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史瓦帝尼王國農產品出口對經濟增長的影響

The Impact of Agricultural Exports on Economic Growth in the
Kingdom of Eswatini

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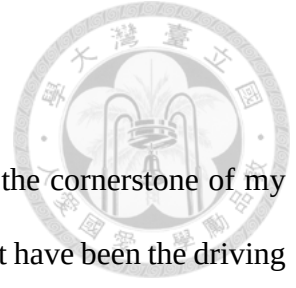
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Dedication

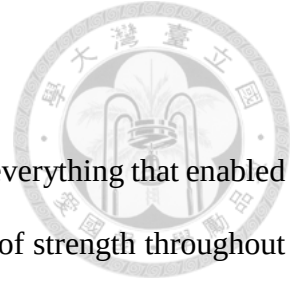


My late father, whose steadfast financial and emotional support served as the cornerstone of my academic career, is honored in my thesis. Your guidance and encouragement have been the driving force behind my success. Though you left us on June 2, 2014, your memory continues to inspire and motivate me every day.

To my beloved mother and the entire family, your moral support and prayers have been invaluable throughout this process. Thank you for always believing in me and standing by my side.

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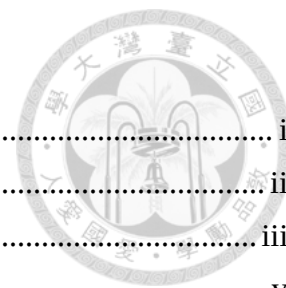
Abstract



This study examined the impact of agricultural exports (AGR_X) on economic growth (RGDP) in Eswatini over the period from 1972 to 2022. The ARDL framework was employed to estimate the relationship between agricultural exports and real gross domestic product (RGDP) by controlling for Inflation (INFL), Gross Capital Formation (GCF), Foreign Direct Investment (FDI), and Exchange Rate (EXC). The findings revealed no long-term cointegration, indicating that agricultural exports did not have a sustained long-term effect on economic growth. However, short-term analysis showed that past economic performance positively influenced current growth, while Gross Capital Formation negatively correlated with economic growth, possibly due to inefficient investments. The exchange rate had an immediate negative effect but a positive lagged impact, reflecting initial economic contraction followed by growth from currency depreciation. These results challenged the export-led growth hypothesis in Eswatini's agricultural sector, emphasizing the need for improved infrastructure, market access, R&D, capital formation, exchange rate stability, foreign direct investment, and human capital development.

Keywords: Agricultural Exports, Real Gross Domestic Product, ARDL

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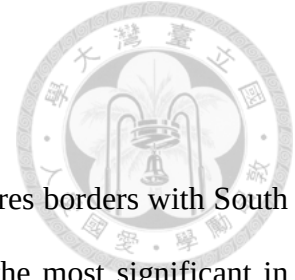
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Chapter 1 Introduction



1.1 Background and Motivation

Eswatini is a small landlocked country located in Southern Africa that shares borders with South Africa and Mozambique to the northeast. The farming sector is one of the most significant in Eswatini, contributing around 7% of the country's GDP and providing the raw materials required by other economic sectors, especially the manufacturing sector (World Bank, 2011). Proof of its importance to the economy can be found in its inclusion in the country's main policy documents, such as the National Development Strategy (NDS), which acts as the overall policy document, and the Poverty Reduction Strategy and Action Plan (PRSAP). Eswatini has a competitive advantage in agricultural products, according to the Ministry of Economic Planning and Development (1999). The World Bank (2011) reports that since 70% of the country's population lives in rural areas and depends on agriculture for both their food and money, the agricultural sector is important to the nation's citizens' daily life.

After the manufacturing sector, the agricultural industry makes up the second-largest portion of the economy in Eswatini. A large portion of the Eswatini people cultivate maize for subsistence. In the past, the nation has been a net importer of goods such as vegetables, animal feed, maize, and other items. The quantity of imports is highly dependent on the amount of rainfall, which affects domestic production. Agriculture imports exceeded USD 58 million in value in 2016. Wheat, rice, whole maize, fruits and vegetables, and yellow maize are the top five agricultural items imported.

The majority of people in Eswatini are from rural origins, and their primary source of income is agriculture. The government has made agricultural and rural development a key component of the National Development Strategy (NDS) since agriculture-based rural growth is required to

accomplish the country's development goals. A similar strategy is used under the Government Program of Action 2008–13 (GPA), which emphasizes food security and smallholder agriculture's intensification and diversification as the pillars for ending poverty. Agriculture is recognized as the engine of economic growth. The Poverty Reduction Strategy and Action Program (PRSAP), which was authorized in 2007, and the GPA are compatible in this regard. The Eswatini government has worked hard in recent years to boost funding for the agricultural industry, but the outcomes of this work have been patchy. Significant development issues still face Swazi agriculture: low productivity, a failure to keep up with population expansion, and an increase in food insecurity, particularly in rural areas, are all part of the problem (World Bank, 2011).

In 1983, the production and processing of cultivated and forestry products employed about 75% of the rural population, provided 29% of paid employment in the official sector, 40% of GDP, and roughly 73% of all exports (World Bank, 1987). The agricultural sector is highly dualistic in terms of production, ownership, and the tenurial system utilized to cultivate land. The majority of the agricultural output in the nation is produced by the contemporary commercial subsector, which is mostly owned and operated by foreign entities and operates on leasehold land. Twenty percent of the land area in the nation is made up of 24 Title Deed Farms (TDL), out of 800 owned by commercial farmers (World Bank, 1987). The remaining 40% of agricultural production comes from the smallholder subsector, which is distinguished on the Swazi Nation Land (SNL) by semi-subsistence farming, communal grazing, and traditional tenure. With 53% of the total crop area, maize is the main crop grown by smallholders. SNL land, which makes up almost 50% of the nation's total land area, is primarily inhabited by smallholder farmers.

On the other hand, export-oriented cattle production, sugar, and canned fruit production are the mainstays of commercial agriculture. Cattle in the livestock business earn foreign cash through

exports of beef to the EEC market under the Lome quota arrangement. Less than 2% of Eswatini's overall exports are currently made up of meat and meat products. A significant rise in liquid milk output has been observed, mostly from Title Deed Land. The availability of crop by-products allows cattle productivity to rise without requiring more imports of concentrate feed. It is obvious that Eswatini has the most potential to succeed in the agriculture industry and, as a result, earn foreign cash through exports. Therefore, it is a crucial issue for further study.

1.2. Objectives of this Study

The manufacturing industry makes up the majority of Eswatini's GDP, with the agricultural sector coming in second. The Kingdom of Eswatini, like many other nations, needs to figure out how to encourage steady economic growth. According to the World Bank (2011), Eswatini's economy is mostly thought to be driven by the farming industry. This industry's contribution to the GDP has been steadily declining over time, despite the fact that it has historically been vital to the nation's development. From a peak of twenty-three percent (23%) in 1980 to an estimated nine percent (9%) in 2016, the agriculture sector's share of the national GDP has been falling (SME Roadmap Eswatini, 2018). Nevertheless, sugar, fruit canning, and exporting cattle are the main industries of Eswatini's commercial agriculture. Developing successful strategies to encourage economic growth is a problem for policymakers in Eswatini, especially given the country's reliance on agricultural exports. Their greatest problem is figuring out how to boost economic growth through agricultural exports. This is important because, without knowledge of this component, policymakers will find it challenging to build targeted plans to promote agricultural exports as a way to promote economic development.

The Autoregressive Distributive Lag (ARDL) Model was established by Pesaran et al. (2001) to address the endogeneity of study variables. It comprises the independent or explanatory factors

and the lag terms of the dependent variables. According to Ali et al. (2016), selecting the proper lag reduces the endogeneity problem and eliminates residual correlation. The ARDL approach was utilized by Sultanuzzaman et al. (2018) to show that exports have a direct short-term effect on Sri Lankan economic growth and a long-term unfavorable effect on the nation's economy, while foreign direct investment has a notable and inverse effect on Sri Lankan economic growth in both the short and long terms. The ARDL results demonstrated that, while imports continue to have a negligible undesirable impact on Nepal's economic growth, exports are a significant component of the nation's economy in Parajuli's (2021) study, which used time series data from 1994/95 to 2018/19 to investigate the effects of foreign trade on national economic growth. This study's main objective is to use ARDL to data from 1972 through 2022 in order to provide a thorough analysis, as there are currently no pertinent papers on the topic of how agricultural exports affect Eswatini's economic growth. Eswatini's growth plan, which is primarily dependent on agricultural exports, will be significantly illuminated by the analysis's findings. This will assist stakeholders and decision-makers in determining potential areas for the optimization and strengthening of the country's economic development measures. Additionally, it will increase the amount of information currently known about export-led growth strategies and how effectively they function in Eswatini's unique economic environment.

Chapter 2 Brief Overview of the Eswatini Economy



The aim of this chapter is to give a brief summary of various features of the Eswatini economy, including GDP contribution by sector, important products related to agriculture that are exported, etc.

2.1 GDP Contribution by Sector

In accordance with the World Bank study (2023), the sectors of agriculture, forestry, and fisheries, which comprise agricultural cultivation and livestock production, also fall within ISIC divisions 1-3. Value contributed in mining, building, energy, water, and gas is included in the industry sector. The manufacturing industry produces food, drink, tobacco, chemicals, machinery, apparel, and textiles. The value contributed in wholesale and retail commerce (including hotels and restaurants), transportation, government, financial, professional, and personal services like education, health care, and real estate services are all included in the services sector, which is represented by ISIC divisions 50 through 99. Included are import duties, imputed bank service costs, and any statistical discrepancies found by national compilers, including those arising from rescaling.

The data in the accompanying figure demonstrates a small variation in the GDP contribution of forestry, fishery, and agriculture, ranging from 8.12% to 10.20%. The sector remains a prominent component of the economy from 2010 to 2021, despite the lack of a discernible growth or decrease trend. The GDP contribution of the manufacturing sector has fluctuated, going from 32.53% to 26.63%. This drop implies that manufacturing's significance in relation to other industries has decreased. Construction and manufacturing are included in the larger industrial group, which also shows a declining trend from 37.71% to 32.30%. This suggests a move away from traditional industrial activity in the economic structure. The services sector, which encompasses a wide range

of industries like banking, healthcare, and education, has steadily increased from 49.55% to 53.90%.

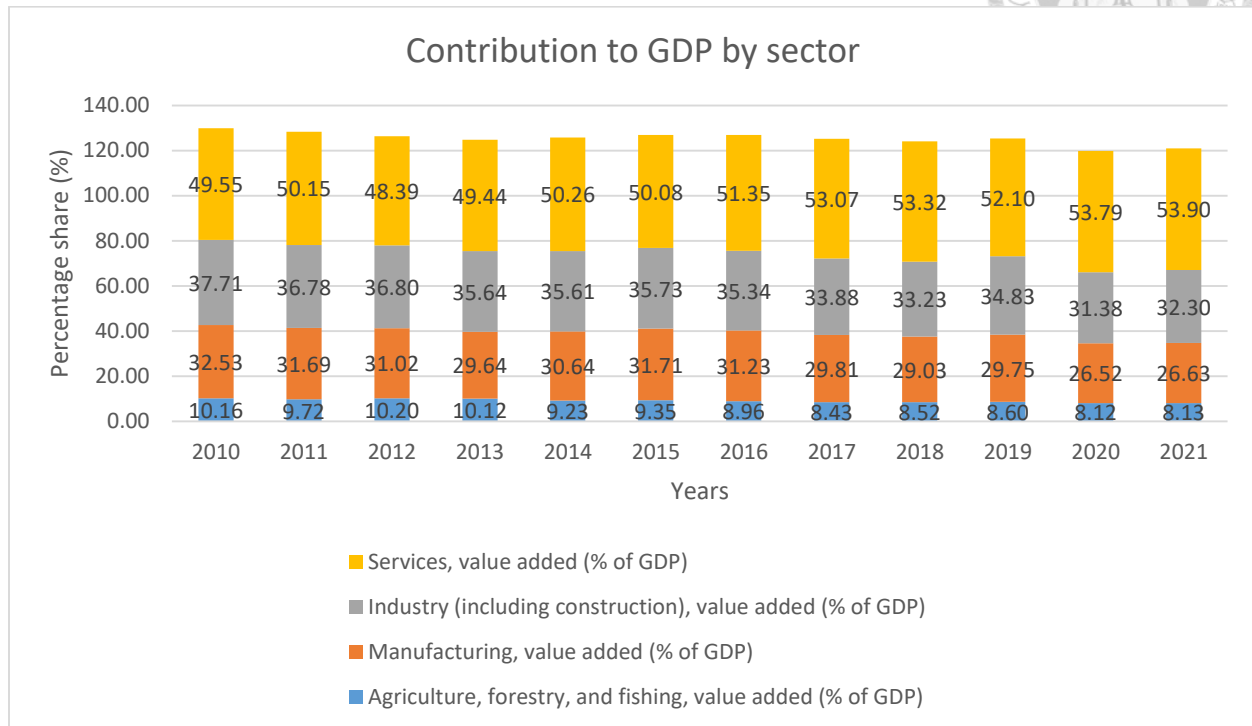
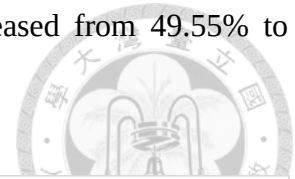


Figure 2.1: Contribution to GDP by Sector, 2010-2021

Source: World Bank (2023)

One of the main economic sectors of Swaziland is agriculture, which in recent years has contributed roughly 10% of the nation's GDP (Central Bank of Swaziland, 2013). There are connections between the agricultural sector and other industries like transportation and manufacturing. The largest contribution to manufacturing comes from agriculture, which provides raw materials for further processing such sugarcane, cotton lint, and citrus. Furthermore, the main industry in the nation that employs both skilled and unskilled people is agriculture. According to the Food Agricultural Organization (2011), 75% of Eswatini export's earnings are from agriculturally based commodities. Most agricultural products are used as raw materials to a lot of

final products which are then categorized as manufactured products in the economy. Agriculture makes a huge contribution to the manufacturing sector's GDP as shown by table 2.1 below.

As demonstrated by the table below, the food, beverages, and tobacco subsector dominated the manufacturing sector in Eswatini (86.38%) in 2011. This reflects that 86.38% of the 31.69% GDP contribution that the manufacturing sector contributed in 2011 to Eswatini's total GDP is accounted for by the food, beverages, and tobacco subsector. It is important to remember that this subsector is tightly associated with agriculture because it deals with the conversion of raw agricultural goods into items with added value, such tobacco, drinks, and packaged foods. This subsector's substantial contribution suggests a strong link between agriculture and manufacturing, as it relies on a stable and productive agricultural base for raw materials.

Table 2.1 Agriculture Contribution to the Manufacturing GDP Share

Sector	Contribution to Manufacturing GDP Share (%)
Textiles and clothing	5.55
Other manufacturing	6.74
Machinery and transport equipment	0.71
Food, beverages, and tobacco	86.38
Chemicals	0.63
Manufacturing, value added (% of GDP)	31.69

Source: World Bank (2011)

2.2 Trade Environment

This section delves into Eswatini's trade dynamics before and after gaining independence from Britain.

Pre-independence era

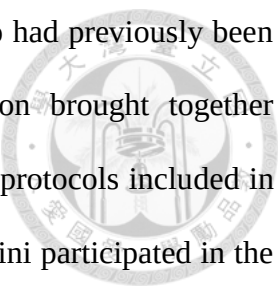
1910 saw the creation of the Southern African Customs Union (SACU) by Eswatini, Botswana, Lesotho, and South Africa due to their shared long-standing understanding of the importance of

trade for economic growth (Sacolo et al., 2018). In order to provide its member countries unfettered commerce in goods and a shared external tariff, SACU is a customs union that was established during the colonial era. In this instance, the elimination of tariffs and quantitative import and export restrictions was made possible by free trade, which helped various industries and Eswatini's economy grow. This topic will be covered in more detail in the following part. Nonetheless, there is proof in the literature that a rise in non-tariff measures frequently coincides with a decrease in tariffs (Kalaba et al., 2016).

Prior to gaining freedom or independence, the two primary businesses in the country were mining and agriculture (Sacolo et al., 2018). Agriculture produced citrus fruits, wood pulp, sugar, beef and veal, and canned fruits. Iron ore, coal, and asbestos were the byproducts of mining. Eswatini was (i) an importer of manufactured goods, (ii) an exporter of raw resources and primary commodities, and (iii) a provider of cheap labor to international capital. Foreign direct investment (FDI) was received by the nation; the mining and agricultural industries benefited most from it. For instance, the mining company Anglo-American Corporation made investments in the Mpaka coal mine and the Ngwenya iron ore mine in 1945. The Commonwealth Development Company's (CDC) agricultural investment came next. Tobacco, cotton, and timber were planted on 106,000 acres that the CDC purchased in the Northern Lowveld of the nation (Daniel, 1982). Through these investments, British investors were able to benefit from the Imperial Preferences and Commonwealth Agreement that the British government extended to its colonies (Hennigar, 1947).

Trade relations after independence

An agreement covering all iron ore exports to Eswatini for the duration of the mine was signed by Japan and that nation in 1970 (Commonwealth, 1970). Eswatini ratified the Lomé Convention in 1975, placing the nine states that comprised the European Economic Commission against the 46



affiliates of the African Caribbean and Pacific (ACP) Group of States, who had previously been colonies of many EEC countries (Faber, 2004). The Lomé Convention brought together instruments related to trade and aid for development. The four commodity protocols included in the Lomé Convention were rum, sugar, cattle and veal, and bananas. Eswatini participated in the protocols pertaining to sugar and meat and veal. The Community agreed to import 1.3 million metric tons of sugar annually as part of the Sugar Protocol at guaranteed prices higher than those on the international market from producers of ACP sugar, including Eswatini. On the other hand, the Beef and Veal Protocol allowed Eswatini and six other countries to export 52,100 tonnes of beef and veal at a 92% import tariff reduction were shipped to the EU (Laaksonen et al., 2007). Eswatini was admitted as a founding participant of the Southern African Development Coordination Conference (SADCC) in 1980. The main objective of the SADCC, which was recognized as the "economic pillar" to advance development in the Southern African states, was to provide infrastructure and economic security. GATT (General Agreement on Trade and Tariffs) membership for Eswatini began in 1993. The World Trade Organization (WTO) was created in 1995 as a successor to the GATT (WTO,nd.). Reduced goods tariffs, increased competition in the services sector, and a phased reduction of nontariff barriers (NTBs) leading to their eventual elimination are among the commitments made by the GATT (WTO, nd.). Owing to its GATT membership, Eswatini is permitted to engage in trade with other GATT participants on the basis of Most Favoured Nation (MFN) and National Treatment.

In 1994, the PTA was renamed the Common Market for Eastern and Southern African States (COMESA) in an attempt to encourage full regional market incorporation. As a country cannot affiliate in more than one customs union, Eswatini was ineligible to participate in the customs union section of the treaty because, in contrast to the other COMESA members, it was already a

member of SACU. Eswatini was granted a concession under Article 4 of the COMESA Treaty, which permitted it to enjoy non-reciprocal preferential market access in other COMESA Member States (COMESA, 1994). Acknowledging the distinct circumstances of Eswatini and comparable states, like Lesotho and Namibia, in the framework of the Common Market, the derogations provide provisional releases from the complete implementation of a number of Treaty duties. Unlike the PTA, COMESA eliminates all nontariff trade obstacles, creates a customs union and a common external tariff on imports from non-COMESA nations, and allows unrestricted travel for individuals. It also enables free trade for all commodities and services produced on the common market.

With other SADC countries, Eswatini ratified the SADC Free Trade Agreement in 1996. SADC (1996) states that the SADC Protocol on Free Commerce aimed to promote economic growth, guarantee effective production within the Area, and liberalize interregional trade in products and services. Eswatini met the requirements specified by the US government in order to qualify for the African Growth Opportunity Act (AGOA) program, which it accomplished following five years of the SADC Protocol on Free Trade. Among the laws that needed to be changed were the Public Order Act, the Suppression of Terrorism Act, and the Industrial Relations Act. As a result, Eswatini was named the 35th eligible nation for AGOA in January 2001.

Eswatini's entry into the SADC Protocol on Trade allowed for the creation of the SADC Free Trade Area (FTA) in 2008. All taxes on items imported from inside the SADC area were to be gradually reduced, as per the terms of the Free Trade Agreement. A trade agreement between the SACU nations and the members of the European Free Trade Area (EFTA)—Iceland, Liechtenstein, Norway, and Switzerland—was signed in the same year. A 500-tonne yearly livestock quota was granted to Eswatini under the terms of the SACU-EFTA agreement. Fundira et al. (2007) states

that the goals of this agreement are to create economic ties between the nations, liberalize goods trade, and promote investment in the free trade area.



2.3 Eswatini's Major Trading Partners

According to Daniel Workman (2023), the table shows Eswatini's main trade partners in 2021. South Africa stands out as the top partner, taking in 67.9% of Eswatini's exports, which highlights a significant economic dependency. Kenya imports 5.6% while Nigeria takes 3.9% after South Africa, indicating significant trade within the African continent. Zimbabwe imports 2.4% and Mozambique imports 3.4%, respectively, indicating significant regional trade connections. With 1.94% of exports, the United Kingdom is the most significant non-African partner. Tanzania (1.92%), Botswana (1.5%), Namibia (1.1%), Zambia (1%), Uganda (0.9%), and Spain (1.4%) are additional important partners. The aforementioned distribution highlights the significance of regional trade accords and economic collaboration among African nations, concurrently implying that Eswatini must broaden its range of trade alliances.

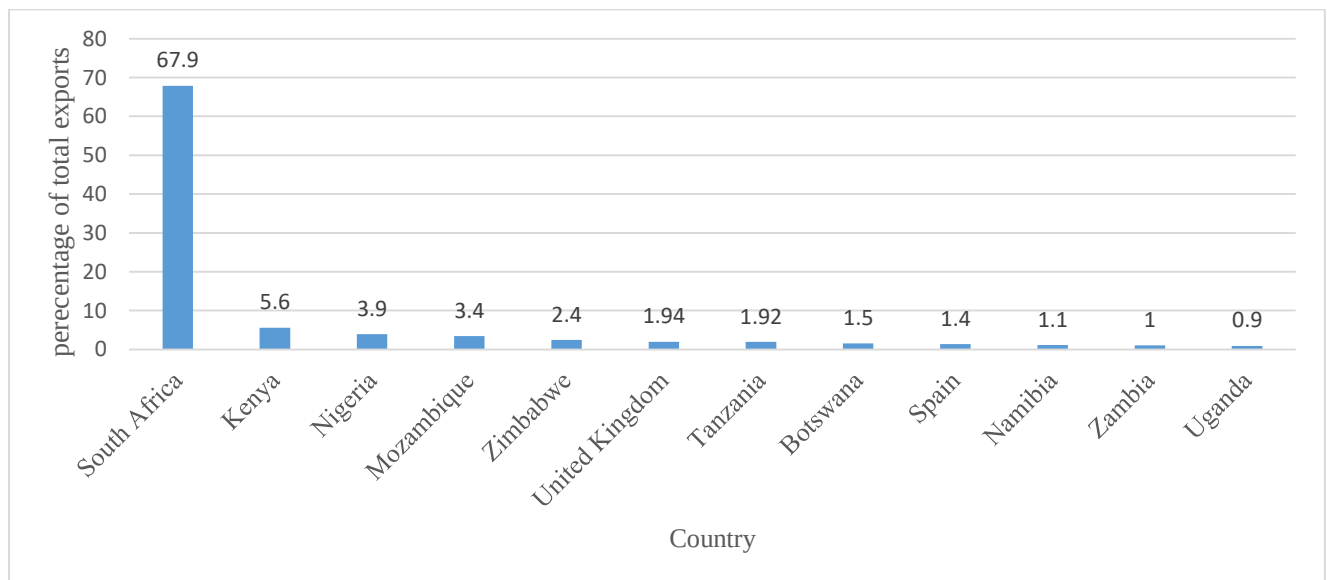


Figure 2.3 Eswatini Major Exports Partners

Source: Daniel Workman (2023)



According to Daniel Workman (2023), Eswatini's exports to other African countries accounted for 92.9% of total export value, with 5.5% of the country's sales going to clients in Europe. North America received 0.9% more of Eswatini's total exports. Other regions with lower percentages included Asia (0.6%), Oceania (Australia and New Zealand) (0.01%), and Latin America (0.0003%), which includes the Caribbean but does not include Mexico. With 1.139 million people living there, Eswatini's \$2.1 billion in exports in 2021 corresponds to almost \$1,800 for each citizen of the nation in southern Africa. That monetary figure is comparable to the average per capita from 2020, which was one year earlier.

2.4 Major Agriculture-related Product Exports

According to a report by the International Trade Council (2018), Eswatini has the following products as major agricultural exports.

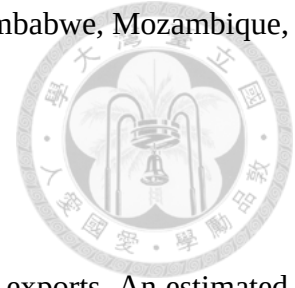
Sugar

According to International Trade Council (2018) in a Global Agricultural Information Network (GAIN) report, in terms of production, Eswatini is the fourth-largest sugar producer in Africa and the 25th in the world. This illustrates how intensely focused the sector is on maintaining economic growth. For Eswatini, sugar is the main export good. An approximate estimate of 350,000 metric tons of sugar, valued at \$200 million, are exported from Eswatini each year. The European Union, South Africa, and Mozambique are important trading partners for Eswatini's sugar.

Soft Drink Concentrates

Concentrates for soft drinks, primarily made from tropical fruits, are a major export from Eswatini. Concentrates for soft drinks are estimated to be exported for roughly \$150 million annually.

Eswatini's major trading partners for its concentrates for soft drinks are Zimbabwe, Mozambique, and South Africa.



Citrus Fruits

Lemons, oranges, and grapefruits are among the citrus fruits that Eswatini exports. An estimated \$30 million worth of citrus fruits, weighing 30,000 metric tons, are exported from Eswatini annually. The UK, Mozambique, and South Africa are significant trading partners for citrus fruits originating from Eswatini.

Wood Pulp

Wood pulp is exported from Eswatini and is mostly utilized in the paper and packaging sectors. Wood pulp exports are thought to bring in about \$25 million a year. China, Mozambique, and South Africa are Eswatini's main trading partners for wood pulp.

Textiles and Apparel

Fabrics, clothes, and other apparel-related products are exported from Eswatini. Eswatini is anticipated to export \$20 million worth of clothing and textiles each year. For clothes and textiles from Eswatini, the United States, the United Kingdom, and South Africa are significant trading partners.

Sugar Confectionery

Chocolates and candies made of sugar are among the confectionary goods exported from Eswatini. An estimated \$15 million worth of sugar candy is exported from Eswatini each year. Zimbabwe, Mozambique, and South Africa are important trading partners for Eswatini's sugar confections.

Dairy Products

Dairy goods like milk, cheese, and butter are exported from Eswatini. It is expected that dairy products export for about \$10 million a year. Lesotho, Mozambique, and South Africa are important trading partners for dairy goods from Eswatini.



Essential Oils

Essential oils from different plants, such as lavender and eucalyptus, are exported from Eswatini. Essential oil exports are projected to be worth \$5 million annually. South Africa, Mozambique, and the United States are important trading partners for Eswatini's essential oils.

Man-made Filaments

Fabrics created by humans, such as synthetic yarns and fibers, are exported from Eswatini. About \$5 million is thought to be the yearly export volume of man-made filaments. Mozambique, Zambia, and South Africa are important trading partners for Eswatini's artificial filaments.

Live Animals

Cattle, goats, and pigs are among the live animals exported by Eswatini. An estimated \$4 million worth of live animals are exported from Eswatini each year. South Africa, Mozambique, and Botswana are important trading partners for live animals from Eswatini.

2.5 Inflation and Economic Growth Trends in Eswatini

According to Mkhathshwa et al. (2015), Eswatini's economic growth reached a peak in 1988, with a rate of 18.58%. The nation benefited from political upheavals in Mozambique and the Republic of South Africa during this time. The nation's economic growth from 1990 to 1991 dropped to 1.76% in 1991 and hasn't been above 5% since. The average GDP growth rate for the 1980–2013 review period was 3.84%. The migration of businesses to South Africa and the nation's frequent,

severe droughts, which have an impact on the agriculture sector, one of the major forces behind the country's economy, were the primary reasons for the growth slowdown.

The inflation rate in Eswatini was 10.3% on average between 1980 and 2013, with the greatest rates recorded in 1983 and 1987, when it was 20.5% and 20.3%, respectively. Eswatini's inflation shocks are mostly caused by changes in the world market prices for food and energy. Since the nation is a net importer of both commodities, its inflation tendency has fluctuated across the examined time. The nation had previously used both monetary and fiscal strategies to try to control excessive inflation. The Central Bank of Eswatini's interest rate adjustments in conjunction with lower government spending have been the main instruments utilized by the nation in its economic growth strategy.

Though there is ongoing discussion on the precise nature of the correlation between inflation and growth, policy makers are faced with the challenge of striking a balance between stabilizing both. Despite the implementation of monetary policies aimed at controlling inflation, Eswatini's economy does not appear to be growing. Although the Central Bank of Eswatini's accommodative monetary policy approach has maintained interest rates low (at less than 6%) and inflation at single digits since 2010, the nation's economic development has remained sluggish. In the agricultural sector, lower interest rates are expected to boost investment, which will raise domestic agriculture output and expand the economy. This is the expectation from monetary policy.

Chapter 3 Literature Review



The study's goal is to investigate how agricultural exports affect the Kingdom of Eswatini's economic expansion. The chapter analyzes past empirical studies on this topic.

3.1 Testing of Export-led Growth Hypothesis

Malefane (2021) observed that when the VAR method and VECM were used, there was a positive cointegrating link between exports and economic growth in Botswana, Namibia, Eswatini, and South Africa. The export-led growth hypothesis is valid in Namibia and South Africa but not in Botswana, Lesotho, or Eswatini, according to the VAR causality results. The study came to the conclusion that it was necessary to identify and address the issues impeding Lesotho from pursuing an export-led growth strategy.

Using secondary data from the Reserve Bank of India from 1995 to 2020, Jacob et al. (2021) assessed the effects of inflation and currency rates on the export performance of the Indian economy using a VAR model. The findings showed that currency rates, inflation, and export performance are all cointegrated. The outcomes additionally demonstrated the significant impact of currency rate volatility and the wholesale price index on the performance of Indian exports.

A study conducted by Ronit et al. (2014) sought to ascertain the correlation between India's GDP growth and export expansion. Export growth and GDP growth have a positive correlation, according to annual statistics from 1969 to 2012. From 1961 to 2011, Hamdi et al. (2013) looked into the export-led growth (ELG) idea. They provided evidence for the existence of two unidirectional causal relationships: one between exports and economic growth in Morocco and Tunisia, and the other between imports and exports.

The Granger-causality in the Kingdom of Eswatini between sugar exports and economic expansion was examined by Dlamini and Dlamini (2019) using quarterly data from 2005 to 2017. The Kingdom of Eswatini's sugar exports and economic growth have a unidirectional causal relationship, according to the Granger-causality test outcomes. Specifically, sugar exports influence economic growth, but economic growth does not influence sugar exports. The analysis concludes that boosting sugar exports will contribute to the country's economic expansion. Thus, policies that increase the proportion of local sugar exporting enterprises should be developed by policymakers in order to support the nation's export sector.

To demonstrate a one-way causal relationship between Turkey's exports and economic growth, Ozturk and Acaravci (2010) used the Toda-Yamamoto Granger-causality test. Soyyigit (2010) conducted an analysis of the years 1990–2008 using the Toda Yamamoto causality test. The project found that the import of investment and intermediate goods is the mechanism through which economic expansion and manufacturing industry export occur, highlighting the advantageous connection between economic growth and exports.

Hassan and Murtala (2016) used yearly data from 1970 to 2012 and a modified Toda Yamamoto causality technique to investigate the export-led development hypothesis in Malaysia. Exports and GDP have a bidirectional causal link, based on the Granger causality study's conclusions. Lam et al. (2016) investigated the correlation between GDP and exports in Thailand, Malaysia, Indonesia, and the Philippines—four ASEAN countries. The findings showed a causal relationship between GDP and exports for Malaysia. Thailand, the Philippines, and Indonesia are the other three nations where the relationship between economic growth and export growth is one-way.

In Ljungwall et al. (2006), the export-led development hypothesis is investigated using a vector autoregression (VAR) model and the Granger no-causality approach created by Toda and Yamamoto in 1995. Monthly time series data for Shanghai, one of China's principal exporting provinces, were employed in the study. In three different ways, this book contributes to the corpus of literature. For the first time, a regional dataset (Shanghai) is used to investigate the export-led growth theory. Second, in order to avoid incorrect causation conclusions, the analysis takes the rise in imports into consideration. Finally, it is expected that the method created by Toda and Yamamoto will advance the typical F-statistics throughout the causality test procedure. A one-way Granger causal relationship between GDP and exports is found by the study.

The panel data approach was developed by Kónya et al. (2006) utilizing a novel panel-data technique based on Wald tests with bootstrap critical values that are specific to each country and SUR systems. The findings show a clear, unidirectional, one-period-ahead causal relationship between GDP and exports in Angola, Chad, and Zambia as well as between GDP and exports in Haiti, Rwanda, and Sierra Leone. Considering the correlation between FDI and GDP, it can be noticed that FDI drives GDP in Benin and Togo, but GDP drives FDI in Burkina Faso, the Gambia, Madagascar, and Malawi. This study looks at the link between FDI and EXP and finds that although FDI generates real exports in Haiti, Madagascar, Mauritania, Malawi, Rwanda, Senegal, and Zambia, real exports cause FDI in Benin, Chad, Haiti, Mauritania, Niger, Togo, and Yemen. A study on export-led growth in India was conducted by Kumari & Malhotra (2014). There are contradictory and unclear findings from the large amount of research on the hypothesis of export-led growth in India. There are three possible reasons for this: differences in definitions, approaches, and time frames. This study uses Johansen cointegration and the Granger causality technique to investigate the causal relationship between exports and economic growth. The variables GDP per

capita and exports were analyzed using annual time series data for India from 1980 to 2012. Both the short- and long-term relationships between exports and economic growth are examined. The results of the cointegration approach led this study to the conclusion that the relationship between GDP per capita and exports is not in a state of long-term equilibrium. This Granger causality test demonstrates a two-way causal relationship between GDP per capita and exports as well as between GDP per capita and exports.

The export-led growth theory is examined by Toyin et al. (2016) for the South African years 1975–2012. Empirical study indicates that there is no causal relationship between GDP and agricultural export components. Therefore, the export-led growth theory is refuted by South Africa's scenario through agricultural exports. It is implied that South Africa's current economic growth is not solely dependent on the volume of processed and unprocessed agricultural exports, and that previous levels of agricultural exports were insufficient to propel economic growth, given the lack of a clear correlation between the components of agricultural exports and growth. More domestic and international investment, along with focused incentives to promote agricultural export participation, are needed for the export-led growth of the agricultural industry.

Umar (2016) carried out research on how labor, exports, investment, and exchange rates affect the growth of the Indonesian economy. The study's findings show that the following variables marginally affected economic growth between 2007 and 2013: labor had a significant and positive impact on growth; exports, in this case net exports, had a significant and negative impact on growth; and the exchange rate between the rupiah and other currencies had no effect on growth. Furthermore, Indonesia's economic growth was positively impacted by labor, exports, foreign exchange, and investment all at the same time. Zimbabwe's agricultural exports and economic growth were the focus of a 2017 study by Matandare. The empirical outcomes of the study

demonstrated that the economic development of Zimbabwe was significantly impacted by labor, inflation, exchange rates, and agricultural exports. The government should refocus its efforts to increase agricultural exports as the country's economy expands, the report recommended. To support the agriculture industry, farmers should get government subsidies and other incentives. To compete in global markets, local farmers should focus on raising the output and quality of their food products. It is imperative that the government invigorate the agro-based industries in order to reinforce ties both forward and backward.

3.2 Autoregressive Distributed Lag Model

The acronym Autoregressive distributed lag is referred to as ARDL, which is a model that is distributive, that is, it encompasses the independent or explanatory variables—and "autoregressive," or including the lag terms of the dependent variables. The notation for this is ARDL ($p, q_1, \dots, q_K$), according to Pesaran et al. (2001), where p denotes the number of lags in the dependent variable, q_1 represent the number of lags in the first explanatory variable, q_K is the number of lags in the K th explanatory variable, and K is the total number of independent variables ($X_1 \dots X_K$). Despite endogeneity in some regressors, the ARDL technique produces objective estimates and trustworthy t-statistics (Harris & Sollis, 2003). Ali et al. (2016) found that the endogeneity problem is mitigated and residual correlation is eliminated when the appropriate lag is applied. It works well with small sample sizes and is applied when there is mixed integration of the variables ($I(0)$ and $I(1)$ but not $I(2)$) (Ibid). Because of its special characteristics, the literature on the connection between economic growth and this paradigm is frequently consulted. A review of related works that make use of this paradigm can be found below:

In order to examine the factors influencing NTAE growth in Zambia, Mabeta et al. (2015) used an ARDL model in conjunction with time series data covering the years 1980 to 2013. The ARDL

limits test confirmed that NTAE and the hypothesized variables cointegrated. The study's conclusions show that important short-term variables influencing cotton export performance are real exchange rates, real interest rates, worldwide prices, and real income of trading partners. The GDP, interest rate, and exchange rate, on the other hand, have a noteworthy impact on the long-term performance of cotton exports. According to the study, Zambia's rise in tobacco exports was considerably impacted in the near term by FDI, exchange rates, and trading partner income. But in the long run, the only variables that truly mattered in impacting the increase of tobacco exports were the money earned by trade partners and the real exchange rate. According to the research, Zambia's government should concentrate its efforts on attaining stable exchange rates.

The factors impacting Iran's pistachio exports were examined by Tavakoli et al. (2021) using the ARDL model. It was discovered that while GDP growth, exchange rate appreciation, and bank credit facilities were substantial positive variables, increased bank liquidity was a significant negative factor affecting Iran's pistachio exports. The study commended that in order to achieve economic constancy, the relevant authorities should finance pistachio growers and exporters, target domestic inflation and adjust it based on exchange rates, direct credit advances to the economically active sectors of the economy, and give priority to strengthening the Iranian industrial sector.

In Dube et al.'s (2018) analysis of the variables influencing the performance of unconventional agricultural exports—a case study of horticultural products in Ethiopia—they employed the autoregression distributed lag bound technique to cointegration. The analysis discovered that while overseas GDP and interest rates only had a major short-term impact, real exchange rates, Ethiopia's RGDP, FDI, pricing, and structural break are significant variables that impact Ethiopia's horticultural export performance in the long run. In order to attract investments that would support the expansion and diversification of the nation's commodity exports, the report recommended

strengthening domestic economic growth performance and implementing an elastic currency rate regime that moves in lockstep with the other macroeconomic indicators of the country.

Okyere and Jilu (2020) demonstrated cointegration between Ghana's exports and economic growth using the ARDL bound technique, and they came to the conclusion that exports significantly influence the country's economic growth. The study's conclusion advised opening a Chinese bank in Ghana to promote foreign trade since China and Ghana have grown to be important trading partners.

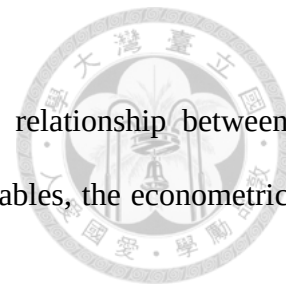
The ARDL approach was utilized by Sultanuzzaman et al. (2018) to show that exports have a direct short-term influence on Sri Lankan economic expansion and a long-term harmful effect on the nation's economy. On the other hand, economic growth is considerably and negatively impacted by foreign direct investment (FDI) over the long and short terms. The ARDL findings in Parajuli's (2021) research, which used time series data from 1994/95 to 2018/19 to investigate the impact of foreign trade on Nepal's economic growth, demonstrated that exports are a significant part of the nation's economy even though imports continue to have a negligible negative impact. The study concludes that Nepal's economy is significantly influenced by foreign trade. Therefore, it is vital that the government and other decision-makers generate a purposeful policy that would encourage the growth of export-oriented commodities and facilitate their export.

Fayisa et al. (2021) used panel ARDL analysis and heterogeneous panel data to examine the variables influencing exports in East Africa. The analysis, which used the shared mean group estimation outcomes, concluded that real GDP, trade openness, labor availability, domestic demand, and gross capital creation were important short-term determinants impacting East African exports. Trade openness, gross capital formation, FDI, final consumption, and the RGDP of both exporting and importing nations were long-term important factors affecting East African exports.

The analysis also discovered that real gross domestic product has a considerable beneficial influence on East African exports.

Utilizing an ARDL approach and time series data spanning from 1980 to 2015, Awan and Bibi (2021) explored the influence of exports to Pakistan's economic expansion. In this analysis, exports, foreign direct investment, and imports were the independent variables, and GDP, which is a proxy for economic growth, was the dependent variable. The findings of the ARDL presented that exports significantly boosted Pakistan's economic growth, whilst imports and foreign direct investment (FDI) had an essential detrimental effect. According to the paper, the primary reasons for the negative consequences of FDI and imports are political uncertainty, a heavy reliance on imported luxury goods, high tax rates, inflation, and the utilization of FDI in capital-intensive enterprises as opposed to speculative ones. The research recommended that Pakistan's government broaden the range of goods the country can produce and concentrate on educating its citizens to help them discover their potential because knowledge is the foundation for skill development. Using data for Tunisia from 1960 to 2008 using the autoregressive distributed lag (ARDL) bounds testing method, Qazi and Houda (2011) examined the possibility of a long-term equilibrium between GDP, imports, and exports. Their estimates indicate a causal relationship in both directions between imports and exports.

Chapter 4 Research Methodology



This chapter explains how to apply the ARDL model to examine the relationship between agricultural exports and Eswatini's economic growth. It describes the variables, the econometric model, and the cointegration tests used to evaluate long-term relationships.

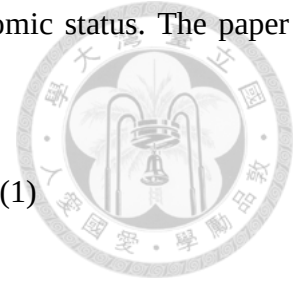
4.1 Model Specification

The paper employed the ARDL model to examine the influence of agricultural exports on Eswatini's economic expansion. The fact that the ARDL approach produces correct t-statistics and unbiased estimates even in situations where some regressors are endogenous justifies the adoption of this model (Haris and Sollis, 2003). Ali et al. (2016) state that minimizing the endogeneity issue and eliminating residual correlation can be achieved by choosing the right lag. Even with small sample sizes, this model performs well (Pesaran et al., 2001). Previous scholars have employed this method in the literature to measure economic growth in the domains they have examined. Lelya and Ngaruko (2021), Ijirshar et al. (2015), and Dube et al. (2018) are a few of these.

GDP is frequently used as a stand-in or proxy for economic growth in the literature on economic growth since it assesses the state of an economy. A number of studies employed GDP as a proxy for economic growth, including Ivongbe et al. (2021), Polat et al. (2021), Islam et al. (2021), and Darko et al. (2015). The entire monetary value of goods and services produced inside the borders of the country, regardless of the people who make them, is known as the real gross domestic product (RGDP) after inflation is taken into account. In this study, the RGDP is regarded as a dependent variable that measures economic growth. Agricultural exports (AGRX), inflation (INFL), gross capital formation (GCF), foreign direct investment (FDI), and exchange rates (EXC) are the variables in this study that are regarded as independent. This is the case because, as the

literature study demonstrates, these variables have an influence on economic status. The paper primarily specifies the subsequent econometric model:

$$RGDP_t = \beta_0 + \beta_1 AGRX_t + \beta_2 INFL_t + \beta_3 GCF_t + \beta_4 FDI_t + \beta_5 EXC_t + \varepsilon_t \dots \quad (1)$$



Cointegration in the ARDL model- ARDL Bound Test

To understand whether a long-term connection exists between the independent and dependent variables, a cointegration test is utilized. The ARDL Bound method of cointegration was applied to RGDP and AGRX in order to determine the presence of cointegration or long-term links. This was carried out with the limits approach and is expressed as follows:

$$\begin{aligned} \Delta RGDP_t = & \beta_0 + \sum_{i=0}^p \beta_{1i} RGDP_{t-i} + \sum_{i=0}^q \beta_{2i} AGRX_{t-i} + \sum_{i=0}^q \beta_{3i} \Delta INFL_{t-i} + \sum_{i=0}^q \beta_{4i} \Delta GCF_{t-i} + \sum_{i=0}^q \beta_{5i} \Delta FDI_{t-i} \\ & + \sum_{i=0}^q \beta_{6i} \Delta EXC_{t-i} + \phi_1 RGDP_{t-1} + \phi_2 AGRX_{t-1} + \phi_3 INFL_{t-1} + \phi_4 GCF_{t-1} + \phi_5 FDI_{t-1} + \phi_6 EXC_{t-1} + \varepsilon_t \dots \quad (2) \end{aligned}$$

In this equation, Δ symbolizes the first difference operator, t signifies the time period, β_0 is the constant term, and $\beta_{1i}, \beta_{2i}, \beta_{3i}, \beta_{4i}, \beta_{5i}, \beta_{6i}$ are the coefficients of the corresponding variables' lag differences. Additionally, $\phi_1, \phi_2, \phi_3, \phi_4, \phi_5, \phi_6$ are the coefficients or amounts of the level terms, and ε_t is the error term.

The equation includes the lagged level variables and their differences. The F-test is used to assess cointegration between the variables, and the null hypothesis is that the coefficients of the level terms ($\phi_1 = \phi_2 = \phi_3 = \phi_4 = \phi_5 = \phi_6 = 0$) are all jointly equal to zero. Pesaran et al. (2001) provide crucial F-values and T-values, one for the upper bound and another for the lower bound, to assess the presence or absence of cointegration. The test is considered inconclusive if the computed F and T

values are between the lower and upper bounds. If the estimated values of F and T are smaller than the lower bound of the lower value, we infer no cointegration and cannot reject the null hypothesis. If the estimated F and T values are greater than the critical F and T values for the upper bound, the null hypothesis that there is no cointegration is rejected and cointegration is presumed to exist.

The rate of adjustment, or the rate at which the series will stabilize in the event that its equilibrium is disturbed must be determined if the results of a limits test indicate cointegration. This requires additional estimation of the Error Correction Mechanism (ECM). And this manifests itself as follows:

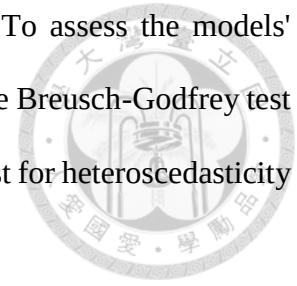
$$\Delta RGDP_t = \alpha_0 + \sum_{i=1}^n \beta_i \Delta RGDP_{t-i} + \sum_{i=1}^n \gamma_i \Delta AGRX_{t-i} + \sum_{i=1}^n \Phi_i \Delta INFL_{t-i} + \sum_{i=1}^n \Psi_i \Delta GCF_{t-i} + \sum_{i=1}^n \omega_i \Delta EXC_{t-1} + \sum_{i=1}^n \delta_i \Delta FDI_{t-1} + \lambda ECM_{t-1} \dots \dots \dots (3)$$

The speed of adjustment, shown as λECM_{t-1} , indicates the time interval required for the restoration of equilibrium or the period of time following displacement that the series shall require to return to long-run equilibrium. For long-term convergence to be ensured, the must sign needs to be negative and large.

Diagnostics Tests

Proper diagnostic tests were performed both before and after estimation to guarantee the quality and reliability of the data and estimated conclusions. The underlying time series variables were checked for stationarity before the estimation to ensure that there was no integration of order two. In order to guarantee that the research findings were devoid of econometric issues, including but not limited to heteroscedasticity and serial correlation, several tests were conducted again after the

estimate. Heteroscedasticity and serial correlation tests are part of this. To assess the models' robustness and dependability, diagnostic tests were conducted on them. The Breusch-Godfrey test was used to ascertain whether serial correlation was present, and White's test for heteroscedasticity was one of these tests.



4.2 The Expected Impacts of Independent Variables

The unit of measurement in this study is US\$10,000,000 and the dependent variable used to measure economic growth or expansion in Eswatini is the Real Gross Domestic Product (RGDP). To understand the impact of independent variables on the dynamics of economic growth, the ARDL framework was employed for their evaluation.

Agricultural exports variable (AGRX)

The value of Eswatini's agricultural exports to other nations over a given time period is represented by the agricultural exports variable (AGRX), which has a \$10,000,000 (USA Currency) unit of measurement. Crops, cattle, and forestry products are among the many agricultural goods produced domestically that are exported (World Bank, 2023). An important measure of how much the agricultural sector contributes to the national economy and how integrated it is into global trade markets is the AGRX variable. Positive correlation is anticipated because more agricultural exports can improve trade balances, generate more foreign exchange earnings, and support general economic growth by raising agriculture income and productivity.

Inflation Rate (INFL)

How much a basket of goods and services costs the average consumer is determined by tracking inflation with the consumer price index, which changes annually by a percentage. As per the World Bank (2023), this expense might be constant or could vary on a regular basis, such once a year.

The yearly averages obtained from WDI and computed from the monthly rate are employed in this study. Minhaj et al. (2021), Polat et al. (2021), Alagidede and Ibrahim (2017), and other authors' economic growth nexus research included the variable, which led to its selection based on the literature. The connection between inflation and economic growth has been the subject of conflicting study; some empirical research, such as that conducted by Minhaj et al. in 2021, indicate a beneficial impact, while other studies (Polat et al., 2021, Alagidede & Ibrahim, 2017) do not agree. Inflation drives up prices, which in turn reduces real income and, ultimately, aggregate demand or consumption. A decrease in consumption will cause the economy to grow more slowly. Costs of production increase in lockstep with inflation. Lower output due to increased manufacturing costs will have an effect on GDP (gross domestic product). As a result, it is assumed from the outset that inflation will impede economic expansion.

Gross capital Formation (GCF)

This includes the governmental and private sectors' monetary contributions to the economy. All domestic citizen investments made in the local economy to increase production unit capacity and promote efficiency and productivity are included in the GCF. This include permanent assets such as manufacturing facilities, office buildings, commercial complexes, machinery, and plants. Investments in railroads, schools, hospitals, and other amenities are also included in this. This variable's measurement, which comes from the World Development Indicators, is also given as a percentage of GDP for the purposes of this study. GCF was once referred to be an investment. It is also expected that investment will increase in parallel with economic expansion. A rise in national output due to investment means a positive GCF is expected. Previous researchers, such as Darko et al. (2015), Mabeta et al. (2015), Qazi et al. (2021), and Urriola et al. (2018), have

sufficiently justified the inclusion of this variable as an independent variable to assess economic growth in their work.



Foreign Direct Investment (FDI)

Foreign direct investment is when a foreigner makes an investment in the country's physical infrastructure rather than shares or other marketable securities. The study expressed foreign direct investment (FDI) as a proportion of GDP in order to examine or measure its impact on economic growth. This include permanent assets such as manufacturing facilities, office buildings, commercial complexes, machinery, and plants. Investments in railroads, schools, hospitals, and other amenities are also included in this. This variable's measurement, which comes from the World Development Indicators, is also given as a percentage of GDP for the purposes of this study. The expected sign is positive and the justification for its inclusion in the model is fully met because the writers mentioned above also included it as an explanatory variable in their models to investigate the relationship between economic growth and this variable.

Exchange Rate (EXC)

EXC is, to put it simply, the expense incurred while getting foreign currency. For the purposes of this study, since the US dollar is the most frequently used currency on the global market, it is utilized as the reference currency. Nevertheless, the EXC variable is measured in terms of the Eswatini emalangeni (E) in relation to the currency of another country. This variable was furthermore obtained via the WDI. The daily rate set by the interbank market on the basis of supply and demand is referred to as the "exchange rate" in this study. Daily averages are followed by weekly averages, monthly averages based on weekly averages, and annually based on monthly averages. Since it has been shown to have an effect on economic expansion, this variable is usually

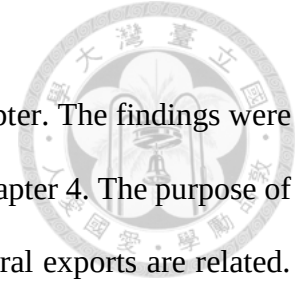
included in analyses of economic growth, especially when it comes to exports. Ahiabo and Amoah (2019), Okyere and Jilu (2020), and Alagidede and Ibrahim (2017) have all included this information in their research. Therefore, research backs up the use of this statistic to gauge economic development. Inflation results from a decline in the worth of the exchange rate, and inflation is predicted to negatively impact aggregate demand and, consequently, economic growth. When the exchange rate increases in value, the opposite is true. Alagidede and Ibrahim (2017) and Ahiabo and Amoah (2019) are some of the researchers that wrote papers that looked at how exchange rates affect economic growth. The indication that is expected is positive.

The following table 4.1 provides a summary of the variable description and the expected sign of the dependent variables.

Table 4.1 Variables Explanations and a Prior Expectation

Variable	Description (Units)	Expected Sign (+ or -)
RGDP	Real gross domestic product in constant dollar terms of 2015 (US\$10,000,000)	
AGRX	Agricultural exports (US\$10,000,000)	+
INFL	Inflation consumer price index (annual growth, %)	-
GCF	Gross capital formation (% of GDP)	+
FDI	Net inflow of foreign direct investment (% of GDP)	+
EXC	Official exchange rate (local currency per US\$ period average)	+

Chapter 5 Data and Empirical Results



The investigation's findings and the data analysis are presented in this chapter. The findings were obtained by the application of the data analysis techniques described in Chapter 4. The purpose of the study was to look into how Eswatini's economic growth and agricultural exports are related. To this end, the data is presented using several results presentation formats, including tables and graphs.

5.1 Trend Analysis and Descriptive Statistics

The World Bank's World Development Indicators provided secondary statistics on gross capital formation, inflation, and currency rates for the years 1972 to 2022. The Food and Agricultural Organization's Trade Statistics Division provided data for the following: Real Gross Domestic Product (RGDP), net inflows of Foreign Direct Investment (FDI), and aggregated values of agricultural exports (AGRX) from 1972 to 2022. Following the descriptive statistics presented in Table 5.1, each variable's trend analysis is provided in this section.

Table 5.1 Descriptive statistics of Studied Variables

Statistic	RGDP	AGRX	INFL	GCF	FDI	EXC
Units	US\$10 000 000	US\$10 000 000	% of GDP	% of GDP	% of GDP	E/US\$
Mean	242.7292	27.66538	9.596582	20.04951	3.224675	5.857267
Median	237.4089	25.9241	8.076088	17.35446	2.700421	4.607962
Std. dev.	126.4211	14.39018	5.126813	8.033928	3.43997	4.786437
Min	50.51493	4.0941	2.3663	11.7876	-2.73893	0.679477
Max	483.8918	61.04224	20.80512	47.90682	13.45853	16.47026
Skewness	0.210476	0.544368	0.728714	1.635535	0.657437	0.726071
Kurtosis	1.825257	2.615482	2.643891	5.621906	3.204249	2.402606



Trends in Real Gross Domestic Product (RGDP)

As shown by figure 5.1, from 1972 to 2022, the Real Gross Domestic Product (RGDP) showed a clear upward trend, increasing from 50.5149 to 483.8918 (in units of 10 million), reflecting significant economic growth over these 50 years. This data, sourced from the World Bank, indicates that during the decade from 1972 to 1982, the RGDP more than doubled, showcasing strong growth with notable increases in the mid-1970s. The following decade, from 1983 to 1992, continued this trend with steady growth, highlighted by significant increases in the mid to late 1980s. From 1993 to 2002, the RGDP continued its consistent rise, despite a slight dip in 2000. The period from 2003 to 2012 included the 2008 financial crisis, which is reflected in a relatively smaller increase between 2008 and 2009. However, the overall trend remained upward. Despite a minor decline in 2020 brought on by the COVID-19 pandemic's economic impact, the most recent decade, which ran from 2013 to 2022, saw excellent growth, which rebounded strongly in 2021. Overall, the RGDP data from 1972 to 2022 reflects consistent economic growth, resilience, and recovery after economic shocks, underscoring a long-term expansion of the economy.

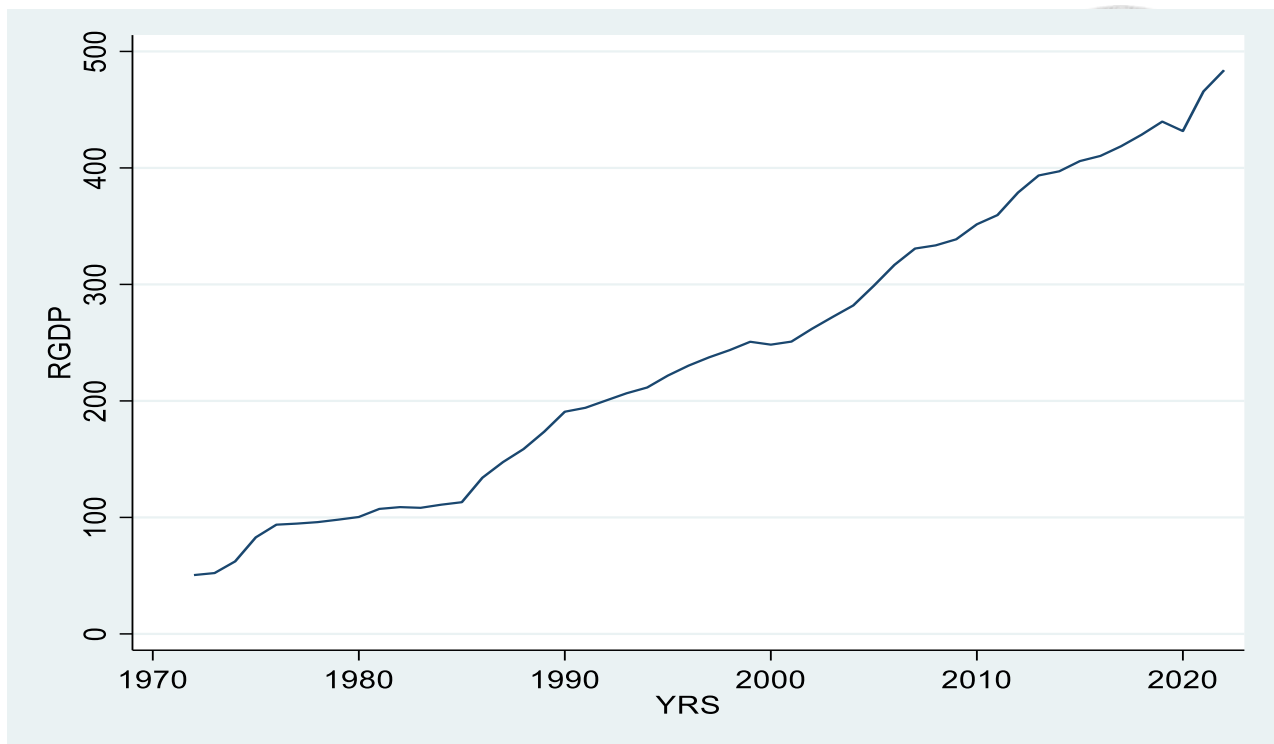
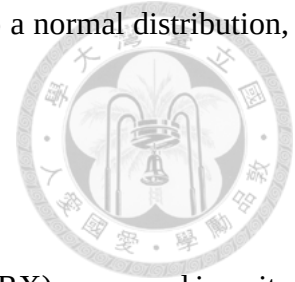


Figure 5.1 Real Gross Domestic Product (RGDP) Trends

Source: The World Bank

According to Table 5.1, the dataset for Real Gross Domestic Product (RGDP), measured in units of 10 million, includes 51 observations representing economic output over a specified period. The mean RGDP of 242.729 units indicates the average economic activity during this time, while the median RGDP of 237.409 units suggests that half of the observations fall below this midpoint. The standard deviation of 126.421 units reflects moderate variability around the mean, indicating fluctuations in economic output. The range from a minimum RGDP of 50.515 units to a maximum of 483.892 units underscores the diversity of economic performance observed. The distribution has a minor right skew, as shown by the skewness of 0.210, which implies that although most observations are clustered around the mean, there are times when economic output is higher than normal. A considerable frequency of both high and low economic outputs is also indicated by the

distribution's somewhat peaked shape and heavier tails when associated to a normal distribution, which has a kurtosis of 1.825.



Trends in Agricultural Exports (AGRX)

As demonstrated by figure 5.2, from 1972 to 2022, agricultural exports (AGRX), measured in units of US\$10 million, exhibited notable fluctuations and overall growth. Starting at 4.0941 in 1972, agricultural exports increased steadily through the 1970s, peaking at 21.1038 in 1980. The 1980s showed significant variability, with highs in 1980 (21.1038) and 1981 (19.3567), followed by a dip, then rising again to 27.0732 by 1988. The early 1990s experienced substantial growth, particularly in 1990 (34.4857) and 1991 (33.6897). This growth continued through the 1990s, with another peak in 1997 (36.2403). Entering the 2000s, agricultural exports demonstrated strong performance, highlighted by consistent increases and peaks in 2006 (39.6472) and 2007 (23.0974). The late 2000s and early 2010s saw moderate fluctuations, but a significant surge occurred in 2013 (52.5975) and continued with substantial increases in the mid-2010s, reaching 54.7613 in 2015. The trend remained upward with occasional dips, such as in 2020 (54.3175), likely due to global disruptions, followed by a record high in 2021 (61.0422). The period concluded with a slight decrease to 45.7421 in 2022. Overall, agricultural exports from 1972 to 2022 reflected a trajectory of growth interspersed with periods of variability, indicating resilience and expansion in the agricultural export sector.

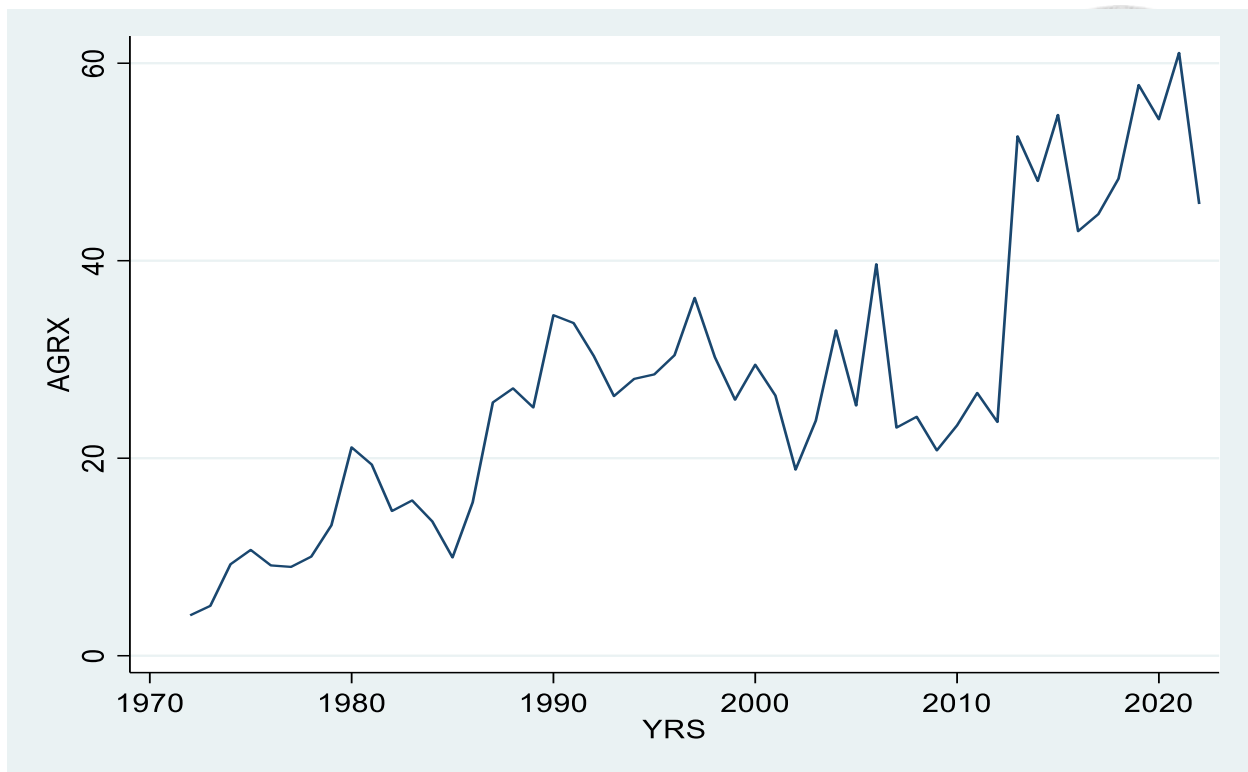


Figure 5.2 Agricultural Exports (AGR) Trends

Source: The World Bank

Based on Table 5.1, the dataset for Agricultural Exports (AGR), measured in units of US\$10 million, spans 51 observations and offers insights into the export performance of agricultural goods over the specified period. The mean AGR of 27.665 units suggests the average value of agricultural exports during this time, while the median AGR of 25.924 units indicates that half of the observations fall below this median value. The standard deviation of 14.390 units reflects notable variability around the mean, highlighting fluctuations in agricultural export values over the period analysed. The range from a minimum AGR of 4.094 units to a maximum of 61.042 units underscores the wide spectrum of export levels observed. A positive skewness of 0.544 indicates a distribution that is skewed to the right, implying that there are periods where agricultural exports were higher than the average. The kurtosis of 2.615, which displays a

significant occurrence of both high and low export values, suggests a shape with heavier tails and a more pronounced peak than a normal distribution.



Trends in Inflation (INFL)

As presented in Figure 5.3, from 1972 to 2022, inflation (INFL), represented as a percentage, experienced considerable variability. Starting at a relatively low 2.37% in 1972, inflation surged to 11.54% in 1973 and peaked at 19.29% in 1974, reflecting economic challenges of that period. The mid-1970s to early 1980s saw continued volatility with a high of 20.81% in 1977 and another peak at 20.06% in 1981. The early 1980s experienced persistently high inflation, followed by a general decline, although spikes continued with 20.46% in 1985 and 20.39% in 1988. In the 1990s, inflation moderated somewhat but remained variable, with notable figures including 13.09% in 1990 and 13.77% in 1994. The early 2000s saw fluctuating rates, peaking at 12.21% in 2000, followed by a dip and subsequent rises, including 12.66% in 2008 amid the global financial crisis. The 2010s experienced more stability with lower inflation rates, mostly under 10%, except for a few instances like 8.94% in 2012 and 7.85% in 2016. In recent years, from 2019 to 2022, inflation was relatively low, reaching a low of 2.60% in 2019 and slightly increasing to 4.03% in 2022. Overall, the inflation data from 1972 to 2022 highlights periods of high economic turbulence, gradual stabilization, and more recent low and stable inflation rates.

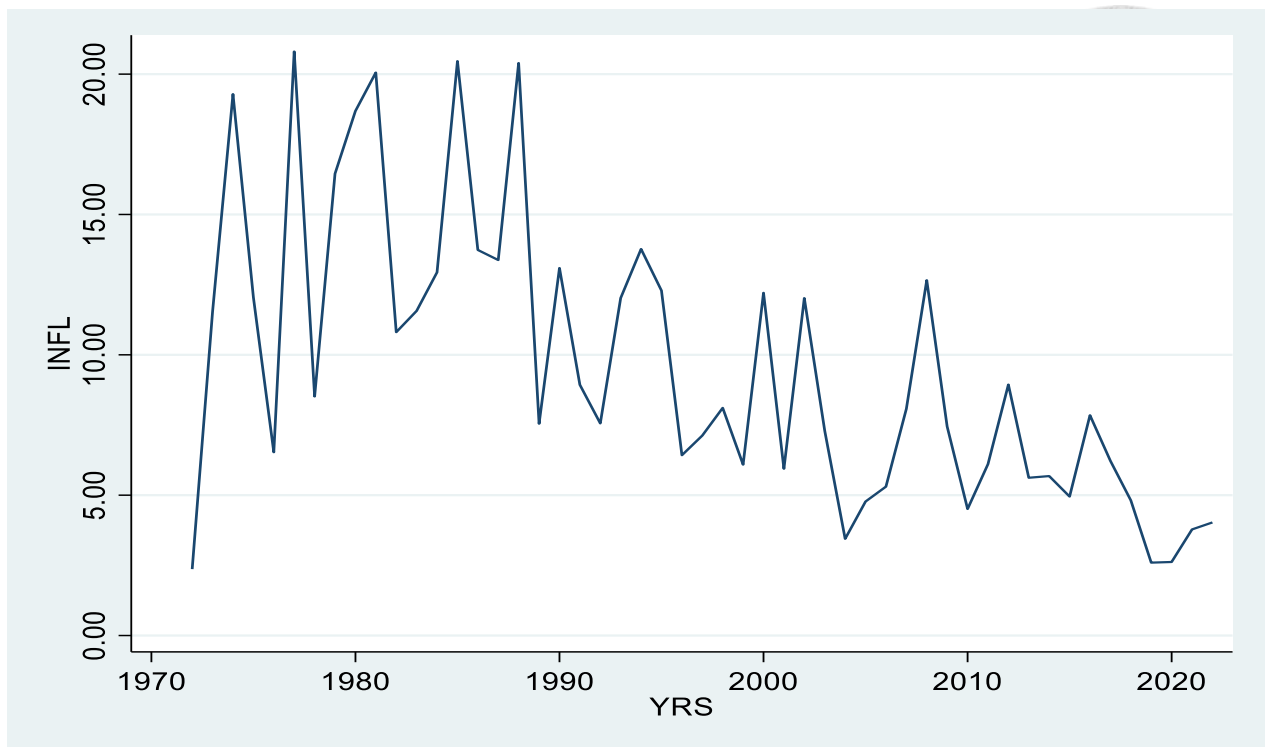


Figure 5.3 Inflation (INFL) Trends

Source: The World Bank

As shown in Table 5.1, the dataset had 51 observations, representing annual inflation rates over the specified period. The mean inflation rate is 9.597%, indicating the average annual increase in price levels during this period. The median inflation rate is slightly lower at 8.076%, suggesting that half of the observed years experienced inflation rates below this level. This median number, as opposed to the mean, offers a strong indicator of center tendency that is less affected by extreme values. The 5.127% standard deviation illustrates a moderate degree of variability surrounding the mean inflation rate, signifying variations in yearly price rises. The range of inflation rates spans from a minimum of 2.366% to a maximum of 20.805%, showcasing the breadth of inflationary pressures observed over the period. The skewness of 0.729 indicates a distribution skewed to the right, suggesting that while the average inflation rate is moderate, there are periods with higher inflation rates that contribute to the skewness. A leptokurtic distribution, which is further indicated

by a kurtosis of 2.644, is more likely to have intense inflationary periods since it is heavier in the tails and more peaked than a normal distribution.



Trends in Gross Capital Formation (GCF)

Figure 5.4 illustrates the notable variations in Gross Capital Formation (GCF) as a percentage of Gross Domestic Product between 1972 and 2022. Early in the 1970s, the GCF showed strong investment activity, peaking at 23.58% in 1974 after falling to 20.14% in 1973. The mid-1970s saw a decline to 18.58% in 1975, followed by an increase, with a notable peak at 26.93% in 1977. The late 1970s and early 1980s witnessed high volatility, with an exceptional peak at 47.91% in 1978 and 42.69% in 1979, before dropping to 31.04% in 1981 and further fluctuating throughout the 1980s. In the 1980s, GCF declined to a low of 14.86% in 1987 but saw some recovery towards the end of the decade, with 23.93% in 1989. The early 1990s experienced a dip, hitting a low of 15.11% in 1990, followed by a gradual increase peaking at 19.72% in 1992. However, the mid to late 1990s saw a relatively stable but lower range of GCF, fluctuating around 16-19%. Entering the 2000s, GCF experienced moderate growth with peaks at 23.54% in 2000 and 23.69% in 2001, but subsequently fluctuated and gradually declined, reaching 14.48% in 2010. The 2010s saw a steady decline, with GCF consistently below 15%, reaching a low of 11.82% in 2012. This downward trend continued, stabilizing around 12-13% towards the late 2010s. In the recent years of 2020 to 2022, GCF showed minor fluctuations, starting at 12.26% in 2020, slightly increasing to 13.63% in 2021, and then dropping again to 11.79% in 2022. In general, the data shows that there were times of strong investment activity between 1972 and 2022, particularly in the late 1970s and early 1980s. These were followed by general trends of stabilization at lower percentages in the subsequent years. The changing investment patterns and economic situations over the years are reflected in this trend.

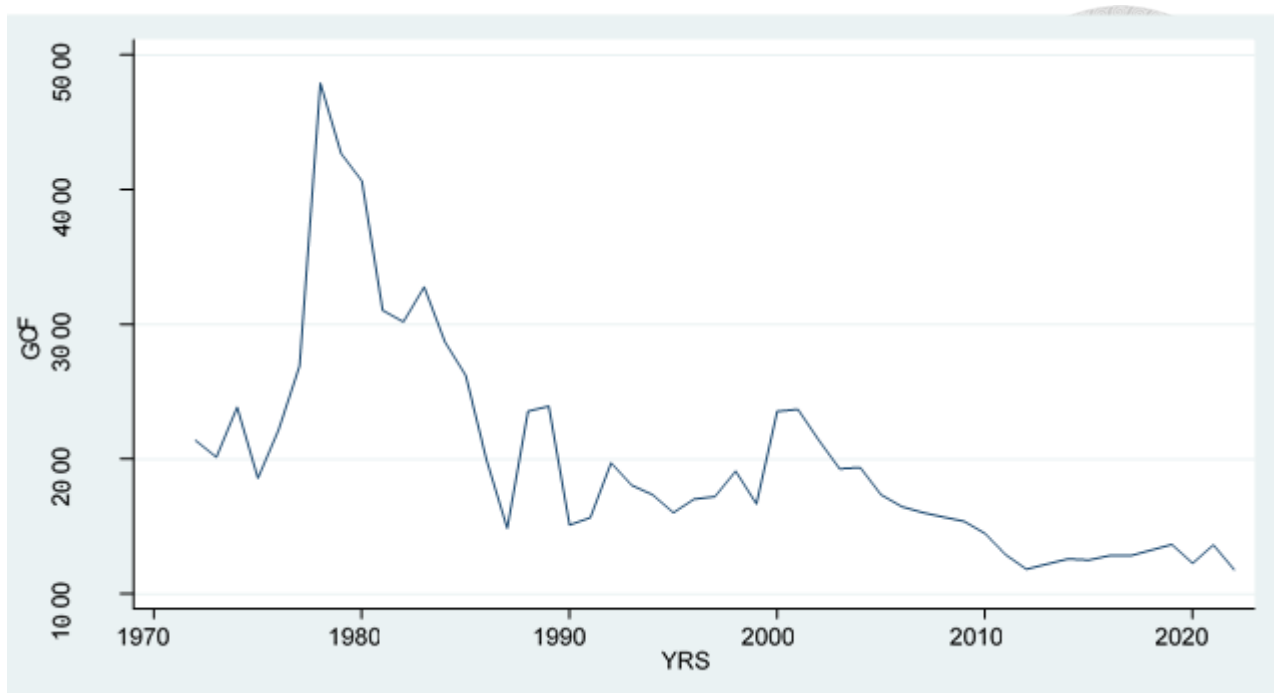
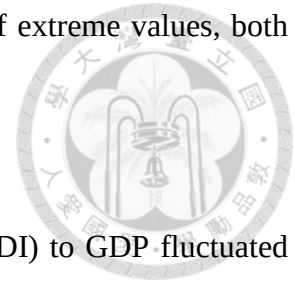


Figure 5.4 Gross Capital Formation (GCF) Trends

Source: The World Bank

As presented by Table 5.1, the mean of GCF is 20.050%, indicating the average proportion of GDP devoted to capital formation during this period. GCF's median, which was 17.354%, indicates that half of the observations are below this number. This means that the measure of central tendency is less affected by extreme values than by the mean. The 8.034% standard deviation indicates a moderate level of variability around the mean GCF, which suggests variations in the GDP percentage allotted to capital formation. The range spans from a minimum of 11.788% to a maximum of 47.907%, illustrating the breadth of capital investment levels observed across the dataset. The skewness of 1.636 indicates a distribution that is significantly skewed to the right, implying a longer tail towards higher values of GCF percentages. This suggests that there are periods or instances where a relatively large proportion of GDP is allocated to capital formation, contributing to the skewness. The kurtosis of 5.622 indicates a leptokurtic distribution, which has heavier tails and a more pronounced peak than a normal distribution. When comparing GCF

percentages to a normal distribution, this suggests a greater probability of extreme values, both high and low.



Trends in Foreign Direct Investment (FDI)

Between 1972 and 2022, the proportion of Foreign Direct Investment (FDI) to GDP fluctuated significantly, as illustrated in Figure 5.5, reflecting varying levels of foreign investment interest and economic conditions. In the early 1970s, FDI started at 0.46% in 1972, dropped sharply to 0.03% in 1973, and then rose significantly to 1.34% in 1974. The mid-1970s saw a surge, peaking at 6.58% in 1977. The late 1970s experienced even more dramatic growth, with a high of 13.46% in 1979, indicating strong foreign investment during this period. The 1980s began with a dip to 4.88% in 1980, followed by moderate increases and a notable decline in 1982, when FDI turned negative (-2.54%). This negative trend continued into 1983 with -1.02%, but by the mid-1980s, FDI rebounded, reaching 9.64% in both 1987 and 1989. The early 1990s saw fluctuating FDI levels, with significant investments in 1991 (7.10%) and 1992 (6.80%) but lower levels in subsequent years, such as 1.35% in 1996 and -0.89% in 1997. The late 1990s and early 2000s experienced more stability and positive FDI, peaking at 9.68% in 1998 and maintaining moderate levels through 2000 (5.22%) and 2002 (6.49%). However, the period also saw occasional negative values, such as -2.74% in 2003 and -1.44% in 2005. The mid-2000s had modest positive FDI, with a peak of 3.68% in 2006, followed by lower and fluctuating values through the late 2000s and early 2010s. In recent years, from 2010 to 2022, FDI showed a trend of moderate investment with occasional dips into negative territory, such as -1.31% in 2017. Positive but low FDI levels were observed in 2019 (2.87%) and 2021 (2.33%), while 2022 saw a drop to 0.28%. Overall, the data from 1972 to 2022 highlights periods of high foreign investment interspersed with years of lower

or even negative investment, reflecting the dynamic nature of global economic conditions and investor confidence over the decades.

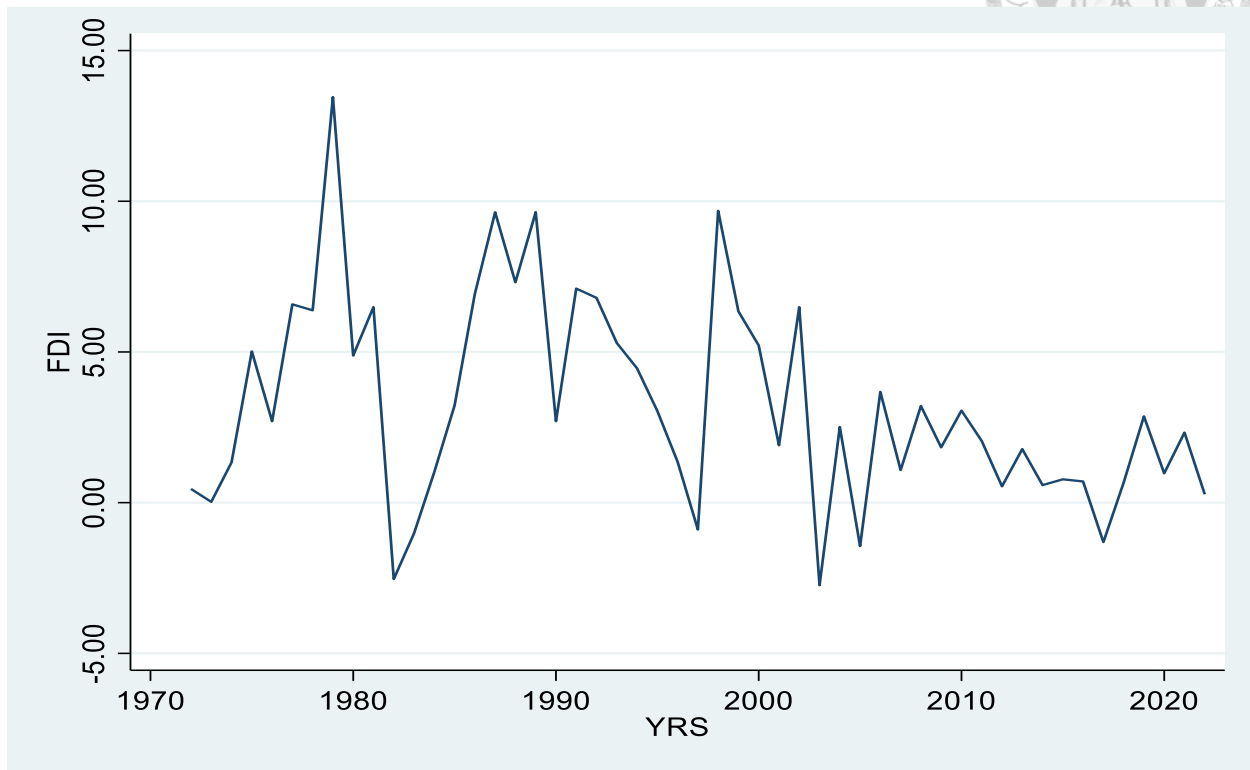


Figure 5.5 Foreign Direct Investment (FDI) Trends

Source: The World Bank

The dataset consists of 51 observations, each representing the percentage of GDP attributed to Foreign Direct Investment over a specified period as demonstrated by Table 5.1. The mean FDI is 3.225%, indicating the average proportion of GDP that foreign direct investment represents during the period studied. As a reliable indicator of central tendency that is less impacted by extreme values than the mean, the median FDI, at 2.700%, indicates that half of the observations fall below this number. The foreign direct investment (FDI) proportion of GDP is subject to variations over time, as indicated by the moderate variability around the mean FDI represented by the standard deviation of 3.440%. From a minimum of -2.739% to a maximum of 13.459%, the range of FDI

percentages shows the variation in FDI levels found in the sample. The skewness of 0.657 indicates a distribution that is moderately skewed to the right. This suggests that while the average FDI percentage is positive, there are periods or instances where FDI as a percentage of GDP has been notably higher than the median, contributing to the skewness. When compared to a normal distribution, the distribution with the kurtosis of 3.204 is leptokurtic, which means it has heavier tails and is more peaked. This suggests that, in contrast to what would be predicted under a normal distribution, there is a higher chance of seeing extreme values in FDI percentages, both positive and negative.

Trends in Exchange Rate (EXC)

From 1972 to 2022, the exchange rate (EXC), measured as units of domestic currency per USD, reveals a general trend of currency depreciation and is demonstrated in Figure 5.6. Starting at 0.77 units per USD in 1972, the exchange rate exhibited a gradual increase through the 1970s, maintaining values around 0.87 units per USD from 1976 to 1978 before dipping slightly to 0.84 in 1979 and then to 0.78 in 1980. The early 1980s marked the beginning of more noticeable depreciation, reaching 1.09 units per USD in 1982 and 1.48 in 1984. The mid-1980s saw a sharper rise, with the exchange rate jumping to 2.23 units per USD in 1985 and continuing to climb, hitting 2.62 in 1989. This upward trend persisted into the 1990s, with significant milestones such as 3.27 units per USD in 1993 and 4.30 in 1996. By the end of the decade, the exchange rate had surged to 6.11 units per USD in 1999, reflecting continued depreciation. Entering the 2000s, the trend of depreciation accelerated. The exchange rate reached 6.94 units per USD in 2000 and escalated to 10.54 in 2002. After a dip to 7.56 in 2003, the rate stabilized somewhat but remained elevated, hovering around 6-8 units per USD through the mid-2000s. By 2008, the rate increased again to 8.26 units per USD. The 2010s began with the exchange rate at 7.32 units per USD in 2010, rising

to 9.66 in 2013 and continuing to climb sharply, hitting 12.76 units per USD in 2015 and peaking at 14.71 in 2016. After a slight decline to 13.32 in 2017, the rate stabilized but remained high, fluctuating between 13-14 units per USD for the rest of the decade. The trend continued into the 2020s, reaching 16.47 units per USD in 2020, dropping slightly to 14.78 in 2021, and then rising again to 16.36 in 2022. Overall, the data indicates a long-term trend of currency depreciation against the USD, with notable periods of rapid increase, particularly during economic crises or periods of high inflation.

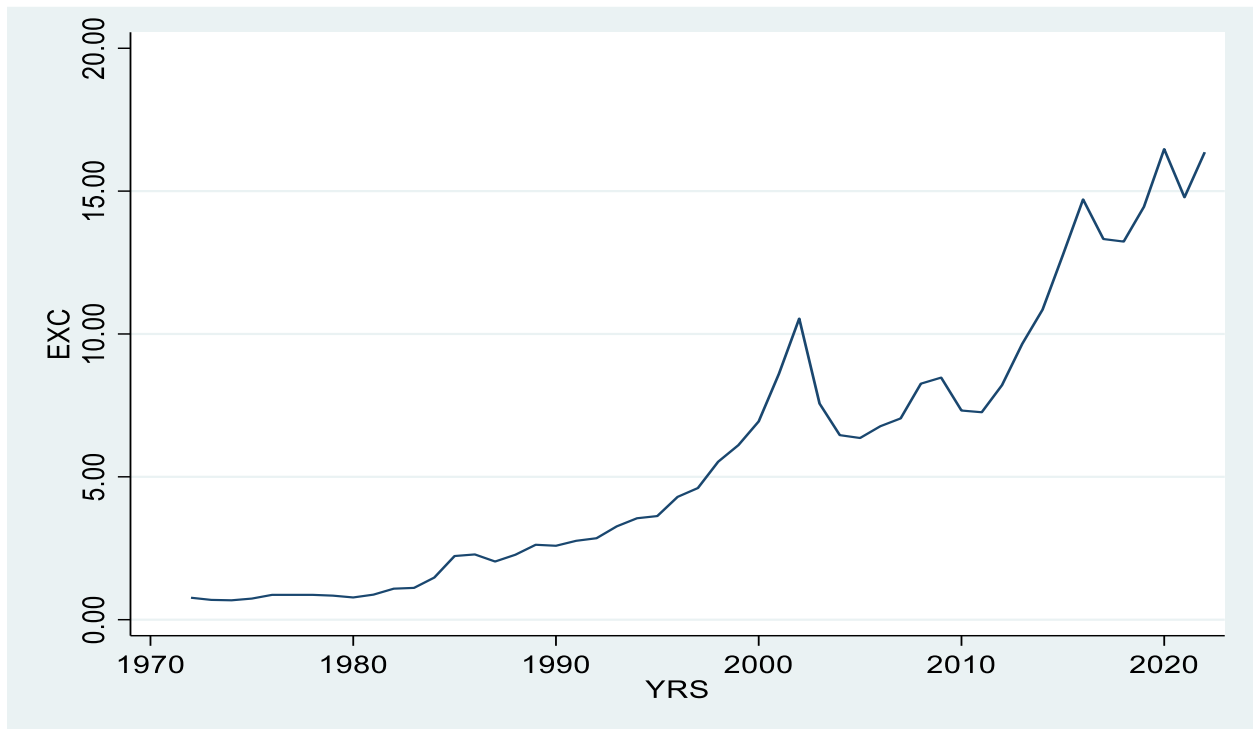


Figure 5.6 Exchange rate (EXC) Trends

Source: The World Bank

Table 5.1 revealed a mean of 5.857 for exchange rate, indicating the average valuation of the currency during this time frame. The median of exchange rate was 4.608, suggesting that half of the observations fall below this value, providing a measure of central tendency less affected by extreme fluctuations. The standard deviation of 4.786 reflects moderate variability around the mean, indicating fluctuations in currency valuation over the analyzed period. The range of exchange rates spans from a minimum of 0.679 to a maximum of 16.470, illustrating the breadth of valuation levels observed. A positive skewness of 0.726 suggests a distribution skewed to the right, indicating periods where the currency experienced relatively stronger valuation. In addition, a leptokurtic distribution with a kurtosis of 2.403 suggests a higher probability of extreme exchange rate values because it is associated with a distribution with heavier tails and a more prominent peak than a normal distribution. These statistics collectively provide a comprehensive overview of the variability, central tendency, and distributional characteristics of the exchange rate (EXC), offering insights into currency movements and their potential economic implications over the specified period.

5.2 Estimation Results

Unit Root/ Stationarity Test

To ascertain the level of variable integration, a stationarity test was conducted using the ADF and Philips-Perron tests, which are displayed in Table 5.2. This requirement is not necessary for the ARDL model to work, but it is prudent to ensure that none of the variables are integrated of order two, or $I(2)$, as this will go against the bound test assumption and cause the model to malfunction since it contains $I(2)$ variables. The results from the Dickey-Fuller (ADF) test provided valuable insights into the stationarity characteristics of various economic variables at their original levels and after applying first differences (Δ). Starting with the levels data, Real Gross Domestic Product

(RGDP) displayed a high p-value of 0.9977 and a test statistic of 1.537, indicating significant evidence against stationarity. This suggested that RGDP exhibited trends or stochastic components over time, complicating modeling assumptions that required stationary data. Agricultural Exports (AGRX) showed a p-value of 0.2774 and a test statistic of -2.021, suggesting weaker evidence against stationarity compared to RGDP. While not conclusive, this indicated that AGRX levels had some degree of stationarity or less pronounced non-stationarity.

In contrast, both Inflation (INFL) and Foreign Direct Investment (FDI) exhibited strong evidence of stationarity in their levels. INFL had a low p-value of 0.0003 and a test statistic of -4.398, while FDI showed a very low p-value of 0.0001 and a test statistic of -4.629. These results indicated that INFL and FDI data in their original form were likely stationary, showing little systematic trends over time. Gross Capital Formation (GCF) and Exchange Rate (EXC), however, displayed higher p-values (0.3421 for GCF and 0.99 for EXC) and test statistics that did not sufficiently reject the null hypothesis of a unit root, suggesting potential non-stationarity in their levels.

Turning to the first differences (Δ), all variables showed very low p-values (0.0000) and test statistics well below the critical values (-3.587, -2.933, -2.601). This indicated that after differencing, all variables became stationary. Whether initially non-stationary like RGDP, AGRX, GCF, and EXC, or stationary like INFL and FDI in their levels, the transformation to first differences removed any trends or non-stationarity present in the original series.

The Phillips-Perron test results offered valuable insights into the stationarity characteristics of several economic variables both in their original levels and after applying first differences (Δ). Starting with the levels data, Real Gross Domestic Product (RGDP) showed a high p-value of 0.9974 and a test statistic of 1.466, indicating strong evidence against stationarity. This aligned

with the findings from the Dickey-Fuller test, suggesting that RGDP exhibited trends or stochastic components over time that made it non-stationary and potentially challenging for models that assumed stationary data. Similarly, Agricultural Exports (AGRX) displayed a p-value of 0.3572 and a test statistic of -1.847, also suggesting non-stationarity in its levels, consistent with the RGDP findings.

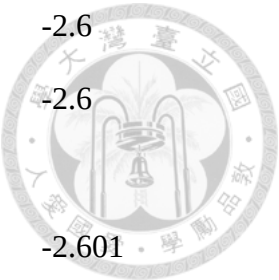
Conversely, Inflation (INFL) showed compelling evidence of stationarity with a very low p-value of 0.0002 and a test statistic of -4.556, indicating that inflation data in their original form were likely stationary and exhibited little systematic trends over time. Foreign Direct Investment (FDI) also demonstrated strong evidence of stationarity with a p-value of 0.0001 and a test statistic of -4.703, reinforcing its stability in levels. Gross Capital Formation (GCF) and Exchange Rate (EXC), however, presented mixed results in their levels. GCF displayed a p-value of 0.366 and a test statistic of -1.829, indicating weak evidence against stationarity. EXC showed a higher p-value of 0.9937 and a test statistic of 0.947, suggesting it was likely non-stationary. These findings indicated that GCF and EXC exhibited varying degrees of non-stationarity in their original levels, requiring further analysis or transformation.

Turning to the first differences (Δ), all variables, including RGDP, AGRX, INFL, GCF, FDI, and EXC, exhibited very low p-values (0.0000) and test statistics well below the critical values (-3.587, -2.933, -2.601). This further confirmed that after taking the first differences, all variables became stationary. This transformation was crucial for eliminating trends or non-stationary behavior from the original series, providing a solid foundation for more reliable econometric modeling and analysis.

Table 5.2 Results of Unit Root Test



Variable	P-value	Test Statistic	1%	5%	10%
Dickey-Fuller (ADF) test					
Levels					
RGDP	0.9977	1.537	-3.58	-2.93	-2.6
AGRX	0.2774	-2.021	-3.58	-2.93	-2.6
INFL	0.0003***	-4.398	-3.58	-2.93	-2.6
GCF	0.3421	-1.879	-3.58	-2.93	-2.6
FDI	0.0001***	-4.629	-3.58	-2.93	-2.6
EXC	0.99	0.706	-3.58	-2.93	-2.6
First Difference					
Δ RGDP	0.0000***	-5.843	-3.587	-2.933	-2.601
Δ AGRX	0.0000***	-9.528	-3.587	-2.933	-2.601
Δ INFL	0.0000***	-11.335	-3.587	-2.933	-2.601
Δ GCF	0.0000***	-7.002	-3.587	-2.933	-2.601
Δ FDI	0.0000***	-12.254	-3.587	-2.933	-2.601
Δ EXC	0.0000***	-6.249	-3.587	-2.933	-2.601
Phillips-Perron test					
Levels					
RGDP	0.9974	1.466	-3.58	-2.93	-2.6
AGRX	0.3572	-1.847	-3.58	-2.93	-2.6
INFL	0.0002***	-4.556	-3.58	-2.93	-2.6
GCF	0.366	-1.829	-3.58	-2.93	-2.6



FDI	0.0001***	-4.703	-3.58	-2.93	-2.6
EXC	0.9937	0.947	-3.58	-2.93	-2.6
First Difference					
Δ RGDP	0.0000***	-5.851	-3.587	-2.933	-2.601
Δ AGRX	0.0000***	-9.707	-3.587	-2.933	-2.601
Δ INFL	0.0000***	-15.042	-3.587	-2.933	-2.601
Δ GCF	0.0000***	-7.065	-3.587	-2.933	-2.601
Δ FDI	0.0000***	-12.236	-3.587	-2.933	-2.601
Δ EXC	0.0000***	-6.192	-3.587	-2.933	-2.601

Note: ***, ** indicates statistical significance at 1%, and 5%, level.

ARDL Bounds Test

The findings of the ARDL Bounds Test, which are displayed in Table 5.3, shed light on the cointegration status of the variables being studied, which is crucial for comprehending the long-term linkages between them in econometric analysis.

Starting with the F-test bounds, the test statistic of 2.371 is compared against critical values at various significance levels (10%, 5%, 0.25%, and 1%). These critical values (2.26, 2.62, 2.96, and 3.41 for I(0); 3.35, 3.79, 4.18, and 4.68 for I(1)) represent thresholds above which we reject the null hypothesis of no cointegration (I(0)) and accept the presence of cointegration (I(1)). In this case, the F-statistic of 2.371 falls below all critical values across the significance levels tested. This indicates insufficient evidence to reject the null hypothesis of no cointegration, suggesting that the variables do not exhibit a stable long-term relationship based on the F-test.

Concurrently, the T-test bounds examine the significance of individual coefficients within the ARDL model. The T-statistic of -0.312 is evaluated against critical values (-2.57, -2.86, -3.13, -3.43 for I(0); -3.86, -4.19, -4.46, -4.79 for I(1)) at similar significance levels. Like the F-test, the T-statistic does not surpass the critical values for either I(0) or I(1), indicating that the coefficients in the ARDL model are not statistically different from zero. This reinforces the conclusion drawn from the F-test that there is no statistically significant evidence of cointegration among the variables.

Table 5.3 ARDL Bounds Test results

		F-Test bound		
Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	2.371	10%	2.26	3.35
k	5	5%	2.62	3.79
		0.25%	2.96	4.18
		1%	3.41	4.68
		T-Test bound		
Test Statistic	Value	Significance	I(0)	I(1)
T-statistic	-0.312	10%	-2.57	-3.86
		5%	-2.86	-4.19
		0.25%	-3.13	-4.46
		1%	-3.43	-4.79

Impacts of Agricultural Exports on Economic Growth in Eswatini Short Run

The impacts of various variables on economic growth in the short run were investigated using a traditional ARDL framework. After conducting optimal lag selection with the Akaike Information Criteria (AIC), the estimation outcomes were presented in Table 5.4 and discussed as follows.

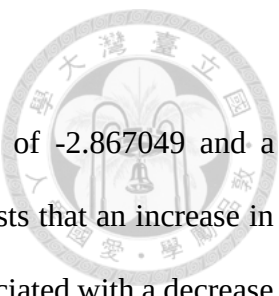
Real Gross Domestic Product (RGDP)

The ARDL model's analysis reveals several significant variables that provide crucial insights into the dynamics of Real Gross Domestic Product (RGDP) and its determinants. First, the coefficient value for the first lag of RGDP, $D(RGDP(-1))$, is 0.9655342 and is highly significant at the 1% level ($p\text{-value} = 0.000$). This demonstrates a very significant positive correlation between the RGDP of the prior era and the RGDP of the present period. Specifically, a 1-unit increase in RGDP one year ago is associated with an approximate 0.97-unit increase in the current RGDP, when holding all the other variables constant, suggesting high persistence in GDP growth rates over time. This result emphasizes the importance of past economic performance in shaping current economic outcomes.

Gross Capital Formation (GCF)

Another significant variable is Gross Capital Formation (GCF), with a coefficient of -0.4581731 and a significance level of 5% ($p\text{-value} = 0.016$). This negative coefficient shows that there is a correlation between a rise in GCF and a fall in RGDP. Specifically, a 1-unit increase in current GCF leads to an approximate 0.46-unit decrease on current RGDP, when all the other variables do not change. This unexpected result could indicate that more capital is being created in less productive industries, or it could be the result of a temporary crowding-out effect where investments take time to boost the economy. This shows how complicated the effects of investments on the economy may be and implies that not all investments immediately boost GDP.

Exchange rate (EXC)

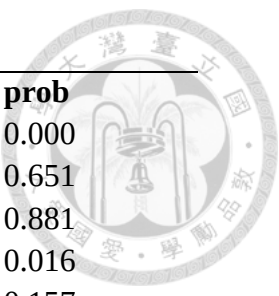


The exchange rate variable (EXC) is also significant, with a coefficient of -2.867049 and a significance level of 5% (p-value = 0.015). This negative coefficient suggests that an increase in exchange rates, likely indicating a depreciation of the local currency, is associated with a decrease in RGDP. Specifically, a 1-unit rise in the current exchange rate causes an approximate 2.87-unit decrease in current RGDP, considering that all the other variables are held constant. This reflects the adverse impact of currency depreciation on economic growth, possibly due to increased costs of imports and inflationary pressures. Furthermore, the first lag of the exchange rate variable $D(EXC(-1))$ has a coefficient of 3.036969 and is significant at the 5% level (p-value = 0.050). This positive coefficient shows that a growth in the RGDP during the present period is related to the exchange rate increase from the prior year. To be more precise, while all other factors stay the same, a one-unit increase in the initial lag of the exchange rate leads to an approximately 3.04-unit increase in the current RGDP. This indicates a delayed positive impact of exchange rate changes, possibly due to adjustments in trade balances or capital flows that take time to manifest.

Constant term (cons)

Finally, the constant term (cons) has a coefficient of 19.44006 and is significant at the 5% level (p-value = 0.039). This indicates that when all other variables are held constant, the RGDP is expected to be 19.44006 units. The intercept represents the baseline level of RGDP when the independent variables are zero, reflecting other underlying factors influencing the economy not captured by the model. This significant constant term underscores the presence of additional influences on RGDP beyond the included explanatory variables.

Table 5.4 Estimation Results of ARDL Model



RGDP	Coefficient	Std. error.	t-test	prob
D(RGDP(-1))	0.9655342***	0.03621	26.66	0.000
D(AGRX)	0.0557735	0.12241	0.46	0.651
D(INFL)	-0.041963	0.278999	-0.15	0.881
D(GCF)	-0.4581731**	0.181991	-2.52	0.016
D(FDI)	0.4574745	0.316387	1.45	0.157
D(EXC)	-2.867049**	1.122015	-2.56	0.015
D(EXC(-1))	3.036969**	1.497667	2.03	0.05
D(EXC(-2))	-1.49111	1.587399	-0.94	0.354
D(EXC(-3))	2.337221	1.213764	1.93	0.062
cons	19.44006**	9.105661	2.13	0.039

Note: ***, ** indicates statistical significance at 1%, and 5%, level.

Model Summary Statistics

As shown in Table 5.5 the ARDL model results present an impressive fit, as evidenced by several key statistics. The ARDL model covers a substantial period from 1976 to 2022, with 47 observations, which enhances the reliability and robustness of the results due to the long-time frame and relatively large number of data points. With a p-value of 0.0000 and an F-statistic of 1849.45, the model as a whole appears to be highly significant, indicating that the independent variables together account for a sizable amount of the variability in RGDP. With an adjusted R-squared of 0.9972 that takes into consideration the number of predictors, the model's independent variables account for 99.78% of the variance in RGDP, as seen by the R-squared value of 0.9978. This still indicates an excellent match. These high values show how well the model is at explaining phenomena. Despite being primarily utilized for model comparison, the log likelihood value of -147.37935 shows a fair match to the data considering the complexity of the model. The root mean square error (RMSE) of 6.2740 measures the average deviation of the predicted values from the actual values of RGDP, and this low RMSE suggests that the model has good predictive accuracy given the scale of RGDP values.



Table 5.5 Model Summary Statistics

Statistics	Value
Number of obs	47
F(9, 37)	1849.45
Prob > F	0.000
R-squared	0.9978
Adj R-squared	0.9972
Log likelihood	-147.37935
Root MSE	6.274

Diagnostic Tests

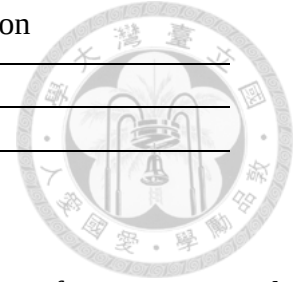
The Breusch–Godfrey LM test was done to assess autocorrelation and the White's test was conducted to assess the presence of heteroskedasticity in the ARDL model. Tables 5.6 and 5.7 display the outcomes of the two tests, respectively.

Serial Correlation Test Result for ARDL Model

According to Table 5.6, the Breusch–Godfrey LM test results, with a chi-squared statistic of 0.001, 1 degree of freedom, and a p-value of 0.9776, indicate that it fails to reject the null hypothesis of no autocorrelation. This high p-value, significantly above the common significance levels of 0.05 and 0.01, suggests there is no evidence of autocorrelation in the residuals. The absence of autocorrelation implies that the residuals are independently distributed, satisfying a key assumption of ordinary least squares (OLS) regression. This result supports the robustness of the ARDL model, indicating that it is well-specified and reliable for capturing the temporal dependencies in the data.

Table 5.6 Breusch–Godfrey LM Test for Autocorrelation

lags(p)	chi2	df	Prob > chi2
1	0.001	1	0.9776



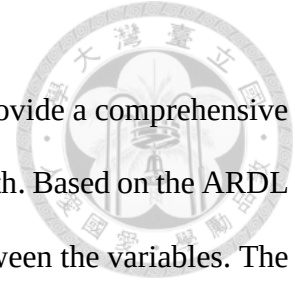
White's test Results for the ARDL Model

As demonstrated in Table 5.7, the results of White's test indicate no significant issues with heteroskedasticity, skewness, or kurtosis in the regression model's residuals. The chi-squared statistic for heteroskedasticity is 47 with a p-value of 0.4313, reflecting constant variance of residuals. For skewness, the chi-squared statistic is 10.92 with a p-value of 0.2812, indicating no significant skewness. The kurtosis test yields a chi-squared statistic of 1.62 with a p-value of 0.2028, showing no significant deviation from normal kurtosis. The overall test statistic is 59.54 with a p-value of 0.348, confirming that the residuals are homoskedastic and normally distributed, ensuring efficient model estimates.

Table 5.7 White's Test for Heteroskedasticity

Source	chi2	df	p
Heteroskedasticity	47	46	0.4313
Skewness	10.92	9	0.2812
Kurtosis	1.62	1	0.2028
Total	59.54	56	0.348

Chapter 6 Conclusions

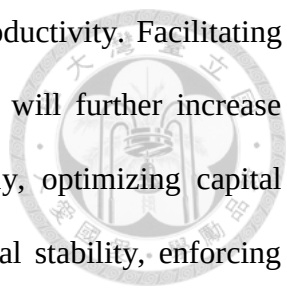


This research uses ARDL to analyze data from 1972 to 2022 in order to provide a comprehensive understanding of how agricultural exports affect Eswatini's economic growth. Based on the ARDL Bounds Test results, there was no evidence of long-term cointegration between the variables. The short-term impacts of agricultural exports on economic growth in Eswatini were examined using the ARDL paradigm. The results showed numerous important conclusions. The strong positive relationship between past and current economic performance, as indicated by the lagged RGDP, underscores the significance of historical economic growth, aligning with Darko (2015) and Qazi et al. (2021). However, Gross Capital Formation (GCF) showed a significant negative relationship with RGDP, contrasting with Darko (2015), Mabeta (2015), and Qazi et al. (2021), possibly due to investments in less productive sectors or short-term adjustment costs. The exchange rate had a significant negative impact on RGDP, while the lagged exchange rate showed a positive effect, supporting Alagidede and Ibrahim (2017), Ahiabo and Amoah (2019), and Okyere and Jilu (2020), who noted initial economic decline followed by growth due to currency depreciation effects. Additionally, the significant constant term pointed to other underlying factors influencing RGDP, reflecting the complex nature of economic growth as emphasized in various studies. The overall model fit was strong, explaining nearly all the variance in RGDP.

The ARDL Bounds Test results indicated no evidence of cointegration among the variables, suggesting that agricultural exports (AGRX) did not have a sustained long-term influence on economic growth (RGDP) in Eswatini. Furthermore, the short-run analysis revealed that the past economic performance did not significantly influence current RGDP. These findings therefore suggested that the export-led economic growth hypothesis did not hold in Eswatini's context of agricultural exports. Several factors contributed to this conclusion. Firstly, limited infrastructure

and technological advancements in the agricultural sector may have hindered the scalability and efficiency gains needed to sustainably boost exports over time. Shepherd et al. (2007) discuss how institutional constraints and market imperfections can limit the transmission of export revenues into broader economic growth. Secondly, the agricultural sector in Eswatini faced significant price volatility in international markets over the years in the primary agricultural export products, leading to unstable export revenues and hindering consistent economic growth. Gylfason (1999) discusses how reliance on primary commodities can expose countries to adverse terms-of-trade shocks, which negatively impact growth. Thirdly, Eswatini's agricultural exports were highly dependent on external factors such as weather conditions, pests, and diseases, affecting production unpredictably. Byerlee et al. (2009) highlighted that agricultural productivity is susceptible to climatic and biological risks. Lastly, Eswatini's agricultural sector contributed less to the nation's overall economic dynamism than the industrial sector did due to its weaker backward and forward ties with the rest of the economy. Warr (2001) emphasizes the importance of strong inter-sectoral linkages for economic growth.

Drawing upon the empirical findings of the study, the following concise policy recommendations are proposed to guide Eswatini towards sustained economic growth and agricultural development. These recommendations stem from an analysis of key economic indicators, including agricultural exports (AGRX), real gross domestic product (RGDP), exchange rates (EXC), foreign direct investment (FDI), gross capital formation (GCF), and inflation (INFL). By aligning policies and strategies with the identified economic dynamics, Eswatini can optimize its potential for long-term prosperity and resilience. The recommendations are as follows. First and foremost, improvements in agricultural infrastructure, such as irrigation systems, storage facilities, and transportation networks, are necessary to increase productivity and reduce post-harvest losses. In the meanwhile,



encouraging R&D in agriculture can result in breakthroughs that raise productivity. Facilitating access to markets through trade agreements and reducing trade barriers will further increase agricultural exports, potentially contributing to RGDP growth. Secondly, optimizing capital formation requires improving the investment climate by ensuring political stability, enforcing property rights, and streamlining regulations to attract more investments. Addressing the negative impact of gross capital formation (GCF) on RGDP, as identified in the ARDL results, entails directing investments into productive sectors and supporting SMEs through access to finance and training programs to bolster their contribution to economic growth. Thirdly, managing exchange rate volatility necessitates diversifying the economy to mitigate its adverse effects, supported by building adequate foreign exchange reserves and implementing sound monetary policies to maintain stability and control inflation. Fourthly, boosting Foreign Direct Investment (FDI) involves creating an enabling environment through transparent regulatory frameworks and reliable infrastructure, promoting Eswatini as an attractive investment destination globally, and leveraging FDI for technological innovation to enhance productivity and competitiveness. Finally, developing human capital is essential through investments in education, vocational training, and strengthening extension services for farmers to enhance agricultural productivity and sustainability. Promoting entrepreneurship through educational and mentoring programs can further drive innovation and foster sustainable economic growth.

The results of this paper point to a number of potential directions for future investigation that could greatly expand our understanding and influence policy recommendations. First, research on the long-term effects of infrastructure investments in agriculture, like storage facilities and irrigation systems, on agricultural productivity and climate change resilience should be done through longitudinal studies. Understanding these long-term effects is crucial for developing sustainable



agricultural strategies. Secondly, there is a need for deeper investigations into the sector-specific dynamics of capital formation's impact on economic growth. This entails exploring why certain types of investments (e.g., infrastructure versus technology) yield varying economic outcomes and identifying optimal investment strategies for different sectors. Thirdly, researching the dynamic, long-term, sector-specific effects of exchange rate fluctuations on economic performance can provide significant fresh insights into how to lessen the risk brought on by currency swings and enhance economic stability. Fourthly, studies should examine the complex effects of various forms of FDI on innovation diffusion, productivity enhancement, and economic diversification. Comparative research between industries and areas would be helpful in figuring out how to draw in and make the most of FDI for sustainable development. Fifthly, investigating the complex relationship between investments in human capital development (e.g., education, vocational training) and economic growth could shed light on how enhancing workforce skills and capabilities contributes to long-term economic resilience and competitiveness. Lastly, evaluating the effectiveness of policy interventions aimed at promoting economic growth and agricultural development, using comparative analyses across countries with similar economic structures, could offer valuable insights for policymakers in Eswatini and other developing economies. These research areas collectively aim to deepen understanding, inform evidence-based policymaking, and contribute to sustainable economic development strategies tailored to Eswatini's context and challenges.

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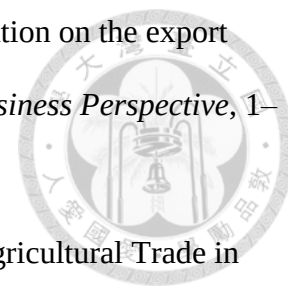
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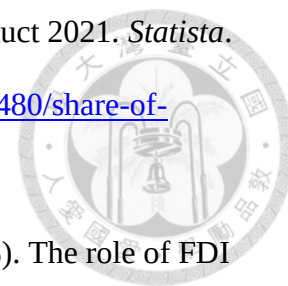
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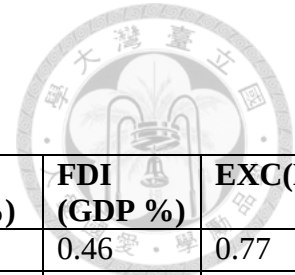
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Appendix



Data used in the study

YRS	RGDP (\$10 Million)	AGRX (\$10 Million)	INFL (%)	GCF (GDP %)	FDI (GDP %)	EXC(E/\$)
1972	50.51493	4.0941	2.37	21.38	0.46	0.77
1973	52.25781	5.0525	11.54	20.14	0.03	0.69
1974	62.25794	9.2659	19.29	23.85	1.34	0.68
1975	82.88678	10.7177	12.05	18.58	5.02	0.74
1976	93.77263	9.1458	6.53	22.19	2.70	0.87
1977	94.71935	8.9967	20.81	26.93	6.58	0.87
1978	95.9764	10.038	8.52	47.91	6.38	0.87
1979	98.0749	13.212	16.45	42.69	13.46	0.84
1980	100.3784	21.1038	18.68	40.65	4.88	0.78
1981	107.3064	19.3567	20.06	31.04	6.49	0.88
1982	108.8511	14.6553	10.81	30.19	-2.54	1.09
1983	108.2554	15.7282	11.57	32.78	-1.02	1.11
1984	110.9412	13.6012	12.94	28.70	1.01	1.48
1985	113.076	9.9527	20.46	26.22	3.23	2.23
1986	134.0902	15.5342	13.74	19.96	6.93	2.29
1987	147.5201	25.6518	13.38	14.86	9.64	2.04
1988	158.6889	27.0732	20.39	23.55	7.31	2.27
1989	173.6183	25.1387	7.55	23.93	9.64	2.62
1990	190.7346	34.4857	13.09	15.11	2.70	2.59
1991	194.092	33.6897	8.93	15.65	7.10	2.76
1992	200.3549	30.3509	7.56	19.72	6.80	2.85
1993	206.5772	26.292	12.02	18.06	5.30	3.27
1994	211.5367	28.0323	13.77	17.35	4.46	3.55
1995	221.7452	28.49	12.29	16.02	3.05	3.63
1996	230.2648	30.4336	6.43	17.03	1.35	4.30
1997	237.4089	36.2403	7.13	17.22	-0.89	4.61
1998	243.5917	30.2341	8.11	19.10	9.68	5.53
1999	250.7802	25.9241	6.09	16.68	6.35	6.11
2000	248.3101	29.47019	12.21	23.54	5.22	6.94
2001	250.9292	26.3464	5.94	23.69	1.90	8.61
2002	261.9201	18.8426	12.02	21.41	6.49	10.54
2003	272.0832	23.8047	7.29	19.29	-2.74	7.56
2004	281.9432	32.9497	3.45	19.37	2.51	6.46
2005	298.8564	25.3377	4.77	17.35	-1.44	6.36
2006	316.7644	39.6472	5.30	16.47	3.68	6.77
2007	330.814	23.0974	8.08	16.04	1.08	7.05

2008	333.5322	24.2006	12.66	15.70	3.21	8.26
2009	338.7522	20.7949	7.45	15.38	1.84	8.47
2010	351.6036	23.3308	4.51	14.48	3.06	7.32
2011	359.5049	26.6129	6.11	12.90	2.05	7.26
2012	378.887	23.6713	8.94	11.82	0.54	8.21
2013	393.5206	52.5975	5.62	12.22	1.78	9.66
2014	397.1142	48.06844	5.68	12.60	0.58	10.85
2015	405.8639	54.76133	4.95	12.51	0.78	12.76
2016	410.3313	42.99031	7.85	12.84	0.70	14.71
2017	418.647	44.71583	6.22	12.83	-1.31	13.32
2018	428.5757	48.30983	4.82	13.25	0.67	13.23
2019	439.7741	57.79193	2.60	13.66	2.87	14.45
2020	431.636	54.31747	2.62	12.26	0.97	16.47
2021	465.6632	61.04224	3.78	13.63	2.33	14.78
2022	483.8918	45.74209	4.03	11.79	0.28	16.36