal, 19(2), 231-247.*
- Tinbergen, J. (1962). Shaping the World Economy: Suggestions for an International Economic Policy. The Twentieth Century Fund.*
- Veeramani. C. (2009). Trade barriers, multinational involvement and intra-industry trade: panel data evidence from India. Applied Economics, 41, 2541-2553.*
- Van, T. (2020). Determinant of Intra-industry Trade Between Vietnam and Countries in TPP. Journal of Asian Finance, Economics and Business, 123-129.*
- Woodridge, J. M. (2002). Econometric Analysis of Cross Section and Panel Data. MIT Press.*

APPENDIX

The raw data had the problem of heteroskedasticity and also it wasn't normally distributed. To correct for heteroskedasticity data was transformed to natural log and robust standard errors were used. For normal distribution the data was transformed to natural logs, hence the correction of heteroskedasticity also corrected for normal distribution. The tables and figures accompany the output for heteroskedasticity and normal distribution.

Heteroskedasticity

hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of IIT

chi2(1) = 116.10

Prob > chi2 = 0.0000

Data show the presence of heteroskedasticity.

Normal distribution

GDP Product

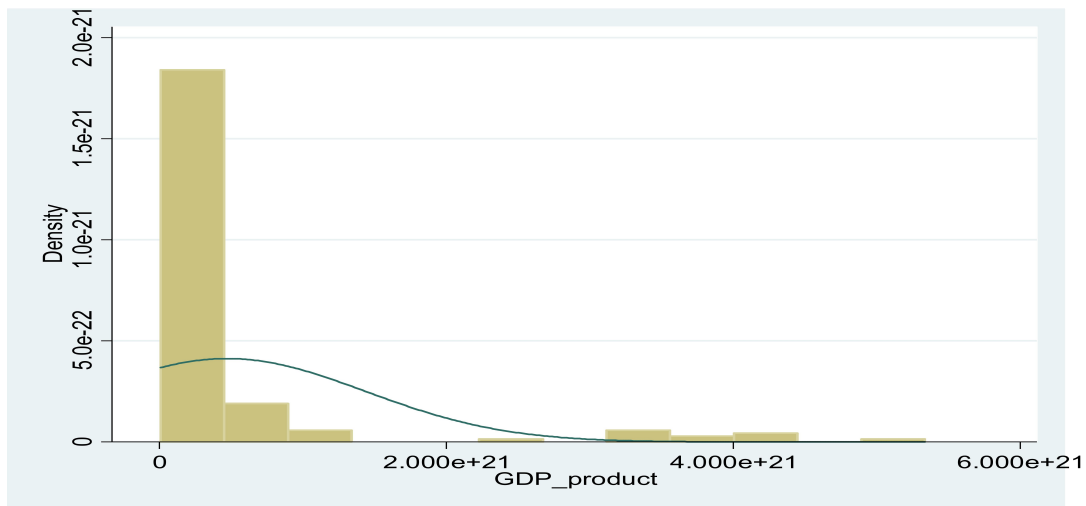


Figure 5: Graph of GDP product

The data was transformed into natural log

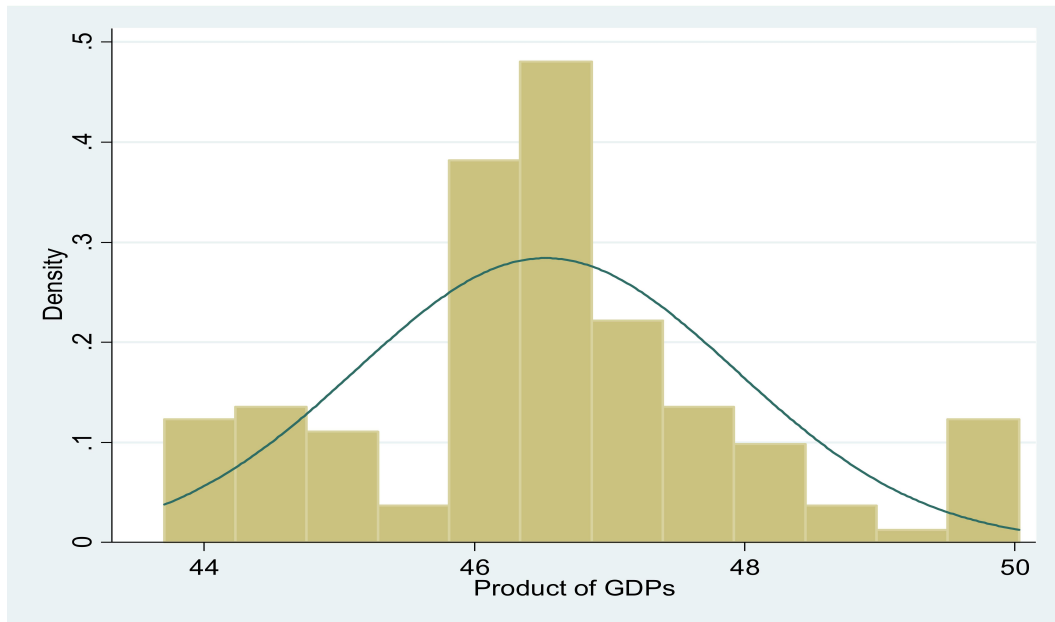


Figure 6: Correction of the variable

Intra-industry trade

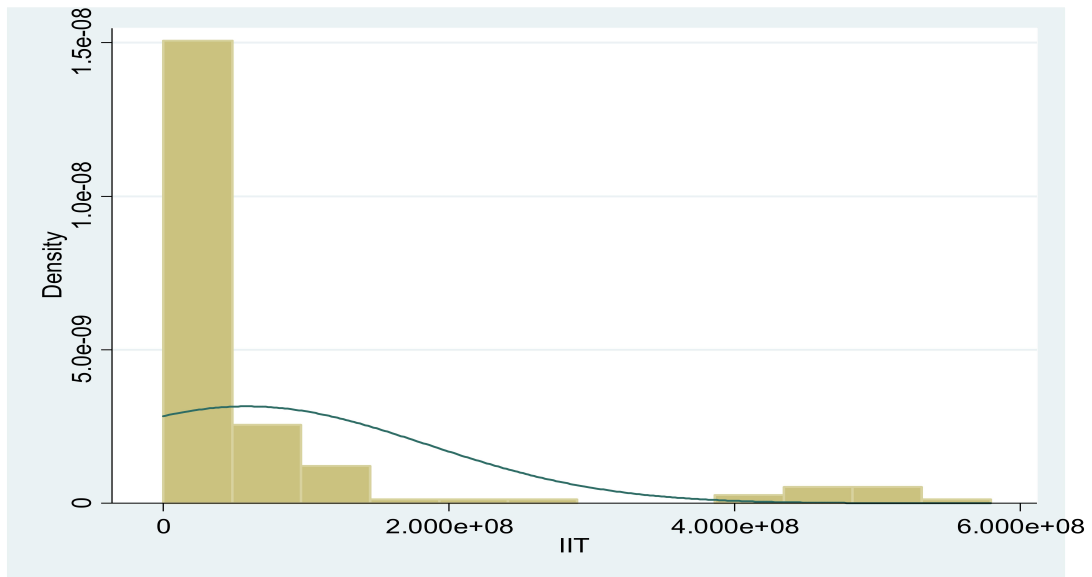


Figure 7: IIT

Data was transformed into natural log

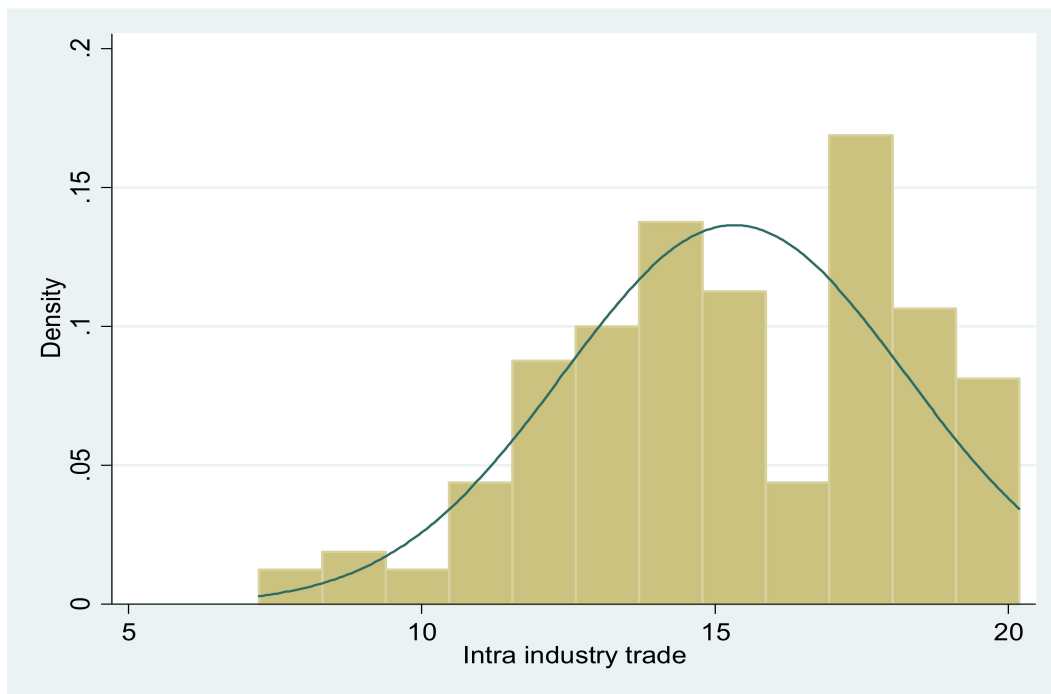


Figure 8: Correction of the problem

Geographical distance

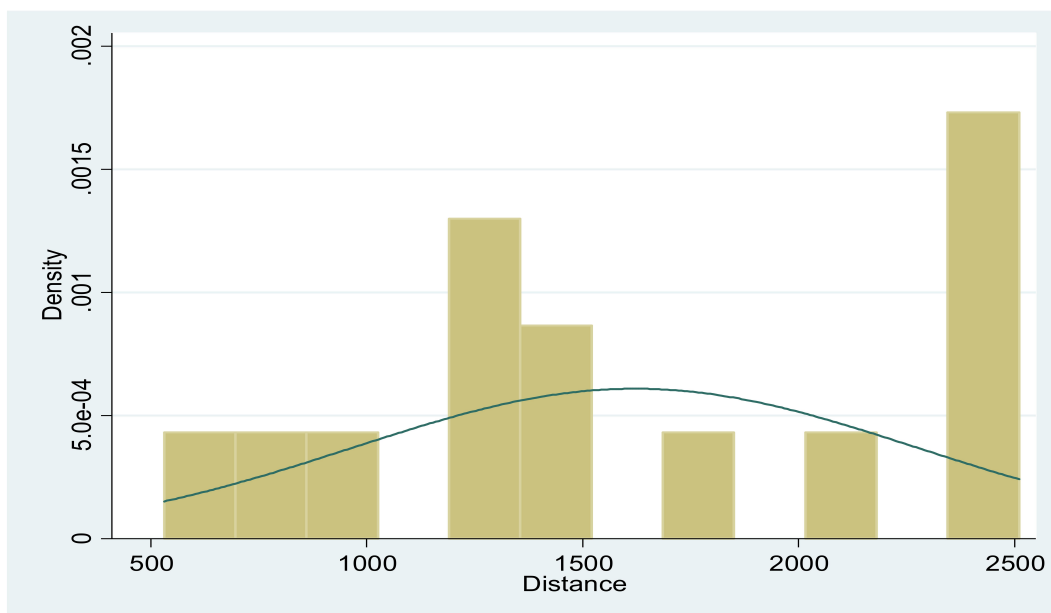


Figure 9: Distance

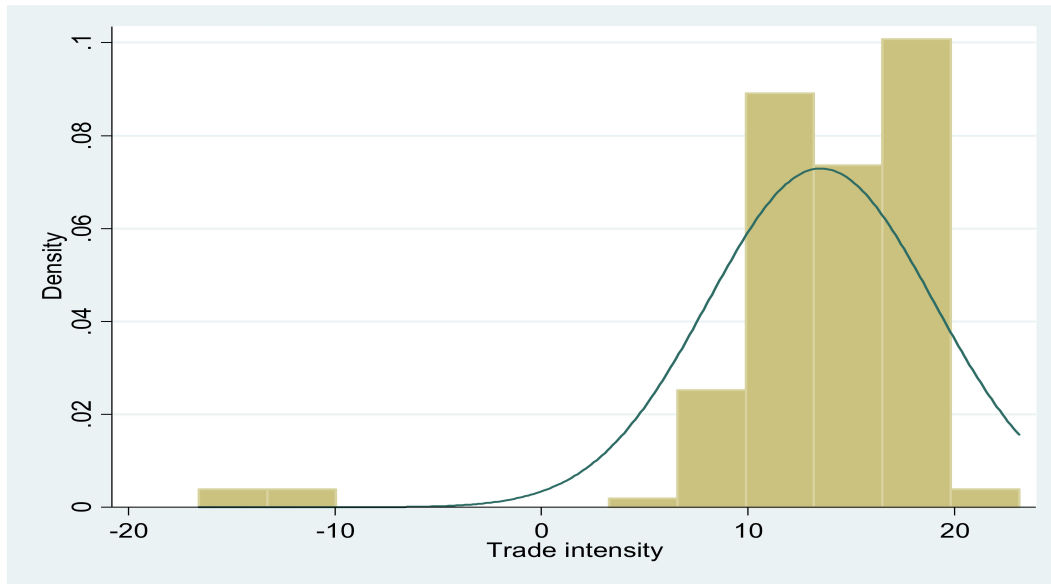


Figure 10: Intesity of Trade

Test for multicollinearity

Multicollinearity is present in data when Variance Inflation Factor (VIF) is 10 and above.

Table 6: Diagnostic results for multicollinearity

Variable	VIF	1/VIF
Distance	1.63	0.614765
Common boarder	1.51	0.663454
Exchange rate	1.22	0.821921
GDP product	1.14	0.877090
Trade intensity	1.12	0.892782