CAN TRADE OPENNESS, TARIFFS AND EXCHANGE RATES ADDRESS THE INEQUALITY PROBLEM IN SOUTHERN AFRICAN DEVELOPMENT COMMUNITY?

by

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DECLARATION

I declare that the dissertation titled "CAN TRADE OPENNESS, TARIFFS AND EXCHANGE RATES ADDRESS THE INEQUALITY PROBLEM IN SOUTHERN AFRICAN DEVELOPMENT COMMUNITY?" hereby submitted to the University of Limpopo, for the degree of MASTER OF COMMERCE IN ECONOMICS has not previously been submitted by me for a degree at this or any other university; that is my work in design and in execution, and that all material contained herein has been duly acknowledged.

Mathebula NP (Miss) 2024/04/08

Surname, Initials (title) **Date**

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ABSTRACT

The African Continental Free Trade Area (AfCFTA) is a trade agreement among African countries aimed at establishing a single market for goods and services, promoting intra-African trade, and boosting economic growth across the continent. The pressing issue is that Africa is known as the most unequal continent in the world, next to Latin America. Similarly, in the past few years, the Southern African Development Community (SADC) struggled to sustainably reduce its level of income inequality due to the existence of informal sectors, migration, and the international COVID-19 pandemic deepened this crisis. Therefore, the purpose of the study was to investigate the impact of trade openness, tariffs, and real exchange rates on income inequality for selected SADC countries for the period 2004 to 2020. The study employed the Panel Autoregressive Distributed Lag (PARDL) technique to investigate the relationship among variables, while Granger causality examined the causal connection between variables. The empirical findings revealed that exports, tariffs, and real exchange rates have a positive and significant impact on income inequality, whereas imports are inversely and significantly related to income inequality. The Granger Causality test identified five causalities between the Gini coefficient and exports, tariffs, and real exchange rates and between real exchange rates and exports.

Based on the empirical findings, SADC can adopt the economic policy to promote trade openness and regional integration, particularly by leveraging the opportunities presented by the AfCFTA to address income inequality. By reducing trade barriers and facilitating the free movement of goods and services across SADC member states, the region can stimulate economic growth, attract investments, and create employment opportunities. Additionally, by harmonizing tariff regimes and implementing fair trade practices, SADC can ensure that smaller regional economies have equal access to markets and resources. Furthermore, by managing real exchange rates effectively, SADC can enhance export competitiveness, promote industrialization, and attract foreign direct investment, which can contribute to reducing income inequality and fostering inclusive economic development.

KEY CONCEPTS: Income inequality, Trade openness, Tariffs, Real Exchange rates, Panel Autoregressive Distributed Lag (PARDL), Causality, SADC.

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ACRONYMS

ADF	Augmented Dickey-Fuller
AfCFTA	African Continental Free Trade Area
AGOA	African Growth and Opportunity Act
CET	Common External Tariff
COMESA	Common Market for Eastern and Southern Africa
DRC	Democratic Republic of Congo
EAC	East African Community
ECCAS	Economic Community of Central African States
EPA	Economic Partnership Agreement
EU	European Union
FDI	Foreign Direct Investment
IMF	International Monetary Fund
IPS	Im, Pesaran & Shin
LLC	Levin, Lin & Chu
PP	Phillips-Perron
PPP	Purchasing Power Parity
RER	Real Exchange Rates
SACU	Southern African Customs Union
SADC	Southern African Development Community
SMEs	Small and Medium-sized Enterprises

TRA	Tanzania Revenue Authority
UN	United Nations
WTO	World Trade Organization

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CHAPTER 1
ORIENTATION TO THE STUDY

1.1 INTRODUCTION AND BACKGROUND

International trade along with trade reforms have recently played a vital part in the development of many countries. Since 1990, developing countries have experienced faster economic growth as a result of trade reforms, which has decreased income disparity and global inequality (United Nations, 2020). This includes developing countries with higher growth rates than developed nations, such as Brazil, China, and India. This is due to rapid and comprehensive trade reforms and quick integration into global markets, which have assisted to reduce the income per capita gap among developed and developing nations (World Bank, 2021). The process of integrating into the international economy through trade has also led to income division, particularly among countries, although it has helped many emerging countries to improve their standard of living. According to the United Nations (UN) (2019), economic disparities within each nation have increased on average while decreasing between nations.

The phenomenon can be clarified by the substantial rise in incomes among the upper echelons of the income distribution, distinguished with a lack of growth in incomes for those at the lower end. The study focuses on selected Southern African Development Community (SADC) nations namely, South Africa, Namibia, Botswana, Tanzania, Democratic Republic of Congo (DRC), Mozambique, Madagascar, Angola and Swaziland. This study focuses on nine countries as a result data limitations, but also considering that these nations are mostly affected by inequality. According to Wiig, Rocha, Vaz, Domingos, Gomes, Silva and Kolstad (2017), Angola has a high degree of inequality with a Gini index of 0.55. Projections were that the richest 20% of the population takes 59% of all incomes, while the 20% with the lowest incomes only receive 3%.

Currently, Botswana ranks among the utmost unequal nations globally after South Africa and Seychelles. Botswana has the third highest inequality level in the world (Daniel, 2021). The Democratic Republic of Congo is another nation where inequality has become worse over the past year (Lwango, 2020). Mozambique has experienced exponential growth in recent years, yet this prosperity has also exacerbated the inequality gap. In Namibia, there is a significant amount of both inequality and poverty.

It is the second most unequal nation in the region. Since the COVID-19 outbreak began over the past year, its Gini Coefficient has slightly deteriorated. South Africa is known as the most inequitable nation in the globe and the COVID-19 pandemic has deepened this crisis (Mukwevho, 2021).

A polarized labour market causes high wage inequality. Equality of opportunity is relatively low and serves as a stumbling block to reductions in inequality (World Bank, 2018). Zambia continues to be one of the most unequal societies in SADC, and among the top 10 nations globally with the worst forms of inequalities over the previous year. Overall, its inequality has gradually been rising over the past decade. This has basically been caused by having most of its employment in the informal sector (with statistics increasing to more than 80%) where earnings are twice less than income earned in the formal sector. Given some of the stated countries, indeed inequality has its presence in the SADC region (Kapenda, 2016).

There are four related ways to observe inequality. Income inequality is one of the most used metrics that measure the distribution of income in a population. The impact of factors such as gender, household socioeconomic status, ethnic background, over which people have no control on income is best described as inequality of opportunity. Lifetime inequality refers to income disparities for a person over their lifetime. Inequality of wealth describes wealth distribution amongst individuals at a particular time. These interrelated theories of inequality provide complementary but different perspectives on the causes and effects of inequality, which provides governments with further guidance for formulating targeted policies to reduce inequality (IMF, 2021).

The study employed the AfCFTA which is a free trade area that was created in 2018 and launched on the 1st of January 2021 (AU, 2018). Since the World Trade Organization (WTO) was founded, the AfCFTA is the biggest trade agreement in the world when it comes to the number of participating nations (Kolawole, 2020). The establishment of AfCFTA implies that tariffs should be removed, and the removal of tariffs has a direct effect on exports, imports, and real effective exchange rates. Perhaps the aforementioned economic variables may be key to addressing the inequality.

Exports have the potential to contribute to decreasing income inequality in SADC (AU, 2019)**.** Workers who were previously unemployed or underemployed now have income because of export growth. It has been found that trade openness indorses job growth (Kavitha, 2018). There is an excess of unskilled labour in the informal sector in developing nations with lower incomes than in those with higher incomes. Thus, it is projected that lower-income developing nations will experience a greater influence from export growth on the development of unskilled jobs (Hallward-Driemeier & Nayyar, 2017). Contrary to higher-income emerging nations, there is an excess of unskilled labour in the informal sector in lower-income developing nations. Thus, it is anticipated that export growth will have a stronger impact on the creation of unskilled jobs in lower-income emerging countries (Hazama, 2017). Hence, the need to apply this framework in an empirical setting within the confines of SADC.

The AfCFTA policy employed in the study aims to remove tariffs in African countries. The removal of tariffs will result in an open economy that is fully integrated. An open economy will give access to formal and informal businesses to import and export without being charged extra fees. The informal businesses will in turn generate more profit and as a result, may register their businesses and become formal. Formal businesses are obliged to the Minimum Wage Act hence promoting equality in SADC countries (Maphiri, et al., 2021).

Exchange rates are important for all nations because they determine the volume of exports and imports by increasing the cost structure over time. Imported goods would cost more in the domestic market when a domestic currency declines in value compared to a foreign currency, and vice versa (Panda, 2019). Inflation kicks in when a currency depreciates, resulting in a price increase. Low-income earners are the ones who bear most of the burden in this situation. When the real exchange rate rises, exports become more expensive, and imports become less so. This rise in the exchange rate reflects a decline in trade competitiveness. As a result, the actual exchange rate can be said to be exactly linked to income inequality (Gebregziabher, 2019).

1.2 PROBLEM STATEMENT

Africa is the second most unequal continent globally next to Latin America (Abebe & Tinguene, 2017). Similarly, the SADC has in the past few years struggled to sustainably reduce its level of inequality. Access and control over both productive and reproductive assets in the area continue to be characterized by inequalities along the dimensions of class, race, and gender. Inequality in SADC is a problem that has been existing for ages and this is due to the existence of huge informal sectors in SADC (AU, 2019). According to Lynsey Chutel (2018), the gap is not only widening but also intergenerational. The situations that worsen SADC's inequality are both historic and a consequence of years of policy uncertainty, making it tougher for ordinary SADC countries to hook their way out of poverty. One problem associated with inequality is the huge migration of people who seek better opportunities. Countries that experienced substantial immigration include South Africa, DRC and Angola. During 2020, these three nations were predicted to be hosting the most international migrants in the sub-region (United Nations, 2020). This has of course cost much internal turmoil in South Africa, with the so-called xenophobic attacks, high crime, drought, and poverty. Additionally, this has stimulated the development of operations such as "Operation Dudula" that seek to clear communities of foreigner or foreign owned businesses have developed (Moyo, 2021).

The global COVID-19 pandemic has worsened poverty and discrimination in the region, especially in the job market and education sector (Brown, 2020). Existing social safety nets, welfare programs, regulations, and practices were unprepared and ineffective in protecting the most vulnerable communities. According to Haikali (2021), the 2021 Gini Index rankings display that six SADC member states rank amongst the top 10 most unequal nations worldwide. South Africa as the most unequal country tops the list, followed by Namibia, Zambia, Eswatini, Mozambique, and Botswana (Haikali, 2021).

1.3 RESEARCH AIM AND OBJECTIVES

1.3.1 Aim of the study

The study aims to investigate the impact of trade openness, tariffs, and the real exchange rate on income inequality in selected SADC countries (South Africa, Botswana, Tanzania, DRC, Mozambique Madagascar, Namibia, Angola and Swaziland) for the period 2004 to 2020.

1.3.2 Objectives of the study

- To determine the relationship between trade openness and inequality
- To analyse the link between tariffs and inequality
- To investigate the relation between real exchange rates and inequality

- To determine causal relationship between inequality, trade openness, tariffs, and real exchange rates.

1.4 RESEARCH QUESTIONS

- Is there a relationship between trade openness and inequality?
- Is there a link between the real exchange rate and inequality?
- Is there a connection between tariffs and inequality?
- Is there a causal relationship between inequality, trade openness, tariffs, and the real exchange rate?

1.5 DEFINITION OF CONCEPTS

- **Inequality** refers to the phenomenon of an unfair distribution of opportunities and resources among the members of a particular society. The "Gini coefficient" determines the degree to which the income distribution in a nation deviates from ideal equity and is used to measure income inequality (Koh, 2020).
- **Trade openness** refers to the manner in which a nation's economy is structured in relation to the framework of world trade. The actual volume of a country's recorded imports and exports is used to gauge a country's level of openness (Debashis, et al., 2019).
- **Tariffs** relate to the customs duties that governments impose on imported goods. As a result, international goods cost more than their domestic counterparts. Tariffs are intended to give an advantage to domestic goods, but the consequences are not always quite that simple (Kimberly & Boyle, 2021).
- **Real Exchange Rate** compares the buying power of a currency, factoring in inflation, in relation to another currency. It considers the ability of each currency to buy a specific set of services and goods, while accounting for the level of price variations between the two countries (Gordon, 2021).

1.6 ETHICAL CONSIDERATIONS

The study used publicly available secondary data collected from the Federal Reserve Bank of St. Louis Databank and World Bank Database. Furthermore, this study was carried out without misquotations or deliberate plagiarism. Complete references were used to identify and credit all sources that were used or quoted. The study adhered to the university's guidelines for postgraduate research.

1.7 SIGNIFICANCE OF THE STUDY

Most studies including Mitra and Hossain (2018), Hazama (2017), Cerdeiro and Komaromi (2017) as well as Rojas and Turnovsky (2017) focused on what widens inequality. These investigations were carried out prior to the implementation of the AfCFTA, with a primary emphasis on examining the relationship between income inequality and various factors such as trade openness and real exchange rates. The studies primarily targeted nations that are developed including the United States of America and Sub-Saharan Africa. This study narrows the scope to the SADC region as a community with its own bilateral or multilateral policy perspective.

The tariff was introduced as another variable to analyse its effect on income inequality in SADC. The literature review revealed that few studies interrogated this variable, and those that did were not at the regional level (Rojas and Turnovsky, 2017; Rehana *et al*., 1999). The study period is also relevant in that it ranges between 2004 – 2020, while employing the PARDL and Granger causality techniques. Hence, the study offers knowledge and will assist SADC policymakers in formulating short- and long-term policies in the context of the AfCFTA. The study is expected to contribute knowledge on how to reduce inequality and contribute to the solutions on how the economies may ensure equality amongst people in SADC.

1.8 STRUCTURE OF THE STUDY

Chapter one presents a thorough introduction to the subject of the study, providing context on the selected research topic and addressing the problem statement. Additionally, it meticulously outlines the research questions and thoroughly explores the study's aims and objectives. The subsequent chapters are outlined as follows: Chapter two furnishes an in-depth overview of the selected SADC countries. This is done through a detailed examination of macroeconomic variables within each country. As a result, chapter two offers a trend analysis spanning the study's time frame, which aids in comprehending the global economic landscape within the context of the countries under scrutiny. Chapter three enhances the discussion by exploring the appropriate empirical and theoretical literature similar to study objectives. This section guides the research by evaluating prior work on the selected macroeconomic variables and inequality, thereby drawing comparisons and distinctions. Subsequently, in Chapter four, we delve into the research methodology. This chapter provides a meticulous exploration of the step-by-step analytical approach employed to address the defined objectives. Chapter five presents the empirical findings that address the established research questions and objectives. Finally, chapter six serves as the culmination of the study, offering a comprehensive summary. It draws conclusions based on the research conducted and provides valuable recommendations.

CHAPTER 2
AN OVERVIEW OF THE MACROECONOMIC PERFORMANCE OF SADC

2.1 INTRODUCTION

Chapter two provides an overview of macroeconomic indicators such as income inequality, trade openness, tariffs and the real exchange rate in selected SADC countries.

The SADC region has 16 member states, namely Mauritius, Madagascar, Mozambique, Lesotho, Namibia, Eswatini, Seychelles, DRC, South Africa, Comoros, Tanzania, Botswana, Zambia, Angola, Malawi and Zimbabwe. The headquarters of SADC is located in Gaborone, Botswana. The primary goal of the organization is to reduce poverty, promote development and economic growth, and also to improve the quality of life and standard of living for people in Southern Africa. This study focuses on assessing inequality as an indicator of the standard of living and quality of life, examining its relationship with related trade variables such as tariffs, exchange rates, and openness. Other objectives of SADC include supporting the socially disadvantaged through regional integration and creating an area with a high level of rationalization and harmonization (Shakeel, 2016).

These countries also benefit from other trade agreements apart from the SADC. The region has made tremendous progress in restructuring regional trade with the support of trade pacts like SACU (Southern African Customs Union) and AfCFTA to ensure that the countries trade more among themselves. Trade is essential for the region's economic growth and offers additional advantages that aid in regional integration (SADC, 2021). Economies that liberalise their trade rules and promote business with other countries experience faster economic growth and better living conditions for their citizens. Increased business between SADC member nations is essential as it enables the region to fully utilize its natural resources and build its economy (Sikuka, 2015). Furthermore, these initiatives have fostered regional integration, cultural exchange, and stability, bringing additional advantages to the region. Overall, the progress in restructuring regional trade has been instrumental in enhancing the region's economic development and promoting closer ties among member states.

2.2 SADC MACROECONOMIC ANALYSIS

An essential part of this study is to reflect on the macroeconomic outlook in the selected SADC countries. This is an attempt to ensure an understanding of the indices and capture the current state of the countries. The analysis is made on a country level as follows.

2.2.1 Angola

Angola joined SADC in 1992, along with Mozambique and Tanzania. Being a member of SADC is important to Angola for various reasons. Firstly, it enables Angola to play a role in the organization's initiatives for regional integration and cooperation in fields like trade, infrastructure development, and regional security (SADC, 2020). Secondly, it provides a platform for Angola to interact with other southern African nations and strengthen political, economic, and social bonds (Nyambe, 2017). Furthermore, Angola's membership in SADC allows it to take part in regional programs like the SADC Industrialization Strategy and Roadmap, aimed at boosting industrialization and economic growth in the area (SADC, 2019). Currently, the economy of Angola is mostly based on the oil industry, with fishing and oil being the two primary industries that draw foreign investment. The following sub-sections examine the macroeconomic outlook in Angola.

2.2.1.1 Income inequality

In Angola, the prevalent challenge of income inequality stems largely from the repercussions of civil war and political corruption, as highlighted by Zhou (2020). Despite the country's abundance in natural resources such as oil and diamonds, a significant portion of the populace experiences poverty (Azevedo & Teixeira, 2019). Factors contributing to the challenges that Angola is facing is the lack of access to education and job opportunities, resulting in many individuals being stuck in low-paying, informal sector jobs (Azevedo & Teixeira, 2019). The civil war, which lasted from 1975 to 2002, resulted in displacements among people and the destruction of the country's infrastructure, further exacerbating poverty and inequality (Zhou, 2020). The concentration of wealth is also evident in the country's high Gini coefficient, which is among the highest in the world (Azevedo & Teixeira, 2019). The figure below indicates the trend of unequal distribution of income in Angola from 2004 to 2020.

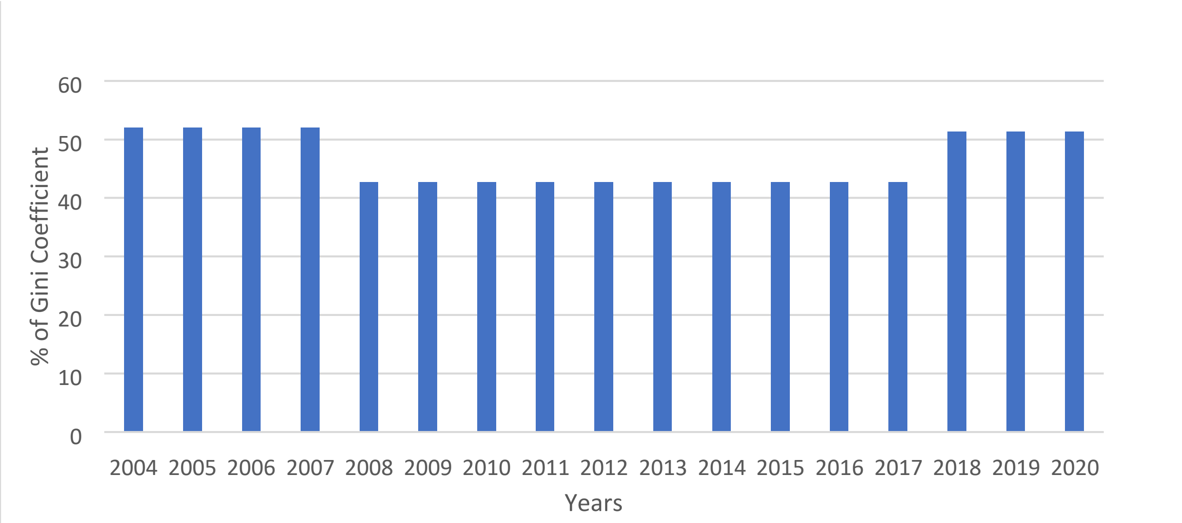


Figure 2.1: Gini coefficient in Angola

Source: World Bank Databank (2004-2020)

From 2004 to 2008, the level of income inequality in Angola remained consistent with a Gini coefficient of approximately 52 percent. However, between 2008 and 2009, there was a notable decrease in income inequality, as indicated by the Gini coefficient crashing from 52 percent to 42.7 percent. The drop in income inequality is linked to the international financial crisis that began in 2008. The crisis caused a huge decline in stock prices and housing values, which had a disproportionate impact on the wealthiest households. This decline in wealth among the rich led to a decrease in income inequality (Saez, 2019). Furthermore, the government's efforts to address income inequality through increased spending on health, education, and infrastructure also played a role (World Bank, 2019). The decrease in income inequality lasted for a period of 10 years, before increasing to 51.3 percent in 2018. This increase was largely due to the decline in oil prices between 2014 and 2015, which negatively impacted the Angolan economy and government revenue. The political and economic instability in Angola during this time, including high inflation and currency depreciation, also contributed to the increase in income inequality (World Bank, 2019).

2.2.1.2 Trade openness

Trade openness in Angola has been impacted by various factors such as civil war, corruption, and insufficient infrastructure. Despite being a member of SADC and the African Union, Angola has had difficulties in fully liberalizing trade and boosting its economy. The majority of exports in Angola, which primarily consists of oil, account for over 90% of the country's total exports between 2004 and 2020 (World Bank, 2021). Nigeria leads the African continent in respect of oil production, followed by Angola. Additionally, the country has exported other goods such as diamonds, coffee, and fish (United Nations, 2020). Angola's imports mainly consist of capital goods, consumer goods, intermediate goods, and food products, which are mostly imported from South Africa, Portugal, and Brazil (United Nations, 2020). The graph below shows the trend of exports and imports in Angola from 2004 to 2020.

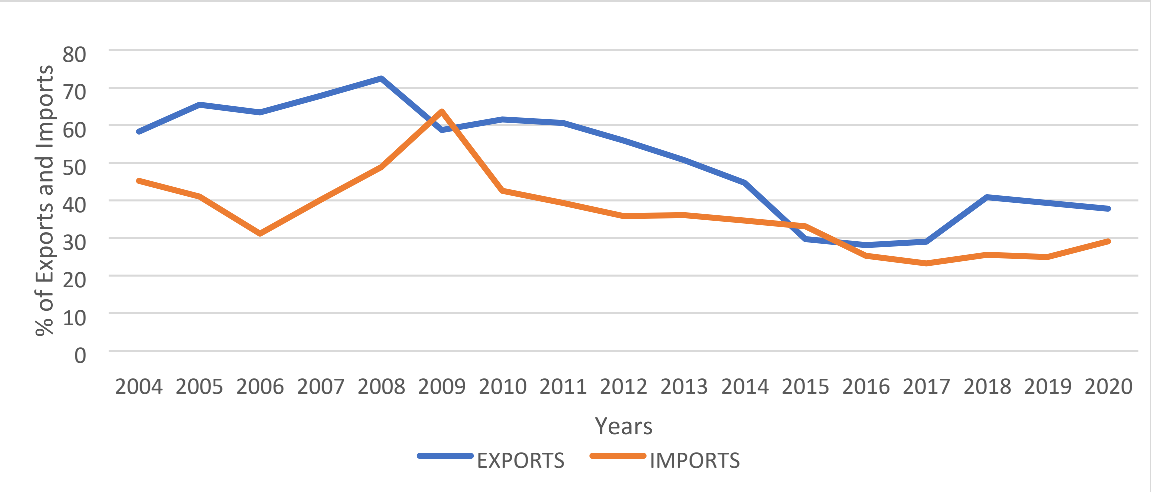


Figure 2.2: Imports and Exports in Angola
Source: World Bank Databank (2004-2020)

Figure 2.2 highlights the trends in Angola's exports and imports from 2004 to 2020. It is evident that Angola's exports experienced growth between 2004 to 2008, reaching a peak of 72,5% in 2008. However, there was a drastic decline in exports in 2009 and a gradual decrease until 2015, when exports reached their lowest point of 29,8%. Following this there was an upward trend in exports, with a slight dip in 2020 due to the COVID-19 pandemic. Meanwhile, the imports of Angola showed fluctuations over the years, with a peak of 63,7% in 2009. From then on, there was a general decline in imports until 2018, with a slight increase followed by a decline in 2019 and a slight increase in 2020.

Several factors could have influenced the variations in Angola's exports and imports. The 2008 global financial crisis affected the economy of Angola, resulting in a decline in exports (World Bank, 2020). Additionally, the decline in oil prices from 2014 to 2016, considering Angola's reliance on oil exports, also affected its economy (IMF, 2021).

The COVID-19 pandemic also played a role in the decrease in exports in 2020 (WHO, 2021). On the positive side, efforts to diversify Angola's economy and reduce its dependence on oil exports could have contributed to the recent increase in exports. Additionally, the improvement in infrastructure, such as the expansion of the port of Lobito (Ministry of Transport, 2019), facilitated Angola's trade with other countries, leading to an increase in exports.

2.2.1.3 Tariffs

The history of tariffs in the country can be traced back to the colonial era when the Portuguese government-imposed tariffs to regulate trade and protect their interests (Angolan Ministry of Economy and Planning, 2021). Post-independence, the Angolan government continued to use tariffs to protect domestic industries and generate revenue. The Marxist-Leninist ideologies, which favoured import substitution and protectionist measures, heavily influenced the country's post-independence economic policies (World Bank, 2022). In recent years, the Angolan government has been implementing reforms to liberalize the economy and promote trade. This has involved gradually reducing tariffs and other trade barriers, with the goal of increasing trade and investment. As a result, there has been a growth in foreign investment and industries such as tourism and mining (World Bank, 2022). However, some economic sectors, like agriculture, are still protected by high tariffs to safeguard domestic producers (International Trade Centre, 2022).

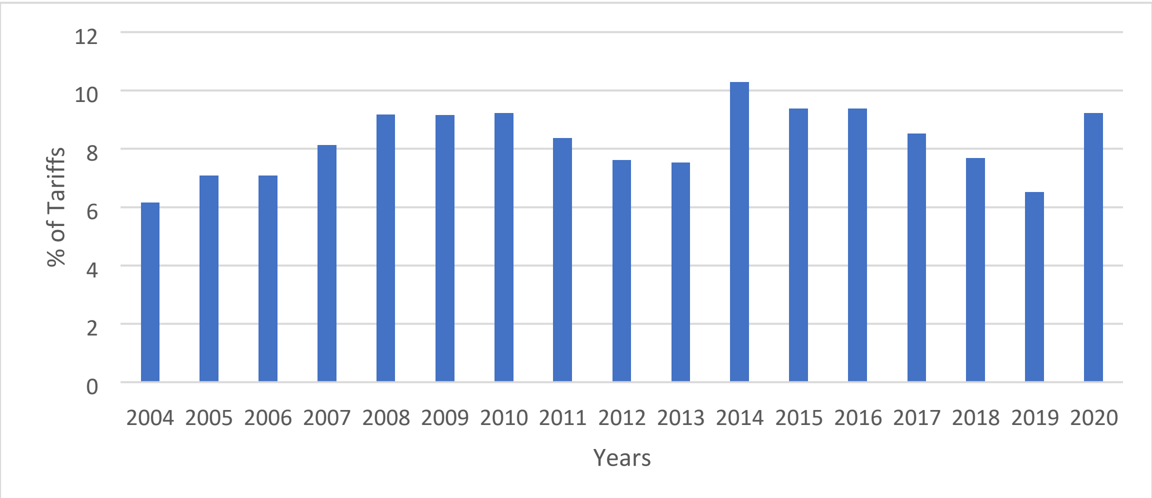


Figure 2.3: Tariff rates in Angola

Source: World Bank Databank (2004-2020)

The figure above represents the fluctuation of tariff rates in Angola for the period 2004 to 2020. In 2004, Angola had a relatively low percent of tariff rates of around 6.16%. However, from 2005 until 2010, the rate suddenly increased. This spike in tariffs is associated with the 2008 global financial crisis, which led to a decrease in foreign investment and exports in Angola. From 2010 to 2013, the tariff rate gradually decreased, reaching a low of around 7.52% in 2013. However, in 2014, the rate increased to around 10.3%. This can be attributed to the decrease in oil prices, which is the main source of income in Angola. The fall in oil prices has led to a decline in government revenues, forcing the government to increase tariffs to make up for the shortfall (Angola Press, 2014). In 2015 and 2016, the tariff rate remained relatively stable at around 9.38%. However, in 2017, the rate decreased to around 8.53%, and in 2019, the rate decreased further to 6.52%. This decrease can be attributed to the government's efforts to attract foreign investment and increase exports (Angola Press, 2019). In 2020, the tariff rate increased to 9.23%.

2.2.1.4 Real Exchange Rates

Exchange rate stability in the country has been impacted by various factors such as the reliance of the country on oil exports, high levels of inflation, and political turmoil (IMF, 2017; World Bank, 2018). These elements have caused fluctuations in the value of the Angolan currency, the Kwanza (AOA), making it challenging for the country to have a stable exchange rate.

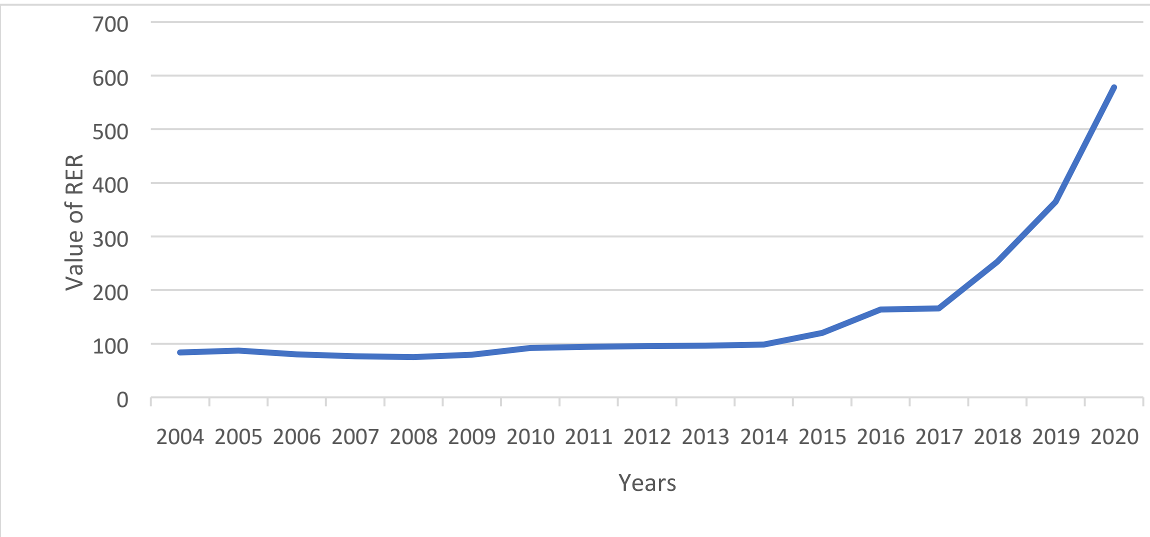


Figure 2.4: Real Exchange Rate in Angola

Source: World Bank Databank (2004-2020)

The kwanza/USD exchange rate was extremely unstable during the period 2004 and 2020, as shown in Figure 2.4. In 2004, 1 USD was equal to approximately 83.54 AOA. However, by 2009, the value had declined from 1 USD to 79.33 AOA. In the proceeding years, the exchange rate continued to fluctuate, with a significant depreciation in 2010. From 2011 to 2020, the AOA continued to lose value compared to the USD, reaching 578.26 AOA to 1 USD in 2020. The fluctuation in the exchange rate can be attributed to a range of factors such as the global economy, the prices of oil and diamonds, and political instability. Despite this instability, the exchange rate has become more stable in recent times, which had a positive impact on Angola's economy (World Bank, 2020). The kwanza, however, though stable, remains weak against the US dollar.

2.2.2 Botswana

As part of SADC, Botswana has taken advantage of the organisation's efforts to enhance economic cooperation and integration among its member states. This has resulted in significant economic growth and development for the country through access to the regional market and participation in regional infrastructure projects. As a result, Botswana's economy has improved substantially (SADC, 2021). The following sub-sections examine the country's macroeconomic outlook.

2.2.2.1 Income inequality

Botswana has faced a persistent issue of income inequality over the past two decades. The root cause of this inequality is the unequal distribution of wealth in the nation, where the top 10% of the wealthy population holds 40% of the country's wealth and the poorest 40% of the population only controls 5% of the country's wealth (World Bank, 2018). This is because the country's economic growth is mainly driven by its diamond industry, which benefits only a select group of elites, rather than being more evenly distributed among the population (Kiessling, 2018).

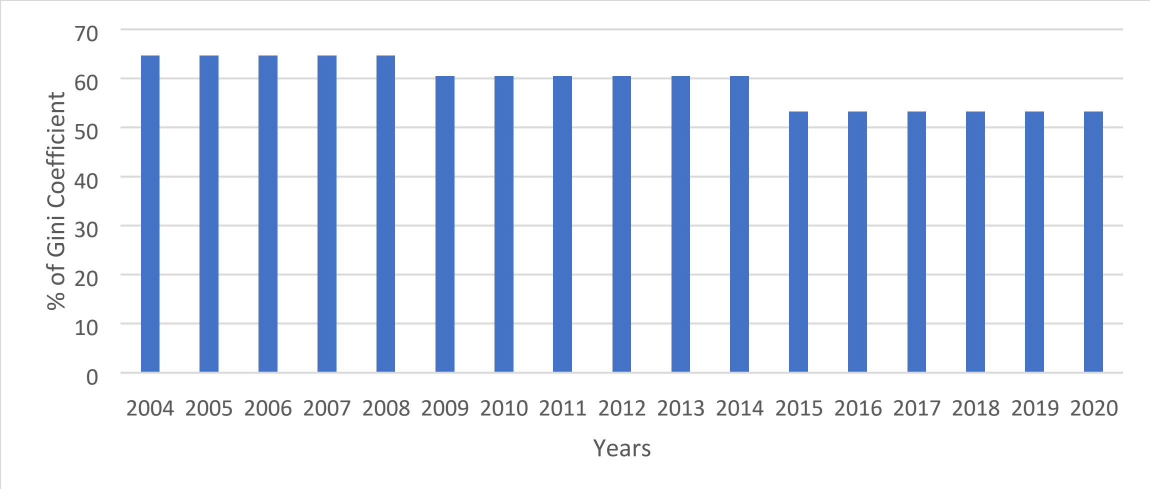


Figure 2.5: Gini coefficient in Botswana

Source: World Bank Databank (2004-2020)

The graph in Figure 2.5 highlights the persistent issue of income inequality in Botswana, which has been above 50% from 2004 to 2020 (World Bank, 2020). Despite a slight decrease in inequality from 64.7% in 2004 to 60.5% in 2009 and 53.3% in 2015, it remains a major issue in the country. Factors contributing to income inequality include unequal access to income-generating opportunities, unequal distribution of land and resources, and the unequal distribution of wealth and limited access to education and job opportunities (UNICEF, 2019). The impact of income inequality is detrimental as it hinders economic growth and development, and exacerbates poverty (Oxfam, 2021).

2.2.2.2 Trade openness

Trade openness in Botswana has been the main factor in the growth and development of the economy in the past years (Ministry of Trade and Industry, 2021). It's trade policy has been characterized by openness, with a focus on promoting exports and attracting foreign investment. The country's trade regime is governed by SADC Free Trade Area agreement, which has facilitated the liberalization of trade in the region (SADC, 2021). One of the key drivers of Botswana's trade openness has been its diamond mining industry. Diamonds account for more than 80% of Botswana's exports, and the industry has helped to transform the country's economy, providing significant contributions to its GDP and employment (Bank of Botswana, 2021).

Figure 2.6: Imports and Exports in Botswana
Source: World Bank Databank (2004-2020)

In 2004, imports accounted for 41.4% of its GDP, while exports made up 49.6% of the GDP. Over the next decade, imports gradually increased, reaching a peak of 61.4% in 2012. However, the percentage of imports in the GDP declined, reaching 46.1% in 2020. On the other hand, exports remained relatively stable, with a decrease from 49.6% in 2004 to 31.1% in 2020. The fluctuation in imports and exports can be attributed to several factors, including the global economic situation and the country's reliance on a few key export commodities. The reliance on diamonds, for instance, means that changes in the global demand for diamonds have a significant impact on Botswana's economy (Kolantsho, 2020).

2.2.2.3 Tariffs

Botswana, as member of SADC, has agreed to reduce trade barriers and tariffs among the member states as part of its commitment to regional integration. However, the country still imposes tariffs on certain goods such as textiles, footwear, and other manufactured goods to protect the domestic industries from foreign competition (Mafuta & Raditloaneng, 2013). In recent years, the government of Botswana has reduced tariffs on several goods to attract foreign investment and increase trade. For example, the government has reduced the tariff on imported vehicles from 40% to 25% to encourage investment in the automotive sector (Chikwati & Zengeni, 2017). This has led to increased foreign investment and the development of a vibrant automotive industry in the country.

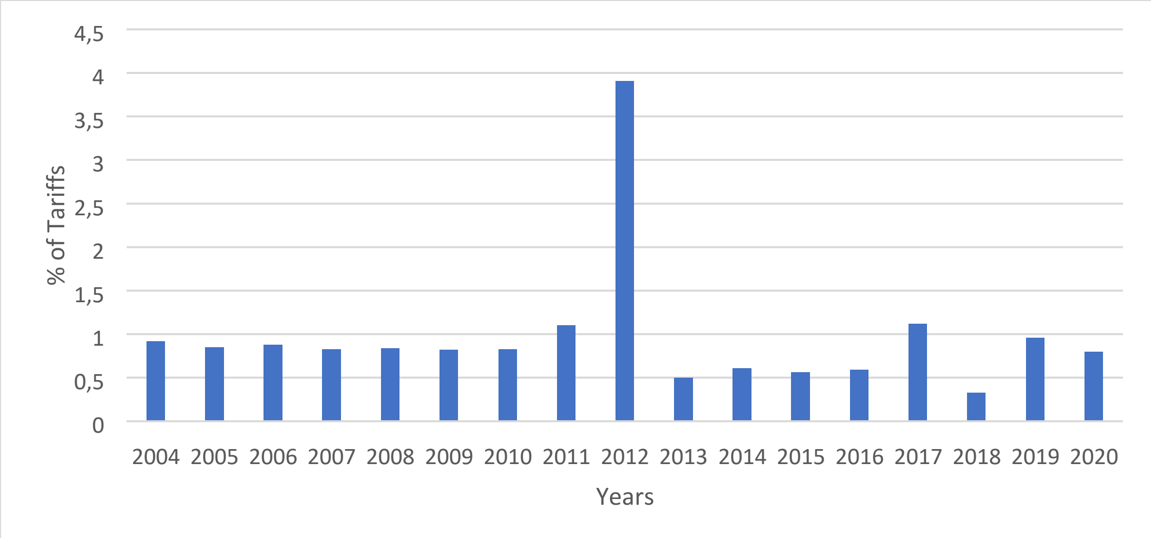


Figure 2.7: Tariffs in Botswana

Source: World Bank Databank (2004-2020)

Based on Figure 2.7 above, it appears that the tariff rates in Botswana remained constant over the past years, which implies that the country did not impose tariffs to dictate imports. Tariff rates seem to have been relatively stable from 2004 until 2020, except in 2012. The tariff rate reached its peak in 2012, with a value of 3.91%. This increase was linked to a combination of economic, political as well as regulatory factors. Government effort to balance the economic development of the country and protect local industries, attract foreign investment, and generate revenue have been the driving forces behind the low rates in Botswana (World Bank, 2021).

2.2.2.4 Real Exchange Rates

Botswana's real exchange rate has seen fluctuations between 2004 and 2020. The country uses Pula as their currency. As of September 2021, there were no currencies pegged against Pula. This implies that the dynamics of supply and demand in the foreign exchange market govern the exchange rate of the Pula. Botswana has maintained a stable macroeconomic environment over the years, with low inflation and prudent fiscal policies. This has helped to anchor confidence in the Pula and support its stability (Central Bank of Botswana, 2021).

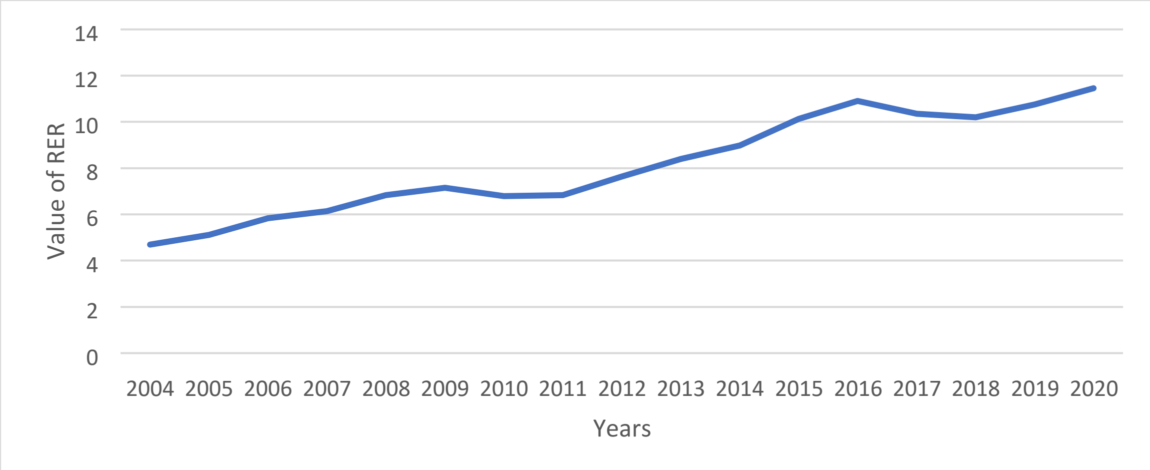


Figure 2.8: Real Exchange Rates in Botswana

Source: World Bank Databank (2004-2020)

The Pula follows the same depreciating trend. It stood at above 4 Pula compared to 1 US dollar in 2004 to around 10.90 Pula per 1 USD in 2016 and nearing 12 Pula to 1 US dollar in 2020. This increased tendency is related to the global financial crisis of 2008, which had a significant impact on the economy (International Monetary Fund, 2021). Additionally, this can also be linked to the efforts of the government to diversify the economy and promote other sectors, such as tourism and agriculture (Ministry of Trade and Industry, 2021). The highest value of Pula was reached in 2020 and can therefore be associated with the COVID-19 pandemic global economic impact (World Bank, 2021).

2.2.3 Democratic Republic of Congo

The larger state geographically in the Southern and Central Africa is the DRC, previously known as the Republic of Zaire. It is one of the richest mining countries in Africa. The Democratic Republic of Congo joined SADC in 1997 and has been an active participant in the organisation's various programs and initiatives. For example, the DRC has been involved in SADC's efforts to improve regional infrastructure, including the upgrading of road networks, the development of energy and water resources, and the construction of telecommunications networks (SADC, 2021). The subsections below analyse the macroeconomic prospects of the Democratic Republic of Congo.

2.2.3.1 Income inequality

In DRC, income inequality has been a persistent issue for several decades, with the country being ranked amongst the poorest in the world, with more than two-thirds of its population living below the poverty line (World Bank, 2021). The root causes of income inequality are complex and multidimensional. Addressing these issues requires a comprehensive and sustained effort by the government and the international community to promote equitable economic growth, increase access to education, and reduce corruption and political instability (Human Rights Watch, 2018; UNICEF, 2018).

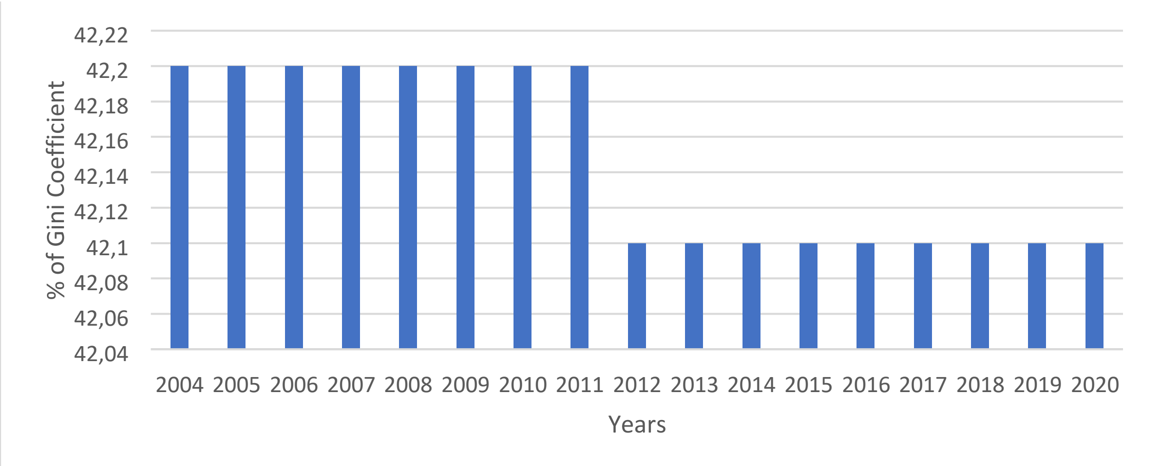


Figure 2.9: Gini coefficient in Democratic Republic of Congo
Source: World Bank Databank (2004-2020)

In the DRC, the Gini coefficient has remained relatively stable over the past 17 years, standing at 42.1 percent in 2020. The Gini coefficient in the DRC has been fluctuating around 42 percent since 2004. This suggests that income inequality in the country has been relatively stable during this period. However, it is important to note that a Gini coefficient of 42 percent indicates a high level of inequality, with a large portion of the population likely living in poverty. Factor that contribute to income inequality in the DRC include shortages of investment in human capital and infrastructure (World Bank, 2020). Without access to education, healthcare, and basic services, many people in the country are unable to improve their economic status and are likely trapped in poverty. This can exacerbate the divide between the wealthy and the poor and contribute to income inequality.

2.2.3.2 Trade openness

The DRC is a country with a lot of natural resources, including minerals and agricultural products, but has faced several challenges in terms of trade openness. A country is considered to be trade open if the value of exports and imports is high, indicating high levels of international trade. One of the main barriers to trade openness in DRC is the lack of infrastructure. The country has poor road networks, limited access to electricity, and inadequate port facilities, which hinder the efficient transportation of goods and services (Kolbe & Koda, 2019). This has resulted in high transportation costs, making it difficult for businesses to trade with other countries.

Figure 2.10: Imports and Exports in Democratic Republic of Congo
Source: World Bank Databank (2004-2020)

Figure 2.10 above shows that the value of exports and imports in the DRC has fluctuated over the years, with exports as low as 22.73 percent in 2004 to as high as 41.11 percent in 2010. Similarly, imports have ranged from 26.61 percent in 2004 to 49.64 percent in 2010. The trend lines reflect a trade imbalance/deficit in all the stated period. The fluctuations in trade openness can be attributed to various factors. Firstly, the global economic environment plays a role, as economic recessions or slowdowns can lead to a decline in international trade. Secondly, changes in the economic and political situation in the DRC can also impact trade. For example, political instability and conflict can discourage international trade and investment, leading to lower exports and imports. Additionally, natural disasters, such as floods and droughts, can also affect the country's trade performance. These events can disrupt production and transportation, leading to a decline in exports and imports.

2.2.3.3 Tariffs

In the DRC, tariff rates are governed by the National Customs Code and the Common External Tariff (CET) of the Economic Community of Central African States (ECCAS). The average tariff rate in the DRC ranges between 8 to 14 percent, although it can be different for different types of goods being imported. For example, the import tariff on food and agricultural products is generally lower than on other products, such as machinery and electronics, which are subject to higher tariffs. This is to encourage the importation of essential goods and to support local food production. Similarly, the import tariff on raw materials and semi-finished products is lower than on finished products to encourage investment in local manufacturing industries.

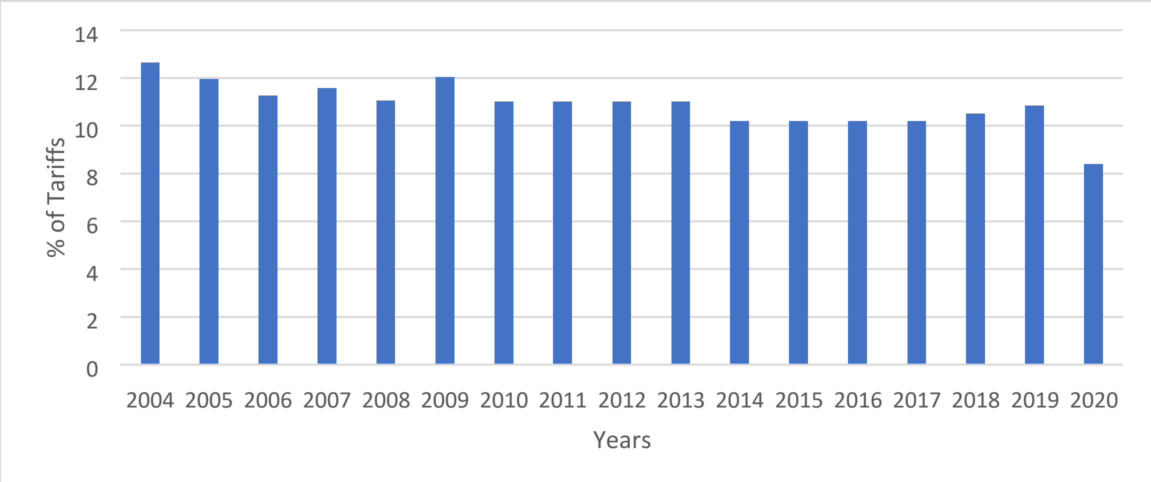


Figure 2.11: Tariff rates in Democratic Republic of Congo

Source: World Bank Databank (2004-2020)

According to Figure 2.11, the DRC tariff rate outlook is stable with mild changes. The highest rate was slightly above 12% in 2004 and below 12% during the rest of the period. The reasons for lower tariff rates is that DRC is a member of several economic communities of the region such as COMESA and ECCAS. Participation in regional integration initiatives often leads to the reduction in tariff rates among member countries to promote intra-regional trade (IMF, 2020). Furthermore, changes in the global market, such as fluctuations in commodity prices also had an impact on tariffs in the DRC. For example, the lowest tariff rates seen in 2020 was associated with the COVID-19 pandemic, which resulted in a decrease in goods and services demanded, resulting in a decrease in tariffs (UNCTAD, 2021).

2.2.3.4 Real Exchange Rates

The RER in the DRC has been affected by several factors, including commodity price fluctuations, political instability, and monetary policy mismanagement. DRC uses Congolese franc (CDF) as their currency. The devaluation of the Congolese franc (CDF) has resulted in increased inflation and a decline in the buying power of the currency. This, in turn, has reduced the competitiveness of the country's exports, which has led to a decline in the country's trade balance. The DRC's reliance on commodity exports, such as copper, cobalt, and oil, has also contributed to the instability of the RER. The global market for these commodities is highly volatile, and changes in demand and prices have a significant impact on the RER (IMF, 2015). The World Bank (2021) affirms that to address the volatility of the RER, the DRC needs to implement structural reforms that corrects the underlying causes of the instability. Further recommendations were that the reforms should include measures to improve the transparency in financial sector, increase effectiveness in monetary policy, and promote stability in the commodity markets.

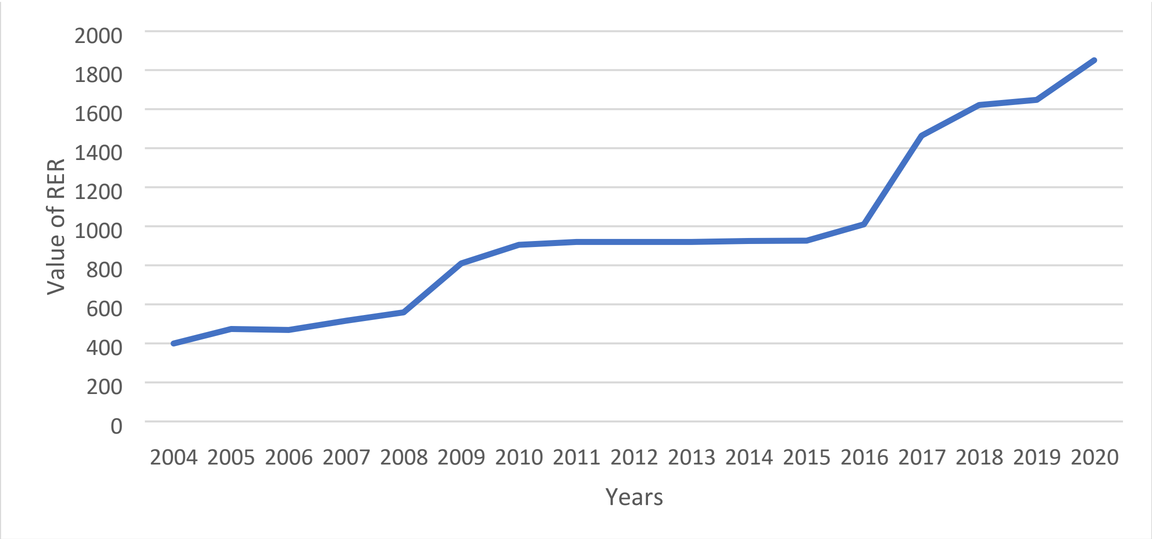


Figure 2.12: Real Exchange Rates in Democratic Republic of Congo
Source: World Bank Databank (2004-2020)

The Congolese franc against US dollar has been extremely unstable during the period 2004 to 2020, as visualized in Figure 2.12. In 2004, 1 US Dollar was equal to 399.48 Congolese Franc. Between 2004 and 2008, the CDF experienced a moderate increase, rising from 339.48 in 2004 to 559.29 against 1 USD in 2008. This increase was attributed to a period of relative stability in the country's economy, which resulted in increased confidence in the franc and higher demand for the currency. Additionally, the DRC's growing trade surplus during this period contributed to the rise in the Congolese franc (World Bank, 2021). Between 2010 and 2015, the currency remained relatively stable, fluctuating slightly around 919,76 to 1 USD in 2012. In 2016, the Congolese franc experienced another sharp increase, rising from 1010,30 compared to 1 USD in 2016 to 1464,42 in 2017. This depreciation in currency was attributed to a combination of factors, including increased foreign investment, rising commodity prices, and improved political stability. Between 2017 and 2020, the Congolese franc continued to depreciate, reaching 1851,12 CDF in 2020. This depreciation can be attributed to continued political stability and improved economic conditions, as well as the Central Bank of Congo’s efforts to maintain monetary stability. Additionally, increased foreign investment and rising commodity prices may have also contributed to the rise in the currency (IMF, 2015). Therefore, the Congolese franc remains weak compared to US dollar.

2.2.4 Madagascar

Madagascar joined SADC in 1997 and since then, the country has been able to benefit from the SADC Free Trade Area (FTA), which was established in 2008 and allows member countries to trade without tariffs imposition and other barriers of trade (SADC, 2008). Furthermore, SADC has also been instrumental in supporting Madagascar's efforts to address the challenges it faces in terms of the growth of the economy and development. The key issue that Madagascar faces is the lack of infrastructure, which has hindered its ability to promote economic growth and attract foreign investment (African Development Bank, 2019). The subsections below analyse the macroeconomic prospects for Madagascar.

2.2.4.1. Income inequality

Income inequality is a major concern in Madagascar as it has been persistently high in recent years. The high Gini coefficient in Madagascar indicates that few people share more income in the nation, while the majority of the population has limited access to income and resources (World Bank, 2021). One of the main causes of income inequality in Madagascar is the lack of job opportunities for the majority of the population. Ravalomanana (2019) reports that the country has a high unemployment rate, and many people are forced to work in low-paying, informal jobs. Moreover, this has led to a significant portion of the population living in poverty, while the minority enjoys high levels of wealth and income.

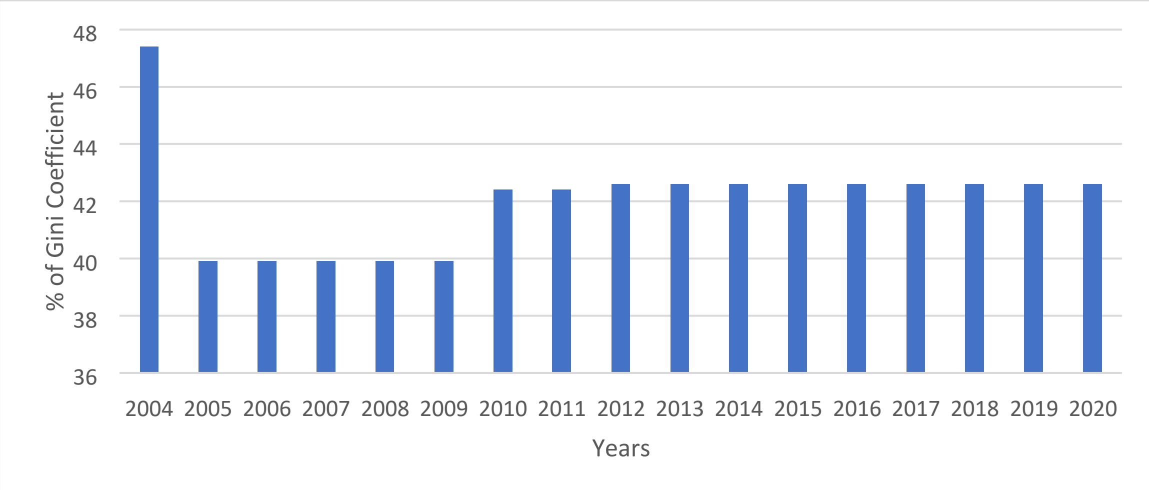


Figure 2.13: Gini coefficient in Madagascar
Source: World Bank Databank (2004-2020)

In 2004, the Gini coefficient was 47.4%, which indicates a high level of income inequality. However, from 2005 to 2009, the Gini coefficient dropped to 39.9%, indicating an improvement in income inequality. This decrease may be due to various factors such as the implementation of poverty reduction programs, the expansion of social safety nets, and the economic growth (World Bank, 2021). From 2010 until 2020, the Gini coefficient has consistently averaged 42.6%, which still indicates a high level of income inequality. The slight increase in the Gini coefficient from 2010 to 2020 may be due to factors such as the unequal distribution of wealth, the increasing disparities in rural and urban areas, and limited access to job opportunities and education (World Bank, 2021).

2.2.4.2 Trade openness

Madagascar has been actively promoting trade openness to stimulate development and economic growth. In recent years, Madagascar implemented several measures to improve trade openness, such as reducing trade barriers, simplifying customs procedures, and promoting investment (World Bank, 2023). As a result, Madagascar has been able to increase its exports, particularly of agricultural products such as vanilla, cloves, and coffee (Trading Economics, 2023). This has allowed the country to diversify its economy and reduce its dependence on a few export products. In addition, Madagascar has also been actively seeking to diversify its trade partners and has signed trade agreements with various countries, including the United States, China, and India. This has helped to reduce the country's dependence on a few major trading partners and has allowed it to tap into new markets and opportunities. However, despite these efforts, Madagascar still faces significant challenges to trade openness (Ministry of External Affairs, 2017). For instance, the country still lacks the necessary infrastructure, such as modern ports and transportation systems, to fully realize its trade potential. In addition, the country still struggles with corruption and bureaucratic inefficiencies, which can act as a barrier to trade (World Bank, 2021).

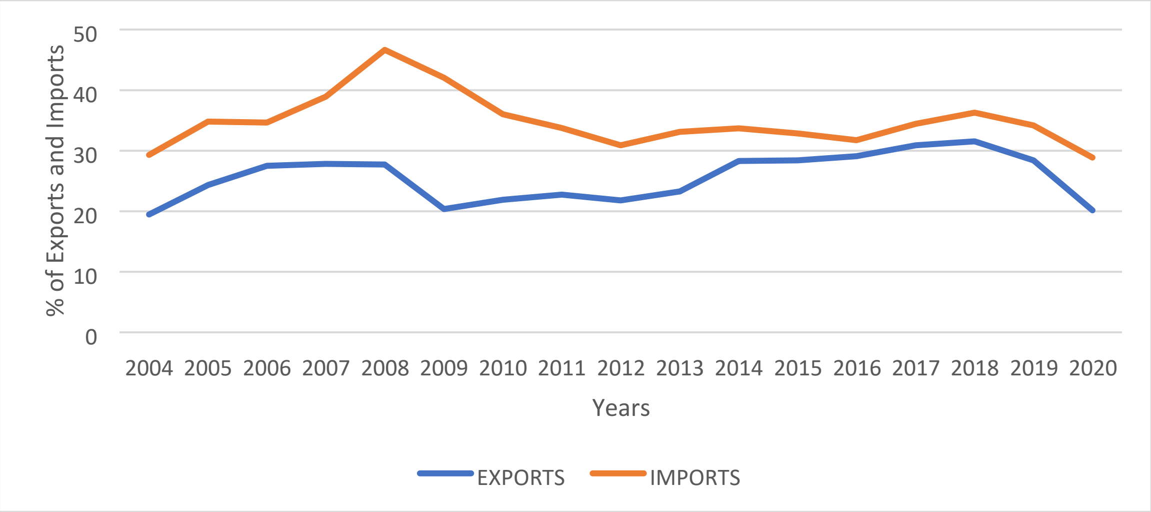


Figure 2.14: Imports and Exports in Madagascar
Source: World Bank Databank (2004-2020)

Figure 2.14 above shows the trend in exports and imports from 2004 until 2020. Exports increased from 19.46 percent in 2004 to 27.71 percent of GDP in 2008, while imports increased from 29.32 percent to 46.65 percent during the same period. This period saw a significant increase in both exports and imports, which suggests a growing economy and increasing international trade. This increase can be linked to factors such as increased investment, favourable global economic conditions, and the expansion of the country's export base (World Bank, 2021). However, in 2009, there was a significant decrease in both exports and imports, with exports declining to 20.38 percent and imports declining to 42.04 percent. This decrease was due to the global financial crisis, which caused a huge effect on the world economy and resulted in decreased demand for goods and services (World Bank, 2021). From 2010 to 2020, both exports and imports had been generally increasing, with exports reaching 31.54 percent in 2018 and imports reaching 36.31 percent in 2018. This trend suggests a continued growth path of the economy and increasing international trade.

2.2.4.3 Tariffs

Tariffs play an important role in Madagascar's economic policy as they are a source of income for the government and are used to protect domestic industries and promote economic development. According to the World Bank (2021), Madagascar applies both import and export tariffs. Import tariffs range from 0% to 35% and are based on the Harmonized system of classification for goods. In general, the tariffs are higher for luxury goods and lower for basic necessities such as food and medical supplies. The government's implementation of trade agreements with other countries also helps to increase trade and boost the country's economy.

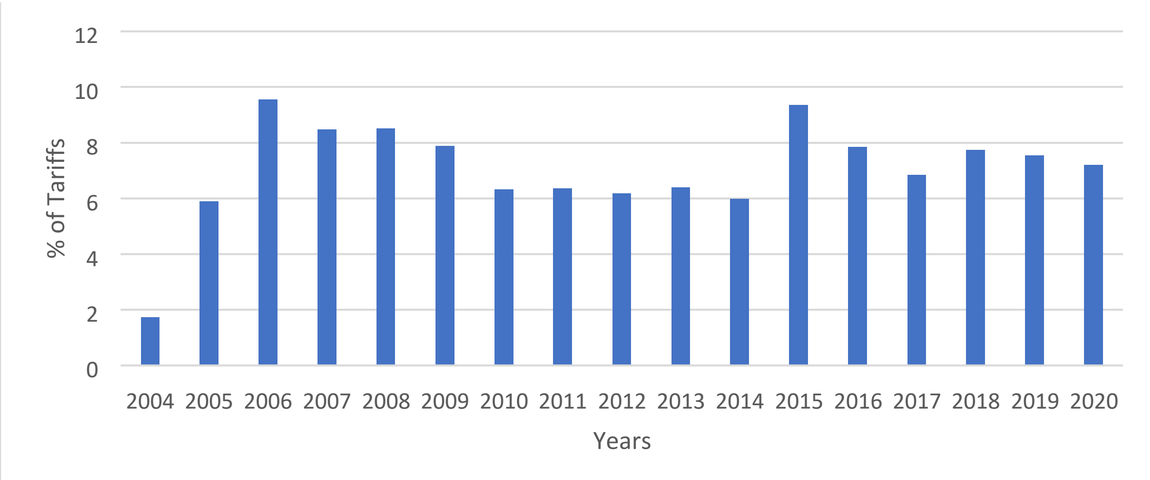


Figure 2.15: Tariffs in Madagascar

Source: World Bank Databank (2004-2020)

The tariff rate has been fluctuating over the years, rising from 1.74% to 5.89% in the period 2004 to 2005. The increase was linked to various factors such as the rise in production cost, changes in government policies, and economic factors such as inflation (IMF, 2019). Between 2008 and 2009, the tariff rate remained relatively stable, fluctuating slightly from 8.51% to 7.89%. However, in 2010, there was a significant decrease to 6.32%. This decrease was attributed to the global crisis that led to a decline in goods and services demanded, and therefore, a decline in tariff rates (World Bank, 2022). From 2016 to 2018, the tariff rate decreased, fluctuating from 7.86% to

7.74%. Once more, this decrease was linked to the efforts of the government to make the cost of services and goods more affordable for the citizens of Madagascar (IMF, 2019). In 2019 and 2020, the tariff rate remained relatively stable, fluctuating slightly from 7.54% to 7.2%. This stability was credited to the efforts of the government to maintain a stable economy and to keep the cost of services and goods affordable for the citizens of Madagascar (Madagascar Ministry of Finance, 2021).

2.2.4.4 Real Exchange Rates

The Malagasy ariary (MGA) experienced significant fluctuations in the past years. According to the IMF (2019), the MGA appreciated significantly between 2010 to 2014, resulting in a decline in exports and competitiveness. However, from 2014 to 2018, the MGA depreciated, boosting exports and economic growth. The study also highlights that the MGA was affected by various factors, including macroeconomic stability, inflation, and terms of trade (World Bank, 2020).

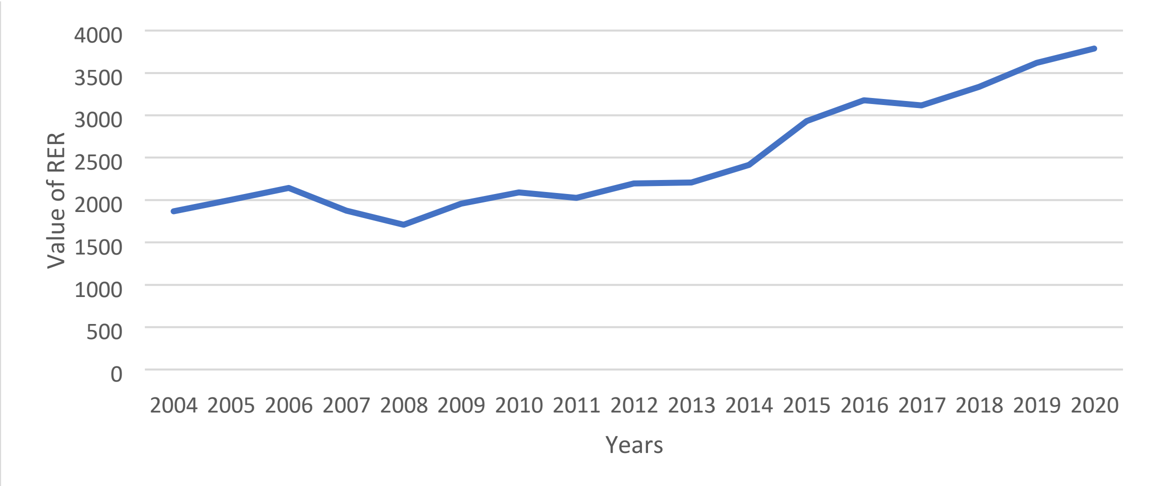


Figure 2.16: Real Exchange Rates in Madagascar
Source: World Bank Databank (2004-2020)

According to data from the World Bank (2020), the MGA experienced a significant increase between 2004 to 2015, reaching a peak in 2020 at 3787.75 MGA compared to 1 USD. However, from 2016 to 2019, the MGA appreciated slightly before depreciating again in 2020 to 3787.75 MGA per 1 USD. From 2016 to 2019, the MGA depreciated slightly, which can be attributed to improved macroeconomic stability. According to the World Bank (2020), improved macroeconomic stability can lead to a decrease in inflation and a more competitive cost of production, resulting in a lower currency. This, in turn, can lead to increased exports and economic growth. In 2020, the MGA increased again compared to USD, which can be linked to the COVID-19 pandemic. The global economic impact resulting to a decrease in terms of trade and goods and services was caused by the pandemic. As a result, there was a rise in the value of MGA as the relative cost of services and goods in the country increased compared to other countries (International Monetary Fund, 2020).

2.2.5 Mozambique

Mozambique joined SADC in 1992 and has since been able to participate in the region's common market, which has boosted its exports and attracted foreign investment. According to SADC (2020), the FTA has contributed to the growth of intra-regional trade by 12.4% per year, with Mozambique's exports to SADC countries increasing by more than 60%. The country has also been able to benefit from SADC's initiatives in the energy sector, where the organization is promoting regional integration and the development of energy infrastructure. This has created opportunities for the country to increase its energy generation and distribution capacity, and to participate in regional energy projects, such as the Grand Inga hydropower project in the Democratic Republic of Congo (SADC, 2020). Additionally, SADC has been instrumental in addressing security challenges in the region, including cross-border crime, terrorism, and drug trafficking. Mozambique, in particular, has been facing security challenges, such as drug trafficking, human trafficking, and illegal immigration, which had a negative impact on its economic development and stability. SADC has been working to address these challenges through the implementation of regional security initiatives and the strengthening of regional cooperation and coordination (SADC, 2020).

2.2.5.1 Income inequality

Mozambique is facing income inequality challenges that persisted for many years and impacts on the economic and social development of the country. One of the main drivers of income inequality in Mozambique is the unequal distribution of economic opportunities, particularly in rural areas. Most people live in rural areas, where poverty is widespread and opportunities for economic growth are limited (World Bank, 2018). This has resulted in low levels of income and wealth and has contributed to the persistence of income inequality in the country (World Bank, 2021).

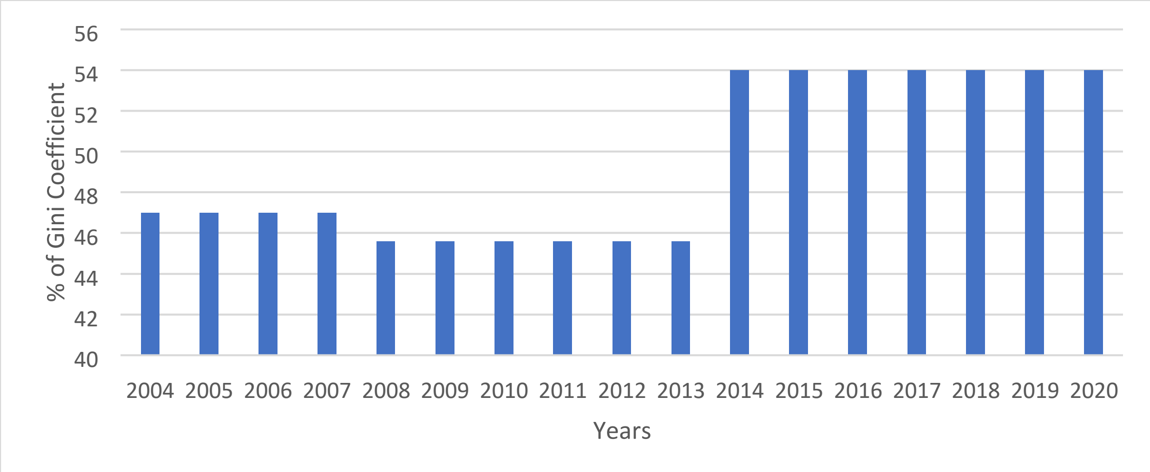


Figure 2.17: Gini coefficient in Mozambique
Source: World Bank Databank (2004-2020)

According to figure 2.17, the Gini coefficient was relatively stable but high in the years 2004 to 2011, with values ranging from 47% to 45.6%. There was a significant increase in income inequality in 2014 rising to 54%. This trend continued through to 2020, with percentage remaining stable at 54% over this period. According to World Bank (2016) there were several reasons explaining the fluctuations in income inequality over this period. In addition, political instability and corruption also play a role. Political instability can lead to a lack of investment and economic growth and can also result in the misallocation of resources and a reduced ability to address poverty and inequality (World Bank, 2021).

2.2.5.2 Trade openness

The country has made significant progress in increasing its trade openness in recent years, with growing exports, increasing participation in regional and global trade agreements, and attracting FDI (World Investment Report, 2020). However, there are still challenges to trade openness in the country, including the lack of infrastructure, corruption, and weak governance (World Bank, 2021).

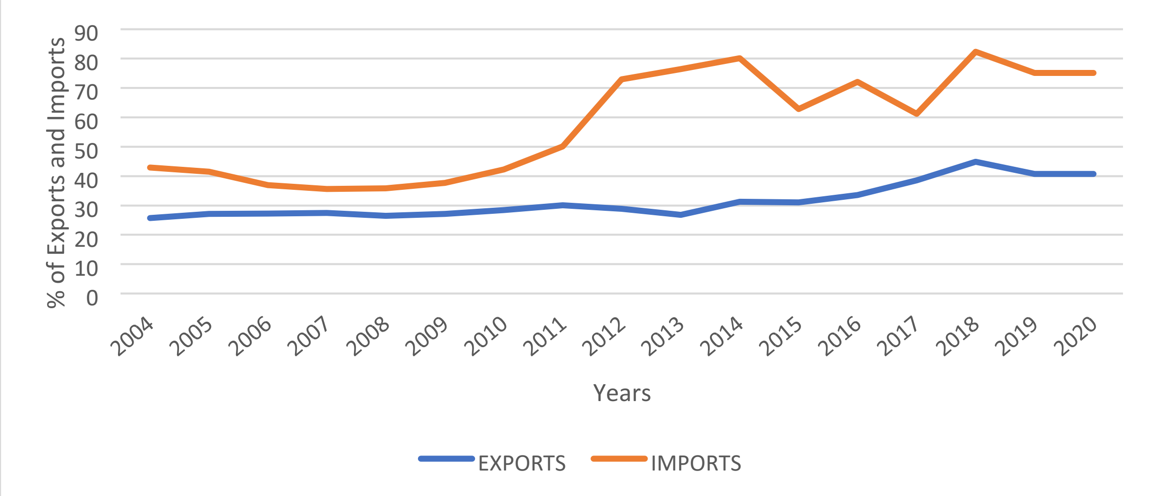


Figure 2.18: Imports and Exports in Mozambique

Source: World Bank Databank (2004-2020)

The graph above depicts the trend in exports and imports in Mozambique from 2004 to 2020. Over the years, there have been fluctuations in the volume of exports and imports, which have implications for trade openness in the country. Exports in the country increased from 25.7 percent in 2004 to 44.9 percent in 2018, before declining to 40.8 percent in 2019 and 2020. The main exports include aluminium, electricity, coal, and seafood. The increase in exports in the mid-2010s was largely due to the growth of the mining and energy sectors (World Bank, 2021).

Imports also increased over the years, reaching a high of 82.3 percent in 2018 before declining to 75.1 percent in 2019 and 2020. The main imports in Mozambique include machinery and equipment, petroleum products, and food products. The increase in imports in the mid-2010s was largely due to the growth of the construction, transportation, and energy sectors, which required significant investment in machinery and equipment (World Bank, 2021). The fluctuations in exports and imports were attributed to several factors, including changes in global commodity prices, exchange rate changes and the economic slowdown in key trading partners. For example, the decline in exports and imports in 2019 and 2020 was largely due to the slowdown of the economy because of the COVID-19 pandemic (World Bank, 2021).

2.2.5.3 Tariffs

Mozambique has a relatively low average tariff rate of 10.6%, compared to other countries in the region. However, the country has a complex and non-transparent tariff system, with a large number of exemptions and special provisions, which can make it difficult for businesses to understand and comply with the regulations (Ministry of Economy and Finance, 2019). In recent years, the government has been making efforts to simplify and modernise its tariff system. In 2019, a new customs code that aimed to improve the efficiency and transparency of customs procedures was introduced, reduced corruption and simplified the tariff system (World Bank, 2022).

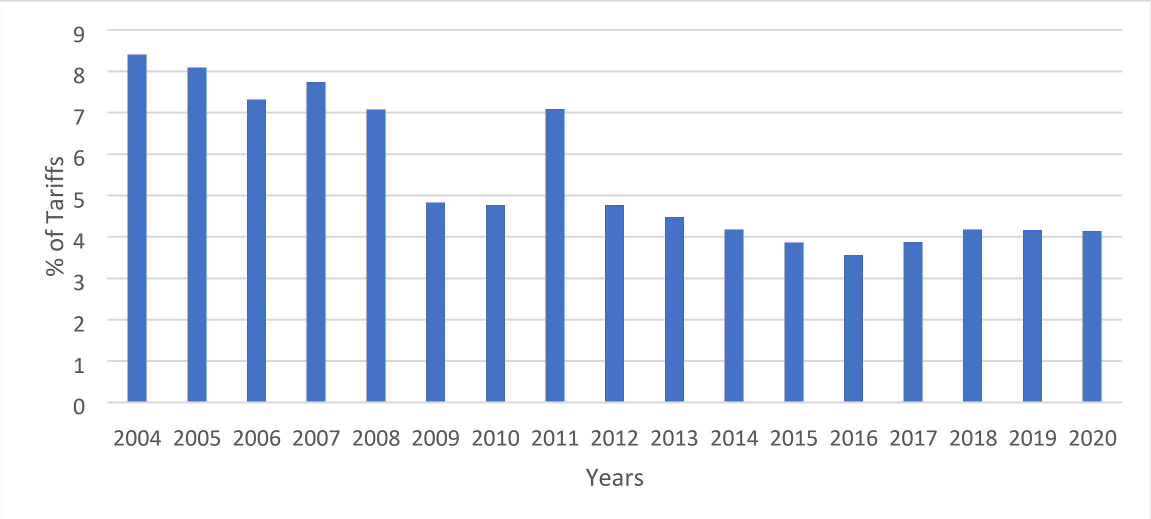


Figure 2.19: Tariffs in Mozambique
Source: World Bank Databank (2004-2020)

The above figure shows the fluctuations in tariff rates from 2004 to 2020. In the early 2000s, the tariff rate was relatively high, with rates of 8.4% in 2004 and 8.09% in 2005. However, the rate dropped in 2006 and continued to decrease until 2009, reaching a low of 4.82%. The sharp drop-in tariff rates were attributed to the government's efforts to attract foreign investment and promote trade in the country (World Bank, 2021). In the following years, the rate fluctuated, with a noticeable increase in 2011 (7.09%). The increase in 2011 can be attributed to the government's efforts to increase revenue through taxation as the country faced economic challenges, such as high inflation and a devaluation of the local currency (International Monetary Fund, 2020). Then the country experienced a decrease in 2012 (4.77%) until 2020 (4.14%). Therefore, the country has a very low tariff rate.

2.2.5.4 Real Exchange Rates

Mozambique has been facing significant challenges in maintaining the value of its currency, the Mozambican Metical, in recent years. According to the World Bank (2021), the Mozambican metical has depreciated over the past decade. This depreciation has been largely driven by factors such as rising inflation, monetary loosening, and political instability. In particular, inflation has been a persistent problem, reaching an average rate of 12.3% in 2020 (World Bank, 2021). The increase in inflation has been fuelled by various factors, including rising food and fuel prices, as well as weak economic performance (IMF, 2020).

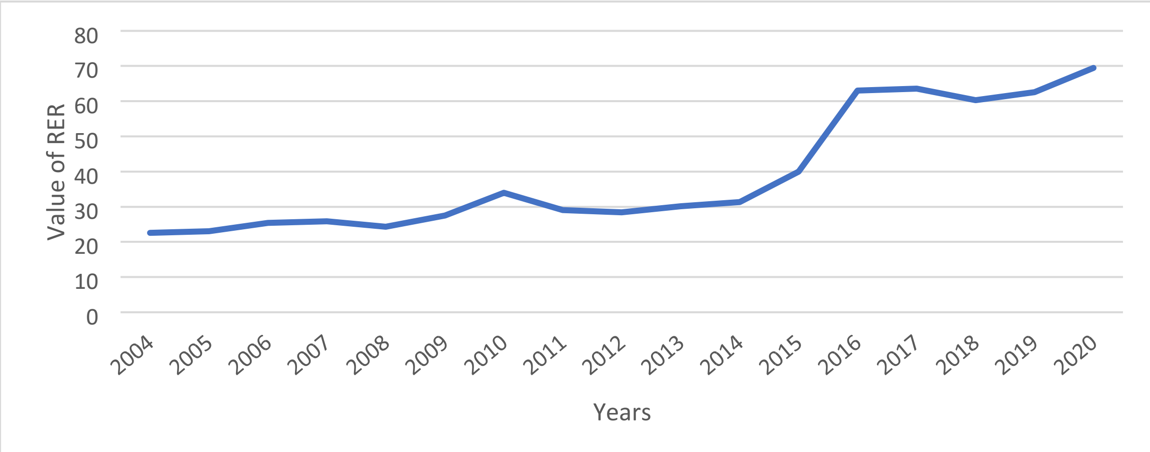


Figure 2.20: Real Exchange Rates in Mozambique
Source: World Bank Databank (2004-2020)

The graph above shows a significant depreciation of the Mozambican metical compared to US dollar from 2004 to 2020, with a particularly steep increase from 2015 to 2016. The first reason for the depreciation in the Mozambican metical was the growth of the economy. According to the World Bank (2021), the GDP of the country has grown by an average of 6.4% per year over the past decade. This growth has led to increased demand for Mozambican goods and services, that has boosted the value of the currency in a country. Additionally, the government has taken steps to promote exports and reduce imports, which has helped to improve the trade balance and support the value of the Mozambican metical. Another factor contributing to the depreciation in Mozambican Metical is political stability. For example, the country has faced persistent inflation, which has depreciated the worth of the Mozambican metical relative to other currencies (World Bank, 2021). Additionally, the country has been facing challenges in maintaining monetary stability, as the Bank of Mozambique struggled to balance the need to curb inflation with the need to support economic growth (IMF, 2020).

2.2.6 Namibia

Namibia joined SADC in 1992, and since then has been an active participant in various SADC programs and initiatives. Namibia participates in the SADC Standby Force, a regional peacekeeping force that is capable of deploying rapidly to respond to crisis situations in the region (SADC, 2021). This demonstrates Namibia's commitment to promoting peace and security in the region, and its willingness to work with other SADC member states to address regional challenges. The subsections below analyse the macroeconomic prospects for Namibia.

2.2.6.1 Income inequality

Inequality of income is a pressing issue in Namibia, with the country ranking as one of the most unequal nations globally (World Bank, 2021). According to World Bank (2019), a significant factor that contribute to income inequality is the high levels of unemployment, particularly among young people and women, and the limited access to health services and education. Another factor is unequal distribution of land. Further analysis was the country's colonial past which is said to have played a major role in having few individuals owning large portion of land. The government has taken some steps to address income inequality, including implementing social protection programs such as old age pensions and disability grants. However, these programs have not been sufficient in reducing poverty and inequality, as they have been insufficiently funded and have not reached the majority of those in need (Human Rights Watch, 2021).

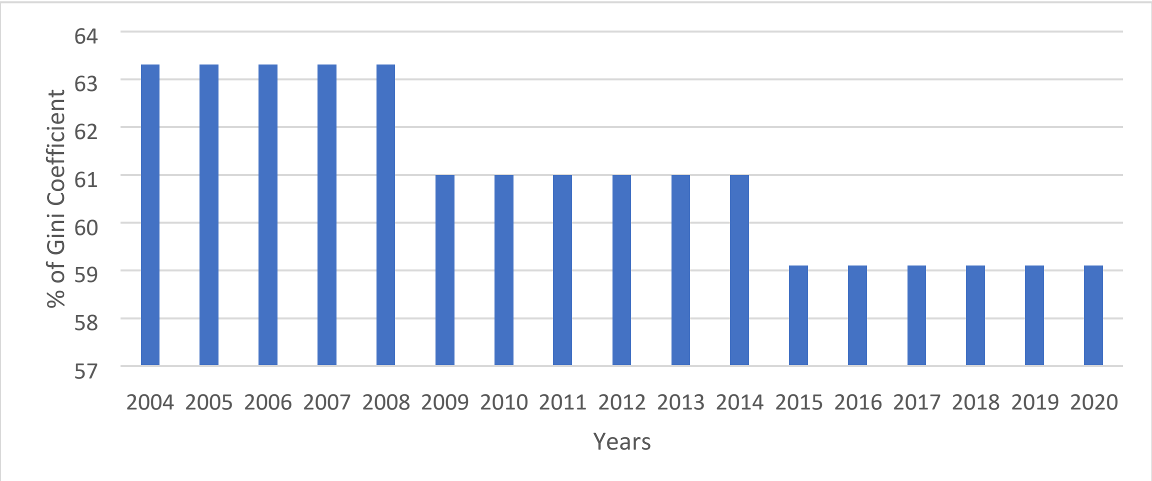


Figure 2.21: Gini coefficient in Namibia
Source: World Bank Databank (2004-2020)

The Gini coefficient shows that there has been a persistent trend of high-income inequality from 2004 to 2009, with a value of 63.3%. This indicates that a significant portion of the country's income is owned by few individuals, and that there is highly unequal distribution of income. However, from 2009 until 2020, though still much a high inequality, there was a slight decrease in income inequality dropping to 59.1%. This suggests that income distribution has slightly improved over time, with some people enjoying a share of the country's income. There are several factors that could have been contributed to the slight Gini improvement (World Bank, 2021). One, government policies aimed at reducing poverty and promoting income redistribution were implemented. Secondly, changes in the labour market, such as the creation of new job opportunities or changes in wage levels, which affected the distribution of income. Finally, external factors such as changes in the global economy, fluctuations in commodity prices, and natural disasters also played a role in determining levels of income inequality. The country still needs to address the income inequality and improve it further to below 50% and beyond.

2.2.6.2 Trade openness

Namibia has pursued a policy of trade openness to stimulate economic growth and development with a relatively open trade regime, low tariffs on imports and a relatively small number of trade restrictions. This has allowed the country to participate in the global economy and to take advantage of the benefits of international trade, such as increased access to goods and services, greater competition, and the opportunity to specialize in areas of comparative advantage (UNCTAD, 2020). Trade openness has its challenges and can create winners and losers within a country. For example, increased competition from imported goods can lead to job losses in certain sectors, while greater access to foreign capital can drive up asset prices and lead to increased inequality. Additionally, trade openness can make a country more vulnerable to external shocks, such as changes in the global economy or fluctuations in commodity prices (World Bank, 2021).

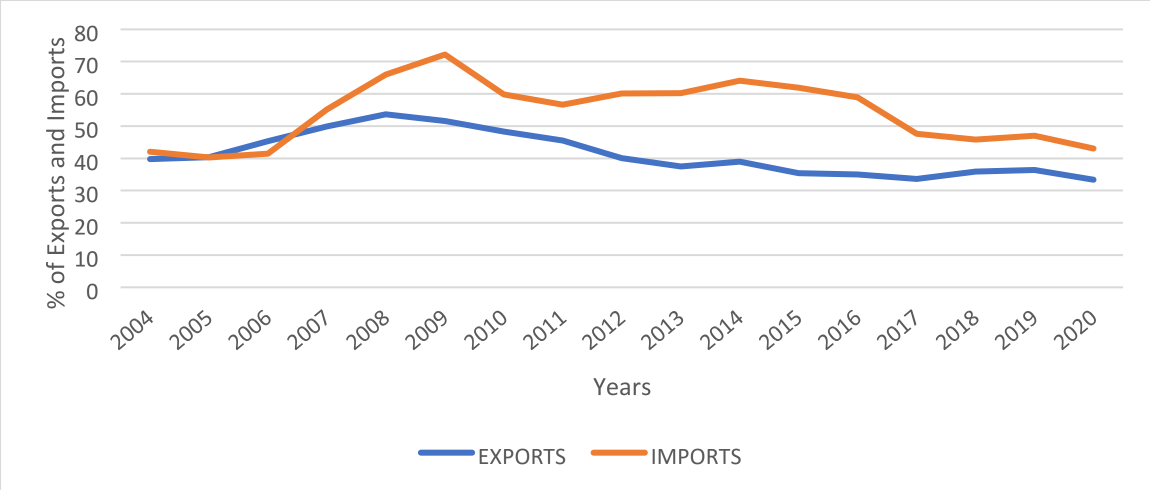


Figure 2.22: Imports and Exports in Namibia
Source: World Bank Databank (2004-2020)

The graph represents the exports and imports of Namibia from 2004 to 2020, measured in percentage. It is evident from the graph that both exports and imports have fluctuated over time. Perhaps low tariff regime explains the imports hovering above exports, where trade deficit is realised. From 2004 to 2008, exports showed an upward trend, increasing from 39.8% in 2004 to 53.6% in 2008. This was linked to the growth in the economy and the country’s ability to tap into new markets. At the same time, imports showed a similar trend, rising from 42.1% in 2004 to 65.9% in 2008. However, from 2009 to 2011, both exports and imports decreased, with exports dropping to 51.6% in 2009 and imports declining to 56.6% in 2011. This was linked to the worldwide financial crisis, which impacted negatively on the economy of Namibia and led to lower imports of services and goods and decreased demand for its exports. Since 2016, exports and imports have increased, with exports reaching 36.4% in 2019 and imports reaching 47.0% in 2019. This was attributed to the recovery of the global economy and the Namibian economy, increased demand for commodities, and a strengthening of the Namibian dollar (World Bank, 2021).

2.2.6.3 Tariffs

The government of Namibia uses tariffs as a trade policy tool to regulate trade and maintain balance in the economy. The Ministry of Trade and Industry set the tariff rates in consultation with relevant stakeholders such as the private sector, trade unions, and government agencies. The tariff rates in Namibia vary depending on the type of goods and services being imported. For example, agricultural products, textiles, and machinery typically face higher tariffs compared to other products. The rates also vary based on the country of origin, with goods from certain countries being subject to lower tariffs due to trade agreements. In recent years, Namibia has implemented several trade liberalisation policies, including reducing tariffs on selected goods, in an effort to promote trade and attract foreign investment. The government has also signed several trade agreements, including SADCFTA and the Economic Partnership Agreement (EPA) with the European Union (EU), which have helped to further lower tariffs and increase trade flows (Ministry of Trade and Industry, 2021).

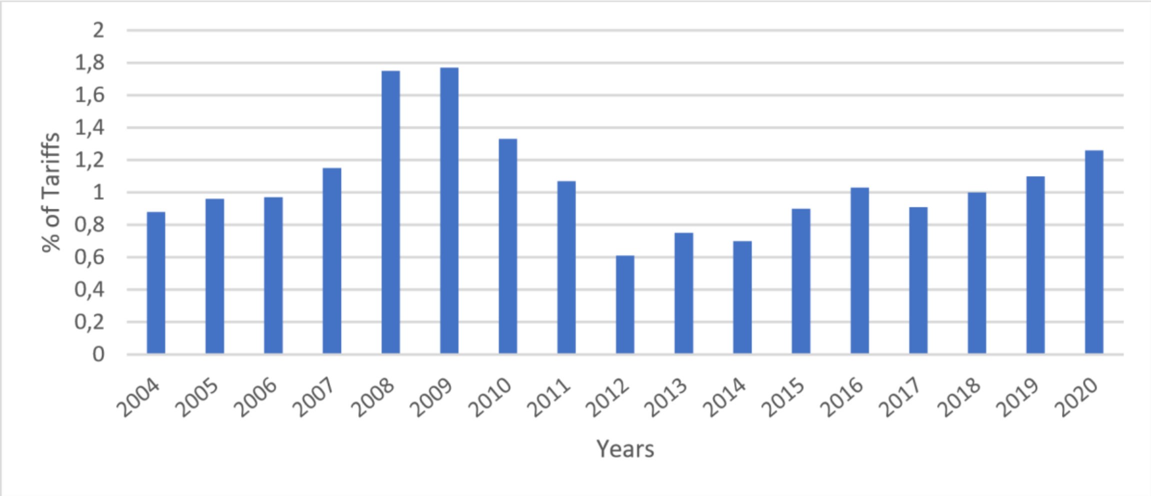


Figure 2.23: Tariffs in Namibia
Source: World Bank Databank (2004-2020)

The graph above shows the tariff rates in Namibia from 2004 to 2020. The rates are less than 2% for all years covered in this study. The country has a very low rates compared to other SADC countries, this can be attributed to its membership in SACU, which allows for member states to trade for free and CET for goods that are imported outside the union. The CET is set at a low rate of 5%, which has contributed to the low tariff rates in the country (Namibia Statistics Agency, 2018). Secondly, Namibia has also entered into various trade agreements with other countries and regional blocs, such as the EPA with the EU and the AfCFTA. These agreements have further reduced tariffs on imports and exports, which has helped to promote trade and investment in Namibia (Ministry of Industrialisation and Trade, 2019). Lastly, Namibia has implemented various economic policies that promote trade and investment, such as the Foreign Investment Act and the Export Processing Zone Act. These policies have attracted foreign investment and encouraged the growth of export-oriented industries, which has helped to diversify Namibia's economy and reduce its dependence on imports (World Bank, 2019).

2.2.6.4 Real Exchange Rates

The country uses the Namibian dollar (N$) as its official currency. Namibian dollar exchange rate in proportion to other currencies affects the country's trade, investment, and inflation rate.

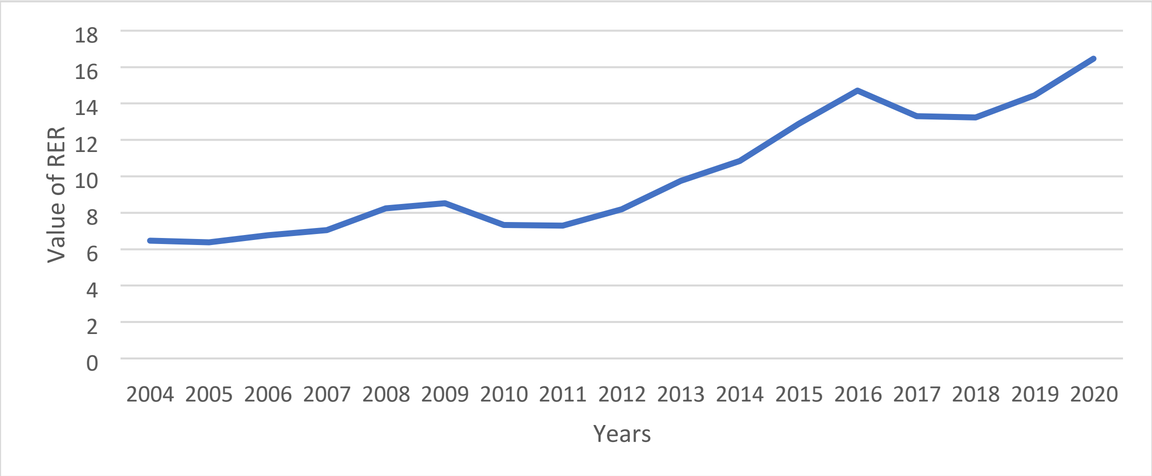


Figure 2.24: Real Exchange Rates in Namibia
Source: World Bank Databank (2004-2020)

The graph above shows the fluctuation of the Namibian dollar from 2004 to 2020. From 2004 to 2007, the Namibian dollar depreciated gradually compared to US dollar, this was attributed to the strong performance of the Namibian economy and an increase in demand for the N$ (Namibia Statistics Agency, 2021). From 2010 to 2011, the N$ compared to US dollar appreciated, but then depreciated from 2012 to 2016. This depreciation was linked to the improvement of the global economy and the increase in demand for commodities, including those produced in Namibia. From 2017 to 2018, N$ appreciated, but then depreciated against US dollar from 2018 to 2020. The reasons for these fluctuations are linked to the performance of the Namibian economy, the demand for the N$, and the global economic environment (Namibia Statistics Agency, 2021).

2.2.7 South Africa

South Africa became a member of SADC in April 1994 and participated in its first summit in August of the same year. The country held its first democratic elections in 1994 (Alence & Pitcher, 2019). Since then, the country has held democratic elections every five years, with the President serving as the head of state. With the most advanced economy in Africa, financial system in South Africa has well-developed, including one of the world's top 10 stock exchanges, as well as advanced physical and telecommunications infrastructure (Silima, 2020). Additionally, the country is a major producer of valuable minerals such as gold, diamonds, and platinum. The subsections below will examine the outlook for the South African economy.

2.2.7.1 Income inequality

South Africa has a highly unequal distribution of income, where a small group of high earners receive a large portion of the income while the vast majority of poor individuals earn very little (Mwangi, 2019). This issue is unique to South Africa due to its long racial inequality history and discrimination, resulting in significant disparities in the labour market based on race and gender (Francis & Webster, 2020). The state after apartheid played a significant role in correcting historical injustices and inequality through different laws, programs, and regulations. Despite efforts by the post-apartheid government to address these injustices, inequality remains a persistent problem in the country. This country is the most unequal country in the world in terms of income (Sulla & Zikhali, 2018), and it also has a large wealth inequality gap (Orthofer, 2016). According to the World Bank analysis, poverty is not decreasing, as the rich are becoming richer and the poor becoming poorer (Tom, 2018). The chart below illustrates the disparity in income for the top 10% and the bottom 90% of the South African population.

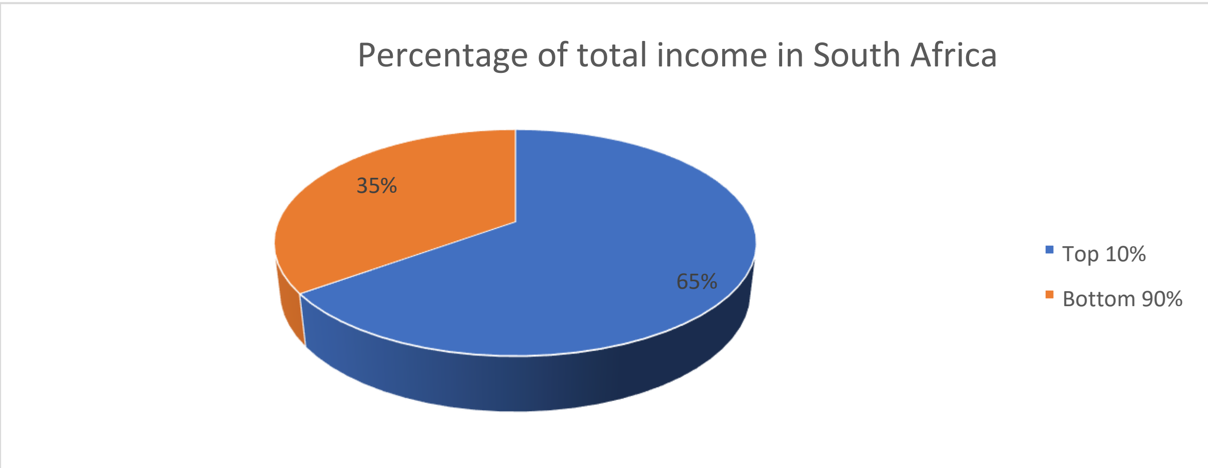


Figure 2.25: Income distribution in South Africa
Source: World Inequality Database (2019)

Figure 2.25 shows that the South African inequality has increased over time. The top 1% of earners in the country receive roughly 20% of the total income, while the top 10% earn 65% (Webster, 2019). This means that the other 90% of the population share 35% of the country’s total income.

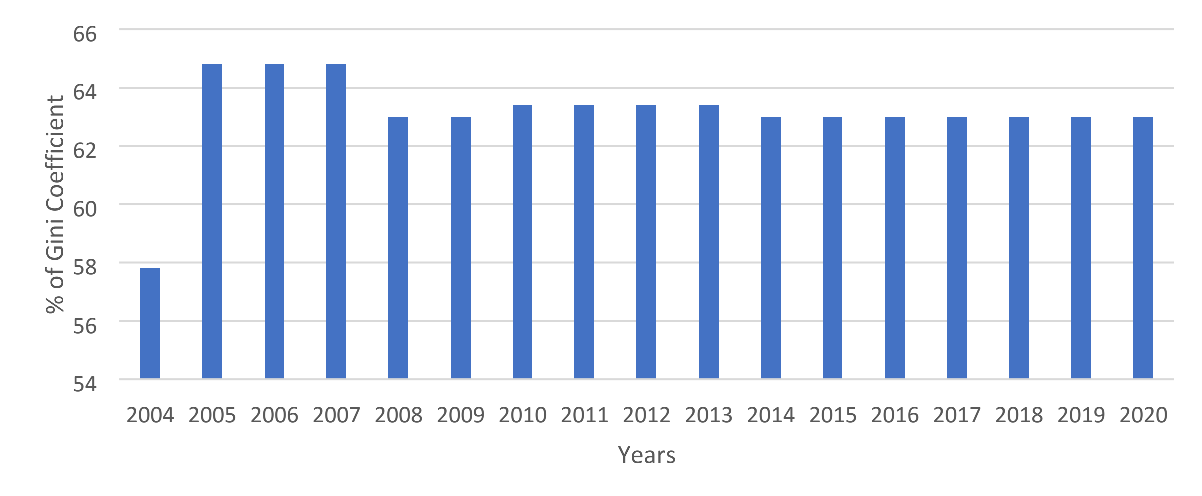


Figure 2.26: Gini coefficient in South Africa
Source: World Bank Databank (2004-2020)

As figure 2.26 shows, inequality was above 50% for all years included in the study. The highest inequality was seen in 2005, with Gini index of 64.8%. The 2007 to 2008 crisis has been linked to a drop of 1.8% in income inequality (Farouk & Leibbrandt, 2018). The country faced an increase of 0.4%, from 2010 to 2013, remaining constant at 63.4%, then decreased to 63% from 2013 to 2014. Thereafter, remained constant from 2014 until 2020. Some of the provided reasons for high inequality in the country is migration, high unemployment rate and lack of education (IMF, 2020).

2.2.7.2 Trade openness

Between 2004 and 2020, both imports and exports made a significant increase in their share of the GDP. After apartheid, the economy grew more outward-looking, productive, and open (Hirsch & Levy, 2018). South Africa's over reliance on primary products was diminished by trade liberalisation, which allowed for a shift to more sophisticated produced commodities and services. Precious mineral resources like diamonds, gold, and platinum are abundant in South Africa (Osakwe, Santos-Paulino, & Dogan, 2018).

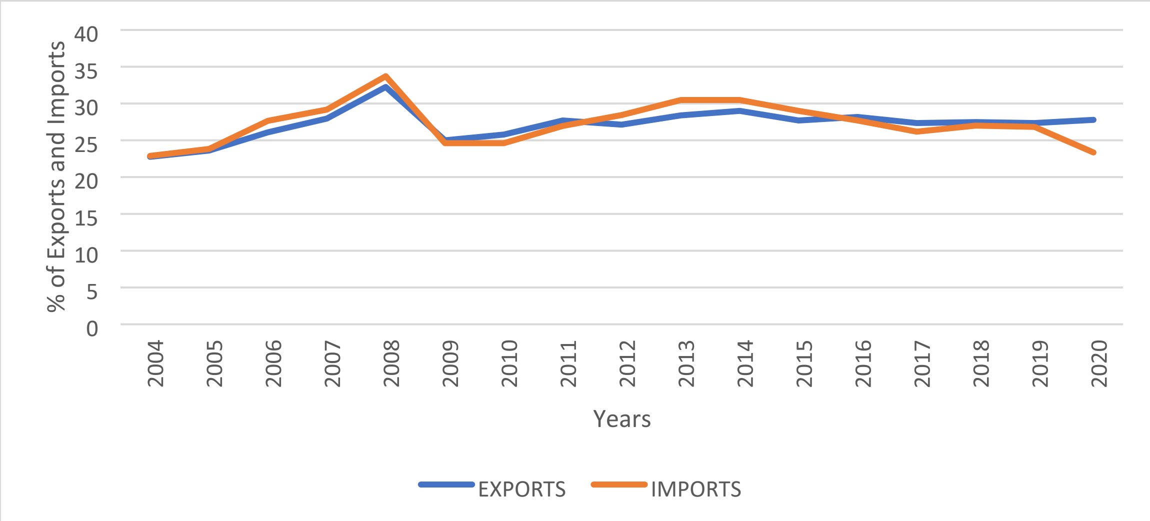


Figure 2.27: Imports and Exports in South Africa
Source: World Bank Databank (2004-2020)

Figure 2.27 shows trade openness in the country measured by the proportions of imports and exports to GDP. The graph indicates that from 2004 to 2020, the imports and exports contributed to South African GDP in quite different ways. The percentage of imports appears to have been steadily rising, peaking at 33.7 percent in 2008, although the shares of both imports and exports stayed below 35 percent throughout. Between 2004 and 2008, exports and imports both saw growth. This improvement in the ratio of exports to imports was correlated with the rand's stability of movement and the implementation of growth-based policies (Avielele, 2020). However, South Africa was also affected by the severe worldwide economic crisis that occurred in 2008. Between 2008 and 2009, both imports and exports fell significantly (Struwig & Watson, 2021). In 2013, there has been an improvement in the percentage of exports and imports, however, imports have dominated throughout, contributing around 30.5 percent, while exports contributed 28.4 percent. From 2016 until 2020, the country was facing a trade surplus, the percentage of exports was higher than imports.

2.2.7.3 Tariffs

In South Africa, imports are constrained by tariff rates. In other words, they raise the cost of products and services bought from other nations, making them less appealing to home consumers. Tariffs were implemented by the South African government for several reasons, including revenue generation, national interest protection, consumer protection, and protection of domestic industries (Bada, 2019). The trend line of applied, weighted mean tariff rates for all products in South Africa is shown in the figure below. The average of the implemented tariff rates is calculated by taking into account the proportion of each country's product imports.

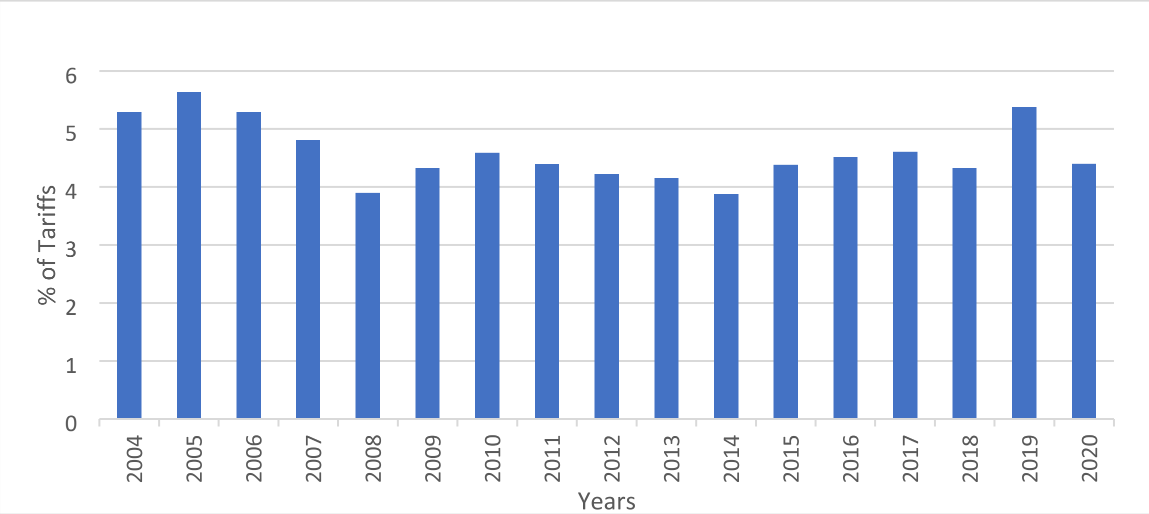


Figure 2.28: Tariffs in South Africa
Source: World Bank Databank (2004-2020)

Figure 2.28 shows tariff rate weighted mean applied for all product in South Africa. The highest value of tariff rates was seen in 2005, with the value of 5.64 percent. From 2006 until 2008, there was a decline in tariffs. In 2009 and 2010, tariff rate increased from 4.32 percent to 4.59 percent. In the latter half of 2010, there was a rise in import taxes on food that created a paradoxical situation. The purpose of these tariffs was to maintain a minimum price for food. However, this had the unintended consequence of putting pressure on low-income consumers, who already allocate a larger portion of their income towards food expenses. This went against the goal of reducing poverty, which was a crucial priority in South Africa due to its high levels of economic disparity (Makgetla, 2021). From 2011 to 2014, the country was experiencing a downward trend, but then climbed back to 5.37 percent in 2019. The tariff rates declined sharply in 2020, with a value of 4.4 percent.

2.2.7.4 Real Exchange Rates

The graph in Figure 2.29 shows the fluctuation of the South African real exchange rate, where the currency used is the Rand (R). The trend has been consistently decreasing since 2004 until 2020. The Rand has gone through cycles of fluctuation, alternating between times of appreciation and depreciation, reflecting the instability in the currency (Jim, 2022).

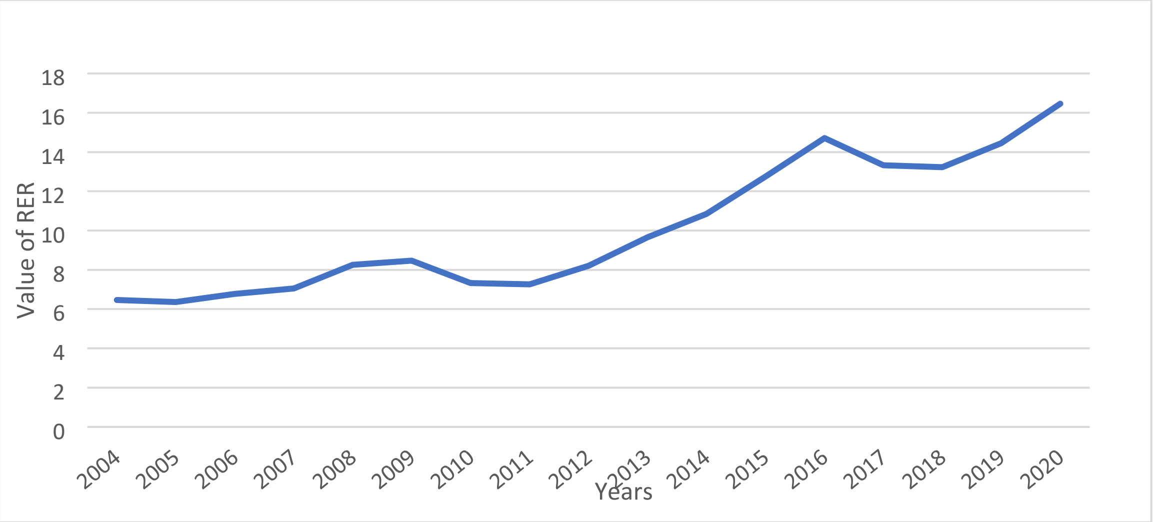


Figure 2.29: Real Exchange Rates in South Africa
Source: World Bank Databank (2004-2020)

The Rand trend from 2004 to 2020 is depicted in Figure 2.29. At the start of 2004, the value of the Rand rose against the US dollar, but it rapidly decreased by 3.2% by the end of the year, mainly due to factors such as high inflation, low interest rates, changes in portfolios, and imbalances between import and export payments (Bhoola, 2016). From 2010 to 2011, there was a small improvement in the Rand, which was attributed to the success of hosting the 2010 Soccer World Cup. However, since 2012, the rand has struggled, being one of the weakest currencies among emerging markets, affected by factors such as decreased risk tolerance toward emerging markets, fears of China's economic slowdown, low commodity prices, and interest rate increases in the US. Additionally, the domestic economy also played a role in the currency's weakness, with factors such as slow economic growth, fiscal and balance of payments deficits, and low business confidence contributing to the decline (Reuters, 2021). In 2017 and 2018, the currency appreciated by R1.39, but from 2019 to 2020, it gradually depreciated against US dollar. In 2020, the rand reached its weakest value compared to US dollar, with R16.46 per 1 US dollar (Sgammini & Muzindutsi, 2020).

2.2.8 Swaziland/Eswatini

Eswatini, formerly known as Swaziland, is a member of SADC. The country is governed under a system known as a Swati Monarchy. In this form of government, the King of Eswatini holds significant executive and legislative powers, serving as the head of state and head of government. The monarchy in Eswatini has a strong influence on the country's political, economic, and cultural affairs. Additionally, while Eswatini is an independent nation, it shares a close relationship with South Africa. The two countries are interlocked through various economic, political, and social ties. South Africa's geographic proximity and historical connections have influenced Eswatini's development and continue to shape its interactions with the international community (SADC, 2021). The subsections below analyse the macroeconomic prospects for Swaziland.

2.2.8.1 Income inequality

In Eswatini, the Gini coefficient has been consistently high, reflecting high levels of income inequality in the country. This was a result of several factors such as low levels of economic growth, unequal distribution of resources and high levels of poverty. The economy of this country is largely based on mining, agriculture and forestry, these are sectors that are not capable of providing significant employment opportunities for the majority of the population (World Bank, 2020). As a result, the majority of the population is trapped in poverty and has limited access to income and resources. Moreover, the government has also not been successful in addressing the problem of income inequality in the country. The World Bank (2021) affirms that despite efforts to implement policies aimed at promoting economic growth and reducing poverty, the country has not seen significant progress. Additionally, the government received criticism for its lack of commitment to addressing the issue of income inequality, as well as its inability to effectively implement policies aimed at reducing poverty and promoting economic growth.

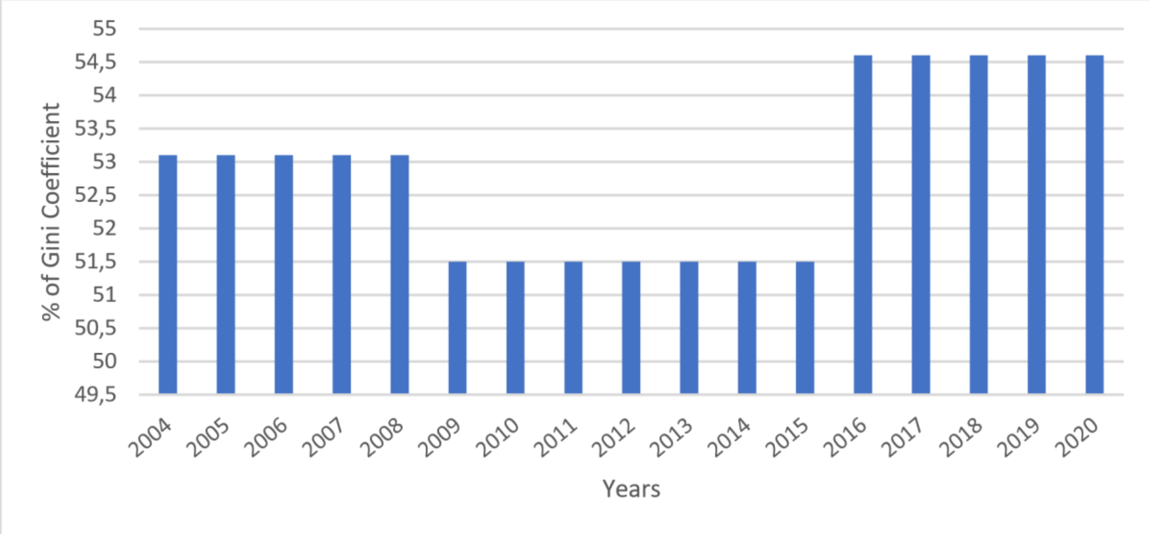


Figure 2.30: Gini coefficient in Swaziland

Source: World Bank Databank (2004-2020)

The graph above shows the Gini coefficient for Eswatini from 2004 to 2020, reflecting changes in income inequality in the country over time. In the period from 2004 to 2009, the Gini coefficient remained relatively stable at 53.1%. Thereafter, from 2009 to 2015, there was a decrease in the Gini coefficient to 51.5%. Lastly, from 2016 to 2020 increased to 54.6%. This indicates a return to high levels of income inequality in the country, reflecting a concentration of income in the hands of a few individuals and households. The reasons for this increase are not clearly, but it is likely due to several factors such as a weak economy, unequal distribution of resources, and a lack of effective government policies aimed at reducing poverty and promoting economic growth (UNDP, 2020).

2.2.8.2 Trade openness

In Eswatini, trade openness has been limited in recent years, reflecting how the country is dependent on a narrow range of exports and limited access to international markets. This limited trade openness has been a major constraint on the economic development in a country and has limited the potential for increased economic growth and job creation. The World Bank (2021) provides the following reasons or factors for the country’s ill trade performance. Firstly, the main factors contributing to limited trade openness include a lack of access to international markets, limited trade infrastructure, and weak trade policies. Secondly, the country has limited access to major international markets, which has limited its ability to export a wide range of goods and services. Thirdly, the country has limited trade infrastructure, including ports and airports, which makes it difficult to import and export goods and services. Lastly, the government has not been effective in implementing policies aimed at promoting trade and investment, which has limited the potential for increased trade openness.

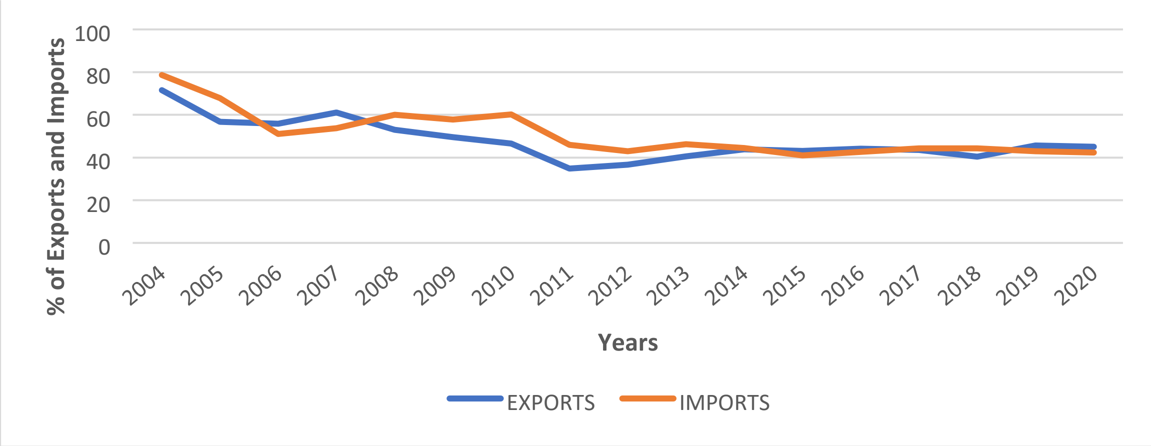


Figure 2.31: Imports and Exports in Swaziland
Source: World Bank Databank (2004-2020)

The trade openness graph in Eswatini indicates a limitation in the trade of a country, with imports and exports as a percentage of GDP fluctuating between 35% and 50% respectively. There is a general trend of decreased exports from 2004 to 2011, followed by a period of slight recovery from 2012 to 2019. In 2020, the COVID-19 pandemic resulted in a decrease in both imports and exports, reflecting the global slowdown when it comes to trade. The World Bank (2021) reports on issues concerned and how to address the trade dilemma where the limited access to international markets, and weak trade policies were stated as contributing factors to the limited trade openness. On corrective measures, to increase trade openness and promote economic growth, the government needs to implement policies aimed at promoting trade and investment, as well as improve trade infrastructure to increase access to international market.

2.2.8.3 Tariffs

ESwatini is poised to embark on an exciting journey towards economic growth and development by implementing lower tariff rates. This strategic decision to reduce tariffs aims to stimulate trade, attract foreign investments, and bolster domestic industries, ultimately enhancing the overall competitiveness of the nation. Lower tariffs will create a favourable business environment, encouraging both local and international businesses to expand their operations, generate employment opportunities, and foster innovation. By embracing this progressive approach, Eswatini is paving the way for increased trade integration, economic diversification, and sustainable development, ensuring a brighter and more prosperous future for its citizens (International Trade Centre, 2021).

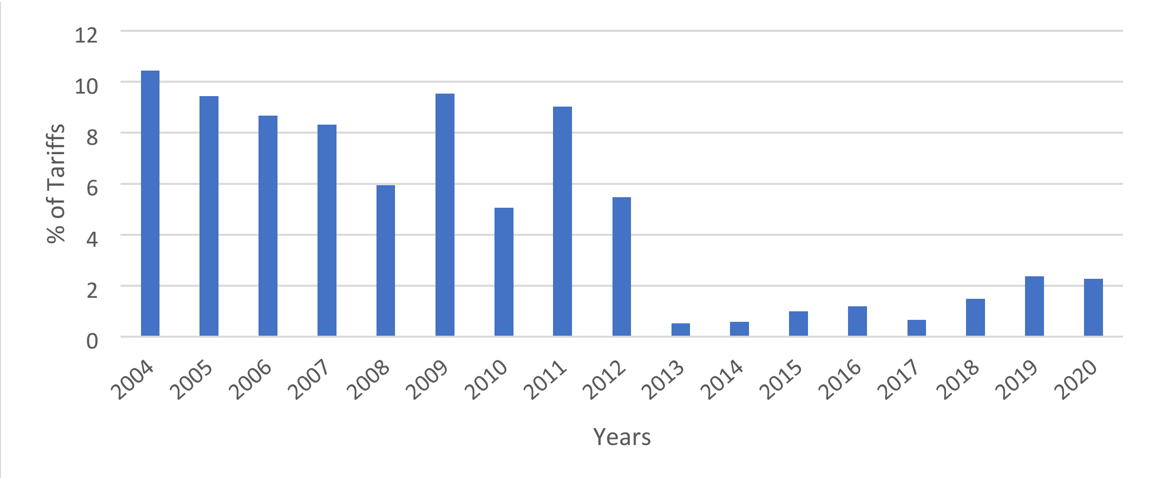


Figure 2.32: Tariffs in Swaziland
Source: World Bank Databank (2004-2020)

Figure 2.32 shows the tariff rates imposed by the government of Eswatini on imported and exported goods over a period from 2004 to 2020. The tariff was ranging between 5.5% and 10.5% from 2004 to 2012. Thereafter, from 2013 to 2020 the rates were below 2.4%. Eswatini has been implementing trade liberalization policies aimed at reducing barriers to international trade. These policies often involve the reduction of tariff rates to promote economic growth and attract foreign investment. The African Growth and Opportunity Act (AGOA) introduced by US in 2000, has also played a role in encouraging trade liberalization in Eswatini. Under AGOA, Eswatini enjoys preferential access to the US market, which has likely incentivized the country to lower its tariff rates (World Bank, 2021).

2.2.8.4 Real Exchange Rates

The Swazi lilangeni (SZL), the currency of Eswatini, has experienced a depreciation against major currencies from 2004 to 2020. Several factors that contributed to the depreciation in the currency are trade imbalances, limited diversification, political and economic instability, and capital outflows (Markit, 2019).

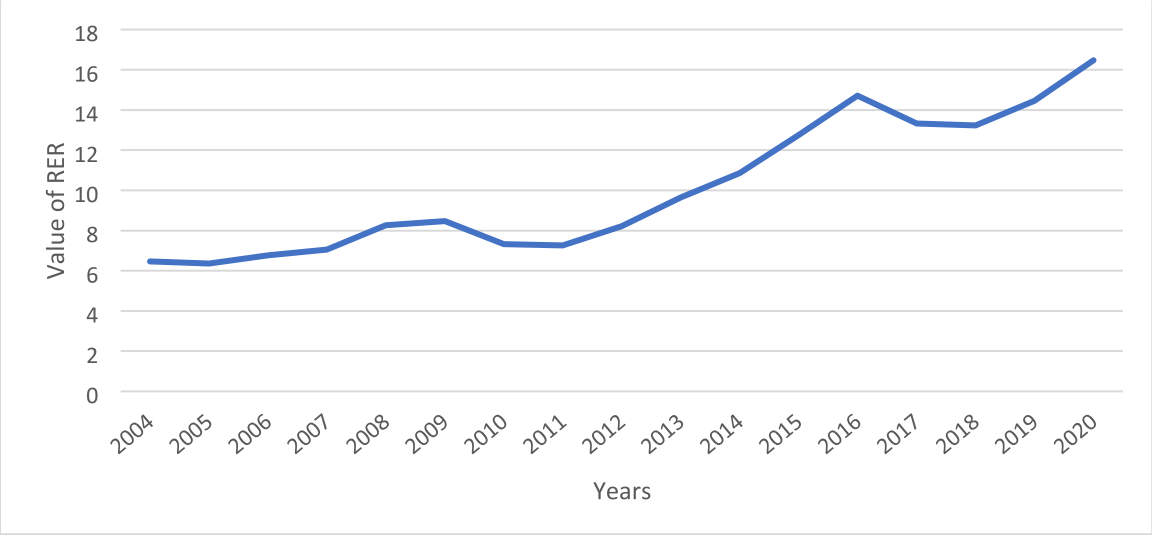


Figure 2.33: Real Exchange Rates in Eswatini

Source: World Bank Databank (2004-2020)

From 2004 to 2009, Swazi lilangeni depreciated from 6.46 lilangeni to 8.47 lilangeni against 1 US dollar. According to Mhlanga (2014), the Swazi economy was heavily dependent on external sources of income, including remittances, foreign aid, and foreign direct investment. The financial crisis led to a decline in these inflows, which affected the foreign exchange reserves in the country and subsequently weakened the value of the Swazi lilangeni. From 2009 until 2011, the currency appreciated against US dollar. The Swazi government's efforts to address fiscal imbalances, reduce budget deficits, and improve the country's debt profile was crucial for stabilizing the economy and boosting the value of the lilangeni. These measures included implementing fiscal discipline, enhancing tax collection, and pursuing prudent monetary policies. These reforms fostered macroeconomic stability and investor confidence in the Swazi economy, resulting in increased demand for the lilangeni and its appreciation against the US dollar (Thwala & Phiri, 2013). From 2011 until 2020, the lilangeni depreciated sharply compared to US dollar, reaching 14.71 lilangeni per 1 US dollar in 2016 and 16.47 lilangeni per 1 US dollar in 2020. One significant reason was the decline in export earnings due to weak global demand and unfavourable terms of trade. This led to reduced foreign exchange inflows, increasing the demand for foreign currency like the US dollar, and putting downward pressure on the lilangeni's value (World Bank, 2021).

2.2.9 Tanzania

Tanzania joined SADC in 1996. The country's membership in SADC has helped to promote economic growth, reduce poverty, and promote peace and security in the region. The organization's initiatives and programs have had a positive impact on the country and have helped to further regional cooperation and integration (South African Development Community, 2021). The subsections below analyse the macroeconomic prospects for Tanzania.

2.2.9.1 Income inequality

Income inequality is a major issue in Tanzania and has implications for economic growth and stability, as well as social and political stability. The country has experienced rapid economic growth in recent years, but this growth has not been inclusive, and income inequality remains a persistent challenge. The main cause of income inequality in Tanzania is the unequal distribution of income and wealth. This is due in large part to the unequal distribution of assets, such as land and other productive resources. For example, the top 10% of households in Tanzania control over 60% of the country's wealth, while the bottom 50% of households control only 5% of the country's wealth (World Bank, 2021).

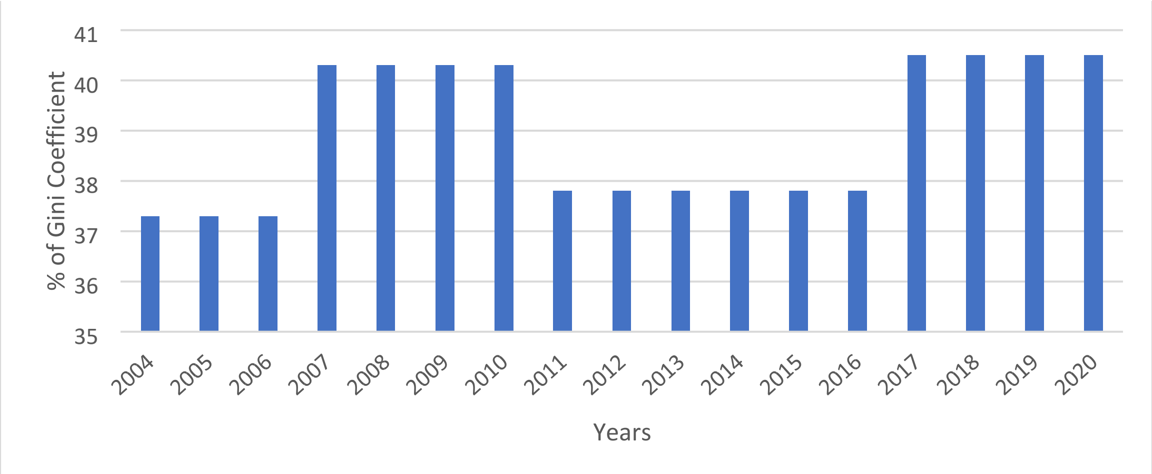


Figure 2.34: Gini coefficient in Tanzania
Source: World Bank Databank (2004-2020)

Figure 2.34 above shows fluctuations of income inequality if Tanzania from 2004 to 2020. The data provide evidence of relatively little income inequality change in Tanzania from 2004 to 2007, with the Gini coefficient remaining relatively stable at around 37.3%. However, there was a noticeable increase in inequality from 2007 to 2010, with the Gini coefficient rising to 40.3%. This trend continued from 2011 to 2016, with the Gini coefficient remaining at around 37.8%. In 2017, there was another significant increase, rising to 40.5% through 2018, 2019, and 2020. According to Smith (2020) there were several factors that may have contributed to increased income inequality. One factor is the growth of the informal sector, which is characterized by low wages and limited job security.

As more workers enter the informal sector, overall wage levels tend to decline, leading to increased income inequality (Oxfam, 2020). Another factor is the uneven distribution of opportunities, land and resources in Tanzania. For example, many rural communities are still unable to access land or other resources, which can limit their ability to generate income and participate in the economy (Wanyama, 2020). Finally, corruption and weak governance was also stated as perhaps a factor in increased income inequality. One concern, according to Transparency International (2019), was that if government resources and policies are not directed towards addressing poverty and inequality, the gap between rich and poor can continue to grow.

2.2.9.2 Trade openness

Tanzania has made significant efforts to promote trade openness as a means of promoting economic growth and reducing poverty. One of the key initiatives aimed at promoting trade openness in Tanzania is the establishment of the East African Community (EAC). The EAC was established in 2000 with the goal of promoting greater economic integration and reducing trade barriers between member countries (East African Community, 2021). Trade openness has been the main economic development factor in Tanzania in recent years (World Trade Organization, 2021). By promoting greater economic integration, reducing trade barriers, and boosting competitiveness, trade openness has helped to spur economic growth, reduce poverty, and promote greater stability in the country (International Trade Centre, 2021; United Nations Development Programme, 2020).

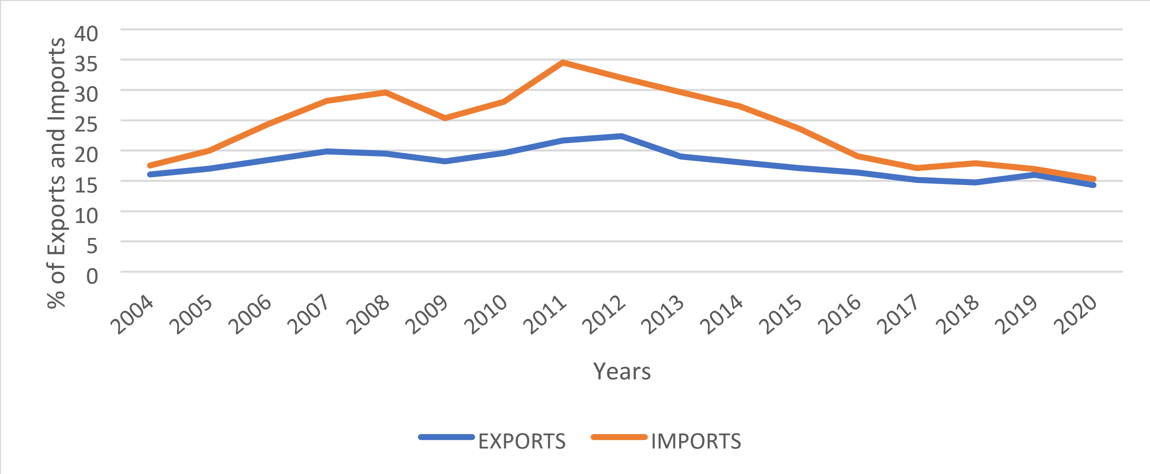


Figure 2.35: Imports and Exports in Tanzania
Source: World Bank Databank (2004-2020)

Figure 2.35 shows the imports and exports values over a period of 17 years from 2004 to 2020. The graph reveals some important trends in the country's trade patterns, which have important implications for its economic development. One of the key trends revealed by the graph is the overall decrease in the value of exports over the years. From 2004 to 2020, the value of exports in Tanzania has steadily declined, reaching a low of 14.3 percent in 2020. At the same time, the value of imports in Tanzania has also decreased, though to a lesser extent. From 2004 to 2020, the value of imports has fluctuated, but overall, it has remained relatively stable.

In 2020, the value of imports was 15.3 percent. The decline in the exports values and imports stability has resulted in a trade deficit in Tanzania, which means that the country is importing more than it is exporting. This has important implications for the country's economy, as a persistent trade deficit can lead to a depletion of foreign reserves and an increased dependence on foreign debt (International Monetary Fund, 2021). There are several reasons for the decline in the value of exports in Tanzania, including the global economic downturn, which has reduced demand for the country's products, and the appreciation of the Tanzanian shilling, which has made the country's exports more expensive (World Bank, 2021).

2.2.9.3 Tariffs

Tariffs in Tanzania are determined by the Tanzania Revenue Authority (TRA) and are typically based on the value of the goods being traded and their classification under the Harmonized commodity description and coding system (HS). Tariffs play an important role in the economy of Tanzania because they provide a source of revenue for the government and can also be used to promote local industries and reduce dependence on imports. However, high tariffs can also increase the cost of imported goods and reduce competition, which can lead to inflation and negatively impact economic growth (Smith, 2020).

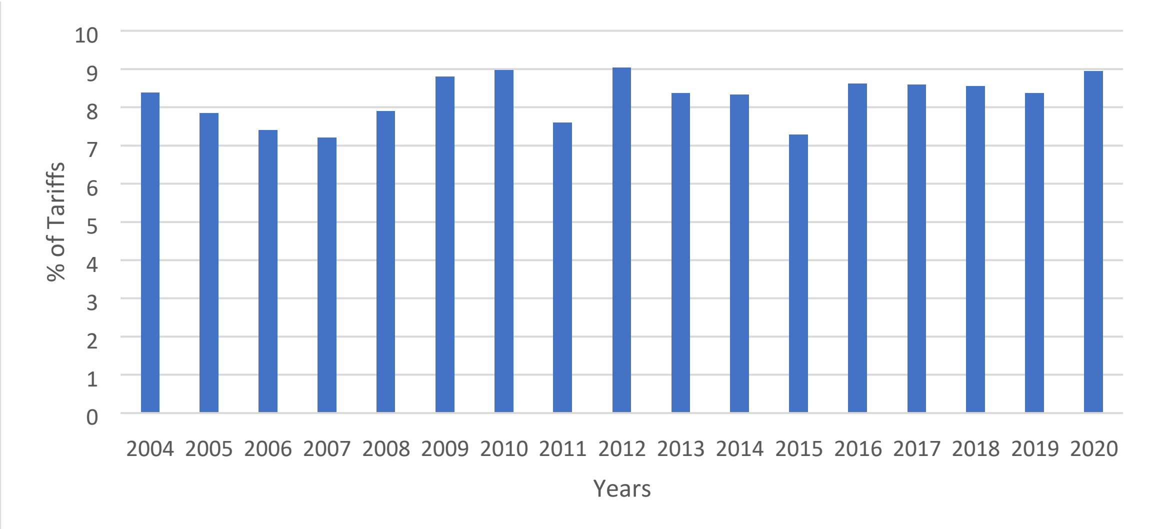


Figure 2.36: Tariffs in Tanzania

Source: World Bank Databank (2004-2020)

In figure 2.36 above, it can be observed that the tariffs in Tanzania generally increased from 2004 to 2010, with a slight decrease in 2011. This increase can be attributed to the government's efforts to generate more revenue and promote local industries. For instance, the increase in tariffs in 2008 (7.89%) can be linked to the international financial crisis, which resulted in a decrease in exports and a need for the government to increase its revenue (Smith, 2020). However, after 2011, the tariffs in Tanzania decreased and remained relatively stable until 2020. The decrease in tariffs can be related to the efforts of the government to reduce inflation and promote trade. For instance, the decrease in tariffs in 2015 (7.28%) can be attributed to the government's efforts to reduce the cost of imported goods and increase competition (Johnson, 2016). In 2020, the tariffs in Tanzania increased again to 8.94%, which can be attributed to the COVID-19 pandemic and its effect on the economy globally. The pandemic resulted in a decrease in exports and a need for the government to generate more revenue to support its economic recovery efforts (Brown, 2021).

2.2.9.4 Real Exchange Rates

The currency used in Tanzania is called the Tanzanian shilling (TZS). In recent years, the TZS has depreciated against major currencies such as the US dollar and euro, resulting in a lower real exchange rate. This depreciation is partly due to high inflation rates, which have reduced the purchasing power of the shilling in the international market. Additionally, low interest rates in Tanzania have reduced the appeal of investing in the country, leading to a lower demand for the Tanzanian shilling and, therefore, a weaker exchange rate (IMF, 2018).

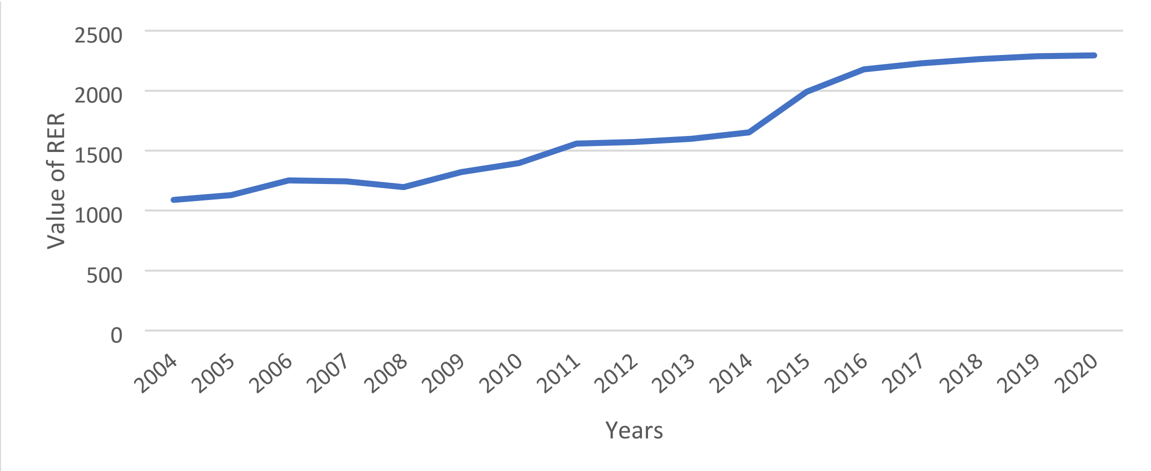


Figure 2.37: Real Exchange Rates in Tanzania
Source: World Bank Databank (2004-2020)

The TZS has experienced significant fluctuations over the years, as seen in the figure above. Between 2004 and 2008, the TZS increased from 1089,3 TZS to 1196,3 TZS against 1 US dollar. This increase can be attributed to several factors, including an improvement in the country's trade balance and a rise in foreign investment. Additionally, during this period, inflation in Tanzania was relatively low, which helped to support the TZS (IMF, 2018). Between 2008 and 2011, the TZS experienced a significant depreciation, from 1196,3 TZS per US dollar to 1557,4 TZS per US dollar. Between 2011 and 2016, the TZS continued to increase, rising from 1557,4 to 2177,1. This depreciation can be attributed to a surge in foreign investment. Between 2016 and 2019, the TZS experienced a relatively stable increase, rising from 2177,1 TZS to 2288,2. TZS per 1 US dollar. This stability can be attributed to the country's continued strong performance in key sectors, such as agriculture and tourism, as well as a stable trade balance (World Bank, 2020).

2.3 COMPARISON OF SELECTED SADC COUNTRIES

This section aims to provide a comparison of nine selected SADC countries across five key economic indicators used in the study. Detailed analysis of these indicators per country is covered in the section above. The comparison of fluctuations in Gini coefficient will start, followed by exports, imports, tariffs and lastly, the section present the real exchange rates.

2.3.1 Gini coefficient

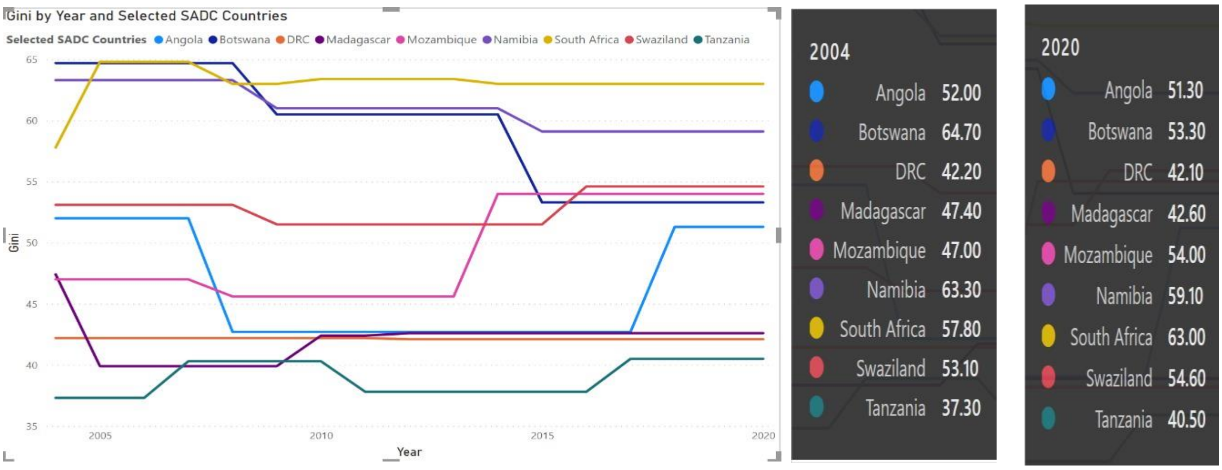


Figure 2.38: Gini coefficient in selected SADC countries

Source: World Bank Databank (2004-2020)

In comparing the Gini coefficient of SADC countries in 2004 and 2020, it is evident that there have been mixed changes in income inequality across the region. In 2004, the leading countries with higher Gini coefficients were Botswana (64.70), Namibia (63.30), and South Africa (57.80). However, by 2020, the leading countries with the highest Gini coefficients were South Africa (63), Namibia (59.10), and Botswana (53.30). These countries have consistently exhibited higher levels of income inequality within their populations over the years. It is worth noting that while some countries, such as DRC, Madagascar, and Tanzania, experienced slight decreases in their Gini coefficients, others, including Mozambique, Swaziland, and Angola, saw small increases in income inequality during this period.

2.3.2 Exports

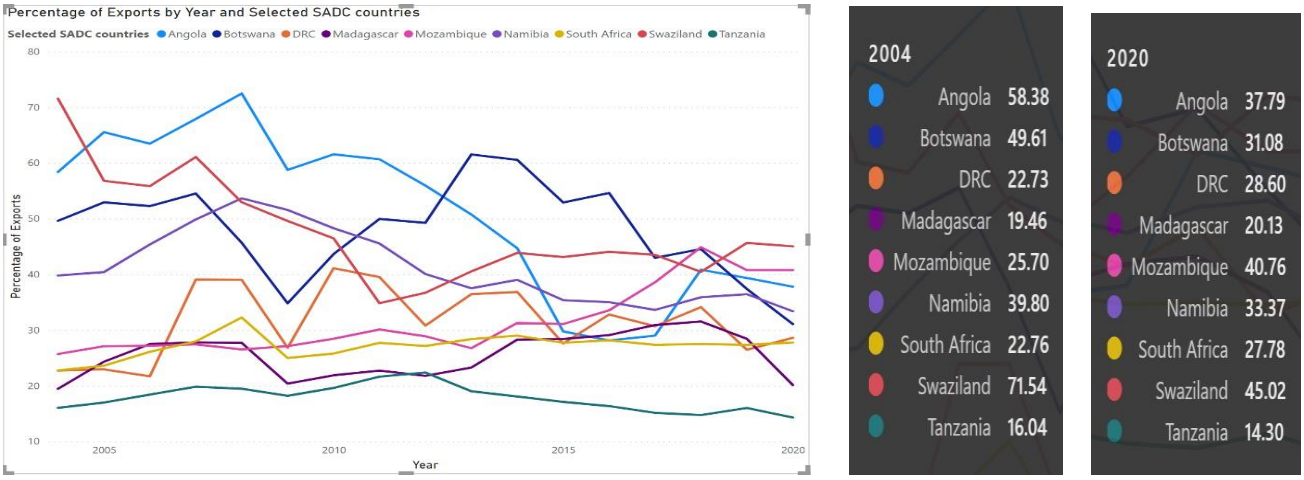


Figure 2.39: Exports in selected SADC countries

Source: World Bank Databank (2004-2020)

In 2004, the leading SADC country in terms of exports were Swaziland with 71.54, Angola with 58.38, and Botswana with 49.61. By 2020, the rankings had shifted slightly, with Swaziland still leading at 45.02, followed by Mozambique with 40.76 and Angola with 37.79. Notable changes include Mozambique's significant increase in exports and Swaziland's decrease. Other countries, such as South Africa, Botswana, Madagascar, DRC, Tanzania and Namibia, experienced varying levels of fluctuation in their export numbers, some seeing slight decreases while others remained relatively stable.

2.3.3 Imports

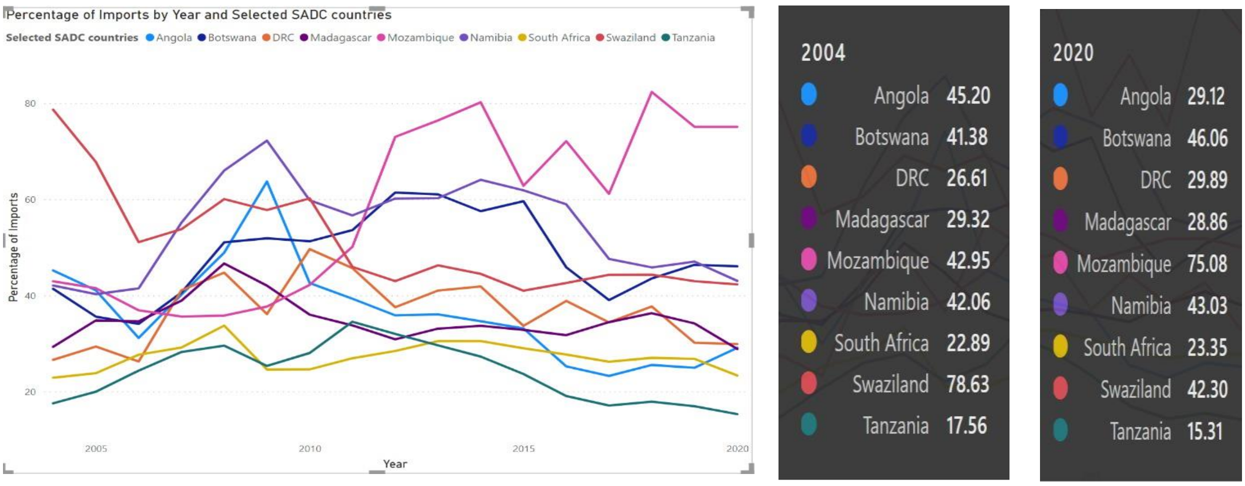


Figure 2.40: Imports in selected SADC countries

Source: World Bank Databank (2004-2020)

In 2004, the leading countries with the highest percentage of imports were Swaziland (78.63%), Mozambique (42.95%), Angola (42.20%), and Namibia (42.06%). However, by 2020, the import percentages had shifted. Mozambique experienced a significant increase in imports, reaching 75.08%, making it the highest among the SADC countries. Other leading importers in 2020 were Botswana (46.06%), Namibia (43.03%), and Swaziland (42.30%). Overall, the import percentages fluctuated over time, with some countries experiencing increases and others experiencing decreases.

2.3.4 Tariff Rates

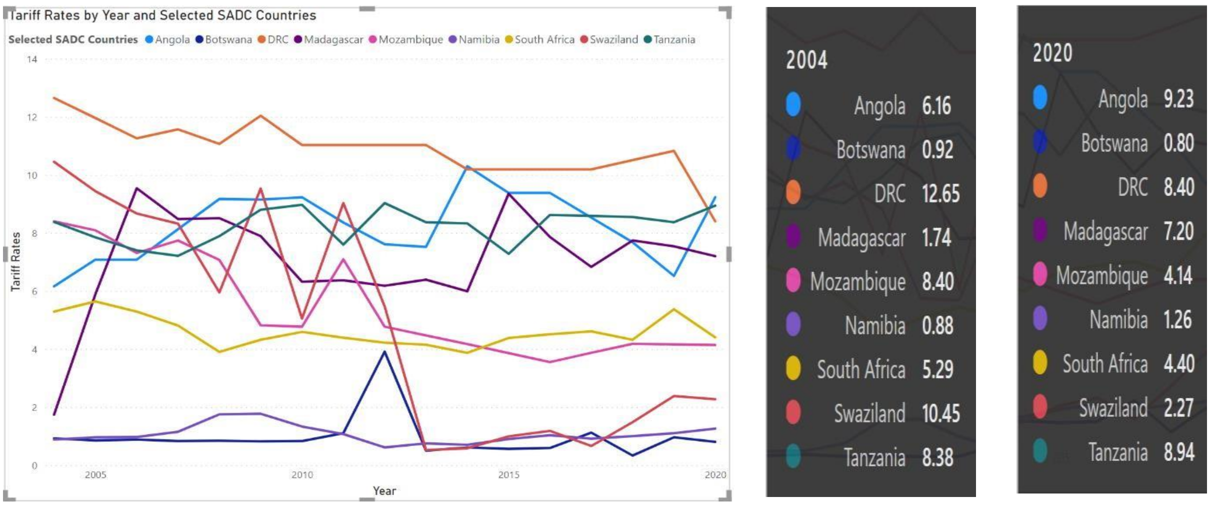


Figure 2.41: Tariff rates in selected SADC countries

Source: World Bank Databank (2004-2020)

In 2004, Angola had a tariff rate of 6.16%, which increased to 9.23% in 2020. Botswana's tariff rate decreased from 0.92% in 2004 to 0.80% in 2020. The DRC had a high tariff rate of 12.65% in 2004, which decreased to 8.40% in 2020. Madagascar experienced a significant increase in its tariff rate, rising from 1.74% in 2004 to 7.20% in 2020. Mozambique's tariff rate decreased from 8.40% in 2004 to 4.14% in 2020. Namibia saw a slight increase in its tariff rate, from 0.88% in 2004 to 1.26% in 2020. South Africa's tariff rate decreased from 5.29% in 2004 to 4.40% in 2020. Swaziland experienced a substantial decrease in its tariff rate, dropping from 10.45% in 2004 to 2.27% in 2020. Tanzania's tariff rate remained relatively stable, with a slight increase from 8.38% in 2004 to 8.94% in 2020. Among these countries, the leading countries in terms of lower tariff rates in 2020 were Botswana (0.80%), Namibia (1.26%), South Africa (4.40%), and Mozambique (4.14%).

2.3.5 Real exchange rates

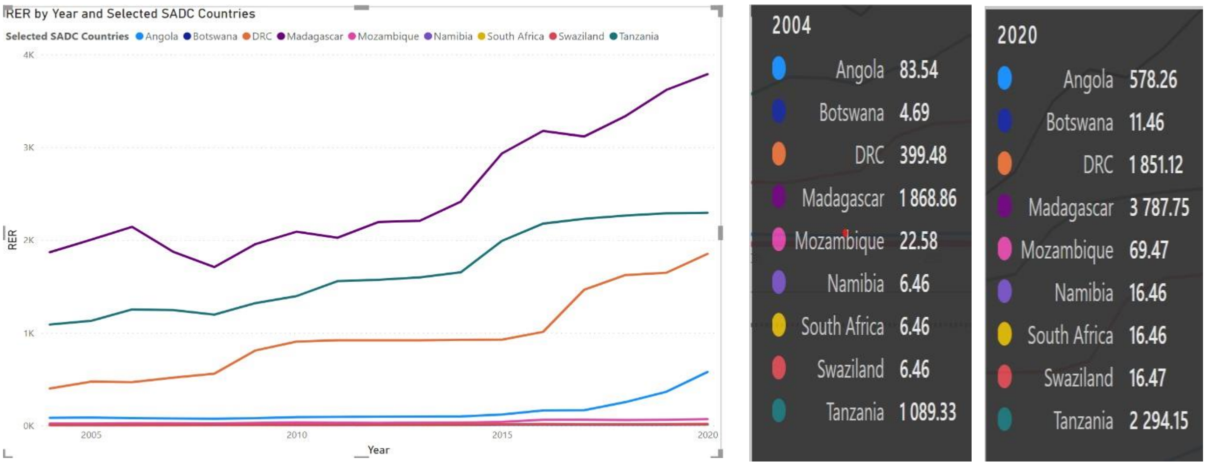


Figure 2.42: Real Exchange Rates in selected SADC countries

Source: World Bank Databank (2004-2020)

Figure 2.42 indicates a comparison of SADC countries' currencies to the US dollar based on real exchange rates, there have been significant changes between 2004 and 2020. In 2004, Angola's currency stood at 83.54 kwanza against the US dollar, but by 2020, it had depreciated to 578.26 kwanza. Botswana's currency also experienced depreciation, going from 4.69 Pula in 2004 to 11.46 Pula against US dollar in 2020. The DRC saw its currency weaken from 399.48 Congolese franc to 1851.12 Congolese franc against US dollar. Madagascar's currency depreciated from 1868.86 Malagasy ariary to 3787.75 Malagasy ariary against 1 US dollar, while Mozambique's currency went from 22.58 Mozambican metical to 69.47 Mozambican metical against the US dollar. Namibia, South Africa, and Swaziland had their currencies remain relatively stable, with the value of 6.46 (Namibian dollar, Rand, and Swazi lilangeni) to 16.46 (Namibian dollar and Rand) and 16.47 (Swazi lilangeni), respectively. Tanzania experienced a depreciation, with its currency going from 1089.33 Tanzanian Shilling to 2294.15 Tanzanian shilling against the US dollar. Therefore, the country with less currency value in 2020 is Madagascar.

2.4 SADC AND AFCFTA

The AfCFTA is considered the largest free trade area in terms of participating nations since the establishment of the WTO. It is anticipated that the AfCFTA will establish a single market for commodities and services, enabling the unrestricted flow of capital, goods, and services throughout the continent. This is expected to lead to increased trade and investment, job creation, and economic growth, helping to raise living standards and reduce poverty in Africa (African Union, 2021).

One of the key benefits of the AfCFTA is that it provides African countries with a platform to negotiate as a bloc and bargain with more powerful trading partners in the global economy. This is expected to help level the playing field and increase the bargaining power of African countries in trade negotiations. However, the AfCFTA also poses some challenges, including the need for infrastructure development, regulatory harmonization, and the elimination of non-tariff barriers to trade. Some African countries may also be concerned about competition from larger and more efficient firms, which could potentially harm small and medium-sized enterprises. Despite these challenges, the AfCFTA is a significant step forward in the integration of the African continent. The agreement is expected to impact positively on job creation, poverty reduction, economic growth, as well as improve the competitiveness of African firms in the global economy (African Commission, 2020).

SADC has a significant position in the AfCFTA, as it is one of the largest regional economic communities in Africa and includes some of the continent's most developed economies. According to the SADC Secretariat (2021), the organization is committed to supporting the AfCFTA and contributing to its success. This commitment is reflected in the SADC Industrialization Strategy and Roadmap, which recognizes the importance of regional integration and the AfCFTA in promoting economic development in the region.

SADC is supporting the AfCFTA by ensuring that its member states are ready to participate in the single market. This involves helping member states to address trade related challenges, such as infrastructure and transport constraints, and to implement the necessary legal and regulatory frameworks (SADC Secretariat, 2021). The organization is also working to enhance the competitiveness of SADC industries, with a focus on value-added production and intra-regional trade (SADC Secretariat, 2021). Efforts made by the SADC Secretariat to harmonize policies, legislation and develop financial markets and instruments in the region are commendable and contributes to a great extent to developing the region. The AfCFTA is expected to promote trade and investment, increase economic growth, and create job opportunities across the continent. However, income inequality remains a significant challenge in SADC, and the AfCFTA could play a crucial role in addressing this issue. The unequal distribution of wealth and income between different socioeconomic groups within a country can impede economic growth, reduce social mobility, and increase poverty levels. The AfCFTA is designed to promote intra-African trade, which is expected to lead to increased economic growth, job creation, and improved competitiveness for businesses. By increasing trade, the AfCFTA can provide an opportunity for African countries to reduce poverty levels and boost economic growth, thereby reducing inequality of income.

Key feature of the AfCFTA is the elimination of tariffs on goods traded between member states. This will make it easier for businesses to trade across borders, reducing the costs of doing business and improving the competitiveness of African firms in the global market. The AfCFTA will also promote investment by creating a level playing field for businesses operating in different countries, allowing them to expand their operations, create new jobs, and increase their revenue (African Union, 2020). Moreover, the AfCFTA also aims to address income inequality through its provisions on Small and Medium-sized Enterprises (SMEs). These businesses, being a critical employment source and a major influence on the growth of the economy in many African countries, often face significant challenges in accessing markets and financing. The AfCFTA seeks to address these challenges by providing SMEs with access to markets, financing, and technical assistance, allowing them to grow and create more jobs (African Union, 2020).

2.5 SUMMARY

Income inequality remains a major challenge in the SADC region as there is a vast difference between the poor and the rich, which hampers the growth of the economy and stability. Trade openness, on the other hand, has been on the rise, with the region being one of the most open in Africa. This has led to increased integration and cooperation between SADC countries, which is a key factor in driving economic growth, and perhaps alleviating the inequality pandemic through trade. Tariffs, while necessary to protect local industries and businesses, can also limit trade and investment opportunities. The potential impact of the resource curse for a lot of these countries is relevant as they are dependent on a few commodities or minerals to stimulate exports. Fluctuations in commodity prices will affect the sector and the economy as well, especially the economic growth rate and performance. The SADC region has made efforts to reduce tariffs and promote free trade, but more can be done to improve the trade environment and increase the flow of services and goods.

Real exchange rates are crucial in determining the competitiveness of the region and its ability to participate in the global economy. The SADC region has made significant strides in improving its exchange rate stability, but more work needs to be done to ensure that it remains competitive. The changed trade elasticities are excluded as well. The World bank in a recent study in 2023 found that elasticities increase with an increase in per capita income. It is important that elasticity is greater than one for developed countries and less for developing countries and implies different asymmetric responses to shocks. The AfCFTA presents a significant opportunity for the SADC region to increase its trade and investment with other African countries, leading to increased economic growth and stability. However, it will require careful management and coordination to guarantee that the benefits of the AfCFTA are distributed equally and that the region remains competitive in the global economy.

CHAPTER 3

LITERATURE REVIEW

3.1 INTRODUCTION

Chapter three explains the theoretical framework and empirical literature between inequality and the four selected macroeconomic variables. Firstly, the chapter examines the theoretical literature, which details the different hypotheses on the impact of exports, imports, tariffs, and exchange rates on inequality. The theoretical framework helps to ensure that the research is logically structured and that the findings are consistent, or even in contradiction with existing theories. Secondly, the chapter examines the empirical literature which presents the information from other researchers. The review thereof helps relate the gap that this study aims to fill, while helping reflect the study significance.

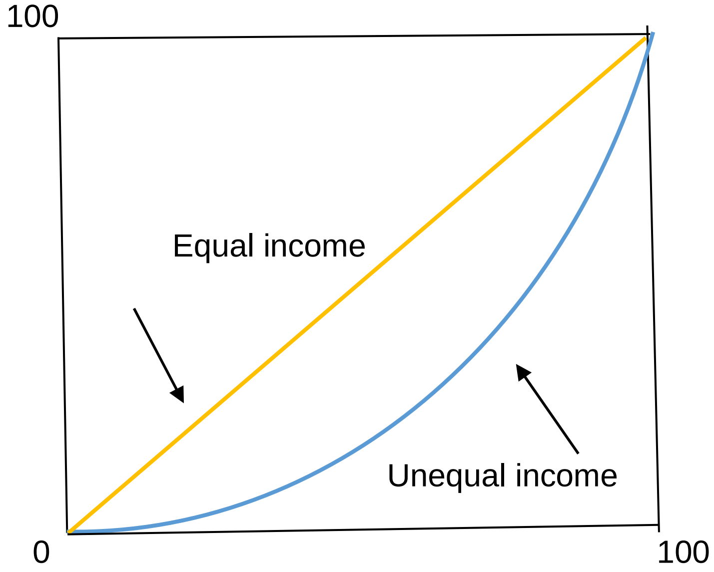
3.2 THEORETICAL FRAMEWORK

The theories discussed below were employed to explain the effects of exports, imports, tariffs, and exchange rates on inequality. The theories included the Lorenz curve which measures income inequality, the Heckscher-Ohlin Theory to account for trade and income inequality, the Ricardian Model of Trade Theory to account for tariffs and inequality and the Purchasing Power Parity Theory to account for real exchange rates.

3.2.1 The Lorenz Curve

The Lorenz curve is a graphical representation commonly used to depict income or wealth inequality (Vineeth, 2021). Lorenz curve was initially established by American economist Max O. Lorenz in 1905 as a means to illustrate the distribution of wealth in American society during the conclusion of the Gilded Age in the late 19th century, a period marked by extreme economic disparity in the United States (Lorenz, 1905). The Lorenz curve, closely related to the Gini coefficient, which measures income inequality in an economy, is widely recognized and employed in economics to assess and present the level of fair distribution of income or wealth (Prateek, 2019). The Lorenz curve provides a quantitative measure of income distribution within the SADC region, allowing for a comprehensive assessment of inequality levels. Below is the graphical representation on income distribution.

Cumulative % of income



Cumulative % of a population

Figure 3.1: The Lorenz Curve

The Lorenz curve has an x-axis representing the cumulative percentage of population and a y-axis representing the cumulative proportion of revenue. The curve is plotted from coordinates (0:0) throughout to (100:100). The Gini coefficient, which is used to demonstrate inequality, has a range from 0 to 100. Absolute equality is correlated with a Gini coefficient of 0. This implies that everyone has an equal level of wealth or income (Vineeth, 2021). The straight-line graph passing through the origin and ending at (100:100) represent the perfect equal distribution of income. A Lorenz curve that is below this line indicates that the distribution is unequal, and the greater the difference between the two curves, the more unequal the distribution is (Loranz & Robbin, 2017). The Lorenz curve has been widely used to study income and wealth inequality around the world. For example, a recent study by the World Bank found that the Gini coefficient for income in the United States increased from 0.40 in 1980 to 0.48 in 2018, indicating a growing inequality in the distribution of income (World Bank, 2020). Similarly, a study by Oxfam found that the wealth of the richest 1% of the world's population is equal to that of the poorest 50% (Oxfam, 2021). These studies demonstrate the usefulness of the Lorenz curve in measuring income and wealth distribution the extent of inequality in the world.

3.2.2 The Heckscher Ohlin theory

The Heckscher-Ohlin is the theoretical link between trade and income inequality. The Hecksher-Ohlin theory is a fundamental theory in international trade as it explains the determinants of trade patterns between countries according to the differences in relative factor endowments. This theory was developed in 1930 by Eli Heckscher, Swedish economist, and his student Bertil Ohlin. The theory suggests that nations will specialize in the production of goods that are abundant in that country and trade with other nations to get goods that require relatively scarce factors (Ohlin, 1933). The two factors of production considered in the theory are capital and labour, and trade occurs between countries that have different endowments of these factors (Madhuri & Dheeraj 2021).

The Hecksher-Ohlin theory states that a nation will have a comparative advantage in producing goods that require the utilization of plentiful factors of production inside that nation. For example, a country possessing large amounts of capital will have a comparative advantage when producing capital-intensive goods like machinery and equipment, while a country possessing large amounts of labor will have a comparative advantage when producing labor-intensive goods like textiles and clothing. The Hecksher-Ohlin theory of trade offers a framework for comprehending how variations in a country's factor endowments affect patterns of international trade (Krugman, Obstfeld, & Melitz, 2014).

The Hecksher Ohlin theory is based on the assumptions below:

- There are two nations, each producing two goods using two factors of production - labour and capital.
- The two countries have different relative endowments of labour and capital.
- The two goods are different in their factor intensity. One is capital-intensive, while the other is labour-intensive.
- The production function of each good exhibits’ constant returns to scale.

Beyer, Rojas, and Vergara (1999) suggest that openness increases income inequality in Chile by enlarging the wage gap between unskilled and skilled employees. Harrison and Hanson (1999) come to the opposite conclusion from the Heckscher-Ohlin model's estimate and claim that trade reform has made wage disparity worse in the case of Mexico. In the context of Africa this means that the AfCFTA may exhibit a worsening effect on inequality. However, even the contrary is possible because the trade pact is aligned only for the African nations, which all are still in the developing phase. Heckscher-Ohlin theory states that rising wage inequality due to trade is frequently linked to the relative abundance of untrained labour. This is particularly relevant in emerging nations like the African nations.

The Heckscher-Ohlin theory can be mathematically expressed using the following equation:

$Q = f(K,L)$……………………………………………………………………...……(3.1)

Equation (3.1) represents the fundamental concept of the Heckscher-Ohlin theory, which seeks to explain international trade patterns based on factor endowments. It claims that the production function f(K, L) represents the relationship between the quantity of a good produced (Q) and the amounts of capital (K) and labor (L) used in its creation. According to the hypothesis, nations will focus on manufacturing commodities that make greater extensive use of their plentiful resources for production. For example, if a country has a relative abundance of capital compared to labour, it will specialize in producing capital-intensive goods and export them, while importing labour-intensive goods. This equation serves as a mathematical foundation for understanding the relationship between factor endowments and international trade patterns within the Heckscher-Ohlin framework.

The Heckscher-Ohlin theory has been criticised in the past years (Dixit & Norman, 1980). One of the criticisms of the theory is that it does not consider the effects of technological differences and economies of scale on international trade. Another criticism is that the assumption of two factors of production is too simplistic and unrealistic (Gandolfo, 2010). Despite its limitations, the Heckscher-Ohlin theory remains an important contribution to the study of international trade (Feenstra & Taylor, 2017; Heckscher, 1919). It provides a useful framework for understanding the role of factor endowments in determining patterns of trade and can help policymakers make informed decisions about trade policies (Helpman & Krugman, 1985; Jones, 2001).

In the context of the research topic on addressing inequality in the SADC through trade openness, tariffs, and exchange rates, the Heckscher-Ohlin theory provides valuable insights. Specifically, the theory suggests that trade can exacerbate income inequality within countries by favouring factor-abundant groups while potentially reducing inequality between nations. For instance, countries with a surplus of production factors might specialize in and export goods that heavily utilize these factors, thereby raising wages for the factor's owners. Conversely, countries with scarce factors may import such goods and experience lower wages for the owners of scarce factors. However, this is a simplified perspective, and the actual impact of trade on inequality is complex and heterogeneous, influenced by factors such as labour market dynamics, technology transfer, and wealth distribution. Therefore, policymakers in SADC need to carefully consider these complexities when designing trade policies to mitigate potential inequality effects and ensure inclusive growth.

According to the Heckscher-Ohlin theory, countries with a surplus of production factors will likely specialize in and export commodities that heavily utilize them, which will raise the wages of the factors' owners. Conversely, countries with scarce factors will import such goods and experience lower wages for the scarce factor's owners. Therefore, trade, according to the theory, could exacerbate income inequality within countries by favouring the factor-abundant groups while potentially reducing inequality between nations. However, this is a simplified view, and in reality, trade can have complex and heterogeneous effects on inequality, influenced by various factors such as labour market dynamics, technology transfer, and the overall distribution of wealth and power within and between countries. Policymakers need to consider these complexities and adopt targeted measures to address potential inequality issues resulting from trade.

3.2.3 Ricardian Model of Trade Theory

The Ricardian Model of Trade Theory is the theoretical link between tariffs and income inequality. The theory is a classical economic model that explains the gains received from trade and the distribution of those gains between countries. English political economist David Ricardo developed this theory in his well-known book of Principles of Political Economy and Taxation in 1817. It is the first official framework for global trade. The benefit had already been promoted by Adam Smith before Ricardo. Ricardo strengthens the case for free trade by offering a theoretical framework based on the principle of comparative advantage. The Ricardian model of international commerce tries to account for the differential in comparative advantage based on technological variations between the nations. The main supply-side divergence between the two trading nations is the result of the technological disparity. The Ricardian model presupposes that all other variables are connected across all nations (Madani, 2021). Utilizing the Ricardian Model of Trade Theory, it becomes evident that tariffs within SADC can perpetuate inequality by distorting resource allocation and hindering the comparative advantage of countries with less developed economies.

If a nation can manufacture a good at a lower opportunity cost than another nation, it has a comparative advantage over that nation. The price of manufacturing one unit of a good relative to the creation of another is known as the opportunity cost (Marjit, 2020). According to the theory, each country should concentrate on producing items in which it has a competitive advantage and 'trade with other countries. (Spirin, 2021). This allows both nations to consume a combination of goods that is greater than what they could produce on their own. The gains from trade arise because each country is able to produce the goods it specializes in at a lower cost than it would be able to produce the other good. The Ricardian model can be used to explain income inequality between nations The model assumes that the gains from trade will be distributed between countries based on their relative endowments of factors of production. The Ricardian model considers labour to be the only factor of production and makes the assumption that labour productivity varies across nations (Asogwa, et al., 2022).

The distribution of the gains from trade between countries depends on the elasticity of demand for the goods produced by each country. If the demand for the good produced by the country with the comparative advantage is relatively inelastic, then the gains from trade will accrue mainly to that country. Trade benefits will be divided more equally between the two nations if the demand for the good provided by the one with the comparative advantage is more elastic (Firooz & Heins, 2020). The model predicts that tariffs will raise the cost of imported goods while lowering their import volume. Consequently, the importing country will experience an increase in labour demand while the exporting country will see a decrease (Masood, et al., 2023).

The Ricardian model of trade addresses the interchange of intermediate goods between a developing nation and the rest of the developed world. This model produces the U-shaped correlation since the preferences of the political majority are influenced by inequality both in terms of how much of the tax base is used for income taxes and tariffs and how much of the tax base is used for other purposes (Katsimi & Moutos, 2010). The labour theory of value serves as the foundation for the Ricardian model of trade. This concept emphasized how technology advancements were the main driver of trading operations. Trade is advantageous for all the nations involved in international trade, in contrast to other theories of international trade that contend that trade benefits certain countries but not others (Yoshihara, 2021).

Based on the analysis of the Ricardian model of trade theory and its link to tariffs and income inequality, several conclusions can be drawn. The model highlights that tariffs can have significant implications for income distribution between nations. Tariffs, by increasing the price of goods imported, can lead to a redistribution of gains from trade, affecting wages in exporting and importing nations. If the demand for the imported good is relatively inelastic, tariffs may disproportionately impact consumers in the importing country, potentially exacerbating income inequality within that (Meng, Russ, & Singh, 2023). Conversely, tariffs may have less of an impact on welfare if the demand for the imported commodity is relatively elastic, but they may still have an impact on how profits are distributed among the participating nations. Furthermore, the model underscores the importance of technological differences as a key determinant of comparative advantage and the overall benefits of trade for nations, even for developing countries with lower technology levels. In conclusion, the analysis based on the Ricardian model suggests that tariffs can have complex effects on income inequality, and the distribution of gains from trade will largely depend on the specific circumstances and elasticities of demand involved. Policies should carefully evaluate these factors when recommending trade policies to ensure a more equitable distribution of rewards and support sustained economic growth.

3.2.4 Purchasing power parity theory

The PPP hypothesis is one widely accepted economic theory that explains the relationship between real exchange rates and income inequality. According to this theory, the relative prices of products and services in two nations determine the actual exchange rate between them. According to the PPP theory, the ratio of the prices of a basket of goods and services in two countries should be equal to the exchange rate between those two countries (Bahmani-Oskooee & Fariditavana, 2021). This implies that if the price of a basket of goods and services in one country is twice that of another, then there must be a two-to-one exchange rate between the two. A valuable practical application of the Purchasing Power Parity (PPP) is the Burgernomics that is widely used internationally. According to this the Big Mac Index is a practical application that countries use to assess whether the exchange rate is over or undervalued, for example, the South African Rand ZAR is significantly undervalued. In a nutshell, the PPP theory postulates that two countries' exchange rates will eventually adjust to equalize the buying power of their respective currencies.

The PPP theory states that the real exchange rate ought to represent the relative price levels of the two nations. PPP theory's principal consequence is that variations in national inflation rates ought to be the primary cause of exchange rate volatility (Zhugri, 2022; Rogoff, 1996). If a nation is experiencing high inflation than other nations, the currency of that country depreciate or lose value relative to other nation's currency to sustain the relative price levels of services and goods. For example, if the inflation rate in Angola is higher than in Tanzania, the Angolan kwanza should depreciate relative to the Tanzanian shilling to equalize the price levels of goods and services. Therefore, application of the PPP Theory reveals how fluctuations in exchange rates can impact the real incomes of individuals within the SADC region, potentially exacerbating inequality by affecting the purchasing power of different income groups. PPP theory has important implications for international trade. If exchange rates are determined by relative price levels, then countries with higher inflation rates should have cheaper exports and more expensive imports, while countries with lower inflation rates should have more expensive exports and cheaper (Itskhoki, 2021; Taylor, 2002). This can make it more difficult for countries with high inflation rates to compete in international markets, as their goods and services are relatively more expensive. Conversely, nations with low inflation rates may have a comparative advantage in international trade, as their goods and services are relatively cheaper.

In a number of nations, the relationship between real exchange rates and income inequality has been explained using the PPP theory. For example, a study by Bahmani-Oskooee and Fariditavana (2021) found that income difference had a considerable positive impact on Iran's real exchange rate. In a similar vein, Delis and

Iosifidi (2021) discovered that income disparity significantly boosted real exchange rate in Greece. However, PPP theory has several limitations. First, it assumes that there are no barriers to trade or transportation costs that could affect the relative prices of goods and services across borders (Rogers, 1994). There are often significant differences in the prices of goods and services between countries even after adjusting for exchange rates. Second, PPP theory assumes that there is a single basket of goods and services that is identical across countries. There is a chance that the products and services produced and used in one nation will differ from those in another. Third, PPP theory assumes that exchange rates adjust quickly to changes in inflation rates, which may not always be the case in practice.

Given the limitations of the PPP theory, there are potential contradictions in its application to real-world scenarios. The existence of tariffs and other trade barriers, which can have a substantial impact on the relative costs of goods and services across nations, is ignored by the presumption that there are no trade barriers or transportation expenses. Tariffs act as an added cost on imports, which may not be fully reflected in exchange rates. This implies that the relationship between exchange rates and income inequality predicted by the PPP theory might not hold true when tariffs are taken into account. Tariffs can distort price levels and trade flows, potentially complicating the impact of inflation rates on exchange rates and exacerbating income inequality disparities. Therefore, while PPP theory offers insights into exchange rate dynamics and income inequality, its applicability in the real world must consider additional factors such as tariffs and trade barriers to gain a comprehensive understanding of the relationship between exchange rates and income inequality.

3.3 EMPIRICAL LITERATURE

There is a growing literature that supports how to trade openness, tariffs, and real effective exchange rates affect inequality. Several studies have been done on what widens inequality. The empirical literature covers different countries and uses different methodologies that are used to check how the independent variables affect inequality.

3.3.1 Relationship between trade openness and inequality

Balié and Ravillion (2021) used a global simulation analysis to examine the impact of trade on income distributions across all 159 countries, 1981-2015. The study decomposed the overall impact into two counteracting effects, a pro-poor effect via lower prices and a pro-rich effect via the adjustment costs imposed on unskilled labour. The study estimates suggest that the net impact of trade was to increase inequality in the majority of countries, especially since the turn of the century, with China's rise being the largest contributor to the change. The pro-poor effect was generally small, and it tended to be concentrated in the early phase of globalization, whereas the pro-rich effect dominated in the later phase. The authours also find that the incidence of the pro-rich effect was related to the skill-intensity of a country's trade, with the pro-rich effect being much stronger in the more skill-intensive sectors. The authors provide valuable insights into the nuanced effects of trade on income distribution globally, yet their study lacks deeper exploration into the underlying mechanisms driving the observed trends, potentially overlooking important contextual factors.

Frensch and Wöhlbier (2021) analyzed the relationship between trade and income inequality using panel data from 1990 to 2015 in developing countries. The fixed effects and instrumental variables regression was used to address potential endogeneity problems. According to the study, trade reduces income inequality, and this reduction is more pronounced for nations whose export baskets have a higher skill skew. The study also discovered that trade had varying effects on income inequality depending on where in the income distribution one is located, with the biggest effects being in the higher tail of the distribution. These findings suggest that policies aimed at promoting trade should consider the potential distributive effects of trade liberalization and take measures to ensure that the benefits of trade are more equally distributed. While Frensch and Wöhlbier (2021) offer comprehensive analysis on the relationship between trade and income inequality, their focus on developing countries limits the generalizability of their findings, necessitating further research across diverse economic contexts.

Ahmad and Mamoon (2020) used panel data analysis from 1995 to 2015 to look at the connection between trade openness and income inequality in a panel of developing nations. The study estimated the relationship between trade openness and income inequality using fixed effects, random effects, and system GMM approaches. The findings showed that trade openness significantly and favorably affects income disparity. Furthermore, human capital, economic growth, and government expenditure also increase income inequality in developing countries. The findings suggest that policies aimed at promoting trade openness in developing countries should also consider measures to mitigate the negative distributive impact on income. Therefore, the panel data analysis highlights the potential benefits of trade openness in reducing income inequality, but the study overlooks potential endogeneity issues and fails to account for the heterogeneity in effects across different types of trade liberalization policies.

De Benedictis and Tamberi (2020) looked into how globalization affected a panel of European nations distributively between 1995 and 2015. The main aim was to investigate the impact of various globalization channels, distinguishing between within- and between-sector effects, and accounting for institutional quality. The results suggest that globalization has increased income inequality. This effect is driven by the between-sector effect, which is in turn linked to the higher share of high-skilled labour in the sectors that are more exposed to globalization. The study also find that the negative impact of between-sector effects is stronger in countries with weaker institutions. In contrast, within-sector impacts are typically linked to reduced income disparity, particularly for highly skilled individuals. Lastly, the study shed light on the distributive impacts of globalization within European nations, yet their reliance on aggregate measures of income inequality may mask disparities within specific socio-economic groups, warranting more granular analysis.

Kondo (2020) examines the impact of globalization on income inequality in advanced and emerging economies over the period 1990–2014. The study found that while globalization typically reduces income inequality, the effects differ between developed and developing countries, based on a dynamic panel data model. Specifically, it has been seen that globalization exacerbates income inequality in developed economies, whereas it has no impact on income inequality in developing nations. Moreover, the research indicates that the influence of globalization on income disparity is more pronounced in economies that exhibit greater trade openness and financial integration. These results suggest that the distributive effects of globalization are likely to depend on the characteristics of the economy in question. The study focus on advanced and emerging economies overlooks the experiences of less developed nations, which may exhibit distinct patterns.

Mavrozacharakis and Panagiotidis (2020) examines the distributive effects of globalization in a sample of developed economies. The study, which used panel data analysis to examine the years 1995–2015, found that income inequality has decreased as a result of globalization, with the effect being bigger in nations with higher trade openness levels. The effect of globalization on income inequality is mostly driven by between-sector impacts, which are linked to a higher share of highly trained labor in sectors exposed to international trade, according to the authors' investigation of the impact of various globalization channels. Income disparity is found to be negatively impacted by within-sector effects, particularly for high-skill individuals. Finally, the study found that the distributive impact of globalization varies across different stages of the business cycle, with the effect being stronger during periods of economic expansion. Mavrozacharakis and Panagiotidis (2020) offer comprehensive insights into the distributive effects of globalization, yet their reliance on panel data limits the ability to draw causal inferences, and their analysis could benefit from a more nuanced exploration of within-sector dynamics.

Mitra and Hossain (2018) conducted a study from 1979 to 2014 on how more open trade affected income inequality in the United States. Additionally, the relationship between income disparity and real per-capita income is investigated. The non-stationarity of the data leads to the application of the cointegration approach. The results demonstrate a significant inverse relationship between trade openness and income inequality in the short run. The long-run connection is strongly positive, supporting both the Stolper-Samuelson and Samuelson theorem assumptions as well as the Hecksher-Ohlin-Samuelson theorem. The "U-curve" link between trade openness and income inequality is represented by the negative short-run coefficient and the positive long-run coefficient. Income disparity and real per capita income are found to have a significantly negative long-term connection. The authors investigation into the relationship between trade openness and income inequality in the United States highlights long-term trends, but the research analysis lacks consideration of potential confounding variables and fails to explore the mechanisms driving the observed relationship.

Hazama (2017) used an unequal panel data set covering the years 1971–2012 to conduct research on the impact of exports on income inequality for developing nations with lower incomes (n=70) and higher incomes (n=36). For lower-income developing countries, the findings in the long and short runs indicate a negative association between income inequality and exports, while no statistically significant result was discovered for higher-income developing nations. Mahesh (2016) did research on how trade openness affects income inequality using data from the BRIC nations. Many nations have opened their economies to trade in the recent decades. And as a result, from 33% in 1975 to 59% in 2013, the percentage of global commerce in total output increased. Hazama (2017) research on the impact of exports on income inequality in developing nations provides valuable insights, yet the study focus on aggregated data overlooks potential heterogeneity in effects across different sectors and fails to address potential endogeneity concerns.

Along with an increase in economic inequality within nations, these same years saw a widening income gap between developed and developing nations. The study delved deeper into the connection between income distribution and trade openness. The BRIC nations namely Brazil, the Russian Federation, India, and China were the subjects of the study. The study discovered that the income distributions in these nations have gotten worse as a result of rising trade as a percentage of GDP. A research by Harrison and Hanson (2009) examined the connection between globalization and pay disparity. The technique used in the study is a literature review of previous empirical research, where the authors surveyed the major channels through which globalization affects wage inequality and examined the existing empirical evidence on this relationship. The authors found that skill-biased technological change and trade are the most plausible explanations for rising wage inequality in advanced countries, while in developing countries, inequality is more likely to be due to the impact of trade on unskilled labour. The analysis also suggests that policies to promote skill formation and facilitate adjustment to trade shocks are needed.

In order to better understand how economic globalization—which is typified by rising levels of international trade and foreign direct investment (FDI)—has affected China's income distribution, Baotai, Ajit, and Xiaofei (2008) looked at data from 1979 to 2006. This study use the usual measure of income inequality, the Gini coefficients, and conducts the empirical analysis within the framework of unit root and cointegration. The empirical findings demonstrate that economic globalization has a tendency to reduce China's income disparity. Thus, other forces must be at play in China's growing wealth inequality.

Chanda and Pohit (2007) conducted a study to examine the impact of trade liberalization on wage inequality in India using panel data from 1983-2000. The findings imply that changes in the returns to education and skill have positively impacted trade liberalization's overall effect on pay disparity in India. The findings also indicate that the organized sector is more affected by trade liberalization's effects on pay disparity than the unorganized sector is. These findings have important implications for policy makers in India as they consider further liberalization of trade and investment. Prechel (1905) did research on how trade, development, and governmental debt affect income disparity. It is hypothesized that debt and exports as a share of GDP widen the income gap between individuals. These correlations with development and temporal controls were examined using regression analysis (n=28 at two different time periods). These hypotheses were tested with additional data using a panel cross-section design with n = 37 and n = 46 of data for countries where it is not accessible. The results of all six regression studies point to the conclusion that exports exacerbate income disparity. Furthermore, a covariant analysis shows that income distribution does not get more egalitarian as a nation grows because exports significantly increase inequality in developing countries compared to industrialized countries that pursue export-oriented industries.

3.3.2 The connection between tariffs and inequality

Heid and Larch (2020) looked at how tariff reductions affected income inequality in a sample of 75 nations between 1990 and 2015. According to the study, tariff reductions have a short-term beneficial impact on income inequality but a long-term detrimental one. increased productivity improvements in the tradable sector, which result in increased wages and profits, are the primary driver of the short-term effect.The long-term effect is driven by adjustment costs, as less productive firms exit the market and workers shift to other sectors. The study also discovered that nations with more sophisticated financial systems and higher levels of human capital had greater effects from tariff reductions on income inequality. Therefore, the author provide valuable insights into the short-term and long-term effects of tariff reductions on income inequality across nations, yet the study lacks a deeper exploration of the nuanced mechanisms driving these impacts and may overlook other relevant factors influencing inequality dynamics.

Sissoko (2020) used a household survey dataset to investigate how tariff reductions affected income inequality in Mali. According to the Gini coefficient, the results indicate that tariff reductions raise income inequality by roughly two percentage points. Changes in the distribution of income among sectors are the main cause of the impact, which is more noticeable in urban regions than in rural ones. We also discover that different industries are affected differently by tariff reductions on income inequality, with manufacturing and services experiencing the biggest effects. Hence, while Sissoko (2020) analysis on Mali sheds light on the sectoral disparities resulting from tariff reductions, its reliance on a single-country dataset limits the generalizability of findings and fails to account for broader regional or global economic dynamics that could influence inequality outcomes.

Xing and Wan (2020) investigated the impact of tariff reductions on income inequality in China using a dynamic computable general equilibrium model. According to the simulation results, tariff reductions have a short-term beneficial influence on economic growth and a short-term negative impact on income disparity. However, these impacts vanish over time as the economy adjusts. The study also discovered that different industries are affected differently by tariff reductions on income inequality, with manufacturing and agriculture experiencing the biggest effects. These results suggest that policies to mitigate the short-term negative impact of tariff reductions on income inequality should focus on supporting workers in the sectors most affected by tariff reductions. The study reliance on a simulation model may oversimplify the complex dynamics of real-world economic adjustments and fail to capture all relevant factors influencing inequality trends.

A dynamic general equilibrium model was used by Khondker et al. (2019) to explore how tariff reductions affect economic development and income inequality in Bangladesh. According to the simulation results, tariff reductions boost economic development but first have a favorable, then negative influence on income disparity. The short-term positive impact on income inequality is due to higher returns to factors of production, while the long-term negative impact is due to changes in the composition of output and employment. Additionally, the study discovered that trade liberalization has a greater effect on income inequality in rural than in urban areas. The study illuminates the trade-offs between economic development and income inequality resulting from tariff reductions, yet the study reliance on a theoretical model may oversimplify the multifaceted nature of inequality dynamics and overlook country-specific factors that could shape outcomes.

A study by Choi and Yoon (2018) looked at how South Korea's income disparity was affected by tariff reductions. The authors estimated how tariff reductions will affect various income categories using household-level data. The study found that tariff reductions lead to lower prices for consumers, which benefits lower-income households more than higher-income households. However, the authors also found that tariff reductions lead to greater wage inequality, as workers in export industries receive higher wages than workers in non-export industries. The authors conclude that policymakers should be aware of these distributional effects when designing trade policies. The study focus on a single country may limit the generalizability of findings and overlook potential interactions with broader global economic trends.

Another research was conducted by Rojas and Turnovsky (2017) to look into the connection between income inequality and tariff reductions for 37 countries over the period of significant trade liberalization from 1984 to 2010. A permanent cut in the tariff rate will result in a considerable rise in short-run income inequality, claims the study, which used panel data methodologies to arrive at this discovery. The study also assessed the effect of tariffs on income shares by quintiles in order to have a better understanding of how the income distribution is impacted. The study finds that although the lowest quintile's relative income is most significantly impacted, those in the second-richest quintile stand to gain the most. They also found that, although the results are less compelling, decreasing tariffs will undoubtedly result in a rise in long-term income disparities. Empirical data partially support the premise that the rate and beginning point of the tariff adjustment have an effect on income inequality. Lower tariffs have an expansionary impact on overall output, which is a generally held assumption that actual evidence confirms. This suggests that cutting tariffs would result in a trade-off between boosting the economy's activity and a short-term rise in income inequality. Lastly, the study reliance on panel data methodologies may overlook specific contextual factors influencing inequality dynamics and limit the depth of analysis on the mechanisms driving observed outcomes.

The economy of China was the subject of an analysis by Ianchovichina and Martin (2001) following its entry into the WTO. The authors estimated the effects of tariff reductions and other trade policy reforms on several sectors of the Chinese economy using a computable general equilibrium model. They found that the reforms led to increased output and productivity in export-oriented sectors, but also led to increased income inequality within China. The authors argue that policymakers must take steps to address this inequality, such as investing in education and training programs for workers in non-export sectors.

Rehana, Rizwana, Zafar, and Aqdas (1999) conducted research on how households and other large macroeconomic aggregates were affected by the lowering in tariffs on industrial items. Analyzing the impact of the reduction in tariffs on industrial items within the context of a CGE model The 215 equations in the model described how the variables were related to one another. Social Accounting Matrix was used to gather the fundamental information needed to estimate the model for the years 1989 to 1990. According to the imitation exercise, the lower income class is disproportionately more affected negatively by changes in comparable prices in response to a fall in the tariff rate. The gap between households in wealth and those in poverty is growing. Reduced investment has detrimental effects on the economy as a whole. The study concluded that Pakistan's rural and urban areas now have worsening income distribution as a result of a reduction in the tariff rate on industrial imports.

3.3.3 The link between real exchange rates and inequality

Faria and Leon-Ledesma (2021) examined the link between income inequality and the real exchange rate for 17 Latin American countries using annual data spanning from 1960 to 2017. The real exchange rate in the area and income disparity have a long-term positive correlation, according to the study. Several measures of inequality, exchange rate regimes, and estimate approaches do not affect the positive link between inequality and the real exchange rate. Furthermore, the findings imply that income inequality influences the relative cost of non-tradable items, which in turn influences the real exchange rate. These results emphasize how crucial income distribution is to the fluctuations of currency rates in Latin America. While Faria and Leon-Ledesma (2021) study provides valuable insights into the positive correlation between income inequality and the real exchange rate in Latin America, it overlooks potential endogeneity issues and fails to explore the underlying mechanisms driving this relationship.

Li and Shi (2021) looked into how China's real exchange rate volatility was affected by income inequality. The study demonstrated that income inequality has a longer-term than short-term positive influence on real exchange rate volatility. Monthly data covering the period 1997:1–2018:8 were used, along with a GARCH-MIDAS model. Furthermore, the study showed that the relationship between real exchange rate volatility and income inequality is not balanced, with income inequality having a greater impact on exchange rate volatility during periods of economic expansion than during contraction. The results imply that measures intended to lessen income disparity may contribute to the stabilization of China's real exchange rate. The study reliance on a specific model may limit the generalizability of its results to other contexts and fails to consider potential reverse causality.

Using a panel cointegration approach, Gogas and Pragidis (2020) examined the link between income inequality and the exchange rate for a sample of 39 countries between 1990 and 2015. Higher levels of income inequality are linked to higher exchange rates, according to the study's evidence of a long-term positive association between the two variables. The findings hold up well under a variety of income disparity metrics, exchange rate policies, and estimation methodologies. According to our research, income inequality influences investment and capital flows in addition to the relative pricing of tradable and non-tradable products, all of which have an impact on the exchange rate. The findings have significant ramifications for income distribution and exchange rate policy, but its reliance on panel cointegration analysis overlooks potential heterogeneity among countries and fails to address causality concerns adequately.

Kang and Lee (2020) looked at the connection between changes in real exchange rates and income inequality in a sample of 28 nations between 1980 and 2014. The reseachers found that real exchange rate depreciation reduces income inequality, while appreciation increases income inequality. Real exchange rate fluctuations have a greater impact on income disparity in nations with high levels of income inequality and low levels of financial development. The outcomes hold up well when different control variables and model parameters are added. The findings have important policy implications for countries seeking to reduce income inequality, but the study focus on changes in the exchange rate without considering other macroeconomic factors limits the depth of its analysis.

Adenutsi and Ofori-Abebrese (2020) used panel data from 38 countries spanning the years 1980–2014 to investigate the association between changes in exchange rates and income inequality in Sub-Saharan Africa. A dynamic panel data technique was employed in the study to account for the short- and long-term effects of exchange rate variations on income inequality. The findings imply that increasing income disparity is linked, both in the short and long terms, to exchange rate depreciation. This effect is robust to a range of sensitivity checks, including different inequality measures, exchange rate regimes, and control variables. These findings suggest that exchange rate policies can have significant distributional consequences, which should be taken into account when designing macroeconomic stabilization and growth strategies in the region.

Halicioglu (2020) used annual data covering the years 1960–2018 to investigate the relationship between real exchange rates and income inequality in Turkey. A long-term negative association between income inequality and the real exchange rate was found by applying the nonlinear autoregressive distributed lag (NARDL) technique, which allows for asymmetric impacts of income inequality on the real exchange rate. The findings imply that while lower levels of income inequality have no discernible impact, higher levels of inequality cause the real exchange rate to decline. These results hold up well when additional control variables, multiple income inequality metrics, and estimating methods are applied. The findings have significant ramifications for Turkish policymakers since they imply that lowering income inequality may eventually contribute to real exchange rate stabilization. Halicioglu (2020) exploration of Turkey's real exchange rate and income inequality offers valuable insights, yet its focus on a specific country and time period limits the generalizability of its findings and overlooks potential nonlinear relationships.

Maasoumi and Rauscher (2020) used a panel of 62 countries to study the connection between income inequality and the real exchange rate between 1980 and 2014. The study's empirical approach addresses the possibility of inequality endogeneity by combining instrumental variables with fixed effects estimation. After adjusting for a wide range of other variables that could affect the exchange rate, the study's findings indicated that greater income disparity is linked to a decline in the real exchange rate. These results are robust to various specification checks, including different inequality measures, sample restrictions, and estimation methods. The findings suggest that income distribution is an important determinant of international competitiveness and trade patterns, but its reliance on fixed effects estimation may not fully address endogeneity concerns and overlooks potential nonlinear effects.

An ARDL model and bound testing analysis were used by Güzel and Arslan (2019) to examine the impact of a rise in the dollar value on the distribution of income in Turkey using annual data from the years 1990–2016. It took into account the impact of GDP per capita on the income distribution when building the empirical model. According to the findings, Turkey's income distribution becomes more unequal when the value of the dollar increases. The dollar plays a vital role in Turkish trade abroad. Because of this, fluctuations in the value of the dollar have a big impact on welfare. Therefore, the authors examination of the impact of dollar value on income distribution in Turkey offers important insights, but its focus on a single currency and lack of consideration for other macroeconomic variables limit the comprehensiveness of its analysis.

In a 2019 study, Bahmani-Oskooee and Fariditavana investigated the connection between real exchange rates and income inequality in the G7 during the years 1970–2015. It uses the recently developed autoregressive distributed lag (ARDL) bounds testing approach to cointegration to capture the short- and long-run dynamics. It also investigates the causal relationship between the two variables using the nonlinear ARDL (NARDL) model. The study's conclusions demonstrate that there has been a consistent correlation over time between G7 exchange rates and income disparity. Additionally, the analysis verifies that there is an asymmetry link between the two variables. More specifically, it is discovered that the influence of exchange rate fluctuations on income inequality, both in the short and long terms, is far greater than the effect of changes in income disparity on exchange rates. The study focus on a specific group of countries and lack of consideration for potential nonlinear relationships may restrict the generalizability of its results.

Gnimassoun and Tapsoba (2019) studied the relationship between economic growth, exchange rate volatility, and income inequality for a panel of 35 rising nations between 1995 and 2016. By employing dynamic panel data methods, we discover proof of a statistically significant and positive correlation between exchange rate volatility and income disparity. This result is robust to different measures of income inequality and exchange rate volatility, and is particularly strong for the upper-middle income countries. Moreover, the results suggest that economic growth and financial development can alleviate the negative impact of income inequality on exchange rate volatility.

Chang et al. (2018) looked at the connection between income inequality and real exchange rates in a sample of 65 countries between 1980 and 2013. The results show that while real exchange rate depreciation has mixed impacts, real exchange rate appreciation raises income disparity in both developed and developing nations. Income inequality is more affected by changes in the real exchange rate in countries with better institutional quality and human capital. These results imply that the relationship between real exchange rates and income inequality varies depending on the context and a number of factors at the national level. Additionally, the study discovered that actual exchange rates have a shorter-term effect on income disparity than a longer-term one. The outcomes hold up well to different model parameters and estimating techniques. The findings underscore the need for a more sophisticated understanding of the relationship between real exchange rates and income inequality in a global setting and have significant policy implications for nations looking to minimize income disparity.

Butt and Gani (2018) looked at the connection between income inequality and currency rate volatility in developing nations while accounting for financial openness. The authors discovered through panel data analysis that while financial openness reduces the influence of exchange rate volatility on income inequality, it nevertheless tends to increase it nonetheless. The study finds that in order to lessen the distributional implications of exchange rate volatility, policymakers in developing nations should encourage financial openness, but its focus on financial openness may oversimplify the complex relationship between exchange rate volatility and income distribution.

A study by Min, Shin, and McDonald (2015) examined the connections and supporting data between income inequality and the real exchange rate. A straightforward model with non-homothetic preferences and purchasing-power parity for trades shows that improved income disparity reduces the price of non-tradables, resulting in a real depreciation. The hypothesised inverse link between income inequality and the real exchange rate is robustly confirmed by empirical data, as demonstrated using panel vector autoregressions, dynamic panel estimations, and random- and fixed-effects models. As a result, measures that broaden the distribution of income in a country by lowering the real exchange rate may also boost the effectiveness of its exports. This association between income inequality and real exchange rates does not, however, imply that draconian redistributive measures will necessarily result in a genuine depreciation of the domestic currency.

Majeed and MacDonald (2010) used panel data analysis to look at the relationship between real exchange rates and income inequality in a sample of emerging nations. The authors discovered that real exchange rate appreciation tends to raise income disparity whereas real exchange rate depreciation tends to lower it. The study makes the recommendation that when developing country policymakers decide how best to control exchange rates, they should take the distributional impacts of those policies into account.

Fujii and Ida (2008) investigated the relationship between real exchange rates and income inequality in four OECD countries: the Japan, United States, United Kingdom and Germany. Using time-series data, the authors found that real appreciation of the exchange rate tends to increase income inequality in all four countries, while real depreciation of the exchange rate tends to reduce income inequality. The paper concludes that policymakers should consider the distributional effects of exchange rate policies when making decisions about exchange rate management. Wei (1999) examined the relationship between real exchange rates and income inequality in a sample of developing countriesThe author discovered using panel data analysis that real exchange rate appreciation is linked to greater income disparity whereas real exchange rate depreciation is linked to decreased income inequality. The paper suggests that policymakers in developing countries should consider the distributional effects of real exchange rate policies when making decisions about exchange rate management.

Edwards and Ahamed (1993) investigated the relationship between real exchange rates and income inequality in six Latin American countries: Colombia, Venezuela, Chile, Argentina, Mexico, and Brazil. Using time-series data, the authors found that real appreciation of the exchange rate tends to increase income inequality, while real depreciation of the exchange rate tends to reduce income inequality. The paper concludes that policymakers in developing countries should be cautious about pursuing policies that result in real appreciation of the exchange rate, as these policies are likely to exacerbate income inequality.

3.3.4 Causality between inequality, trade openness, tariffs, and real exchange rates

Using panel Granger causality tests, Gokmenoglu et al. (2021) examined the causal relationship between trade openness and income inequality during the years 1980 to 2017 across a panel of 44 nations. The panel's trade openness appears to be Granger-caused by income inequality, according to the results. Furthermore, the outcomes hold up well when more control variables are added, various inequality measures are used, and different estimators are used. Furthermore, the findings suggest that the causal relationship between trade openness and income disparity varies depending on the nation. Trade openness Granger-causes income disparity in emerging nations, but income inequality Granger-causes trade openness in affluent countries. Therefore, while Gokmenoglu et al. (2021) suggest a causal relationship between trade openness and income inequality across nations, their findings lack depth in addressing potential endogeneity issues and fail to provide insights into the mechanisms underlying the observed causality.

The causal relationship between trade openness and income inequality was investigated by Sharma and Nguyen (2019) for a sample of 47 countries between 1970 and 2015. A two-way causal relationship between trade openness and income inequality is suggested by the study's empirical findings. Furthermore, the outcomes hold up well when other inequality measures, extra control variables, and estimate techniques are included. The study also found that the causal relationship is country-specific, with income inequality Granger-causing trade openness in developed countries, while trade openness Granger-causes income inequality in developing countries. Lastly, the athors findings highlights a bidirectional causal relationship between trade openness and income inequality, yet the analysis lacks granularity in explaining the heterogeneity across countries and overlooks potential omitted variable bias.

Shahbaz et al. (2019) examined the causality between trade openness and income inequality in a panel of industrialized and developing countries using linear and nonlinear Granger causality tests. Trade openness and income disparity are causally related, with the direction of connection changing with development level, according to study results. According to the study, income disparity in poor countries is Granger-caused by trade openness, whereas in affluent nations trade openness is Granger-caused by income inequality. Furthermore, the results point to a nonlinear link between trade openness and inequality, with trade having a greater detrimental effect on inequality early on. Adjusting for control variables, different measures of inequality, and estimate techniques does not affect the results. Therefore, the study examination of trade openness and income inequality acknowledges country-specific dynamics but fails to sufficiently address the complexity of nonlinear relationships and potential reverse causality, thus limiting the robustness of their conclusions.

Islam et al. (2018) examined the dynamic relationship between trade openness and income inequality in Pakistan using time series data from 1972 to 2015. The Granger causality tests and the ARDL limits testing approach are used in the study to examine the causal link between the two variables. The findings indicated that trade openness and income inequality in Pakistan have a favorable and strong long-term association. The Granger causality tests, however, yielded conflicting results about the two variables' causal relationship. In particular, the study discovered that while trade openness does not show long-term causality, it does Granger-cause income disparity in the short term.

Cengiz and Ertugrul (2017) investigated the causal relationship between trade openness and income inequality in Turkey using time series data from 1980 to 2014. The Granger causality tests and the ARDL method of cointegration were used in the empirical investigation. The findings imply that trade openness and income disparity have a long-term relationship, with trade openness being the cause of income inequality. Nevertheless, the effect's magnitude is negligible. Furthermore, the findings showed a unidirectional causal relationship between economic growth and income inequality, with economic growth both short- and long-term causes of income inequality. A study on the effect of trade on income and inequality was undertaken by Cerdeiro and Komaromi in 2017. The findings indicate a strong relationship between trade and income as well as trade and inequality across countries, although it is difficult to conclude causality because of endogeneity issues. Higher living standards and less wealth disparity are typical in nations with more open commerce (exports plus imports as a percentage of GDP). Therefore, analysis of trade openness and income inequality in Turkey highlights a long-term relationship but overlooks the potential endogeneity of trade policies and other macroeconomic factors, thus limiting the generalizability and policy implications of their findings.

Amiji (2015) investigated, using both linear and nonlinear Granger causality tests, the dynamic Granger causal relationship between exports and economic growth. Annual South African statistics on real GDP and real exports from 1991 to 2011 were utilized in the study. The conclusion of linear Granger causality does not support a large causal link between exports and GDP. The causality conclusion produced by the linear Granger causality test is called into question by the instability of the relevant VAR. Nonlinear techniques are required to evaluate the Granger causal relationship between GDP and exports. The nonlinear Granger causality test by Hiemstra and Jone (1994) is used to find a unidirectional relationship between GDP and exports. But when we use the Diks and Panchenko (2006) test, a more reliable and impartial nonlinear test, we discover strong evidence of bi-directional causality. These results emphasize the potential potential misinterpretation when applying the traditional linear Granger causality tests, which fail to reveal nonlinearities or take into consideration structural breakdowns in the dynamic link between GDP and exports.

Chakraborty (2021) used Granger causality tests to investigate the causal relationship between tariffs and income inequality in the United States. Annual time series data from 1970 to 2019 were used in the study. According to the study's findings, there isn't any proof that tariffs and income disparity in the US are causally related. The findings suggest that the two variables are not causally related, which implies that policy measures aimed at reducing tariffs may not have any significant impact on income inequality in the USA.

Mughal and Abbas (2021) examined the Granger causality relationship between income inequality and tariffs using panel data for 82 countries over the period 1990–2017. The generalized method of moments (GMM) estimator was utilized in the study to account for endogeneity concerns, and a dynamic panel model was used. The study's conclusions showed a unidirectional causal relationship between tariffs and income disparity. In particular, the findings demonstrate that tariffs are a direct effect of income disparity, suggesting that trade policies in developing nations may benefit from measures targeted at lowering income inequality.

In the Gulf Cooperation Council (GCC) countries, Abugamea and Abugamea (2021) used panel data for the years 1995–2018 to investigate the Granger causality relationship between tariffs and income disparity. For endogeneity concerns, the generalized method of moments (GMM) estimator was utilized in conjunction with a panel vector autoregression (PVAR) model in the investigation. The findings of the study indicated a unidirectional causality running from income inequality to tariffs, which implies that income inequality Granger causes tariffs in the GCC countries.

Islam and Alam (2020) examined Granger causality relationship between income inequality and tariffs in Bangladesh using annual time series data for the period 1980-2018. The study employed the VECM and Granger causality tests to examine the causal relationship between the two variables. The results of the study indicated a unidirectional causality running from income inequality to tariffs. Specifically, income inequality Granger causes tariffs in Bangladesh. Amankwah-Amoah and Sarpong (2020) conducted a study to determine Granger causality relationship between income inequality and tariffs in Ghana using annual time series data from 1970 to 2017. The study employed Granger causality tests and Vector Autoregression (VAR) models to examine the causal relationship between the two variables. The findings of the study showed a unidirectional causal relationship between tariffs and income disparity. Specifically, income inequality Granger causes tariffs in Ghana.

Aye and Gupta (2020) investigated the causal relationship between income inequality and the real exchange rate in South Africa using quarterly data over the period 1994Q1–2016Q4. The study employed the Toda–Yamamoto Granger causality test, which allows for non-stationary data, and found evidence of a unidirectional causality running from income inequality to the real exchange rate. The results indicate that higher levels of income inequality lead to an appreciation of the real exchange rate in the long run. The causal effect is robust to the inclusion of other control variables, different measures of income inequality, and alternative estimation methods.

Apergis and Tsoumas (2019) investigated the relationship between income inequality and the real exchange rate for a panel of 23 OECD countries over the period 1985–2016. Using a panel VAR framework and a novel Granger causality analysis, the study found evidence of bi-directional causality between inequality and the real exchange rate. Specifically, the results show that income inequality Granger-causes the real exchange rate, while the latter also Granger-causes income inequality. Furthermore, there is a statistically significant negative long-run association between the two variables, suggesting that rising income inequality causes the real exchange rate to decline.

Swagel and Boruchowicz (2017) proposed policies to combat inequality and the study paid particular attention to measures aimed at raising the earnings of individuals at the bottom of the income distribution. The study concluded that redistribution-focused tax policies are likely to impede development and restrict the ability of the society to address the root causes of inequality. Instead, in order to increase earnings for those with lower incomes, officials should concentrate on tactics that enhance work incentives.

The effects of the exchange rate regime were examined by Duarte (2003) using a dynamic general equilibrium model. The results demonstrated that, unlike other factors, the real exchange rate's volatility increased significantly when it switched from fixed to floating rates. Additionally, fixed rates as opposed to flexible rates were found to have a stronger co-movement of variables across countries. This result indicates that macroeconomic factors are not always significantly influenced by exchange rate volatility.

Lafrance and Tessier (2000) used a VAR model to examine the causal link between real exchange rate variability and investment in Canada using quarterly data covering 1970Q1–2000Q1. According to their research, volatility was defined as the monthly standard deviation of the nominal effective exchange rate, averaged over the previous 24 months. They ascertained that the They discovered that the fluctuations in exchange rates had minimal effect on Canadian investment.

3.4 SUMMARY

This chapter presented four unique theories that aided the relationship between the concepts covered. The first theory that was emphasised was the Lorenz curve. The Lorenz curve was explored to explain the income inequality. The curve is a useful tool for visualizing income distribution and measuring income inequality. It can help policymakers and researchers identify areas of society where income disparities are particularly acute and devise strategies to address these disparities.

The Heckscher-Ohlin theory is the second hypothesis that was investigated in order to highlight the connection between trade and income inequality. The Heckscher-Ohlin theory provides an explanation for trade and income inequality by emphasizing the importance of factor endowments in determining a country's comparative advantage and patterns of trade. According to this theory, nations will import products with a high scarcity factor and export goods with a high abundance factor. Consequently, countries with a labor surplus will export labor-intensive products and import capital-intensive goods, while countries with a capital surplus will export labor-intensive goods and purchase capital-intensive goods. However, the distribution of factors within a country can lead to income inequality, as some factors will receive higher wages or returns than others. Therefore, while trade can benefit countries overall, it may exacerbate income inequality within countries.

The Ricardian model of trade theory was the third theory used in the study to explain the relationship between tariffs and income inequality. The Ricardian model of trade theory provides insights into the effects of trade and tariffs on income inequality. According to the model, trade leads to an overall increase in welfare, but it also creates winners and losers. Tariffs can be used to protect domestic industries and improve the welfare of domestic producers, but they also increase prices for domestic consumers and reduce the overall welfare gains from trade. Moreover, tariffs can exacerbate income inequality by benefiting the owners of capital and hurting the owners of labour. Overall, policymakers need to weigh the costs and benefits of tariffs carefully and consider their distributional impacts on different groups in society.

The fourth theory that was discussed is the Purchasing Power Parity theory to account for real exchange rates and income inequalityTo comprehend the connection between actual exchange rates and income inequality, the PPP theory offers a helpful framework. This hypothesis states that relative to nations with higher income levels, those with lower income levels typically have real exchange rates. This implies that income inequality is a key determinant of real exchange rates. Furthermore, based on the PPP theory, exchange rates typically fluctuate over time to bring about a global parity in the costs of products and services. This can help to mitigate the impact of income inequality on real exchange rates. Exchange rates and income inequality, however, can also be influenced by other variables, including trade laws, capital flows, and political stability. Therefore, a more comprehensive approach is needed to address these complex issues and promote economic growth and development across countries.

Finally, the empirical evidence indicates that there is a complex and context-dependent link between trade openness, tariff rates, real exchange rates, and income inequality. Income inequality and trade openness have been found to positively correlate in some studies, negatively correlate in others, or not significantly correlate in any of the research. Similarly, the impact of tariff rates and real exchange rates on income inequality is not always clear-cut. The conflicting findings may be attributed to differences in data, methodology, and country-specific factors. A lot of these countries are small open economies and therefore dependent on international trade. The role of international agencies like General Agreement on Tariffs and Trade (GATT) (1947) that was incorporated into the WTO (1995) are also important in terms of setting standards; and taking initiative to lower trade barriers like tariffs etc. Overall, it is clear that there is a need for further research to better understand the complex relationships between these variables and to inform policy decisions aimed at promoting more equitable economic growth. This is particularly relevant a study given that the African nations are expected to increase trade among each other given the AfCFTA pact.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 INTRODUCTION

The study investigates the impact of trade openness, tariffs, and the real effective exchange rate on inequality in the SADC region. The study employed quantitative techniques in order to achieve the stated goals and objectives. Sub-sections on data collection, model specifications, and estimation methodologies are included in this chapter to help reflect on the process of handling the stated difficulties and objectives.

4.2 DATA AND SAMPLING

The study employed annual secondary panel data, and the designated model comprises of five variables, including the Gini coefficient, exports, imports, tariffs, and the real exchange rate. The study encompasses nine SADC countries, namely South Africa, Botswana, Tanzania, DRC, Mozambique Madagascar, Namibia, Angola and Swaziland. These countries were selected based on data availability, accessibility and reliability within the research timeframe. The data employed ranges from 2004 to 2020 and was obtained from the World Bank Database and the Federal Reserve Bank of St. Louis Database. The decision to prioritize the Federal Reserve Bank of St. Louis Database (FRED) for data sourcing was made due to its comprehensive coverage, reliability, and accessibility, thereby enhancing the robustness and validity of the study findings. The panel comprises both time-series and cross-sectional dimensions, with a total of 17 years of observations for each of the nine countries, resulting in a rich dataset for examining the relationships between trade openness, tariffs, real exchange rates, and income inequality measured by the Gini coefficient.

4.3 MODEL SPECIFICATION

This study examines the impact of trade openness through exports and imports, tariffs, and real effective exchange rates on inequality in SADC from 2004 to 2020. The model comprises of five variables: inequality as measured by the Gini coefficient, exports, imports, tariffs, and real effective exchange rates. It is assumed that the GINI (Gini Coefficient) is a function of Exports, Imports, Tariffs and the REER (Real Effective Exchange Rates). In other words, the GINI is the dependent variable, while the remaining four variables serve as the explanatory variables. Therefore, the study employed the regression model shown below, which is represented in functional form as follows:

$$Gini = f(LEXPORTS, LIMPORTS, TARIFFS, LRER) \quad (4.1)$$

The natural linear form of this model is presented as follows:

$$GINI_{it} = \beta_0 + \beta_1 LEXPORTS_{it} + \beta_2 LIMPORTS_{it} + \beta_3 TARIFFS_{it} + \beta_4 LRER_{it} + \varepsilon_{it} \quad (4.2)$$

Where $GINI_{it}$ denotes the panel Gini, β_0 denotes a constant parameter, $\beta_1, \beta_2, \beta_3, \beta_4$ are the coefficients of the variables, $LEXPORTS$ and $LIMPORTS$ denotes trade openness, $TARIFFS$ denote tariff rates, $LRER$ denotes real exchange rates and the ε_{it} is the error term. The error term is added to the equation to take into consideration additional variables that could affect how well the chosen variables relate to each other.

There are multiple reasons for the use of logarithmic transformation in econometric models such as the one shown. First, it helps in addressing issues related to the scale and the interpretation of the variables. In this study, variables that are often log-transformed are exports, imports, and real exchange rates (RER). This is because these variables typically exhibit exponential growth over time due to compounding effects. Taking the natural logarithm of these variables linearizes their relationship with the dependent variable (Gini coefficient) and facilitates the interpretation of the coefficients in percentage terms. With log-transformed exports, for instance, a coefficient of 0.05 for exports indicates that a 1% rise in exports is correlated with a 0.05 unit increase in the Gini coefficient. This makes the results more intuitive and easier to interpret.

Second, the use of log transformations can help stabilize the variance of the variables, which is a fundamental assumption in many regression models. When dealing with variables like trade openness (exports and imports) and real exchange rates, their variance may change substantially over time. This can lead to heteroscedasticity, where the spread of data points around the regression line is not constant. Logarithmic transformation often helps in making the variance more constant and, therefore, ensures that the model's assumptions are met. It is important to note that not all variables need to be log-transformed; the decision to log-transform a variable depends on the specific characteristics of the data and the underlying economic theory.

In summary, the log transformation of variables in this study, such as exports, imports, and real exchange rates, is done to linearize their relationships with the Gini coefficient, facilitate the interpretation of coefficients, and address issues related to variable scale and variance. This is a common practice in econometrics to ensure the validity and reliability of regression models, as it helps to capture the underlying economic relationships more accurately and makes the results more meaningful and interpretable.

4.4 ESTIMATION TECHNIQUES

Panel data, as opposed to pure time series data or cross-sectional data, has more information, variability, and efficiency (Glyphseeker, 2021). This section presents the tests that have been employed to estimate the relationship between inequality, exports, imports, tariffs, and real effective exchange rates in SADC. The Panel Auto Regressive Distributed Lag (PARDL) approach was employed to address the associated objectives. In estimating the PARDL technique, the following steps are required: testing for the order of panel cointegration using stationarity/unit root tests, the lag length selection criteria, correlation matrix and the panel cointegration analysis. The study used diagnostic and stability testing to estimate the stability of the model. The last technique used is the Granger causality test.

4.4.1 Stationarity/Unit root test

The sequence of integration of the model was determined in the study using a panel stationarity test. In panel data structures, where cross-sectional presence generates several series from a single series, the term "panel unit root tests" refers to the use of multiple series unit root tests. Panel unit root tests have gained a lot of traction among empirical researchers because panel data includes both time and dimensions. Among cross-sectional and time series methods, panel data methods offer the most effective econometric techniques (Brooks, 2008). Both time and non-time measurements are shown in the panel of data sets. Individual time series unit root tests lack the potency that the panel-based stationary tests have (Costantini & Martini, 2009).

Early panel unit root testing techniques were developed under the usually false assumption of cross-sectional independence. For instance, the test proposed in Levin, Lin, and Chu (2002) and Im, Pesaran, and Shin (2003), respectively, abbreviated as LLC and IPS, assumes cross-sectional independence but allows for heterogeneity in the form of individual deterministic effects (constant and linear time trend) and heterogeneous serial correlation structure of the error terms. Based on the alternative that is taken into account, both procedures test the identical non-stationary null hypothesis, but in different ways (Salal, 2019).

The Augmented Dickey-Fuller (1979) and Phillip-Peron (1988) tests are used along with Levin, Lin, and Chu test (2002), Im, Pesaran, and Shin (2003), and Fisher type tests, which additionally provide the differentiation of variables being evaluated in the study until stationarity is obtained. When the lag length is established and stationarity among the variables is validated, the panel cointegration test will be conducted (Ahmad, 2015). It is frequently necessary to apply the unit root test to correct for inaccurate and deceptive results. If the variables in a series are non-stationary at levels, the stationarity test must be run at the first difference.

4.4.1.1 Levin, Lin and Chu (LLC) panel unit root test

As the panel's cross-section and time series dimensions increase, the pooled t-statistic will exhibit a restricted normal distribution; this will rely on the regression specification but is unaffected by other variables. Levin and Lin revealed new discoveries that addressed heteroscedasticity, including the autocorrelation issue, in their study on panel unit root testing, published in 1993 (Maddala & Wu, 1999). The homogeneity of the autoregressive parameter is typically the basis for the LLC test, which evaluate a relatively limited set of hypotheses that are rarely of practical interest (Maddala & Wu, 1999). Given that this could be a challenge in the short term, the LLC panel unit root test may have certain flaws. It is often important to account for the test statistic's nonzero mean when it has a deterministic intercept and trend term. (Kgomo, 2019).

The model is represented by the equation:

$$\Delta y_{it} = \alpha_i + \rho y_{i,t-1} + \sum_{z=1}^{\rho i} \beta_{i,z} \quad \Delta y_{i,t-z} + \varepsilon_{i,t} \tag{4.3}$$

where i = 1,…, N then t = 1, …, T. The errors $\varepsilon_{i,t} i.\ i.\ d.$ (0, $\sigma_{\varepsilon i}^2$) are expected to be independent across the sample units and follow a N(0, $\sigma_{\varepsilon i}^2$) distribution.

The LLC tests the hypothesis as:

$$H_0: \rho = 0 \tag{4.4}$$

$$H_1: \rho = \rho_i < 0 \tag{4.5}$$

For all i = 1,…, N, with all auxiliary assumptions about the individual effects (α_i= 0 for all i = 1,…, N below Ho). Below the homogenous alternative, the serial correlation coefficient ρ first-order must be identical for all units, a precondition for a pooled test. Below the null hypothesis, the model with no deterministic trend has standard *t*-statistics t_p for a pooled estimator $\hat{p}$ following a standard normal distribution as *N* and *T* increase, and $\sqrt{N}/T$ tends to 0. However, for a model with individual effects, the statistics change to negative infinity. The LLC tests the following adjusted t-statistics:

$$t *_p = \frac{t_p}{\sigma *_T} - NT\widehat{S_N}\left(\frac{\widehat{\sigma_\rho}}{\hat{\sigma}^2 \tilde{\varepsilon}}\right)\left(\frac{\mu *_T}{\sigma *_T}\right) \tag{4.6}$$

Equation (6) represents the adjusted ratio, denoted as $t *_p$, which is calculated by dividing t_p by the standard deviation adjustment $\sigma *_T$. This adjustment involves the mean adjustment ($\mu *_T$) and a function that considers the average individual ratios of long to short run variances based on Levin, Lin, and Chu (2002). The overall formula provides a refined measure by accounting for variations in sample sizes (T).

4.4.1.2 Im, Pesaran and Shin (IPS) panel unit root test

Unlike the LLC test, the IPS usually takes into consideration the heterogeneity of the autoregressive parameters. This type of test is comparable to the Fisher test and is also referred to as an asymptotic test. The goal of the LLC and IPS tests is to take into account the importance of multiple other independent tests (Maddala & Wu, 1999). As opposed to the IPS test, which based its conclusions on aggregating test data, the Fisher tests compare the significant levels of separate tests, hence this is subject to change.

The model for applying the IPS test is as follows:

$$y_{it} = \alpha_i + \beta_i x_{it-1} + \varepsilon_{it} \qquad t = 1,2,\dots,T,\ \ i = 1,2,\dots,N \tag{4.7}$$

The x_{it-1}, represent the exogenous variable in model (7), encompassing constant parameters within variables or individual trends. *T* denotes the study period, while *N* represents the number of cross-sections. The autoregressive coefficients are represented by β_i, and the error term ε_{it} is assumed to be mutually independent. Im, Pesaram & Shin (1997) introduced a panel unit root test that accommodates a heterogeneous coefficient for x_{it-1}. This framework requires that N/T→0 for N→∞. With the above model for the IPS test, the null hypothesis of this test is:

$H_0: \rho_i = 1$, for all individuals

IPS (1997) proposed a procedure for testing alternative hypothesis focuses on the averaged individual unit root test statistic. Thus, the alternative hypothesis is defined as:

$H_{1/\alpha}: \beta_i < 1$, for some i of the individuals.

Therefore, the alternative hypothesis is defined as:

$$H_0: \beta_i = 1, i = 1, 2, N \tag{4.8}$$

When conducting the ADF for the IPS test, if $\beta_i < 1$, it means that y_{it} recommends stationary. Conversely, if $\beta_i = 1$, then y_{it} is said to have a unit root. The testing procedures for the IPS-ADF test were implemented using a Monte Carlo investigation design. The regression models for the IPS test through ADF each cross-section i:

$$y_{it} = \alpha_i + \beta_i x_{it-1} + \sum_{k-1}^{\rho} 0_{it} \Delta y_{i,t-1} + \varepsilon_{it} \qquad t = 1,2,\dots,N \tag{4.9}$$

T is estimated for each cross section i, $i = 1, 2, N$, to calculate the t-statistic for β_i.

4.4.1.3 Fisher type (ADF and PP) panel unit root test

This study also established the sequence of integration using the Fisher ADF and Fisher PP panel unit root tests. The exact test, a statistical significance test typically employed in the analysis of contingency tables, is another name for the Fisher test, which is also known as the Fisher test. Maddala and Wu (1999) assert that, unlike the IPS test, the Fisher test does not necessarily require the panel data to be balanced. The Fisher test and the individual ADF regression both support the use of various lag durations. The Fisher test has the benefit of being applicable to all derived stationarity tests, but it also has several drawbacks, including the requirement that the p-value be obtained using Monte Carlo simulation (Maddala & Wu, 1999). The Fisher type (ADF and PP) panel unit root test permits for more heterogeneity across units. If the test statistics are continuous, the significance levels P_i (i = 1, 2, … , N) are the uniform (0, 1) variables and $-2log_eP_i$ has a x^2 distribution with two degrees of freedom. Using the x^2 Variables, the results are:

$$\lambda = -2 \sum_{i=1}^{N} log_e P_i \tag{4.10}$$

has a x^2 distribution with $2N$ degrees of freedom as $T_i \to \infty$ for all N. When N is large; it is necessary to modify the P test since in the limit it has a degenerate distribution. Having for the P test $E[-2In\ P_i\ ] = 2$ and $Var[-2In\ P_i\ ] = 4$, Choi (2001) proposed a Z test:

$$Z = \frac{1}{2\sqrt{N}} \sum_{i=1}^{N} (-2InP_i - 2) \tag{4.11}$$

where the Lindberg-Levy theorem is sufficient to show that Z converges to a standard normal distribution (T_i , $N \to \infty$) for the null hypothesis.

4.4.2 Lag length criteria

Prior to performing the cointegration test, the lag length was decided upon. The "optimal lag order" refers to the number of lags that each variable in the econometric model should include (Brooks, 2008). An essential component of specifying VAR models is determining and verifying the lag duration of the VAR (Kgomo, 2019). It is crucial to make an effort to employ the fewest lags feasible since over-fitting—that is, selecting an order lag length longer than the appropriate lag length which may cause the mean square of the model to forecast errors (Brooks, 2008). Moreover, results are often skewed by autocorrelated errors resulting from under-fitting the lag duration. Usually, a clear-cut statistical criterion such as the Schwarz information criterion or Akaike information criterion (AIC) is used to determine the estimation of the lag time (Ozcicek & McMillin, 1999).

The significance of lag length selection lies in its ability to determine the accurate lag length ($\hat{\rho}$) for the model. The autoregressive process involves a two-stage approach. In the initial stage, the focus is on determining the autoregressive (AR) lag length $\hat{\rho}$ through specific rules outlined in lag length selection criteria. This entails estimating statistical values for intercepts and coefficients using regression analysis. The $AR(\rho)$ process of the series yt is represented as:

$$y_{it} = a_1\, y_{t-1} + a_2\, y_{t-2} + \cdots + a_p\, y_{t-p} + \varepsilon_t \quad (4.12)$$

where a_1, a_2,…., a_p are autoregressive parameters and ε_t are normally distributed random error terms with a zero mean and a finite variance α^2. The criteria to be considered are:

a) Akaike information criterion, AIC =$-2T\,[In(\hat{\sigma}p^2\,)] + 2p$;
b) Schwarz information criterion, SIC=$In(\hat{\sigma}p^2\,) + \frac{[pIn(T)]}{T}$;
c) Hannan-Quinn criterion, HQC = $\mathrm{In}(\widehat{\sigma}p^2) + 2T^{-1}\,pIn\,\frac{[In(T)]}{T}$;
d) the final prediction error, FPE= $\widehat{\sigma}p^2\,(\mathrm{T} - p^{-1})\,(\mathrm{T} + \mathrm{P})$;

4.4.3 Correlation matrix

A correlation matrix serves as a vital tool for analysing the relationship among multiple variables. Essentially, it is a structured table that displays correlation coefficients between various pairs of variables within a dataset. This matrix does not only aid in identifying patterns and trends within the data but also offers a concise summary of complex datasets. Its application extends to examining multicollinearity, a phenomenon characterized by linear relationships between two or more variables. Multicollinearity can have significant implications for the accuracy of parameter estimates within statistical models (Alin, 2010). To delve deeper into this concept, multicollinearity arises when explanatory variables in a model exhibit high levels of correlation with each other (Senaviratna & Cooray, 2019). This condition can complicate the interpretation of results and potentially lead to unreliable conclusions. Therefore, researchers often use correlation matrices as an initial step to assess multicollinearity within their datasets. By scrutinizing the values in the matrix, researchers can identify pairs of variables that display strong correlations, indicating a potential multicollinearity issue.

To illustrate, suppose a researcher is conducting a study that involves multiple predictors in a regression analysis. By constructing a correlation matrix, they can examine the interrelationships between these predictors. If the matrix reveals a high correlation coefficient (close to 1 or -1) between two or more variables, it suggests a strong linear relationship. This can be problematic, as it may lead to difficulties in discerning the individual effects of these variables on the dependent variable, thereby undermining the model's reliability.

4.4.4 Cointegration analysis

The panel data cointegration test was applied in the study to determine if there is a long-term relationship between the variables in the given model. The cointegration notion offers the ideal framework for modelling a system's long- and short-term dynamics. The cointegration methodology is also frequently used to examine the clarity of erroneous estimation findings (Alexiou, 2016). Verifying that all of the variables used in the study are included in a specific sequence in levels is important before finding the long-term relationship.

The cointegrating vector, which illustrates how variables are related over the long term, is also known as the linear stationarity combination (Gujarati, 2004). The only thing that the Johansen's VAR method and Pedroni's heterogeneous panel cointegration can demonstrate are whether or not the variables are cointegrated and whether or not there is a long-term relationship (Costantini & Martini, 2009). The Kao and Pedroni tests, which employ the same methodology, are based on the two-step residual-based cointegration test developed by Engel-Granger in 1987. According to Ahmad (2015), the Pedroni and Kao cointegration tests are widely used to determine the long-term relationships between several econometric modelling. Such tests may depend on the VAR's selection of the right lag length. Pedroni (1995) asserted that many of these tests have fundamentally low power, however Shiller and Perron (1985) discovered that the duration of the data, not its frequency, influences the power of these tests.

4.4.4.1 Pedroni panel cointegration test

Pedroni Panel Cointegration Test is a valuable tool in econometrics for exploring the long-term relationships among variables in panel data. To harness the power of long-run variance analysis, Kgomo (2019) propose the use of both parametric and non-parametric kernel predictions. This approach aids in determining whether there exists a sustained, common movement in the variables under investigation. Pedroni's methodology offers a wide array of tests, enabling the examination of long-term trends, while accommodating various intercepts and trend coefficients across different cross-sections.

In the realm of research methodology, the Pedroni Panel Cointegration Test provides a robust framework for investigating cointegration relationships across panel data. It allows for flexibility in modelling, accommodating different specifications for intercepts and trend coefficients at the cross-sectional level. This adaptability is crucial as it acknowledges the potential heterogeneity in cointegration patterns among various units within the panel.

Furthermore, the test encompasses various methods for generating statistics that help in evaluating the null hypothesis that no long-run or cointegrating relationships exist among the variables under scrutiny. In cases where cointegration is not present, the test does not rely on a naive assumption that variables are stationary. Instead, it evaluates the residuals as integrated of order 1, denoted as I(1), which is indicative of non-stationarity.

Conversely, when cointegration is identified, the residuals exhibit stationarity, represented as I(0). This critical distinction between I(0) and I(1) residuals is pivotal in discerning the presence of a long-term relationship among the variables. This approach, as noted by Alam, Shabbir, Rabbani, Tausif, and Abey (2021), enhances the precision and reliability of the analysis, allowing researchers to draw meaningful conclusions about the existence of cointegration in panel data. There are two alternative hypotheses in consideration: the homogeneous alternative and the heterogeneous alternative, the latter being specifically denoted as the panel statistics test, while the former is labelled as the group statistics test. The analysis involves the following model for heterogeneous panel data:

$$y_{it} = \alpha_{it} + x_{it}\beta_i + u_{it} \tag{4.13}$$

$(i = 1, \dots N \; and \; t = 1, \dots T)$

Under the processes:

$$x_{it} = x_{it-1} + \varepsilon_{it} \tag{4.14}$$

$$y_{it} = y_{it-1} + v_{it} \tag{4.15}$$

where x_{it} individual constant term; β_i is the slope parameters for cross-section i of the panel, ε_{it} , v_{it} are stationary disturbance terms and y_{it} & x_{it} are integrated processes of order 1 for all i.

The null hypothesis for panel statistics and group statistics of no cointegration are as follows:

$H_0: y_i = 1$, for all i (4.16)

$H_0: y_i < 1$, for all i (4.17)

The Pedroni cointegration test outperforms other tests because it doesn't impose exogeneity requirements on the independent variables in the cointegrating equation. Additionally, it selectively incorporates only the necessary information regarding potential cointegration relationships. Pedroni (1999) outlined the seven residual-based panel cointegration statistics, providing the following definitions:

a) Panel v-Statistic: $Z_{\hat{v}NT} = \frac{1}{(\sum_{i-1}^{N} \sum_{t-1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{it-1}^{2})}$

b) b) Panel p-Statistic: Panel v-Statistic: $Z_{\hat{p}NT-1} = \frac{\sum_{i-1}^{N} \sum_{t-1}^{T} \hat{L}_{11i}^{-2} (\hat{e}_{it-1} \Delta_{\hat{e}_{it}-\hat{\lambda}_i})}{(\sum_{i-1}^{N} \sum_{t-1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{it-1}^{2})}$

c) Panel t-Statistic (non-parametric): $Z_{tNT-1} = \frac{\sum_{i-1}^{N} \sum_{t-1}^{T} \hat{L}_{11i}^{-2} (\hat{e}_{it-1} \Delta_{\hat{e}_{it}-\hat{\lambda}_i})}{\sqrt{\hat{\sigma}_{NT}^{2} (\sum_{i-1}^{N} \sum_{t-1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{it-1}^{2})}}$

d) Panel t-Statistics (parametric): $Z_{tNT}^{*} = \frac{\sum_{i-1}^{N} \sum_{t-2}^{T} \hat{L}_{11i}^{-2} (\hat{e}_{it-1} \Delta_{\hat{e}_{it}^{*}})}{\sqrt{\hat{S}_{NT}^{*2} (\sum_{i-1}^{N} \sum_{t-2}^{T} \hat{L}_{11i}^{-2} \hat{e}_{it-1}^{2})}}$

e) Group p-Statistic: $\hat{Z}_{\hat{p}NT-1} = \sum_{i=1}^{N} \frac{\sum_{t=1}^{T} (\hat{e}_{it-1} \Delta_{\hat{e}_{it}-\hat{\lambda}_i})}{(\sum_{i-1}^{T} \hat{e}_{it-1}^{2})}$

f)) Group t-Statistic (non-parametric): $\hat{Z}_{tNT-1} = \sum_{i=1}^{N} \frac{\sum_{t=1}^{T} (\hat{e}_{it-1} \Delta_{\hat{e}_{it}-\hat{\lambda}_i})}{\sqrt{\hat{\sigma}_{i}^{2} (\sum_{i-1}^{T} \hat{e}_{it-1}^{2})}}$

g) Group t-Statistic (parametric): $Z_{tNT}^{*} = \sum_{i=1}^{N} \frac{\sum_{t=1}^{T} \hat{e}_{it-1}^{*} \Delta_{\hat{e}_{it}^{*}}}{\sqrt{\sum_{t=1}^{T} \hat{S}_{i}^{*2} \hat{e}_{it-1}^{2}}}$

4.4.4.2 Kao panel cointegration test

The Kao panel cointegration test stands as a significant method for estimating cointegration among variables. It is noteworthy that the Kao test shares similarities with other cointegration tests, particularly the Pedroni test, in terms of the estimation of cross-sectional coefficients and intercepts in the first stage of the regressors. This commonality underscores the foundational principles underlying cointegration analysis. It is important to note that both the Pedroni and Kao cointegration tests employ similar techniques, albeit with variations in their statistical approaches. Kao's test, in particular, offers a comprehensive set of statistical tools, including two types of Durbin-Watson (DF) type statistics and two types of Augmented Dickey-Fuller (ADF) test statistics. These statistics serve as critical tools in assessing the presence of cointegration among variables. One distinguishing feature of the Kao test is its consideration of the exogeneity of regressors. Specifically, two of the test statistics are designed under the assumption of rigorous exogeneity of the regressors, while the other two allow for the possibility of endogeneity of the regressors with respect to the errors used in the equations. This flexibility makes the Kao test a versatile tool for cointegration analysis, accommodating different modelling assumptions and providing researchers with a range of options to suit their specific research contexts.

Furthermore, in the estimation of nuisance parameters within the ADF test statistic, Kao's approach incorporates long-run conditional variances. This additional dimension enhances the precision and robustness of cointegration tests, offering researchers valuable insights into the relationships among variables over time (Kgomo, 2019). The Kao test regression parameters is given as follows:

$$Y_{it} = \alpha + X_{it}'\beta + \delta_i + \varepsilon_{it} \tag{4.18}$$

For *t*=1,2…., *T*,*i*=1,2,…,*N*

In the given model, Y_{it} represents individual cross-sectional time series, and X_{it} is the vector of these cross-sectional time series. The parameter *α* denotes the overall constant in the model. The individual effects are represented by the parameters β_i, which can be set to zero if necessary. The vector β_i contains the cross-section specific regression parameters. Additionally, the error terms are denoted by ε_{it}.

To assess the presence of a unit root in the residuals from equation (18), a supplementary regression is conducted. This auxiliary regression tests the residuals for the unit root are as follows:

$$\varepsilon_{it} = \rho\varepsilon_{it-1} + u_{it} \tag{4.19}$$

The equation above involves independently and equally distributed variables, denoted as u_{it}. The null hypothesis posits no cointegration, specifically expressed as *p*=1, with an alternative hypothesis suggesting cointegration (*p*<1).

4.4.4.3 Johansen-Fisher panel cointegration test

The Johansen-Fisher panel cointegration test was developed by Fisher and is widely used in econometric analysis. This test is designed to examine the presence of cointegrating vectors, which represent long-term relationships among variables, and it draws upon the findings of several independent tests. To determine the number of cointegrating vectors in the Johansen-Fisher panel cointegration test, two key statistics are employed: the maximum-eigenvalue statistics and trace statistics. These statistics play a crucial role in assessing the degree of cointegration within a panel dataset. The maximum-eigenvalue statistic helps identify the presence of cointegration by examining the eigenvalues of a matrix derived from the data. Similarly, the trace statistic involves the summation of these eigenvalues to provide insights into the overall cointegration structure. The Johansen Fisher Panel Cointegration test amalgamates Johansen's individual cointegration trace tests and maximum eigenvalue tests. The unified test utilizesπi as the p-value for the individual cross-section tests, for which the null hypothesis under the panel become:

$$-2\sum_{i=1}^{N}\log(\pi_i)\,,x^2 2N \quad (4.20)$$

Trace Statistic tests for at most r cointegrating vectors among a system of N < 1 time series, and the Maximal Eigenvalue Statistic tests for exactly r cointegrating vectors against the alternative hypothesis of r + 1 cointegrating vectors. The use of composite tests like the Johansen-Fisher panel cointegration test is essential in econometric research as it enables researchers to draw robust conclusions about the long-term relationships among variables, which is often a central focus in economic analysis. By combining information from multiple independent tests, such as the maximum-eigenvalue and trace statistics, researchers gain a more comprehensive understanding of cointegration patterns in panel data (Ahmad, 2015).

4.4.5 Panel Autoregressive Distributed Lag (PARDL)

The Panel Autoregressive Distributed Lag (PARDL) was used in the study to estimate cointegration. Panel Autoregressive Distributed Lag (PARDL) is a robust econometric method commonly employed in empirical research to investigate long-term relationships among variables in a panel dataset. One primary rationale for adopting PARDL is its effectiveness in addressing the distinction between long panel data and short panel data. Long panel data, such as that employed in this study, is characterized by an extended time series dimension but a limited cross-sectional dimension. In this context, the dataset comprises a substantial historical time series data, allowing for the examination of variables over an extended period, yet the number of entities or observations in the cross-sectional dimension is relatively small.

This characteristic aligns with the nature of the data under investigation, emphasizing the necessity of employing PARDL to accommodate this specific panel structure and to investigate potential cointegration relationships accordingly. Furthermore, this approach has been extensively used for cointegration analysis and holds significant relevance in understanding the dynamics of variables that may be integrated in different orders, such as I(0), I(1), or a combination of these. In essence, PARDL serves as a robust framework for analysing the equilibrium relationships that may exist among variables (Malindini, 2017).

The initial step in conducting cointegration tests using the PARDL model involves examining the long-term relationships among the variables. This procedure is vital to comprehend whether there exists a stable relationship among the variables over time. The PARDL method is particularly well-suited for this purpose, and it has gained credibility due to its effectiveness in handling panels with variables of different integration orders. In the context of panel data analysis, PARDL allows researchers to uncover the cointegration vectors that denote the long-run relationships among the selected variables. It accomplishes this by estimating a single long-run relationship equation for each variable of interest. This modelling approach facilitates the identification of how these variables interact and influence each other in the long term.

This method of testing the panel unit root does not warrant objections. When dealing with variables that are integrated in different orders, such as I(0), I(1), or a mixture of I(0) and I(1), PARDL is reliable and useful if there is only one long-run relationship between the underlying variables in the small sample size. Using the ARDL method, one can discover the cointegration vectors. A single long-run relationship equation therefore exists for each of the selected variables. Following is an expression of the PARDL model that was used in the study:

$$\Delta GINI_{it} = a_1 + \sum_{k=1}^{n} \beta GINI \sum_{k=1}^{n} \emptyset EXPORTS + \sum_{k=1}^{n} \rho IMPORTS + \sum_{k=1}^{n} \partial TARIFFS + \sum_{k=1}^{n} \pi RER + \varepsilon_k$$

$$\Delta EXPORTS_{it} = a_2 + \sum_{k=2}^{n} \tau GINI \sum_{k=2}^{n} \theta EXPORTS + \sum_{k=2}^{n} \mu IMPORTS + \sum_{k=2}^{n} \gamma TARIFFS + \sum_{k=2}^{n} \alpha RER + \varepsilon_k$$

$$\Delta IMPORTS_{it} = a_3 + \sum_{k=3}^{n} \theta GINI \sum_{k=3}^{n} \delta EXPORTS + \sum_{k=3}^{n} \varphi IMPORTS + \sum_{k=3}^{n} \omega TARIFFS + \sum_{k=3}^{n} \beta RER + \varepsilon_k$$

$$\Delta TARIFFS_{it} = a_4 + \sum_{k=4}^{n} \omega GINI \sum_{k=4}^{n} \emptyset EXPORTS + \sum_{k=4}^{n} \rho IMPORTS + \sum_{k=4}^{n} \partial TARIFFS + \sum_{k=4}^{n} \pi RER + \varepsilon_k$$

$$\Delta RER_{it} = a_5 + \sum_{k=5}^{n} \cup GINI \sum_{k=5}^{n} \emptyset EXPORTS + \sum_{k=5}^{n} \nexists IMPORTS + \sum_{k=5}^{n} \in TARIFFS + \sum_{k=5}^{n} \delta RER + \varepsilon_k$$

Where:

- Δ represents first-differences of the respective variables.
- $a_1 - a_5$represents constant terms.
- β, τ, θ, ω, and ∪ are coefficients associated with the GINI index.
- φ, ρ, μ, δ, and ∄ are coefficients associated with EXPORTS.

- $\emptyset$, γ, φ, ∂, ∈ are coefficients associated with IMPORTS.
- ∂, γ, ω, ∈, δ are coefficients associated with TARIFFS.
- π, α, β, π, δ are coefficients associated with RER (Real Exchange Rate).
- ε_k represents error terms.

4.4.6 Granger causality analysis

The study also employed the Granger causality test to examine the causal connection between the variables under consideration. Granger causality analysis is a powerful tool employed in research to investigate the causal connections between two variables. This analytical approach, rooted in predictive modelling, was initially introduced by Clive Granger in the 1960s (Seth, 2007). It has since found extensive application in various fields, particularly in economics, to uncover the dynamic relationships between dependent and independent variables. In this section, we delve deeper into Granger causality analysis, its objectives, and framework. The Granger causality analysis, as elucidated by Granger (1988), is designed to discern the direction of causality between two components. Specifically, it seeks to identify which variable influences the other and which variable acts as the initiator or cause (Molele, 2019). This method evaluates how variables respond to each other and assesses whether the combined panel data exhibits correlations.

The primary approach to perform Granger causality analysis typically involves the use of linear regression models. In this framework, we examine whether the independent variable (X) is incidental to the dependent variable (Y), implying a causal relationship either from X to Y or from Y to X. The null hypothesis for this test posits that the lagged values of X do not contribute significantly to changes in Y. For instance, consider the case where we explore whether exports are incidental to income inequality or vice versa. In this scenario, we are essentially testing whether exports (X) are a cause of income inequality (Y) or if income inequality (Y) is driving changes in exports (X). The null hypothesis in this context would suggest that, within the model, X(t) does not Granger cause Y(t). The test for the Granger causality is based on the following equation:

$$y_t = a_1 + \sum_{i=1}^{n} \beta_i \, x_{t-1} \sum_{j=1}^{m} y_j y_{t-j} + e_{1t} \qquad (4.21)$$

$$x_t = a_2 + \sum_{i=1}^{n} \theta_i \, x_{t-i} + \sum_{j=1}^{m} \alpha_j y_{t-j} + e_{2t} \tag{4.22}$$

Baloyi (2018) assumed that y_t and x_t are not correlated white-noise error terms and that x_t is said not to Granger cause y_t. In the Granger causality test, only two variables are considered at a time.

In essence, the Granger causality analysis allows researchers to explore the temporal relationships between variables and assess whether one variable can be considered a leading indicator of changes in another. This methodology is particularly valuable in understanding the cause-and-effect dynamics within complex systems and has far-reaching applications in fields beyond economics, including social sciences, environmental science, and finance. In conclusion, the Granger causality analysis is a powerful research methodology for uncovering causal relationships between variables. It helps researchers determine the direction of causality and assesses how variables influence one another over time. Employing this analytical tool enhances our understanding of dynamic interactions within complex systems.

4.4.7 Diagnostic tests

To determine whether any of the hypotheses of the conventional normal linear regression model are violated and to assess the model's goodness of fit, the study applied diagnostic tests to the error correction model. The study only focused on normality test as battery of diagnostic test. The decision to focus solely on normality testing as part of the diagnostic process stems from the foundational assumption in linear regression that errors are normally distributed. By prioritizing this test, the study ensures that the fundamental assumption of the model is thoroughly examined. While other diagnostic tests could provide additional insights, demonstrating adherence to this crucial assumption strengthens the confidence in the chosen model and the validity of its results without implying inadequacy in other diagnostic measures.

4.4.7.1 Residual Normality test

One of the foundational assumptions in linear regression analysis, specifically in the context of Ordinary Least Squares (OLS), pertains to the probability distribution of the residuals. OLS is a widely used method for estimating the coefficients of a linear regression model, and its validity relies on certain assumptions about the residuals.

According to Wycliffe and Muriu (2014), one of these critical assumptions is that the residuals, which are the differences between the observed values and the predicted values of the dependent variable, follow a normal distribution with a mean of zero and constant variance.

To assess whether this assumption holds true, it is essential to conduct a normality test on the residuals. This test helps determine whether the distribution of the residuals closely resembles a normal (Gaussian) distribution. The specific test mentioned in the provided text is the Residuals Cross-Section Dependence Test. This test examines the presence of cross-sectional dependence among the residuals, which is crucial for assessing the normality of the residuals in panel data or other multi-dimensional datasets (Masoga, 2017).

When performing the normality test using the Residuals Cross-Section Dependence Test, the study pays close attention to the associated p-value. The p-value provides a measure of the evidence against the null hypothesis that the residuals are normally distributed. A low p-value (typically below a chosen significance level, e.g., 0.05) suggests that there is strong evidence to reject the null hypothesis, indicating that the residuals do not follow a normal distribution. Conversely, a high p-value suggests that there is insufficient evidence to conclude that the residuals deviate significantly from a normal distribution, supporting the assumption required for OLS estimation.

4.4.7.2 Stability testing

The study used the inverse of roots AR characteristics of multinomials to test the stability of the stationary VAR approach; the test will produce a positive result if no root lies outside the unit circle, given the unit circle, and the VAR meets the stationarity criteria (Molele, 2019; Khoza, 2017). To conduct the stability test, the study examines the roots of the autoregressive equation and their relationship to the unit circle. Specifically, the test will yield a positive result if all the roots of the AR equation fall within the unit circle. This condition is essential because it signifies that the VAR model satisfies the stationarity criteria, a crucial assumption in time series analysis.

In practical terms, stationarity implies that the statistical properties of the data do not change over time, making it a fundamental assumption for many time series models. When the VAR model meets this stationarity requirement, it suggests that the relationships between variables captured by the model are consistent and reliable throughout the observed time period. Therefore, a positive outcome from the stability test indicates that the VAR model is a valid and robust tool for analysing the data under investigation.

4.5 SUMMARY

In this chapter, the study outlined various econometric techniques employed in investigating the impact of trade openness, tariffs, and real effective exchange rates on inequality in the SADC region. The study employed a quantitative approach and applied various econometric techniques to address the research objectives. It used secondary annual data from 2004 to 2020, obtained from the World Bank Database and the Federal Reserve Bank of St. Louis Databank. The research model was specified with the Gini coefficient as the dependent variable, and exports, imports, tariffs, and real effective exchange rates as explanatory variables. Panel cointegration tests, including the Levin, Lin, and Chu (LLC) and Im, Pesaran, and Shin (IPS) tests, were applied to examine the stationarity of the data. The study selected an appropriate lag length using criteria like the Akaike information criterion (AIC), and diagnostic tests, including the residual normality test, were used to examine the model's assumptions. Furthermore, stability testing was conducted to ensure that the model met the stationarity criteria, and the Granger causality analysis was employed to explore causal relationships between the variables.

The panel data analysis was carried out with precision, adhering to established econometric techniques. The study employed a range of statistical tools, from unit root tests to cointegration analyses to ensure robustness in its findings. The utilization of the Granger causality analysis provided insights into the causal relationships between variables, while diagnostic tests validated the model's assumptions. The stability testing confirmed the model's stationarity, and the choice of lag length was made based on objective criteria. Overall, the research methodology chapter sets a strong foundation for the subsequent analysis and results, ensuring that the study's objectives are met with rigorous and well-documented analytical techniques.

CHAPTER 5

DISCUSSION / PRESENTATION / INTERPRETATION OF FINDINGS

5.1 INTRODUCTION

This chapter presents the outcomes of the various tests employed in Chapter four to examine the relationship between income inequality and macroeconomic factors such as trade openness, tariffs, and the real exchange rate in selected SADC countries. The findings were obtained using EViews 12 software.

5.2 EMPIRICAL TEST RESULTS

The initial part of this chapter covers the outcomes of the descriptive analysis, unit root tests, lag length criteria, correlation matrix, and PARDL technique. Diagnostic tests were also performed to determine if any requirements of the model were violated. Lastly, the stability test was conducted to ensure that the model is stable and reliable.

5.2.1 Descriptive analysis

Table 5.1 presents the outcomes of the descriptive analysis of the data on macroeconomic variables in the selected SADC member states. To measure the spread of the data, the mean which is the typical value used to determine the average value in the dataset was employed. The median, which is the middle value of the variable, was also used as a basic measure of central tendency. The largest and smallest values in the sample are referred to as the sample maximum and minimum respectively and represent the highest and lowest data points in the sample.

Table 5.1: Descriptive analysis test results

	GINI	LEXP	LIMP	TARIFFS	LRER
Mean	0.505699	1.522035	9.917861	5.760065	1.890485
Median	0.515000	1.508593	9.827059	6.160000	1.478626
Maximum	0.648000	1.860188	11.00675	17.06000	3.578382
Minimum	0.373000	1.155199	9.093806	0.330000	0.671528
Std. Dev.	0.089213	0.162301	0.505522	3.623314	0.998035
Observations	153	153	153	153	153

Source: Author's computation

The results in Table 5.1 show that the mean GINI coefficient is 0.51, indicating moderate income inequality in the sample countries. The maximum and minimum Gini coefficients are 0.65% and 0.37% respectively. According to the World Bank (2020), South Africa has the highest income inequality index with a value of 63% compared to other SADC countries, while Tanzania has the lowest income inequality index, with a value of 40.5%. The maximum and minimum export values are 1.86% and 1.16%, respectively. Eswatini had the highest exports, while Tanzania was the lowest exporting country in the SADC region. The maximum and minimum import values are 11.01% and 9.09%, respectively.

The World Bank data (2020) indicates that Mozambique was the most importing country while Tanzania was the least importing country. Tariffs had the highest dispersion among all the independent variables. As already analysed in chapter two, indeed tariff rates are differentiated in the region. This is informed also by the maximum and minimum values of 17.6% and 0.33%, respectively. According to the World Bank (2020), Angola was estimated to have the highest tariff rates while Botswana had the lowest tariff rates. The maximum and minimum real exchange rates are 3.58 and 0.67, respectively. Botswana had the highest value of currency while Madagascar was estimated to have the lowest currency value against the dollar.

The standard deviation of the GINI coefficient is 0.09, while the standard deviation for exports is 0.16. The standard deviation for imports is 0.51, and the standard deviation for tariffs is 3.62. The standard deviation of the real exchange rate is 0.998. Therefore, the SADC countries reflect almost similar inequality trends. As per the World Bank data (2020), South Africa had the largest income inequality index at 0.63, while Tanzania had the lowest index at 0.40. Swaziland had the highest exports at 45.0%, while Tanzania had the lowest at 14.3%. Mozambique had the highest imports at 75.1%, while Tanzania had the lowest at 15.3%. Angola had the highest tariff rates at 9.2%, while Botswana had the lowest rates at 0.8%. Botswana had the highest currency value at 11.46 Pula compared to 1 US dollar, while Madagascar had the lowest value of the currency at 3787.75 Malagasy Ariary compared to 1 US dollar.

5.2.2 Panel unit root tests

This subsection presents both informal and formal unit root test results.

5.2.2.1 Informal Unit root tests (visual inspection)

A visual inspection of data using graphical illustration can provide insights into the behaviour of variables. Figures 5.1 to 5.5 demonstrate this approach by showing the graphical presentation of variables both in their original level form and at first difference. Figure 5.1 represents the visual inspection of the Gini coefficient.

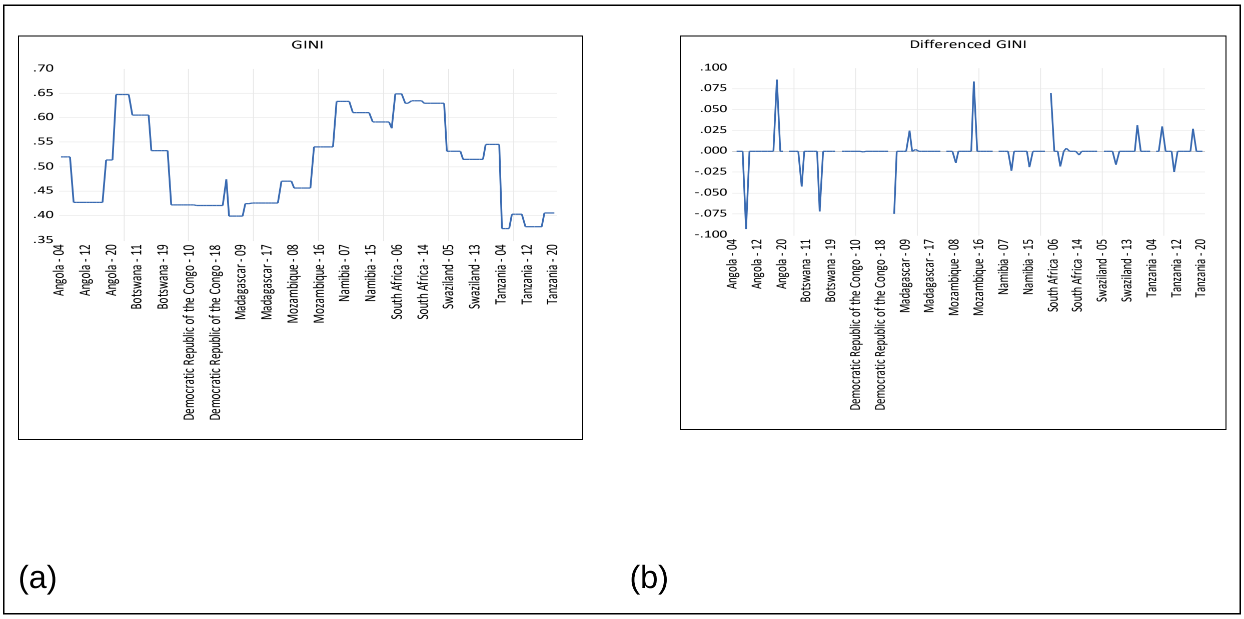


Figure 5.1: Gini Coefficient (2004-2020)

Source: Author's computation

Figure 5.1(a) suggests that the Gini coefficient, which is the dependent variable, is not stationary at its original level because the variances appear to be changing in different directions. However, based on the graph in Figure 5.1(b), at first difference, the Gini coefficient appears to be stationary because of constant statistical properties such as mean, variance, and autocorrelation over time.

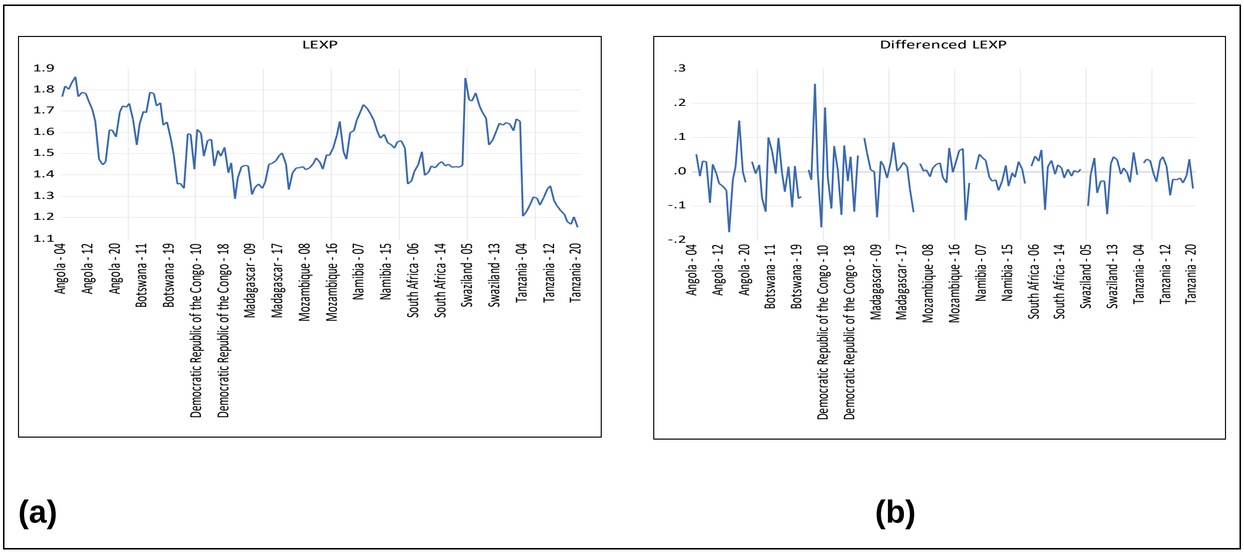
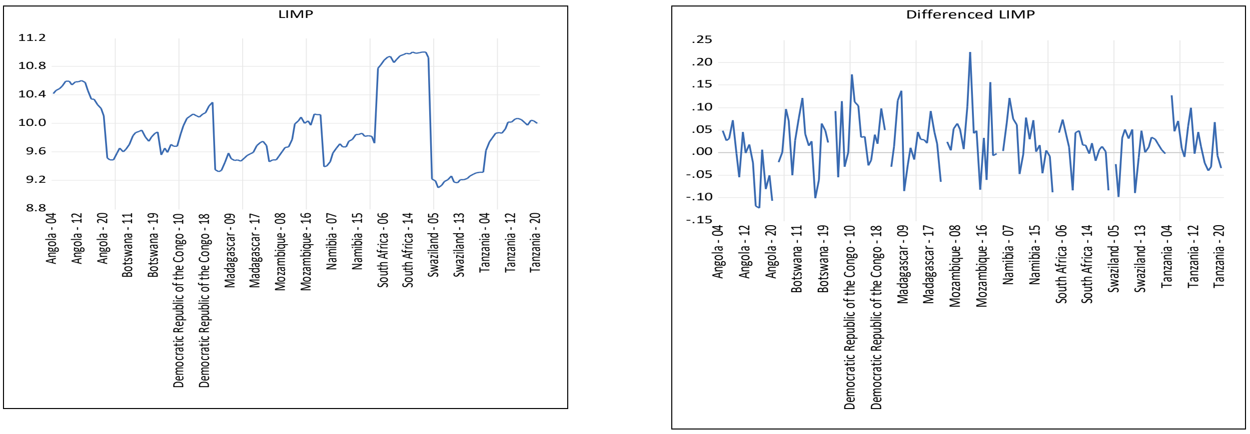


Figure 5.2: Log of Exports (2004-2020)

Source: Author’s computation

Panel (a) of Figure 5.2 displays the log of exports at level. A downward trend indicates that the mean of the series is changing over time. This suggest that log of exports is not stationary at level. To achieve stationarity, it was necessary to apply first difference, as shown in Panel (b), which reveals a clear hovering around the mean zero. This observation suggests that the log of exports became stationary at its first difference. By taking first differences, the trend was removed from the series and that makes it to appear stationary. The reason for such a transformation is that many statistical models assume stationarity and non-stationary data can lead to incorrect or misleading results. However, a formal test is required to reach a conclusive determination on stationarity.

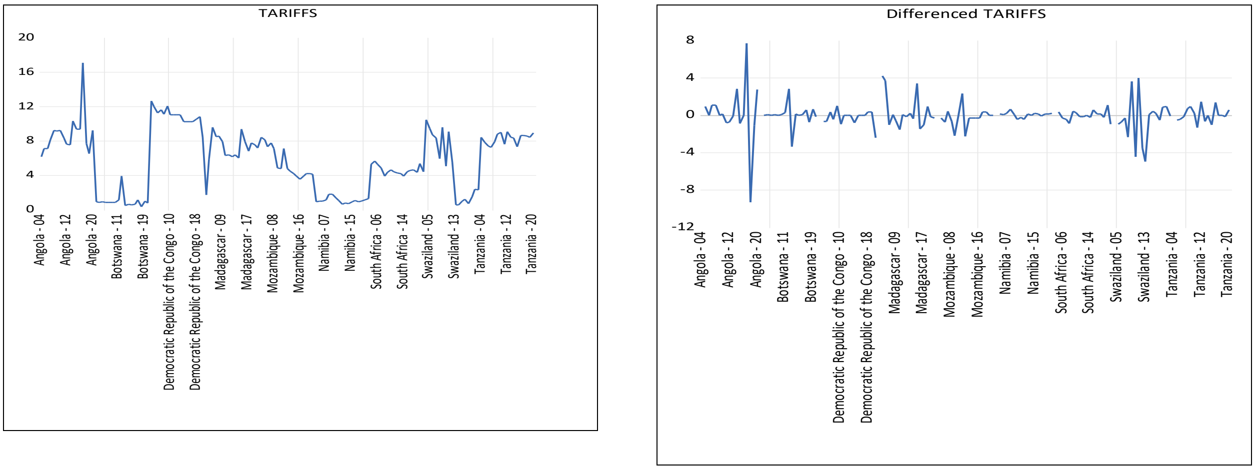


(a) (b)

Figure 5.3: Log of Imports (2004-2020)

Source: Author’s computation

The graph in Figure 5.3 indicates that the log of imports has a unit root at first difference as shown in diagrams (a) and (b) which represent the trend status at the level and first difference, respectively. When viewed at level, the figure shows a downward trend. However, when viewed at the first difference, the variable oscillates around the mean of zero, indicating a stationarity at first difference.

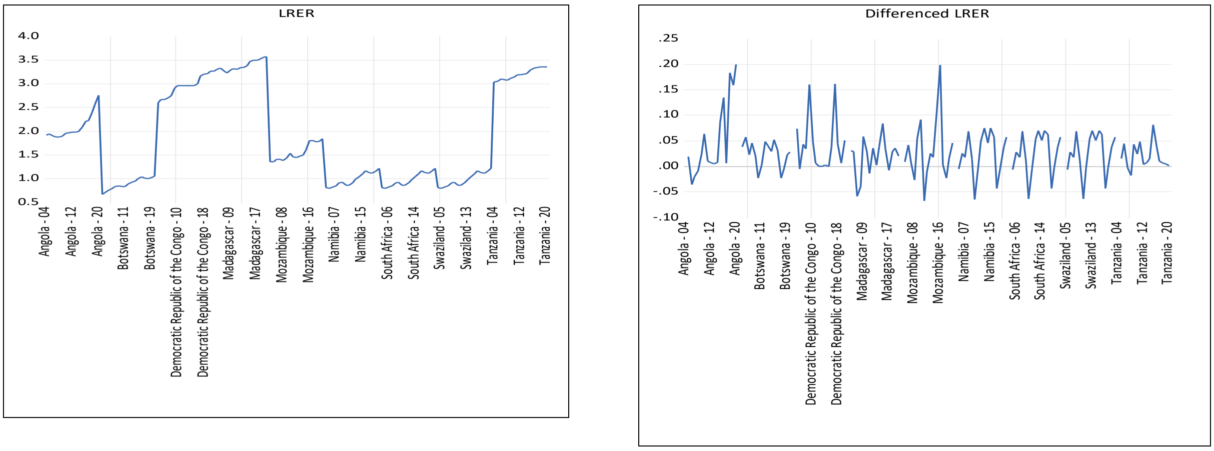


(a) (b)

Figure 5.4: Tariffs (2004-2020)

Source: Author's computation

The trendline in Figure 5.4(a) suggests that the tariff rate is not stationary at level because the variances appear to be changing in different directions over time. However, Figure 5.4(b) illustrates that the tariff rates seem to be stationary after first difference. This is evident from the trend line oscillating closely to the mean value of zero.



(a) (b)

Figure 5.5: Log of Real Exchange Rates (2004-2020)

Source: Author's computation

The diagram in panel (a) of Figure 5.5 displays the log of real exchange rates, and it indicates that this variable is not stationary at level. However, at first difference, the trend line oscillates around the average value of zero. This implies that the log of real exchange rates might be stationary at first difference.

5.2.2.2 Formal Unit Root Tests

Table 5.2 presents the results of the formal unit root test results conducted by means of the LLC, IPS, Fisher ADF, and Fisher PP tests.

Table 5.2: Formal unit root test results

Variable	Test Method	Test Equation	Level	1st Difference
GINI	LLC	Intercept	3.761	-10.194***
		Intercept and trend	-3.487***	-
		None	-1.373*	-
	IPS	Intercept	-0.905	-12.175***
		Intercept and trend	-5.529***	-
		None	-	-
	Fisher-ADF	Intercept	25.373	72.185***
		Intercept and trend	50.708***	-
		None	19.958	58.292***
	Fisher-PP	Intercept	38.451***	-
		Intercept and trend	46.194***	-
		None	25.887	64.628***
EXP	LLC	Intercept	-1.085	-7.486***
		Intercept and trend	-2.868***	-
		None	-0.834	-9.913***
	IPS	Intercept	-1.581*	-
		Intercept and trend	-1.742**	-
		None	-	-
	Fisher-ADF	Intercept	31.000**	-
		Intercept and trend	28.307*	-
		None	11.989	120.989***

	Fisher-PP	Intercept	38.004***	
		Intercept and trend	23.571	68.201***
		None	11.868	124.313***
IMP	LLC	Intercept	-2.347***	-
		Intercept and trend	-1.483*	-
		None	3.362	-8.068***
	IPS	Intercept	0.301	-4.807***
		Intercept and trend	1.096	-3.985***
		None	-	-
	Fisher-ADF	Intercept	20.795	54.224***
		Intercept and trend	13.308	44.621***
		None	4.260	83.798***
	Fisher-PP	Intercept	22.796	52.176***
		Intercept and trend	9.777	63.879***
		None	3.285	83.198***
TARIFFS	LLC	Intercept	-4.913***	-
		Intercept and trend	-4.861***	-
		None	-1.454*	-
	IPS	Intercept	-4.016***	-
		Intercept and trend	-3.702***	-
		None	-	-
	Fisher-ADF	Intercept	48.556***	-
		Intercept and trend	43.042***	-
		None	27.450*	-
	Fisher-PP	Intercept	46.324***	-
		Intercept and trend	49.906***	-
		None	32.616**	-
LRER	LLC	Intercept	2.614	-7.322***
		Intercept and trend	-1.139	-8.334***
		None	5.965	-4.865***
	IPS	Intercept	5.543	-4.478***

		Intercept and trend	-0.575	-3.957***
		None	-	-
	Fisher-ADF	Intercept	2.660	55.715***
		Intercept and trend	25.130	45.852***
		None	0.191	48.333***
	Fisher-PP	Intercept	2.557	43.844***
		Intercept and trend	9.441	37.780***
		None	0.060	58.502***

Notes: *, **, *** represents significance at 10%, 5% and 1%, respectively.

Source: Author's computation

The findings in Table 5.2 are in contradiction of the informal unit root tests presented in Figures 5.1 to 5.5. The results indicates that the Gini coefficient, exports, imports, tariffs, and the real exchange rate have significant values at 1%, 5%, and 10%, and the Gini coefficient, exports and tariffs became stationarity at level, while imports and real exchange rates became stationary after first difference. The formal unit root tests for the Gini coefficient, exports and tariff rates contradicts what was suggested by the informal unit root test. That said, the study relied on the formal unit root tests for several reasons, such as statistical rigour, consistency, wider acceptance, and robustness (Smith & Johnson, 2018).

The unit root tests results of the Gini coefficient, exports and tariffs integrate at I(0) while imports and the real exchange rate integrate at I(1). The rejection of null hypothesis on all the variables was confirmed by the LLC, IPS, Fisher ADF and Fisher PP. Based on the unit root outcomes, it has been concluded that imports, and the real exchange rate integrate at order I (1), while the Gini coefficient, exports and tariffs integrate at order I (0). Based on the outcomes of the formal unit root test, the study employed the PARDL technique given the different orders of integration. A crucial step in estimating the PARDL is determining the optimal lag length.

5.2.3 Lag length criteria test results

Table 5.3 presents the results of the lag length selection using vector autoregressive (VAR) lag order criteria.

Table 5.3: Lag length results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-104.9788	NA	1.04e-05	2.715525	2.863331	2.774827
1	484.1868	1091.047	9.29e-12	-11.21449	-10.32766*	-10.85868*
2	510.1282	44.83693	9.14e-12	-11.23773	-9.611872	-10.58542
3	543.9674	54.30991	7.48e-12*	-11.45599*	-9.091098	-10.50716
4	557.2637	19.69813	1.03e-11	-11.16700	-8.063089	-9.921673
5	578.2245	28.46533	1.21e-11	-11.06727	-7.224329	-9.525433
6	611.0803	40.56268*	1.09e-11	-11.26124	-6.679271	-9.422895
7	633.3838	24.78163	1.32e-11	-11.19466	-5.873662	-9.059806
8	665.1720	31.39578	1.34e-11	-11.36227	-5.302245	-8.930909

Notes: *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; SC: Schwarz information criterion; HQ: Hannan-Quinn information criterion
Source: Author's computation

The selection of the number of lags in constructing the model was based on the criteria with the lowest value (-11.46*). Both AIC and FPE suggested lag three, providing a rationale for avoiding misspecification issues in the analysis. The decision to use three lags was justified by the AIC, which is considered more efficient and minimizes the information criteria value (Brooks, 2008). Consequently, the study employed FPE and AIC in determining the optimal lag.

5.2.4 Correlation matrix test results

Table 5.4 below shows the correlation coefficients between five variables: Gini, Exports, Imports, Tariffs and RER.

Table 5.4: Correlation matrix test results

	GINI	EXPORTS	IMPORTS	TARIFFS	RER
GINI	1.000000				
EXPORTS	0.118236	1.000000			
IMPORTS	-0.115114	0.389504	1.000000		

TARIFFS	-0.243236	-0.126474	0.069371	1.000000	
RER	0.127816	-0.043953	-0.271914	-0.191592	1.000000

Source: Author's computation

Table 5.4 presents the correlation matrix test results. Based on the results, there is a weak positive correlation between exports and the Gini coefficient (0.12), which implies that there is a small tendency for countries with higher levels of exports to have slightly higher income inequality. There is also a weak positive correlation between the Gini coefficient and the real exchange rate (0.13), which implies that as income inequality increases, so does the real exchange rate. In contrast, there is a weak negative correlation between imports and the Gini coefficient (-0.12), indicating that higher income inequality is associated with lower levels of imports. Furthermore, there is a moderate negative correlation between tariffs and the Gini coefficient (-0.24), suggesting that higher levels of tariffs are associated with lower income inequality. There is also a weak negative correlation between tariffs and the real exchange rate (-0.19), indicating that higher tariffs are associated with a lower real exchange rate.

Overall, these findings provide insights into the association between income inequality and exports, imports, tariffs, and the real exchange rate in the SADC region. This implies that the variables have a statistical association, but not necessarily a causal connection. More techniques are required to determine the cause-and-effect relationships between these variables.

5.2.5 Panel Cointegration Test Results

The panel cointegration tests were carried out to ascertain the presence of cointegration among the variables. The Pedroni panel cointegration test results were discussed first followed by other cointegration tests.

5.2.5.1 Pedroni panel cointegration test

Table 5.5 presents the Pedroni panel cointegration test results. The table is divided into three categories based on the presence or absence of a deterministic trend and intercept. Each category contains six columns that report within and between dimension statistics, the statistical method used, test statistic, probability value, weighted statistic, and its corresponding probability value. The Pedroni cointegration test comprises seven statistics, each associated with its respective probability value. The test aims to assess the null hypothesis that no cointegration exists. The rejection or acceptance of the null hypothesis for each statistic is contingent upon its corresponding probability value.

Table 5.5: Pedroni Panel Cointegration Test Results

No deterministic trend					
Equation	Statistical method	Test Statistic	Probability Value	Weighted Statistic	Probability Value
Within Dimension	Panel v-Statistic	-1.432582	0.9240	-1.951595	0.9746
	Panel rho-Statistic	2.269970	0.9884	2.687713	0.9964
	Panel PP-Statistic	-2.352227	0.0093	-3.369403	0.0004
	Panel ADF-Statistic	-1.961489	0.0249	-2.369579	0.0089
Between Dimension	Group rho-Statistic	3.470906	0.9997	-	-
	Group PP-Statistic	-8.046982	0.0000	-	-
	Group ADF-Statistic	-3.857257	0.0001	-	-
Deterministic intercept and trend					
Equation	Statistical method	Test Statistic	Probability Value	Weighted Statistic	Probability Value
Within Dimension	Panel v-Statistic	-2.804222	0.9975	-3.222923	0.9994
	Panel rho-Statistic	3.215959	0.9993	3.269735	0.9995
	Panel PP-Statistic	-2.810435	0.0025	-5.106531	0.0000
	Panel ADF-Statistic	-1.817612	0.0346	-2.500442	0.0062

Between Dimension	Group rho-Statistic	3.902909	1.0000	-	-
	Group PP-Statistic	-15.94193	0.0000	-	-
	Group ADF-Statistic	-4.294671	0.0000	-	-
No deterministic intercept or trend					
Equation	Statistical method	Test Statistic	Probability Value	Weighted Statistic	Probability Value
Within Dimension	Panel v-Statistic	-1.511501	0.9347	-3.138334	0.9992
	Panel rho-Statistic	1.571047	0.9419	0.917422	0.8205
	Panel PP-Statistic	-0.898235	0.1845	0.303046	0.6191
	Panel ADF-Statistic	-0.948032	0.1716	0.432173	0.6672
Between Dimension	Group rho-Statistic	2.384658	0.9915	-	-
	Group PP-Statistic	-4.503348	0.0000	-	-
	Group ADF-Statistic	-3.500016	0.0002	-	-

Source: Author's computation

Firstly, when considering the scenario of no-deterministic trends, most of the equations indicate cointegration, with six out of eleven equations rejecting the null hypothesis. In addition, four of the eight equations within the same dimension and two of three equations between different dimensions also reject the null hypothesis. In the case of deterministic intercept and trend, six of the eleven equations suggest cointegration, with four equations within the same dimension having probability values lower than 5%, while the Panel PP-Statistic and Panel ADF-Statistic are significant at the 5% level. Furthermore, the Group PP-Statistic and Group ADF-Statistic are also statistically significant at the 5% level of significance.

When considering the scenario of no deterministic intercept or trend, none of the seven equations indicate cointegration. All eight equations within the same dimension suggest no cointegration, while two of the three equations between different dimensions suggest cointegration. Therefore, there is no cointegration in this scenario. According to the Pedroni test results, which indicates rejection of the null hypothesis by two of the three methods, it can be concluded that cointegration exists. Consequently, the next step is to assess cointegration using the Kao technique.

5.2.5.2 Kao panel cointegration test

The study used the Kao test as a second approach to analyse panel cointegration. The null hypothesis states that there is no cointegration in the models and allows for an unbalanced panel in the long term.

Table 5.6: Kao panel cointegration test results

Method	T-Statistic	Probability value
Kao ADF test	-2.151508	0.0157
Residual variance	0.000286	-
HAC variance	0.000237	-

Source: Author's computation

According to the results in Table 5.6, the ADF t-statistics is -2.15 and the probability value is 0.02, indicating that there is cointegration in the model. Mahembe and Odhiambo (2016) conducted research in SADC which supports the usefulness of the Kao test in identifying cointegration. The study also employed the Johansen-Fisher cointegration test to confirm the presence of cointegration.

5.2.5.3 Johansen-Fisher Panel Cointegration Results

Table 5.7 presents the outcomes of the Johansen-Fisher panel cointegration test performed to ascertain the existence of cointegration among the variables in the model. The results are provided for both the Fisher statistics for trace and the maximum eigenvalue. Notably, this test is considered more important than the Pedroni and Kao tests.

Table 5.7: Johansen-Fisher cointegration test results

Hypothesized No. of CE(s)	Fisher Stat.*(from trace test)	Probability value	Fisher Stat.* (from max-eigen test)	Probability value
None	386.2	0.0000	264.8	0.0000
At most 1	182.4	0.0000	134.4	0.0000
At most 2	82.13	0.0000	61.66	0.0000
At most 3	41.10	0.0015	43.32	0.0007
At most 4	10.82	0.9018	10.82	0.9018

Source: Author's computation

Table 5.7 provides a summary of the Johansen-Fisher panel cointegration test, employing both trace and maximum eigenvalue statistics. The outcomes indicate the rejection of the null hypothesis of no cointegration, as eight of the ten p-values are below the 1% significance level. These findings align with those of the Pedroni and Kao tests, reinforcing the presence of a long-term relationship among the variables examined in this study, specifically, income inequality, trade openness, tariffs, and the real exchange rate. Thus, the results suggest the existence of a sustained connection in the specified model. Effectively, managing and monitoring these variables could contribute to fostering a more equitable income distribution.

Since the Pedroni, Kao, and Johansen-Fisher panel cointegration tests confirmed the presence of cointegration in the model, the study proceeds to estimate PARDL.

5.2.6 Panel Autoregressive Distributed Lag (PARDL) test results

Having determined the presence of long-term cointegration in the models, the next step involves addressing the first three objectives of the study through two sub-sections: one for the long-run analysis and another for the short-run analysis, including the error correction model. The long-run results show how the dependent variable is influenced by the independent variables, while the short-run equation reveals the rate at which the model adjusts to equilibrium.

5.2.6.1 Long-run Estimates Results

Table 5.8 presents the outcomes of the long-run relationship between exports, imports, tariffs, real exchange rates and income inequality.

Table 5.8: Long-run test results

Variables	Coefficient	Std. Error	t-Statistic	Probability
LEXP	0.104818	0.018234	5.946014	0.0000
LIMP	-0.078148	0.011233	-6.957342	0.0000
TARIFFS	0.001576	0.000882	1.787554	0.0790
LRER	0.047979	0.012960	3.702165	0.0005

Source: Author's computation

According to the long-run results, there exists a significant positive relationship between exports and income inequality, with a significance level of 1%. This implies that if exports increase by 1%, ceteris paribus, there will be a corresponding positive increase of 0.105% in income inequality. This suggests that the SADC region's export basket exacerbates the problem of inequality in the region. The results are in line with Harrison and Zhang (2017) who also found exports to be positively related to income inequality. As more goods are exported, there will be more income inequality. This suggests the current export structure in the region is not useful in addressing the inequality problem.

The Heckscher-Ohlin theory posits that a country's exports are positively related to income inequality in the long run, as they affect the relative prices of factors of production. A country will export products that use their abundant factors of production, and it is raw resources at most in the region, which may exacerbate income inequality (Helpman & Krugman, 1985). Moreover, countries that have specialized and abundant factors of production will export products that require them in high quantity, resulting in a positive correlation between exports and inequality in the long run (Ostry & Berg, 2018; Bourguignon, 2015).

Regarding imports and income inequality, there exists a negative and significant relationship at the 1% level of significance. The findings imply that a 1 percent increase in imports, ceteris paribus, will cause a decrease of 0.078% in inequality. This implies that the expansion of imports in the SADC region reduces income inequality. The results are in line with Baussola and Mussini (2018), Lin & Zhang (2017) and Herzer and Nunnenkamp (2015) who also found imports to be negatively related to income inequality. Therefore, imports have a greater impact on reducing income inequality. According to the Heckscher-Ohlin theory, countries with abundant factors of production will import goods that use them less intensively. This implies that when adopting the Heckscher-Ohlin theory and producing for the world market, it may not be essential to prevent other imports since they reduce income inequality. Therefore, given the exports and imports results, trade openness is a critical element in the region which needs direct policy action, especially amid the AfCFTA. As regards the tariffs and income inequality nexus, there is a positive and significant connection at the 10% level. The implication is that a 1% increase in tariffs, ceteris paribus, will cause an increase of 0.002% in income inequality. This implies that the expansion of tariffs in the SADC region exacerbates the inequality problem. These findings are in line with Kolko (2021) and Sato & Tabata (2020) on the view that a decrease in tariffs will lead to a decline or ease income inequality. In line with the Ricardian model of trade theory, countries can benefit from specializing in producing goods that they have a comparative advantage in and a positive relationship between tariffs and income inequality can arise if tariffs protect domestic producers of goods that are more likely to be produced by high-skilled workers, leading to increased wages and greater income inequality (Krueger, 1997).

The results are also consistent with the AfCFTA which aims to eliminate or substantially reduce tariffs on goods traded among African countries, which will in turn reduce income inequality in the SADC region (African Union, 2018). A key fact is that the import and tariff results are in harmony. Lastly, the real exchange rate has a positive and significant relationship with income inequality. A 1% rise in the real exchange rate, ceteris paribus, will result in a 0.048% increase in income inequality. The implication is that as the currency depreciates against major currencies like the dollar, income inequality also decreases. The findings are in line with Alper and Özdemir (2020) who found a long-run positive relationship between the real exchange rate and income inequality. The purchasing power parity theory also suggests that a positive relationship exists between the real exchange rate and income inequality, as higher income inequality in a country leads to a stronger currency and a higher real exchange rate (Liu & Wan, 2021).

5.2.6.2 Short-run and ECM estimates

This section provides the short-run estimates as well as results from the Error Correction Model (ECM). The results are presented in the same order as the long-run estimates discussed earlier.

Table 5.9: Short-run and ECM test results

Variables	Coefficient	Std. Error	t-Statistic	Probability
COINTEQ01 (ECM)	-0.365649	0.143367	-2.550438	0.0134
D(LEXP)	0.162712	0.078836	2.063934	0.0434
D (LEXP (-1))	0.010649	0.037856	0.281306	0.7795
D(LIMP)	-0.101410	0.094394	-1.074329	0.2870
D (LIMP (-1))	0.011109	0.070341	0.157926	0.8751
D(TARIFFS)	-0.000647	0.002957	-0.218795	0.8276
D (TARIFFS (-1))	0.000162	0.003205	0.050474	0.9599
D(LRER)	-0.102405	0.086170	-1.188414	0.2394
D (LRER (-1))	-0.046861	0.085645	-0.547147	0.5863
C	0.364351	0.140436	2.594430	0.0119

Source: Author's computation

Table 5.9 shows the short-run and ECM estimates for the model. The findings confirm that imports, tariffs, and real exchange rates have a negative impact on income inequality in the short run. The coefficient of ECM (-0.37) is statistically significant at the 5% level and negative as would be expected if a model is adequately modelled and specified. According to the rate of adjustment, 36.6% of the disequilibrium from the prior year is likely to be brought into long-term equilibrium in the next year. The results confirm that the full convergence process will take place in a few years to reach the stable path of equilibrium. this implies that the correction process is moderately adjusting in the Gini equation.

5.2.7 Granger Causality test results

Table 5.10 presents the outcomes of the Pairwise Granger causality test used in the study to determine the causal relationship among variables. These findings address the last objective of the study.

Table 5.10: Granger Causality test results

Null Hypothesis	Obs	F-Statistic	Probability	Decision

LEXP does not Granger Cause GINI GINI does not Granger Cause LEXP	144	3.00490 3.26734	0.0852 0.0728	-Reject the null hypothesis -Reject the null hypothesis
LIMP does not Granger Cause GINI GINI does not Granger Cause LIMP	144	1.09735 0.00996	0.2966 0.9206	-Accept the null hypothesis -Accept the null hypothesis
TARIFFS does not Granger Cause GINI GINI does not Granger Cause TARIFFS	144	1.47289 11.6224	0.2269 0.0008	-Accept the null hypothesis - Reject the null hypothesis
LRER does not Granger Cause GINI GINI does not Granger Cause LRER	144	5.54167 0.20421	0.0199 0.6520	-Reject the null hypothesis -Accept the null hypothesis
LIMP does not Granger Cause LEXP LEXP does not Granger Cause LIMP	144	1.00135 1.08888	0.3187 0.2985	-Accept the null hypothesis -Accept the null hypothesis
TARIFFS does not Granger Cause LEXP LEXP does not Granger Cause TARIFFS	144	0.36126 1.06303	0.5488 0.3043	-Accept the null hypothesis -Accept the null hypothesis
LRER does not Granger Cause LEXP	144	3.10625 0.00205	0.0802 0.9640	-Reject the null hypothesis

LEXP does not Granger Cause LRER				-Accept the null hypothesis
TARIFFS does not Granger Cause LIMP LIMP does not Granger Cause TARIFFS	144	0.28155 0.69202	0.5965 0.4069	-Accept the null hypothesis -Accept the null hypothesis
LRER does not Granger Cause LIMP LIMP does not Granger Cause LRER	144	0.18728 0.86751	0.6659 0.3532	-Accept the null hypothesis -Accept the null hypothesis
LRER does not Granger Cause TARIFFS TARIFFS does not Granger Cause LRER	144	16.7478 1.24494	7.E-05 0.2664	-Accept the null hypothesis -Accept the null hypothesis

Source: Author's computation

The Granger Causality test results shows causal relationships between the Gini coefficient and exports, the Gini coefficient and tariffs, the Gini coefficient and real exchange rates as well as between the real exchange rate and exports. These causalities are all significant at the 1%, 5% and 10% levels. The first causality indicates that exports Granger cause the Gini coefficient and the Gini coefficient also Granger causes exports at the 10% level of significance. There is bidirectional causal relationship between inequality and exports. The findings are a further confirmation of the long run relationship between the Gini coefficient and exports which indicated that an increase in the Gini coefficient will cause an increase in exports by 0.10.

There is also evidence of a unidirectional causal relationship between the Gini coefficient to tariffs at the 1% level of significance. This means that in the long run, the Gini coefficient does Granger cause tariff rates in the SADC region. This causal relationship is in line with Saha and Zhang (2017) who also found that there is unidirectional causality from the Gini coefficient to tariffs. The Granger causality test also shows a unidirectional causality from real exchange rates to the Gini coefficient. This means that in the long run, the real exchange rate Granger cause the Gini coefficient at least in the SADC region. The findings are also confirmation of the long-run relationship between the real exchange rate and the Gini coefficients which indicated that an increase in the real exchange rate will cause an increase in the Gini coefficient. These results of Granger causality are validated by Bahmani-Oskooee and Satawatananon (2020) who also found the existence of unidirectional causality from the real exchange rate to the Gini coefficient.

The study also found a unidirectional relationship from the real exchange rate to exports. The real exchange rate does Granger cause exports at the 10% significance level. Unidirectional causality from the real exchange rate to exports suggests that changes in a country's exchange rate can impact its export levels, with evidence found in studies such as Li and Liang (2019) and Bahmani-Oskooee and Rhee (1996). Lastly, the study accepts the null hypothesis of no causality in all variables with a probability value of more than 10%.

5.2.8 Diagnostic tests results

The purpose of the diagnostic test is to determine if the model is specified correctly, and if the model is of good fit. The study employed a test called residual cross-section dependence to examine whether there is any dependence among the residuals of the cross-sectional data.

5.2.8.1 Residuals Cross-Section Dependence Test (No Weights)

The table below presents the results of the cross-sectional dependence test for residuals, which aims to detect whether there is any correlation between the errors of the regression model. The test includes three different statistics: the Breusch-Pagan LM, the Pesaran scaled LM, and the Pesaran CD. The p-values associated with each test statistic are used to determine whether there is a violation of cross-sectional dependence. If any of the p-values fall below the customary significance level, typically set at 5%, then reject the null hypothesis asserting no cross-sectional dependence and infer that there is a breach.

Table 5.11: Residuals Cross-Section Dependence Test (No Weights) results

Test	Statistic	d.f.	Probability
Breusch-Pagan LM	110.3716	36	0.0000

Pesaran scaled LM	8.764783		0.0000
Pesaran CD	1.013570		0.3108

Source: Author's computation

In Figure 5.11, the results indicate that there is a violation of cross-sectional dependence based on the Breusch-Pagan LM and the Pesaran-scaled LM tests. Both statistics have p-values of 0.00, which are lower than the significance level. Therefore, the study rejects the null hypothesis of no cross-sectional dependence and concludes that there is a violation. On the other hand, the Pesaran CD statistic has a p-value of 0.31, which is higher than the significance level. The study cannot reject the null hypothesis of no cross-sectional dependence based on this test. Therefore, since two of three tests indicate the violation, the study will proceed to the residual cross-section dependence test (cross-section SUR) to correct the model.

5.2.8.2 Residuals Cross-Section Dependence Test (Cross-section SUR)

Table 5.12 presents the results of three tests for cross-section dependence in residuals. Weighing for cross-dependence the table shows the correction of the violation.

Table 5.12: Residuals cross-section dependence test (cross SUR) results

Test	Statistic	d.f.	Probability
Breusch-Pagan LM	14.14643	36	0.9996
Pesaran scaled LM	-2.575467		0.0100
Pesaran CD	-0.021460		0.9829

Source: Author's computation

The Breusch-Pagan LM test shows a test statistic of 14.15 with 36 degrees of freedom and a probability of 0.9996, suggesting no presence of cross-sectional dependence in the residuals. On the other hand, the Pesaran scaled LM test indicates evidence of cross-sectional dependence with a test statistic of -2.58 and a probability of 0.01. However, the Pesaran CD test, with a test statistic of -0.02 and a probability of 0.98, reveals no sign of cross-sectional dependence in the residuals. According to the residual cross-section dependence test (cross SUR) results, it can be concluded that the violation of cross-sectional dependence has been corrected, and hence the model against the data was adopted without any concerns about cross-sectional dependence.

5.2.8.3 *Stability tests results*

The stability of the model was augmented by the inverse roots of AR characteristic polynomial graph shown in Figure 5.6 below. The inverse root of the AR characteristic polynomial is often utilised to identify the presence of autocorrelation in the error term of a regression model. If all the inverse roots lie outside the unit circle, there is no autocorrelation. On the other hand, if one or more of the inverse roots lie inside the unit circle, there is autocorrelation. If the inverse root of the AR characteristic polynomial is close to zero, it indicates the presence of autocorrelation in the error term. But if the inverse root is close to one, it suggests that there is no significant autocorrelation in the error term.

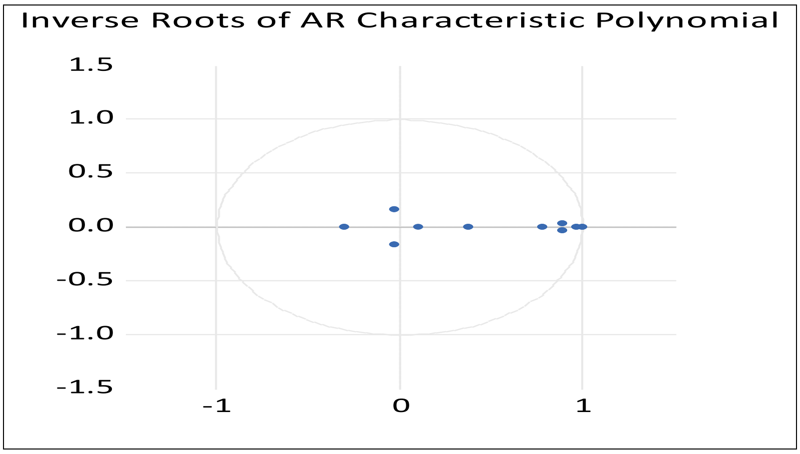


Figure 5.6: Inverse of Root AR (2004-2020)

Source: Author's computation

The graph shown in Figure 5.6 displays the polynomial graph of inverse AR characteristics, which is used to assess the reliability and stability of the PARDL model. The graph indicates that the model is stable since all the data points fall within the unit circle and they are close to zero, meaning that there is autocorrelation in the data. The results align with the research of Kim and Shin (2021), who similarly identified autocorrelation in the inverse root of the AR characteristic polynomial and demonstrated that such autocorrelation can serve as a method for detecting common shocks.

5.3 SUMMARY

In this chapter, the study delved into the outcomes and interpretation derived from various estimation techniques utilized in the research. These techniques encompassed descriptive analysis, panel unit root tests, lag length determination, correlation matrix examination, panel cointegration analysis, PARDL model application, panel causality investigation, and diagnostic tests. The study successfully achieved its aim and objectives. The following chapter is devoted to summarizing the findings of the study, emphasizing crucial outcomes, delineating the limitations of the research, and presenting recommendations for policy.

CHAPTER 6

SUMMARY, RECOMMENDATIONS, CONCLUSION

6.1 INTRODUCTION

This chapter presents the summary and interpretation of the findings, study conclusion, contributions to the study or policy recommendations, limitations and the gap or areas for future research.

6.2 SUMMARY AND INTERPRETATION OF FINDINGS

The study was aimed at investigating the impact of trade openness, tariffs, and the real exchange rate on income inequality in selected SADC countries from 2004 to 2020. The study used stationarity analysis to determine the appropriate approach to estimate the models. Given the different orders of integration I(0) and I(1), the panel ARDL was deemed relevant. The presence of long run cointegration was established by the Kao, Pedroni, and Johansen-Fisher cointegration tests.

The corresponding models were estimated using econometric techniques. The descriptive analysis outcomes revealed that all the variables included in the model were unique in their features. The GINI coefficient indicated moderate income inequality among the sample countries, with South Africa having the highest income inequality index and Tanzania the lowest. Concerning the terms of trade, Eswatini had the highest exports, while Tanzania was the lowest exporting country in the SADC region. Mozambique was the most importing country, whereas Tanzania had the lowest imports. Tariffs showed significant variation across countries, with Angola having the highest tariff rates and Botswana the lowest. Additionally, Botswana had the highest currency value, while Madagascar had the lowest. Overall, SADC countries exhibited similar inequality trends, with South Africa recording the highest income inequality index and Tanzania recording the lowest.

The research findings presented in this study shed light on the intricate and multifaceted relationship between trade openness, tariffs, real exchange rates, and income inequality within the SADC region. It is evident that the dynamics at play are not straightforward, and their implications for income inequality are nuanced. Firstly, the positive association between exports and income inequality suggests that while industries engaged in export activities may generate substantial profits, the benefits may not be distributed equitably among different segments of society. The export basket needs to be improved. The Heckscher-Ohlin theory states that countries should import goods that are in abundance. If SADC economies continue to export unprocessed goods in international markets, this will not help to reduce inequality in the continent. Therefore, efforts to guarantee that the benefits of such activities are shared evenly, particularly among the more marginalized parts of the community, should be implemented alongside policies targeted at encouraging exports.

On the other hand, the inverse relationship between imports and income inequality emphasizes how import-led growth has the ability to assist a wider range of people. Growth driven by imports may enable customers to obtain a greater range of products and services at competitive costs, potentially narrowing the gap in living standards. However, it is important to consider that excessive reliance on imports without fostering domestic industries can also pose risks, such as job displacement in certain sectors. As such, a balanced approach is needed to harness the benefits of import-led growth while safeguarding domestic industries.

Moreover, the study's identification of positive links between tariffs and income inequality, as well as real exchange rates and income inequality, underscores the need for caution in policymaking in these areas. While tariffs can be used as a source of government revenue or to protect domestic industries, they can also contribute to inequality if not carefully managed. Similarly, real exchange rate fluctuations can impact income inequality by affecting the competitiveness of export-oriented industries. Therefore, the findings emphasize the importance of well-thought-out and balanced policy adjustments in these domains to avoid exacerbating income inequality.

Overall, the empirical evidence from this study underscores the significant role of trade-related measures in influencing income inequality dynamics within the SADC region. It highlights the complex interplay of economic variables and their enduring impact on income inequality. The bi-directional and uni-directional causal relationships identified through the Granger causality analysis further underline the interconnectedness of macroeconomic variables and inequality, emphasizing the need for comprehensive and coordinated policy responses to address income inequality effectively. As SADC countries continue to navigate their economic development pathways, the insights from this study can serve as a valuable resource for policymakers in their efforts to promote more equitable and inclusive growth.

6.3 CONCLUSIONS

The analysis of trade openness, tariffs, and real exchange rates has provided valuable insights into the intricate relationship between economic variables and income inequality within SADC. The study's conclusions highlight how intricate and varied these relationships are and how complicated it is to determine how they affect income disparity. From finings, it is evident that South Africa has the highest income inequality index while Tanzania has the lowest income inequality index. The positive association between exports and income inequality suggests the need to ensure a more equitable distribution of benefits from export activities.

On the other hand, the negative relationship between imports and income inequality underscores the potential of import-led growth to benefit a spectrum of the population. The study's identification of links between tariffs, real exchange rates, and income inequality emphasizes the importance of cautious policymaking in these areas. Overall, these findings emphasize the need for comprehensive and well-balanced policy responses within the SADC region to address income inequality effectively and promote more inclusive growth as these economies continue their development journeys.

6.4 CONTRIBUTIONS OF THE STUDY/POLICY RECOMMENDATIONS

Based on the empirical findings of this study, several key recommendations emerge that the SADC region can consider in addressing income inequality. Firstly, prioritizing and promoting trade openness and regional integration is a central policy strategy. Given the potential for intra-regional trade to spur economic growth and reduce inequality, SADC should seize the opportunities presented by the AfCFTA. This involves a concerted effort to reduce trade barriers, streamline customs procedures, and facilitate cross-border trade among member countries. The mutual recognition of standards and regulations across borders, as well as fostering economic cooperation, can create an environment that encourages businesses to expand their operations within the region, ultimately leading to income redistribution and poverty reduction.

Furthermore, harmonizing tariff regimes across SADC member countries and ensuring the establishment of fair-trade practices is essential. This will ensure that all economies, regardless of their size or development stage, have equal access to markets and resources. By reducing tariff disparities and enforcing fair trade standards, SADC can promote an environment where countries are less likely to engage in protectionist policies that may exacerbate income inequality. Instead, countries within the region can engage in trade that is more inclusive and beneficial to all.

Managing real exchange rates is another crucial component of reducing income inequality. A well-managed exchange rate can enhance export competitiveness, essential for economic growth and job creation. Additionally, it can attract FDI, which can bring in new technologies, expertise, and capital. This, in turn, contributes to economic development and job opportunities, thereby reducing income disparities. SADC should ensure that exchange rate policies foster a conducive environment for export-oriented industries while also protecting against excessive currency depreciation, which can negatively affect the purchasing power of money.

6.5 LIMITATIONS OF THE STUDY

A significant constraint of this research was the limited accessibility to data. This constraint necessitated the study to focus solely on nine SADC nations, as opposed to the full complement of sixteen member countries. This data scarcity hindered the comprehensive examination of the entire SADC region, potentially leading to a limited understanding of the broader dynamics influencing income inequality in this context. The exclusion of factors such as variances in access to financial markets and instruments across SADC member states could hinder the effectiveness of trade policies in promoting equitable economic growth. Moreover, the oversight of initiatives such as processing zones and strategic trade policies targeting specific industries may overlook crucial mechanisms for stimulating exports and fostering development within the region. Additionally, a discussion on the role of international agencies like the General Agreement on Tariffs and Trade (GATT), now integrated into the World Trade Organization (WTO), could provide valuable insights into the broader global trade framework and its implications for SADC nations.

6.6 AREAS FOR FUTURE RESEARCH

A number of interesting directions for further investigation on income disparity in the SADC region arise when one takes into account the results and constraints of this study. First and foremost, expanding the dataset and incorporating all sixteen SADC member states would provide a more comprehensive and representative analysis of income inequality trends in the region. Moreover, exploring the specific mechanisms and policy interventions that can mitigate income inequality, such as targeted social welfare programs and labour market policies, could yield valuable insights for policymakers. Additionally, a deeper investigation into the causal relationships between trade openness, tariffs, and the real exchange rate and their impact on income inequality while accounting for potential mediating factors presents an intriguing avenue for future research. Furthermore, examining the dynamic effects of globalization and technological advancements on income inequality within the SADC region could shed light on emerging trends. Finally, comparative studies between SADC and other regional economic communities could offer valuable insights into the unique dynamics and challenges of SADC countries in their pursuit of reducing income inequality.

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APPENDICES

Appendix A: Data

YEAR	COUNTRY	GINI	EXP	LEXP	IMP	LIMP	TARIFFS	RER	LRER
2004	Angola	0,52	58,38036	1,766267	2,6E+10	10,41542	6,16	83,54136	1,921902
2005	Angola	0,52	65,52627	1,816415	2,91E+10	10,46445	7,08	87,15914	1,940313
2006	Angola	0,52	63,46786	1,802554	3,1E+10	10,49118	7,08	80,36807	1,905084
2007	Angola	0,52	67,90578	1,831907	3,33E+10	10,523	8,13	76,70614	1,88483
2008	Angola	0,427	72,47503	1,860188	3,94E+10	10,5955	9,17	75,03335	1,875254
2009	Angola	0,427	58,7573	1,769062	3,92E+10	10,59344	9,15	79,32817	1,899427
2010	Angola	0,427	61,54312	1,789179	3,46E+10	10,53921	9,23	91,90572	1,963343
2011	Angola	0,427	60,66995	1,782974	3,84E+10	10,58434	8,36	93,93475	1,972826
2012	Angola	0,427	55,94013	1,747723	3,84E+10	10,58395	7,61	95,46796	1,979858
2013	Angola	0,427	50,74709	1,705411	4E+10	10,60256	7,52	96,51828	1,98461
2014	Angola	0,427	44,69503	1,650259	3,8E+10	10,57956	10,3	98,30242	1,992564
2015	Angola	0,427	29,7546	1,473554	2,89E+10	10,46089	9,38	120,0607	2,079401
2016	Angola	0,427	28,12449	1,449085	2,17E+10	10,33746	9,38	163,6564	2,213933
2017	Angola	0,427	29,0041	1,462459	2,21E+10	10,34356	17,06	165,916	2,219888

2018	Angola	0,513	40,83629	1,611046	1,83E+10	10,26256	7,68	252,8557	2,402873
2019	Angola	0,513	40,79076	1,610562	1,63E+10	10,21175	6,52	364,8258	2,562086
2020	Angola	0,513	37,91127	1,578768	1,27E+10	10,10528	9,23	578,2588	2,762122
2004	Botswana	0,647	49,61379	1,695602	3,22E+09	9,507471	0,92	4,693833	0,671528
2005	Botswana	0,647	52,92355	1,723649	3,06E+09	9,485488	0,85	5,11675	0,708994
2006	Botswana	0,647	52,25447	1,718123	3,06E+09	9,48568	0,88	5,8303	0,765691
2007	Botswana	0,647	54,51608	1,736525	3,82E+09	9,582435	0,83	6,139408	0,788127
2008	Botswana	0,647	45,67397	1,659669	4,49E+09	9,652634	0,84	6,826858	0,834221
2009	Botswana	0,605	34,80095	1,541591	4E+09	9,602591	0,82	7,155142	0,854618
2010	Botswana	0,605	43,63546	1,63984	4,26E+09	9,629862	0,83	6,793625	0,832102
2011	Botswana	0,605	49,95053	1,69854	5,08E+09	9,706229	1,1	6,838233	0,834944
2012	Botswana	0,605	49,25074	1,692413	6,72E+09	9,827059	3,91	7,640525	0,883123
2013	Botswana	0,605	61,52264	1,789035	7,39E+09	9,868506	0,5	8,398908	0,924223
2014	Botswana	0,605	60,5603	1,782188	7,65E+09	9,883461	0,61	8,976083	0,953087
2015	Botswana	0,533	52,90317	1,723482	8,09E+09	9,908095	0,56	10,12899	1,005566
2016	Botswana	0,533	54,61135	1,737283	6,4E+09	9,806153	0,59	10,90116	1,037473

2017	Botswana	0,533	42,96474	1,633112	5,57E+09	9,745927	1,12	10,34742	1,014832
2018	Botswana	0,533	44,53579	1,648709	6,46E+09	9,810073	0,33	10,19998	1,008599
2019	Botswana	0,533	37,15431	1,570009	7,23E+09	9,859055	0,96	10,75587	1,031645
2020	Botswana	0,533	31,35372	1,496289	7,6E+09	9,880887	0,8	11,45624	1,059042
2004	Democratic Republic of the Congo	0,422	22,72951	1,35659	3,59E+09	9,555101	12,65	399,4758	2,60149
2005	Democratic Republic of the Congo	0,422	22,94418	1,360673	4,43E+09	9,646877	11,96	473,908	2,675694
2006	Democratic Republic of the Congo	0,422	21,7001	1,336462	3,91E+09	9,592606	11,26	468,2788	2,670505
2007	Democratic Republic of the Congo	0,422	39,07191	1,591865	5,09E+09	9,706763	11,57	516,7499	2,71328
2008	Democratic Republic of the Congo	0,422	39,0278	1,591374	4,74E+09	9,675663	11,07	559,2925	2,747639
2009	Democratic Republic of the Congo	0,422	26,81379	1,428358	4,74E+09	9,675663	12,04	809,7858	2,90837
2010	Democratic Republic of the Congo	0,422	41,11115	1,61396	7,06E+09	9,849074	11,03	905,9135	2,957087
2011	Democratic Republic of the Congo	0,422	39,51562	1,596769	9,15E+09	9,961558	11,03	919,4913	2,963548

2012	Democratic Republic of the Congo	0,421	30,80301	1,488593	1,16E+10	10,06558	11,03	919,755	2,963672
2013	Democratic Republic of the Congo	0,421	36,44586	1,561648	1,26E+10	10,09908	11,03	919,5659	2,963583
2014	Democratic Republic of the Congo	0,421	36,83219	1,566228	1,37E+10	10,13515	10,19	925,2263	2,966248
2015	Democratic Republic of the Congo	0,421	27,58332	1,440647	1,28E+10	10,1061	10,19	925,985	2,966604
2016	Democratic Republic of the Congo	0,421	32,78786	1,515713	1,23E+10	10,08968	10,19	1010,303	3,004452
2017	Democratic Republic of the Congo	0,421	30,69015	1,486999	1,35E+10	10,13005	10,19	1464,418	3,165665
2018	Democratic Republic of the Congo	0,421	33,80735	1,529011	1,41E+10	10,15017	10,51	1622,524	3,210191
2019	Democratic Republic of the Congo	0,421	25,75624	1,410882	1,77E+10	10,24764	10,83	1647,76	3,216894
2020	Democratic Republic of the Congo	0,421	28,60459	1,456436	1,98E+10	10,29703	8,4	1851,122	3,267435
2004	Madagascar	0,474	19,45731	1,289083	2,24E+09	9,34968	1,74	1868,858	3,271576
2005	Madagascar	0,399	24,31939	1,385953	2,08E+09	9,318176	5,89	2003,026	3,301687
2006	Madagascar	0,399	27,48691	1,439126	2,15E+09	9,33238	9,54	2142,302	3,330881

2007	Madagascar	0,399	27,79621	1,443986	2,8E+09	9,447548	8,48	1873,877	3,272741
2008	Madagascar	0,399	27,7072	1,442593	3,84E+09	9,58435	8,51	1708,371	3,232582
2009	Madagascar	0,399	20,37583	1,309115	3,16E+09	9,499098	7,89	1956,206	3,291415
2010	Madagascar	0,424	21,87438	1,339936	2,97E+09	9,472728	6,32	2089,95	3,320136
2011	Madagascar	0,424	22,71964	1,356401	3,04E+09	9,483582	6,37	2025,118	3,30645
2012	Madagascar	0,426	21,78069	1,338072	2,94E+09	9,468334	6,18	2194,967	3,341428
2013	Madagascar	0,426	23,27217	1,366837	3,26E+09	9,513425	6,39	2206,914	3,343785
2014	Madagascar	0,426	28,28191	1,451509	3,49E+09	9,542693	5,99	2414,812	3,382883
2015	Madagascar	0,426	28,39065	1,453175	3,72E+09	9,57023	9,35	2933,508	3,467387
2016	Madagascar	0,426	29,09257	1,463782	3,9E+09	9,59076	7,86	3176,539	3,501954
2017	Madagascar	0,426	30,90263	1,489995	4,82E+09	9,683041	6,83	3116,11	3,493613
2018	Madagascar	0,426	31,87334	1,503428	5,36E+09	9,728903	7,74	3334,752	3,523064
2019	Madagascar	0,426	28,24966	1,451013	5,6E+09	9,748234	7,54	3618,322	3,558507
2020	Madagascar	0,426	21,4846	1,332127	4,83E+09	9,683741	7,2	3787,754	3,578382
2004	Mozambique	0,47	25,69704	1,409883	2,89E+09	9,460206	8,4	22,58134	1,35375
2005	Mozambique	0,47	27,09535	1,432895	3,05E+09	9,483672	8,09	23,06097	1,362877

2006	Mozambique	0,47	27,18692	1,43436	3,08E+09	9,488575	7,31	25,40078	1,404847
2007	Mozambique	0,47	27,43493	1,438304	3,48E+09	9,541583	7,74	25,84034	1,412298
2008	Mozambique	0,456	26,51624	1,423512	4,04E+09	9,606441	7,07	24,30064	1,385618
2009	Mozambique	0,456	27,11882	1,433271	4,56E+09	9,658498	4,82	27,5183	1,439622
2010	Mozambique	0,456	28,44395	1,45399	4,64E+09	9,66664	4,77	33,9601	1,530969
2011	Mozambique	0,456	30,09825	1,478541	5,88E+09	9,769428	7,09	29,0676	1,463409
2012	Mozambique	0,456	28,88398	1,460657	9,81E+09	9,991867	4,77	28,37298	1,452905
2013	Mozambique	0,456	26,74394	1,427225	1,08E+10	10,0349	4,47	30,10411	1,478626
2014	Mozambique	0,54	31,28404	1,495323	1,21E+10	10,08326	4,17	31,35269	1,496275
2015	Mozambique	0,54	31,07817	1,492455	1E+10	10,00096	3,86	39,98247	1,60187
2016	Mozambique	0,54	33,54532	1,525632	1,08E+10	10,03422	3,55	63,05623	1,799728
2017	Mozambique	0,54	38,57905	1,586352	9,42E+09	9,974248	3,87	63,58432	1,80335
2018	Mozambique	0,54	44,87	1,651956	1,35E+10	10,1309	4,18	60,32621	1,780506
2019	Mozambique	0,54	32,26836	1,508777	1,33E+10	10,12441	4,16	62,54833	1,796216
2020	Mozambique	0,54	29,86687	1,47519	1,33E+10	10,12265	4,14	69,465	1,841766
2004	Namibia	0,633	39,79794	1,599861	2,45E+09	9,389863	0,88	6,459693	0,810212

2005	Namibia	0,633	40,40858	1,606474	2,48E+09	9,393865	0,96	6,377117	0,804624
2006	Namibia	0,633	45,36683	1,656738	2,88E+09	9,459521	0,97	6,76715	0,830406
2007	Namibia	0,633	49,8552	1,69771	3,81E+09	9,580795	1,15	7,054392	0,84846
2008	Namibia	0,633	53,65344	1,729598	4,52E+09	9,655136	1,75	8,251742	0,916546
2009	Namibia	0,61	51,56317	1,71234	5,2E+09	9,716278	1,77	8,52282	0,930583
2010	Namibia	0,61	48,28195	1,683785	4,67E+09	9,669332	1,33	7,33025	0,865119
2011	Namibia	0,61	45,53978	1,658391	4,64E+09	9,666155	1,07	7,300025	0,863324
2012	Namibia	0,61	40,05834	1,602693	5,54E+09	9,743899	0,61	8,193771	0,913484
2013	Namibia	0,61	37,50198	1,574054	5,93E+09	9,77285	0,75	9,750075	0,989008
2014	Namibia	0,61	39,01709	1,591255	6,99E+09	9,844265	0,7	10,84289	1,035145
2015	Namibia	0,591	35,37085	1,548645	7,01E+09	9,845896	0,9	12,88192	1,109981
2016	Namibia	0,591	35,00947	1,544186	7,29E+09	9,86266	1,03	14,70877	1,167576
2017	Namibia	0,591	33,6208	1,526608	6,55E+09	9,816413	0,91	13,3129	1,124273
2018	Namibia	0,591	35,88257	1,554883	6,63E+09	9,821775	1	13,23394	1,121689
2019	Namibia	0,591	36,36165	1,560644	6,51E+09	9,813295	1,1	14,44869	1,159828
2020	Namibia	0,591	33,47672	1,524743	5,3E+09	9,724674	1,26	16,46327	1,216516

2004	South Africa	0,578	22,75752	1,357125	5,93E+10	10,77318	5,29	6,459693	0,810212
2005	South Africa	0,648	23,59976	1,372908	6,58E+10	10,81803	5,64	6,359328	0,803411
2006	South Africa	0,648	26,09825	1,416611	7,78E+10	10,89087	5,29	6,771549	0,830688
2007	South Africa	0,648	27,95896	1,446521	8,51E+10	10,92975	4,81	7,045365	0,847903
2008	South Africa	0,63	32,25467	1,508593	8,75E+10	10,94178	3,9	8,261223	0,917044
2009	South Africa	0,63	24,98275	1,39764	7,2E+10	10,85739	4,32	8,473674	0,928072
2010	South Africa	0,634	25,78342	1,41134	7,98E+10	10,90191	4,59	7,321222	0,864584
2011	South Africa	0,634	27,69815	1,442451	8,92E+10	10,9505	4,39	7,261132	0,861004
2012	South Africa	0,634	27,13915	1,433596	9,27E+10	10,96698	4,22	8,209969	0,914341
2013	South Africa	0,634	28,37928	1,453001	9,64E+10	10,98418	4,15	9,655056	0,984755
2014	South Africa	0,63	29,00062	1,462407	9,58E+10	10,98118	3,87	10,85266	1,035536
2015	South Africa	0,63	27,71364	1,442694	1,01E+11	11,00256	4,38	12,75893	1,105814
2016	South Africa	0,63	28,15609	1,449572	9,64E+10	10,98423	4,51	14,70961	1,167601
2017	South Africa	0,63	27,34008	1,4368	9,79E+10	10,99083	4,61	13,3238	1,124628
2018	South Africa	0,63	27,48859	1,439152	1,01E+11	11,0047	4,32	13,23393	1,121689
2019	South Africa	0,63	27,34218	1,436833	1,02E+11	11,00675	5,37	14,44843	1,159821

2020	South Africa	0,63	27,77801	1,443701	8,39E+10	10,92361	4,4	16,45911	1,216406
2004	Swaziland	0,531	71,54074	1,854553	1,65E+09	9,217263	10,45	6,459693	0,810212
2005	Swaziland	0,531	56,78394	1,754225	1,56E+09	9,192129	9,44	6,359328	0,803411
2006	Swaziland	0,531	55,83963	1,746943	1,24E+09	9,093806	8,67	6,771549	0,830688
2007	Swaziland	0,531	61,07407	1,785857	1,34E+09	9,126512	8,32	7,045365	0,847903
2008	Swaziland	0,531	52,95108	1,723875	1,51E+09	9,177653	5,95	8,261223	0,917044
2009	Swaziland	0,515	49,58773	1,695374	1,62E+09	9,208619	9,53	8,473674	0,928072
2010	Swaziland	0,515	46,47295	1,6672	1,82E+09	9,260773	5,05	7,321222	0,864584
2011	Swaziland	0,515	34,82774	1,541925	1,48E+09	9,170602	9,03	7,261132	0,861004
2012	Swaziland	0,515	36,69302	1,564583	1,45E+09	9,160057	5,47	8,209969	0,914341
2013	Swaziland	0,515	40,53497	1,60783	1,62E+09	9,208224	0,52	9,655056	0,984755
2014	Swaziland	0,515	43,85442	1,642013	1,62E+09	9,209477	0,58	10,85266	1,035536
2015	Swaziland	0,515	43,10687	1,634546	1,67E+09	9,221475	0,99	12,75893	1,105814
2016	Swaziland	0,546	44,05904	1,644035	1,8E+09	9,255894	1,18	14,70961	1,167601
2017	Swaziland	0,546	43,51311	1,63862	1,93E+09	9,285734	0,66	13,3238	1,124628
2018	Swaziland	0,546	40,43022	1,606706	2,02E+09	9,305908	1,48	13,23393	1,121689

2019	Swaziland	0,546	45,94632	1,662251	2,05E+09	9,312487	2,38	14,45179	1,159922
2020	Swaziland	0,546	44,88706	1,652121	2,04E+09	9,309742	2,27	16,47026	1,2167
2004	Tanzania	0,373	16,04007	1,205206	4,11E+09	9,613322	8,38	1089,335	3,037161
2005	Tanzania	0,373	16,98337	1,230024	5,5E+09	9,740625	7,85	1128,934	3,052669
2006	Tanzania	0,373	18,41499	1,265172	6,13E+09	9,787514	7,4	1251,9	3,09757
2007	Tanzania	0,403	19,83063	1,297336	7,2E+09	9,85716	7,21	1245,035	3,095182
2008	Tanzania	0,403	19,46461	1,289246	7,36E+09	9,867025	7,89	1196,311	3,077844
2009	Tanzania	0,403	18,19427	1,259935	7,21E+09	9,858044	8,8	1320,312	3,120677
2010	Tanzania	0,403	19,60753	1,292423	8,26E+09	9,917162	8,97	1395,625	3,144769
2011	Tanzania	0,378	21,63428	1,335142	1,04E+10	10,01624	7,6	1557,433	3,192409
2012	Tanzania	0,378	22,37207	1,349706	1,03E+10	10,01362	9,03	1571,698	3,196369
2013	Tanzania	0,378	19,0122	1,279032	1,14E+10	10,05871	8,37	1597,556	3,203456
2014	Tanzania	0,378	18,06921	1,256939	1,18E+10	10,07276	8,33	1653,231	3,218333
2015	Tanzania	0,378	17,10491	1,233121	1,12E+10	10,04946	7,28	1991,391	3,299157
2016	Tanzania	0,378	16,34997	1,213517	1,02E+10	10,00901	8,62	2177,087	3,337876
2017	Tanzania	0,405	15,14028	1,180134	9,48E+09	9,976833	8,59	2228,857	3,348082

2018	Tanzania	0,405	14,73914	1,168472	1,11E+10	10,04377	8,55	2263,782	3,354835
2019	Tanzania	0,405	16,00786	1,204333	1,09E+10	10,03769	8,37	2288,207	3,359495
2020	Tanzania	0,405	14,29549	1,155199	1,01E+10	10,00346	8,94	2294,146	3,360621

Appendix B: Descriptive Analysis

	GINI	LEXP	LIMP	TARIFFS	LRER
Mean	0.505699	1.522035	9.917861	5.760065	1.890485
Median	0.515000	1.508593	9.827059	6.160000	1.478626
Maximum	0.648000	1.860188	11.00675	17.06000	3.578382
Minimum	0.373000	1.155199	9.093806	0.330000	0.671528
Std. Dev.	0.089213	0.162301	0.505522	3.623314	0.998035
Skewness	0.193237	-0.056369	0.654919	0.065794	0.401384
Kurtosis	1.589190	2.364244	2.652223	2.184131	1.496642
Jarque-Bera	13.64089	2.657707	11.70849	4.353849	18.51633
Probability	0.001091	0.264781	0.002868	0.113390	0.000095
Sum	77.37200	232.8713	1517.433	881.2900	289.2443
Sum Sq. Dev.	1.209768	4.003934	38.84400	1995.517	151.4034
Observations	153	153	153	153	153

Appendix C: Stationarity

Appendix C1: Gini

C1.1: Intercept

Level

Panel unit root test: Summary
Series: GINI
Date: 03/11/23 Time: 17:46
Sample: 2004 2020
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 3
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	3.76148	0.9999	9	138
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.90475	0.1828	9	138
ADF - Fisher Chi-square	25.3729	0.1150	9	138
PP - Fisher Chi-square	38.4514	0.0034	9	144

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

1st Difference

Panel unit root test: Summary
Series: D(GINI)
Date: 03/11/23 Time: 17:51
Sample: 2004 2020
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-10.1935	0.0000	4	58
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-12.1745	0.0000	4	58
ADF - Fisher Chi-square	72.1850	0.0000	4	58
PP - Fisher Chi-square	66.3841	0.0000	4	60

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

C1.2: Trend and Intercept

Level

Panel unit root test: Summary
Series: GINI
Date: 03/11/23 Time: 17:57
Sample: 2004 2020
Exogenous variables: Individual effects, individual linear trends
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.48683	0.0002	9	142
Breitung t-stat	-1.77343	0.0381	9	133
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-5.52907	0.0000	9	142
ADF - Fisher Chi-square	50.7075	0.0001	9	142
PP - Fisher Chi-square	46.1936	0.0003	9	144

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

C1.3: None

Level

Panel unit root test: Summary
Series: GINI
Date: 03/11/23 Time: 17:57
Sample: 2004 2020
Exogenous variables: None
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 3
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-1.37279	0.0849	9	141
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	19.9581	0.3352	9	141
PP - Fisher Chi-square	25.8867	0.1024	9	144

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

1st difference

Panel unit root test: Summary
Series: D(GINI)
Date: 03/11/23 Time: 17:58
Sample: 2004 2020
Exogenous variables: None
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-13.2612	0.0000	4	59
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	58.2921	0.0000	4	59
PP - Fisher Chi-square	64.6280	0.0000	4	60

** Probabilities for Fisher tests are computed using an asymptotic Chi
-square distribution. All other tests assume asymptotic normality.

Appendix C2: Exports

C2.1: Intercept

Level

Panel unit root test: Summary
Series: LEXP
Date: 03/11/23 Time: 18:16
Sample: 2004 2020
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 3
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-1.08498	0.1390	9	141
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.58134	0.0569	9	141
ADF - Fisher Chi-square	30.9997	0.0288	9	141
PP - Fisher Chi-square	38.0044	0.0039	9	144

** Probabilities for Fisher tests are computed using an asymptotic Chi
-square distribution. All other tests assume asymptotic normality.

1st Difference

Panel unit root test: Summary
Series: D(LEXP)
Date: 03/11/23 Time: 18:17
Sample: 2004 2020
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-7.48634	0.0000	9	133
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-6.05165	0.0000	9	133
ADF - Fisher Chi-square	67.0973	0.0000	9	133
PP - Fisher Chi-square	77.8882	0.0000	9	135

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

C2.2: Trend and Intercept

Level

Panel unit root test: Summary
Series: LEXP
Date: 03/11/23 Time: 18:17
Sample: 2004 2020
Exogenous variables: Individual effects, individual linear trends
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.86756	0.0021	9	137
Breitung t-stat	0.60462	0.7273	9	128
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.74201	0.0408	9	137
ADF - Fisher Chi-square	28.3068	0.0575	9	137
PP - Fisher Chi-square	23.5710	0.1696	9	144

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

1st Difference

Panel unit root test: Summary
Series: D(LEXP)
Date: 03/11/23 Time: 18:18
Sample: 2004 2020
Exogenous variables: Individual effects, individual linear trends
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-7.09526	0.0000	9	132
Breitung t-stat	-3.95120	0.0000	9	123
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-5.11819	0.0000	9	132
ADF - Fisher Chi-square	55.6495	0.0000	9	132
PP - Fisher Chi-square	68.2008	0.0000	9	135

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

C2.3: None

Level

Panel unit root test: Summary
Series: LEXP
Date: 03/11/23 Time: 18:19
Sample: 2004 2020
Exogenous variables: None
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-0.83428	0.2021	9	142
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	11.9889	0.8478	9	142
PP - Fisher Chi-square	11.8675	0.8540	9	144

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

1st Difference

Panel unit root test: Summary
Series: D(LEXP)
Date: 03/11/23 Time: 18:19
Sample: 2004 2020
Exogenous variables: None
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 3
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-9.91292	0.0000	9	131
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	120.989	0.0000	9	131
PP - Fisher Chi-square	124.313	0.0000	9	135

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Appendix C3: Imports

C3.1: Intercept

Level

Panel unit root test: Summary
Series: LIMP
Date: 03/11/23 Time: 18:20
Sample: 2004 2020
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.34656	0.0095	9	144
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	0.30124	0.6184	9	144
ADF - Fisher Chi-square	20.7952	0.2899	9	144
PP - Fisher Chi-square	22.7960	0.1986	9	144

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

1st Difference

Panel unit root test: Summary
Series: D(LIMP)
Date: 03/11/23 Time: 18:21
Sample: 2004 2020
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-7.07253	0.0000	9	134
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.80696	0.0000	9	134
ADF - Fisher Chi-square	54.2243	0.0000	9	134
PP - Fisher Chi-square	52.1762	0.0000	9	135

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

C3.2: Trend and Intercept

Level

Panel unit root test: Summary
Series: LIMP
Date: 03/11/23 Time: 18:21
Sample: 2004 2020
Exogenous variables: Individual effects, individual linear trends
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-1.48347	0.0690	9	142
Breitung t-stat	2.88752	0.9981	9	133
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	1.09613	0.8635	9	142
ADF - Fisher Chi-square	13.3076	0.7730	9	142
PP - Fisher Chi-square	9.77663	0.9390	9	144

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

1st Difference

Panel unit root test: Summary
Series: D(LIMP)
Date: 03/11/23 Time: 18:22
Sample: 2004 2020
Exogenous variables: Individual effects, individual linear trends
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-7.05942	0.0000	9	133
Breitung t-stat	-4.01462	0.0000	9	124
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-3.98490	0.0000	9	133
ADF - Fisher Chi-square	44.6205	0.0005	9	133
PP - Fisher Chi-square	63.8785	0.0000	9	135

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

C3.3: None

Level

Panel unit root test: Summary
Series: LIMP
Date: 03/11/23 Time: 18:22
Sample: 2004 2020
Exogenous variables: None
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	3.36231	0.9996	9	144
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	4.26032	0.9996	9	144
PP - Fisher Chi-square	3.28454	0.9999	9	144

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

1st Difference

Panel unit root test: Summary
Series: D(LIMP)
Date: 03/11/23 Time: 18:23
Sample: 2004 2020
Exogenous variables: None
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-8.06788	0.0000	9	135
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	83.7976	0.0000	9	135
PP - Fisher Chi-square	83.1976	0.0000	9	135

** Probabilities for Fisher tests are computed using an asymptotic Chi
-square distribution. All other tests assume asymptotic normality.

Appendix C4: Tariffs

C4.1: Intercept

Level

Panel unit root test: Summary
Series: TARIFFS
Date: 03/11/23 Time: 18:25
Sample: 2004 2020
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-4.91282	0.0000	9	143
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.01638	0.0000	9	143
ADF - Fisher Chi-square	48.5561	0.0001	9	143
PP - Fisher Chi-square	46.3242	0.0003	9	144

** Probabilities for Fisher tests are computed using an asymptotic Chi
-square distribution. All other tests assume asymptotic normality.

C4.2: Trend and Intercept

Level

Panel unit root test: Summary
Series: TARIFFS
Date: 03/11/23 Time: 18:25
Sample: 2004 2020
Exogenous variables: Individual effects, individual linear trends
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-4.86102	0.0000	9	143
Breitung t-stat	-2.57385	0.0050	9	134
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-3.70205	0.0001	9	143
ADF - Fisher Chi-square	43.0424	0.0008	9	143
PP - Fisher Chi-square	49.9056	0.0001	9	144

** Probabilities for Fisher tests are computed using an asymptotic Chi
-square distribution. All other tests assume asymptotic normality.

C4.3: None

Level

Panel unit root test: Summary
Series: TARIFFS
Date: 03/11/23 Time: 18:26
Sample: 2004 2020
Exogenous variables: None
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 3
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-1.45398	0.0730	9	136
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	27.4500	0.0709	9	136
PP - Fisher Chi-square	32.6157	0.0186	9	144

** Probabilities for Fisher tests are computed using an asymptotic Chi
-square distribution. All other tests assume asymptotic normality.

Appendix C5: RER

C5.1: Intercept

Level

Panel unit root test: Summary
Series: LRER
Date: 03/11/23 Time: 18:39
Sample: 2004 2020
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	2.61405	0.9955	9	144
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	5.54327	1.0000	9	144
ADF - Fisher Chi-square	2.65965	1.0000	9	144
PP - Fisher Chi-square	2.55698	1.0000	9	144

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

1st Difference

Panel unit root test: Summary
Series: D(LRER)
Date: 03/11/23 Time: 18:41
Sample: 2004 2020
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-7.32166	0.0000	9	128
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.47761	0.0000	9	128
ADF - Fisher Chi-square	55.7151	0.0000	9	128
PP - Fisher Chi-square	43.8439	0.0006	9	135

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

C5.2: Trend and Intercept

Level

Panel unit root test: Summary
Series: LRER
Date: 03/11/23 Time: 18:42
Sample: 2004 2020
Exogenous variables: Individual effects, individual linear trends
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-1.13884	0.1274	9	135
Breitung t-stat	1.78056	0.9625	9	126
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.57509	0.2826	9	135
ADF - Fisher Chi-square	25.1301	0.1214	9	135
PP - Fisher Chi-square	9.44121	0.9486	9	144

** Probabilities for Fisher tests are computed using an asymptotic Chi
-square distribution. All other tests assume asymptotic normality.

1st Difference

Panel unit root test: Summary
Series: D(LRER)
Date: 03/11/23 Time: 18:42
Sample: 2004 2020
Exogenous variables: Individual effects, individual linear trends
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-8.33590	0.0000	9	129
Breitung t-stat	-6.17596	0.0000	9	120
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-3.95666	0.0000	9	129
ADF - Fisher Chi-square	45.8515	0.0003	9	129
PP - Fisher Chi-square	37.7801	0.0041	9	135

** Probabilities for Fisher tests are computed using an asymptotic Chi
-square distribution. All other tests assume asymptotic normality.

C5.3: None

Level

Panel unit root test: Summary
Series: LRER
Date: 03/11/23 Time: 18:46
Sample: 2004 2020
Exogenous variables: None
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	5.96541	1.0000	9	143
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	0.19106	1.0000	9	143
PP - Fisher Chi-square	0.05980	1.0000	9	144

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

1st Difference

Panel unit root test: Summary
Series: D(LRER)
Date: 03/11/23 Time: 18:47
Sample: 2004 2020
Exogenous variables: None
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 2
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-4.86483	0.0000	9	130
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	48.3333	0.0001	9	130
PP - Fisher Chi-square	58.5020	0.0000	9	135

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Appendix D: Lag Length Criteria

VAR Lag Order Selection Criteria
Endogenous variables: GINI LEXP LIMP TARIFFS LRER
Exogenous variables: C
Date: 03/11/23 Time: 23:17
Sample: 2004 2020
Included observations: 81

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-104.9788	NA	1.04e-05	2.715525	2.863331	2.774827
1	484.1868	1091.047	9.29e-12	-11.21449	-10.32766*	-10.85868*
2	510.1282	44.83693	9.14e-12	-11.23773	-9.611872	-10.58542
3	543.9674	54.30991	7.48e-12*	-11.45599*	-9.091098	-10.50716
4	557.2637	19.69813	1.03e-11	-11.16700	-8.063089	-9.921673
5	578.2245	28.46533	1.21e-11	-11.06727	-7.224329	-9.525433
6	611.0803	40.56268*	1.09e-11	-11.26124	-6.679271	-9.422895
7	633.3838	24.78163	1.32e-11	-11.19466	-5.873662	-9.059806
8	665.1720	31.39578	1.34e-11	-11.36227	-5.302245	-8.930909

* 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
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Appendix E: Correlation Matrix

	GINI	LEXP	LIMP	TARIFFS	LRER
GINI	1	0.11823601...	-0.1151140...	-0.2432356...	0.12781553...
LEXP	0.11823601...	1	0.38950448...	-0.1264744...	-0.0439526...
LIMP	-0.1151140...	0.38950448...	1	0.06937095...	-0.2719136...
TARIFFS	-0.2432356...	-0.1264744...	0.06937095...	1	-0.1915918...
LRER	0.12781553...	-0.0439526...	-0.2719136...	-0.1915918...	1

Appendix F: Panel Cointegration

Appendix F1: Pedroni Panel Cointegration

F1.1: Individual Intercept

Pedroni Residual Cointegration Test
Series: GINI LEXP LIMP TARIFFS LRER
Date: 03/11/23 Time: 23:37
Sample: 2004 2020
Included observations: 153
Cross-sections included: 9
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
Automatic lag length selection based on SIC with a max lag of 2
Newey-West automatic bandwidth selection and Quadratic Spectral kernel

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-1.432582	0.9240	-1.951595	0.9745
Panel rho-Statistic	2.269970	0.9884	2.687713	0.9964
Panel PP-Statistic	-2.352227	0.0093	-3.369403	0.0004
Panel ADF-Statistic	-1.961489	0.0249	-2.369579	0.0089

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	3.470906	0.9997
Group PP-Statistic	-8.046982	0.0000
Group ADF-Statistic	-3.857257	0.0001

Cross section specific results

Phillips-Peron results (non-parametric)

Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
Angola	0.126	0.000313	2.30E-05	8.95	16
Botswana	0.282	0.000210	0.000160	5.11	16
Democratic R...	0.147	2.87E-08	9.46E-10	15.00	16
Madagascar	-0.382	6.47E-05	8.07E-05	1.58	16
Mozambique	0.471	0.000325	0.000131	5.73	16
Namibia	0.236	2.43E-05	8.79E-07	12.50	16
South Africa	-0.316	6.26E-05	8.69E-05	3.23	16
Swaziland	0.312	6.48E-05	1.69E-06	14.76	16
Tanzania	0.559	0.000105	0.000112	1.45	16

Augmented Dickey-Fuller results (parametric)

Cross ID	AR(1)	Variance	Lag	Max lag	Obs
Angola	0.126	0.000313	0	2	16
Botswana	0.282	0.000210	0	2	16
Democratic R...	0.147	2.87E-08	0	2	16
Madagascar	-0.382	6.47E-05	0	2	16
Mozambique	0.471	0.000325	0	2	16
Namibia	-0.227	1.74E-05	1	2	15
South Africa	-0.316	6.26E-05	0	2	16
Swaziland	0.312	6.48E-05	0	2	16
Tanzania	0.559	0.000105	0	2	16

F1.2: Intercept and Trend

Pedroni Residual Cointegration Test
Series: GINI LEXP LIMP TARIFFS LRER
Date: 03/11/23 Time: 23:44
Sample: 2004 2020
Included observations: 153
Cross-sections included: 9
Null Hypothesis: No cointegration
Trend assumption: Deterministic intercept and trend
Automatic lag length selection based on SIC with a max lag of 2
Newey-West automatic bandwidth selection and Quadratic Spectral kernel

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-2.804222	0.9975	-3.222923	0.9994
Panel rho-Statistic	3.215959	0.9993	3.269735	0.9995
Panel PP-Statistic	-2.810435	0.0025	-5.106531	0.0000
Panel ADF-Statistic	-1.817612	0.0346	-2.500442	0.0062

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	3.902909	1.0000
Group PP-Statistic	-15.94193	0.0000
Group ADF-Statistic	-4.294671	0.0000

Cross section specific results

Phillips-Peron results (non-parametric)

Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
Angola	0.103	0.000312	3.85E-05	7.70	16
Botswana	0.097	0.000190	0.000108	5.42	16
Democratic R...	-0.127	2.20E-08	3.52E-09	7.76	16
Madagascar	-0.412	6.10E-05	6.23E-05	0.92	16
Mozambique	0.404	0.000352	0.000105	6.05	16
Namibia	-0.072	1.58E-05	1.00E-07	7.15	16
South Africa	-0.290	6.64E-05	9.21E-05	2.98	16
Swaziland	0.213	6.43E-05	6.04E-06	10.22	16
Tanzania	0.459	8.42E-05	9.99E-05	2.82	16

Augmented Dickey-Fuller results (parametric)

Cross ID	AR(1)	Variance	Lag	Max lag	Obs
Angola	0.103	0.000312	0	2	16
Botswana	0.097	0.000190	0	2	16
Democratic R...	-0.810	1.72E-08	1	2	15
Madagascar	-0.412	6.10E-05	0	2	16
Mozambique	0.404	0.000352	0	2	16
Namibia	-0.639	1.13E-05	1	2	15
South Africa	-0.290	6.64E-05	0	2	16
Swaziland	0.213	6.43E-05	0	2	16
Tanzania	0.459	8.42E-05	0	2	16

F1.3: None

Pedroni Residual Cointegration Test
Series: GINI LEXP LIMP TARIFFS LRER
Date: 03/11/23 Time: 23:44
Sample: 2004 2020
Included observations: 153
Cross-sections included: 9
Null Hypothesis: No cointegration
Trend assumption: No deterministic intercept or trend
Automatic lag length selection based on SIC with a max lag of 2
Newey-West automatic bandwidth selection and Quadratic Spectral kernel

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-1.511501	0.9347	-3.138334	0.9992
Panel rho-Statistic	1.571047	0.9419	0.917422	0.8205
Panel PP-Statistic	-0.898235	0.1845	0.303046	0.6191
Panel ADF-Statistic	-0.948032	0.1716	0.432173	0.6672

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	2.384658	0.9915
Group PP-Statistic	-4.503348	0.0000
Group ADF-Statistic	-3.500016	0.0002

Cross section specific results

Phillips-Peron results (non-parametric)

Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
Angola	0.621	0.000579	0.000572	1.26	16
Botswana	0.252	0.000213	0.000180	4.10	16
Democratic R...	0.372	1.83E-05	1.91E-05	2.40	16
Madagascar	-0.353	6.81E-05	7.67E-05	2.97	16
Mozambique	0.466	0.000335	0.000240	4.46	16
Namibia	0.629	6.51E-05	6.48E-05	3.39	16
South Africa	-0.276	5.08E-05	6.01E-05	2.82	16
Swaziland	0.312	6.48E-05	1.67E-06	14.81	16
Tanzania	0.600	0.000111	0.000121	1.76	16

Augmented Dickey-Fuller results (parametric)

Cross ID	AR(1)	Variance	Lag	Max lag	Obs
Angola	0.621	0.000579	0	2	16
Botswana	0.252	0.000213	0	2	16
Democratic R...	0.372	1.83E-05	0	2	16
Madagascar	-0.353	6.81E-05	0	2	16
Mozambique	0.466	0.000335	0	2	16
Namibia	0.629	6.51E-05	0	2	16
South Africa	-0.276	5.08E-05	0	2	16
Swaziland	0.312	6.48E-05	0	2	16
Tanzania	0.600	0.000111	0	2	16

Appendix F2: Kao Panel Cointegration

Kao Residual Cointegration Test
Series: GINI LEXP LIMP TARIFFS LRER
Date: 03/11/23 Time: 23:47
Sample: 2004 2020
Included observations: 153
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
Automatic lag length selection based on SIC with a max lag of 3
Newey-West automatic bandwidth selection and Quadratic Spectral kernel

	t-Statistic	Prob.
ADF	-2.151508	0.0157
Residual variance	0.000286	
HAC variance	0.000237	

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID)
Method: Least Squares
Date: 03/11/23 Time: 23:47
Sample (adjusted): 2005 2020
Included observations: 144 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.309881	0.058049	-5.338300	0.0000

R-squared	0.165956	Mean dependent var	-0.000294
Adjusted R-squared	0.165956	S.D. dependent var	0.018487
S.E. of regression	0.016884	Akaike info criterion	-5.318022
Sum squared resid	0.040763	Schwarz criterion	-5.297398
Log likelihood	383.8976	Hannan-Quinn criter.	-5.309642
Durbin-Watson stat	1.726945		

Appendix F3: Johansen Fisher Panel Cointegration

Johansen Fisher Panel Cointegration Test
Series: GINI LEXP LIMP TARIFFS LRER
Date: 03/11/23 Time: 23:29
Sample: 2004 2020
Included observations: 153
Trend assumption: No deterministic trend
Lags interval (in first differences): 1 1

Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)

Hypothesized No. of CE(s)	Fisher Stat.* (from trace test)	Prob.	Fisher Stat.* (from max-eigen test)	Prob.
None	386.2	0.0000	264.8	0.0000
At most 1	182.4	0.0000	134.4	0.0000
At most 2	82.13	0.0000	61.66	0.0000
At most 3	41.10	0.0015	43.32	0.0007
At most 4	10.82	0.9018	10.82	0.9018

* Probabilities are computed using asymptotic Chi-square distribution.

Individual cross section results

Cross Section	Trace Test Statistics	Prob.**	Max-Eign Test Statistics	Prob.**
Hypothesis of no cointegration				
Angola	156.9624	0.0000	88.6574	0.0000
Botswana	118.5883	0.0000	60.8303	0.0000
Democratic R...	98.1612	0.0000	45.6221	0.0003
Madagascar	160.6638	0.0000	96.7854	0.0000
Mozambique	226.8549	0.0000	131.9795	0.0000
Namibia	109.3841	0.0000	44.1336	0.0006
South Africa	128.8947	0.0000	72.8302	0.0000
Swaziland	91.4440	0.0000	47.0803	0.0002
Tanzania	193.7248	0.0000	109.4131	0.0000
Hypothesis of at most 1 cointegration relationship				
Angola	68.3049	0.0000	48.1660	0.0000
Botswana	57.7579	0.0004	35.4292	0.0010
Democratic R...	52.5391	0.0018	28.6173	0.0116
Madagascar	63.8783	0.0001	32.2049	0.0033
Mozambique	94.8754	0.0000	47.5831	0.0000
Namibia	65.2505	0.0000	36.6512	0.0006
South Africa	56.0645	0.0006	31.2832	0.0046
Swaziland	44.3637	0.0179	29.9332	0.0074
Tanzania	84.3118	0.0000	41.2702	0.0001
Hypothesis of at most 2 cointegration relationship				
Angola	20.1389	0.1523	12.4402	0.2661
Botswana	22.3287	0.0863	14.0870	0.1660
Democratic R...	23.9219	0.0554	13.6419	0.1894
Madagascar	31.6735	0.0049	25.5129	0.0028
Mozambique	47.2923	0.0000	27.1545	0.0015
Namibia	28.5993	0.0134	23.4324	0.0064
South Africa	24.7813	0.0432	18.5228	0.0388
Swaziland	14.4305	0.5015	9.2667	0.5647
Tanzania	43.0416	0.0001	22.7584	0.0083
Hypothesis of at most 3 cointegration relationship				
Angola	7.6987	0.2610	7.6980	0.1947
Botswana	8.2418	0.2185	5.8744	0.3642
Democratic R...	10.2800	0.1073	9.0888	0.1160
Madagascar	6.1605	0.4167	6.1600	0.3318
Mozambique	20.1377	0.0020	20.1355	0.0011
Namibia	5.1669	0.5444	4.6529	0.5275
South Africa	6.2585	0.4052	6.0800	0.3407
Swaziland	5.1638	0.5448	4.7416	0.5144
Tanzania	20.2832	0.0019	19.5383	0.0014
Hypothesis of at most 4 cointegration relationship				
Angola	0.0007	0.9864	0.0007	0.9864
Botswana	2.3674	0.1463	2.3674	0.1463
Democratic R...	1.1912	0.3208	1.1912	0.3208
Madagascar	0.0005	0.9896	0.0005	0.9896
Mozambique	0.0022	0.9694	0.0022	0.9694
Namibia	0.5140	0.5362	0.5140	0.5362
South Africa	0.1785	0.7264	0.1785	0.7264
Swaziland	0.4222	0.5793	0.4222	0.5793
Tanzania	0.7450	0.4460	0.7450	0.4460

**MacKinnon-Haug-Michelis (1999) p-values

Appendix G: Panel Autoregressive Distributed Lag (PARDL)

Dependent Variable: D(GINI)
Method: ARDL
Date: 03/11/23 Time: 23:50
Sample: 2006 2020
Included observations: 135
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): LEXP LIMP TARIFFS LRER
Fixed regressors: C
Number of models evaluated: 2
Selected Model: ARDL(1, 2, 2, 2, 2)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
		Long Run Equation		
LEXP	0.108418	0.018234	5.946014	0.0000
LIMP	-0.078148	0.011233	-6.957342	0.0000
TARIFFS	0.001576	0.000882	1.787554	0.0790
LRER	0.047979	0.012960	3.702165	0.0005
		Short Run Equation		
COINTEQ01	-0.365649	0.143367	-2.550438	0.0134
D(LEXP)	0.162712	0.078836	2.063934	0.0434
D(LEXP(-1))	0.010649	0.037856	0.281306	0.7795
D(LIMP)	-0.101410	0.094394	-1.074329	0.2870
D(LIMP(-1))	0.011109	0.070341	0.157926	0.8751
D(TARIFFS)	-0.000647	0.002957	-0.218795	0.8276
D(TARIFFS(-1))	0.000162	0.003205	0.050474	0.9599
D(LRER)	-0.102405	0.086170	-1.188414	0.2394
D(LRER(-1))	-0.046861	0.085645	-0.547147	0.5863
C	0.364351	0.140436	2.594430	0.0119

Root MSE	0.008783	Mean dependent var	-0.000281
S.D. dependent var	0.016295	S.E. of regression	0.014144
Akaike info criterion	-6.434043	Sum squared resid	0.011803
Schwarz criterion	-4.572205	Log likelihood	586.2043
Hannan-Quinn criter.	-5.677734		

*Note: p-values and any subsequent tests do not account for model selection.

Appendix H: Granger Causality

Pairwise Granger Causality Tests
Date: 03/12/23 Time: 00:05
Sample: 2004 2020
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
LEXP does not Granger Cause GINI	144	3.00490	0.0852
GINI does not Granger Cause LEXP		3.26734	0.0728
LIMP does not Granger Cause GINI	144	1.09735	0.2966
GINI does not Granger Cause LIMP		0.00996	0.9206
TARIFFS does not Granger Cause GINI	144	1.47289	0.2269
GINI does not Granger Cause TARIFFS		11.6224	0.0008
LRER does not Granger Cause GINI	144	5.54167	0.0199
GINI does not Granger Cause LRER		0.20421	0.6520
LIMP does not Granger Cause LEXP	144	1.00135	0.3187
LEXP does not Granger Cause LIMP		1.08888	0.2985
TARIFFS does not Granger Cause LEXP	144	0.36126	0.5488
LEXP does not Granger Cause TARIFFS		1.06303	0.3043
LRER does not Granger Cause LEXP	144	3.10625	0.0802
LEXP does not Granger Cause LRER		0.00205	0.9640
TARIFFS does not Granger Cause LIMP	144	0.28155	0.5965
LIMP does not Granger Cause TARIFFS		0.69202	0.4069
LRER does not Granger Cause LIMP	144	0.18728	0.6659
LIMP does not Granger Cause LRER		0.86751	0.3532
LRER does not Granger Cause TARIFFS	144	16.7478	7.E-05
TARIFFS does not Granger Cause LRER		1.24494	0.2664