EXAMINING FACTORS AFFECTING SOUTH AFRICA'S WINE EXPORTS TO SELECTED EAST AFRICAN COUNTRIES

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EXAMINING FACTORS AFFECTING SOUTH AFRICA'S WINE EXPORTS TO SELECTED EAST AFRICAN COUNTRIES

BY

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MINI-DISSERTATION

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DECLARATION 1

I, Mositli Lovedelia Mabote, Student Number: [redacted], attest that I have not submitted my mini-dissertation to any other university for credit towards a Master of Science in Agriculture (Agricultural Economics) degree at the University of Limpopo. I attest that the design and execution of this work are all my own, and that all references have been appropriately cited.

Signature: Date:

06 FEBRUARY 2025

DECLARATION 2 – PUBLICATIONS

Mabote, M.L., Lefophane, M.H., and Belete, A. "*Determinants of South Africa's Wine Exports to Selected East African Markets*." This paper will be extracted from this mini-dissertation and submitted for review and publication in *Beverages*.

DEDICATION

This mini-dissertation is dedicated to my parents, Mr. and Mrs. Mabote; my siblings, Mabote Matshelane, Mabote Masilo, and Mabote Matsawela; my nephew, Mabote Tobola; and the rest of my family members. Most importantly, this mini-dissertation is devoted to my special daughter, Atlegang Paballo Kamilah.

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ABSTRACT

While developed countries represent South Africa's largest wine export market, the projected global growth in wine exports is expected to originate from regional markets such as those in East Africa. However, no studies have specifically focused on South African wine exports to East African countries, using wine as a final and value-added agricultural product. Therefore, this study aimed to examine the factors affecting South Africa's wine exports to selected East African countries, namely Kenya, Tanzania, and Mauritius. To achieve this aim, trend analyses were conducted to fulfil the first objective: to examine the trends in South Africa's wine exports to the selected East African countries from 2012 to 2021. Additionally, the gravity model was employed to address the second objective: to analyse the factors affecting South Africa's wine exports to these countries during the same period.

The trend analysis findings revealed that South Africa experienced upward growth in the value of wine exports to the selected East African countries over the study period. Kenya and Tanzania stood out as the strongest markets with consistent demand, while Mauritius showed moderate demand, supporting the study's focus on these East African markets. The gravity model results indicated that increases in South Africa's production capacity, population size in the importing countries, favourable import duties, and a depreciated exchange rate boost South Africa's wine exports to Kenya, Mauritius, and Tanzania. Therefore, the South African government should implement policies to expand wine production capacity, secure favourable import duty agreements, and leverage growing populations and exchange rate advantages to strengthen wine exports in East African markets.

Conversely, rising inflation rates and increased foreign direct investment (FDI) in the importing countries negatively affect South Africa's wine exports. To sustain market presence and boost wine exports to East Africa, the South African government and wine exporters should pursue partnerships or co-investment opportunities, while importing countries should adopt pricing flexibility or hedging strategies to counter inflation effects.

Keywords: Factors, wine exports, selected East African countries, South Africa

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LIST OF ABBREVIATIONS

AGR	Annual Growth Rate
AMU	Arab Maghren Union
AU	African Union
AVE	Ad-valorem
COMESA	Common Market for Eastern and Southern Africa
COVID-19	Corona Virus
EAC	East African Community
ECCAS	Economic Community of Central Africa States
ECOWAS	Economic Community of West African States
FAO	Food and Agricultural Organisation
FDI	Foreign Direct Investment
IGAD	Intergovernmental Authority on Development
GDP	Gross Domestic Product
POP	Population
IR	Inflation rate
TO	Trade Openness
PW	Price of Wine
PC	Production Capacity
REC	Regional Economic Community
SA	South Africa
SACU	Southern Africa Development Community
SADC	Southern Africa Development Community
SAWI	South African Wine Industry Information and Systems
SSA	Sub-Saharan Africa
TFTA	Tripartite Free Trade Agreement
WTO	World Trade Organisation
XR	Exchange Rate

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CHAPTER ONE: INTRODUCTION

1.1 Background

South Africa's wine export industry has demonstrated significant growth in African and global markets, indicating a 22% year-on-year increase in export volumes to key markets in 2022 (SAWIS, 2021; Vipro, 2021; SAWIS, 2022; SAWIS, 2023). For instance, in 2022, South Africa exported 386.5 million litres of wine, valued at R10 billion, in 2022, South Africa's wine industry produced approximately 1.34 million tonnes of wine yearly, while the remainder was allocated for domestic consumption (SAWIS, 2023). Domestic consumption exceeded exports, reaching 452.2 million litres, valued at R21.7 billion, which is twice the export figure. Although local consumption was higher, wine exports remain a crucial economic driver, strengthening trade relationships, generating foreign exchange earnings, reducing unemployment, and supporting food security (Vipro, 2021).

Additionally, the wine industry contributed R55 billion to South Africa’s economy in 2019 and supported approximately 300,000 jobs (SAWIS, 2021). South Africa’s agricultural exports, including wine, reached $12.8 billion in 2022, reflecting a 4% increase from the previous year (SAWIS, 2022). These figures highlight the industry's robust export growth and economic contribution, reinforcing its importance within South Africa’s broader trade and agricultural sectors. This success can be attributed to South Africa's favourable Mediterranean climate and fertile soil, which enable the production of high-quality grapes and a substantial quantity of wine, setting it apart from many other African countries and regions worldwide (Vipro, 2021; Wine Tourism, 2023).

In 2019, the wine industry contributed roughly R55 billion to the national economy and created around 300,000 jobs, both directly and indirectly, in South Africa. Additionally, the industry exported 420 million litres of wine in 2018, generating 66 million euros in revenue and contributing 9% to the country’s GDP, including tourism and secondary activities related to the sector (SAWIS, 2021). According to Sihlobo (2023), the exportation of South African agricultural products has increased, reflecting exceptional production conditions and higher commodity prices. Wine was listed among the agricultural products that experienced significant growth in export volumes, alongside

maize, citrus, apples, avocados, and wool. Citrus, table grapes, wine, and a variety of deciduous fruits have dominated the export list, with wine continuing to be the main engine of export growth over the past few decades. In 2022, South Africa's agricultural exports reached $12.8 billion, representing a 4% increase from the previous year (SAWIS, 2022). These figures highlight the industry's robust export growth and economic contribution, reinforcing its importance within South Africa's broader trade and agricultural sectors.

South Africa's largest export markets, in terms of value, are developed countries such as the United Kingdom (R2,019.77m), the Netherlands (R888.6m), Germany (R1,230.17m), and Sweden (R472.61m) (WESGRO, 2021). In the Asian market, South Africa has benefited from the conflict between China and Australia over the past few years. China imposed sanctions on Australian products, including beef, cotton, and wine, creating opportunities for South African wineries to expand their market share in China and gain access to Chinese retail markets. Similarly, traditionally challenging markets such as North America, Canada, and the United States have also shown growth in the volume of wine exported from South Africa (Donna, 2021).

However, between 2012 and 2021, several factors affected the production, supply, and export of South African wine. In 2020, the sale and export of wine were prohibited as part of the lockdown restrictions implemented to curb the spread of COVID-19 (Lameez, 2022). Despite these setbacks, wine exports began to recover in 2021 as restrictions were lifted. During this time, African markets showed exceptional recovery, with export volumes exceeding pre-COVID-19 levels. Markets such as Nigeria, Kenya, Tanzania, Uganda, Mozambique, Zimbabwe, and Mauritius played a major role in this recovery (Donna, 2021). As a result, the wine industry successfully reduced its uncontracted wine inventory from 200 million litres at the end of 2020 to 60 million litres by the end of 2021 (SAWIS, 2021).

In 2021, the volume and value of wine exports demonstrated significant growth, particularly in the United Kingdom and expanding African and Chinese markets (Stats, 2021). The African continent, in particular, has seen growth in South African wine exports, originating from secondary, emerging, and regional markets in East Africa (WOSA, 2021). Therefore, the purpose of this study is to examine the factors affecting South Africa's wine exports to selected East African countries, namely Kenya,

Tanzania, and Mauritius. Kenya is the largest importer of South African wine in East Africa, with 3.8 million litres imported, followed by Tanzania with 1.8 million litres and Mauritius with 1.2 million litres (WESGRO, 2021).

Tourism is a vital economic sector of these East African countries, potentially increasing the demand for South African wine. For instance, tourism contributes significantly to Kenya's GDP, with a 6% increase in 2022, driven by attractions such as wildlife, Maasai culture, and luxury accommodations that promote the tasting of quality wines from Stellenbosch, South Africa (Kenya Tourism, 2022). Similarly, in Mauritius, tourism is a key economic pillar, contributing 8.3% to GDP and generating significant employment. South African wine plays a critical role in the Mauritian tourism sector, offering competitive quality and contributing to job creation and economic growth through sales in retail and consumption by tourists (WESGRO, 2023). In Tanzania, tourism is the second-largest contributor to GDP after the manufacturing sector, contributing 10.3% to GDP and creating 33 million jobs in 2019 (Statista, 2021).

Given the growing tourism in Kenya, Tanzania, and Mauritius, the demand for South African wine is expected to rise (Statista, 2021; Kenya Tourism, 2022; WESGRO, 2023). While previous studies have examined challenges in South Africa's agricultural exports (Mosikari et al., 2016; Mamashila, 2017; Phaleng, 2020), they have not specifically addressed wine exports to East Africa. This study fills that gap by analysing factors influencing South Africa's wine exports to these countries from 2011 to 2022. Using the gravity model as a theoretical framework (Tinbergen, 1962; Anderson and van Wincoop, 2003), it assesses key economic and policy-related determinants such as GDP, trade openness, and import duties. The findings offers policymakers with insights to address trade barriers and enhance export opportunities, ensuring sustained access to wine markets in selected East African countries.

1.2 Problem statement

While developed countries represent South Africa's largest wine export market, the projected global growth in wine exports is expected to originate from regional markets such as those in East Africa (WOSA, 2021). However, between 2012 and 2021, various factors affected South Africa's wine production, supply, and exports, including a prohibition on sales and exports in 2020 due to COVID-19 lockdown restrictions

(Lameez, 2022). Despite this, wine exports began to recover in 2021 as restrictions eased, with increased demand from East African countries like Kenya, Tanzania, and Mauritius (Donna, 2021). Additionally, tourism is a major contributor to the economies of these East African countries, potentially increasing the demand for South African wine (Statista, 2021; Kenya Tourism, 2022; WESGRO, 2023).

While previous studies have explored the challenges and driving factors affecting South Africa's agricultural exports to international markets (Mosikari et al., 2016; Mamashila, 2017; Phaleng, 2020), they have not specifically examined factors affecting South African wine exports to East African countries. For example, Phaleng (2020) investigated South Africa's fruit exports to West Africa, focusing on raw agricultural products rather than value-added products like wine. Mosikari and Eita (2016) examined export performance of agricultural, forestry, and fishery products to the Southern African Development Community (SADC), analysing trade agreements involving Common Market for Eastern and Southern African (COMESA and South African Development Community (SACU).

Similarly, Mamashila (2017) studied sugar cane exports under the Tripartite Free Trade Agreement (TFTA), covering COMESA, SADC, and the East African Community (EAC). This highlights a gap in literature, as no study has focused on South African exports of wine, a value-added and final agricultural product, to East African markets. This study, therefore, addresses this gap by examining the factors affecting South Africa’s wine exports to selected East African countries, where increased tourism is potentially stimulating the demand for South African wine (Statista, 2021; Kenya Tourism, 2022; WESGRO, 2023). By so doing, this study offers comprehensive insights into inhibiting and enabling factors, which would allow stakeholders to address inhibiting factors and promote enabling ones, thereby supporting the growth of South Africa’s wine exports in East African markets.

1.3 Motivation

The study is aimed at examining factors affecting South Africa’s wine exports to selected East African countries (Kenya, Tanzania, and Mauritius). These countries were selected due to the growing potential for South Africa’s wine industry in these East African markets, where demand is projected to rise alongside tourism and economic growth (Statista, 2021; Kenya Tourism, 2022; WESGRO, 2023). Despite

South Africa's strong performance in established markets, opportunities in regional markets like East Africa are underexplored, representing a significant opportunity for market diversification and growth (WOSA, 2021). However, various factors, including production constraints, market access issues, and competition, impact South Africa's wine exports, as observed during the COVID-19 lockdown restrictions in 2020, which led to a prohibition on sales and exports (Lameez, 2022). The recovery in 2021 indicated renewed interest from East African markets such as Kenya, Tanzania, and Mauritius, demonstrating the region's importance in driving export growth for South African wines (Donna, 2021).

To achieve a comprehensive understanding of these dynamics, the study employs trend analysis on the value of South Africa's wine exports. This approach, supported by Idsardi (2013), provides insights into market trends and competition, essential for exporters to develop targeted marketing strategies that increase their competitiveness. The results from trend analysis inform stakeholders, such as producers, exporters, and policymakers, about whether South African wine exports to these countries are trending upwards, downwards, or remaining stagnant. These insights guide producers in adjusting production and export levels and allow policymakers to design export-friendly interventions based on market trends (Phaleng, 2020).

Furthermore, the study examines factors affecting South African wine exports to selected East African countries, focusing on both inhibiting and enabling factors. Understanding these factors is crucial for stakeholders to optimise export strategies, leverage enabling conditions, and manage challenges, ultimately expanding market share and increasing economic returns (Mosikari and Eita, 2016). By analysing these factors, the study aims to assist stakeholders in making informed decisions that align production with demand trends, enhance profitability, and stimulate economic growth by increasing foreign revenue (Phaleng, 2020) through wine exports. This approach aligns with the objectives of other studies that emphasised the importance of managing external factors to harness new trade opportunities (Mosikari and Eita, 2016).

1.4 Aim of the study

1.4.1 To investigate factors affecting South Africa's wine exports to selected East African countries from 2011 to 2022.

1.4.2 Objectives of the study

I. To examine the trends in South Africa's wine exports to selected East African countries from 2011 to 2022.
II. To analyse factors affecting South Africa's wine exports to selected East African countries from 2011 to 2022.

1.4.3 Hypothesis

Identified factors do not significantly affect South Africa's wine exports to the selected East African countries from 2012 to 2021.

1.5 Organisation of the study

Chapter One provides the study's background, problem statement, motivation, aim, objectives, and hypothesis. Chapter Two presents a literature review, examining previous studies on exports across various countries, commodities, analytical techniques, and time periods. Chapter Three details the research methodology, including the study area, data sources, and analytical techniques used for analysis. Chapter Four presents the findings from trend analysis, pre-testing procedures, descriptive statistics, empirical results, and validation of the empirical results. Finally, Chapter Five provides a summary, conclusions, and recommendations based on the study's results, along with the delimitations and suggestions for future research.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents the definition of key concepts underlying the study, namely, exports and wine. The definition of exports also covers their economic importance, while the definition of wine incorporates its economic, cultural, and health-related importance, thereby justifying the focus on wine exports in this study. The specific type of wine analysed in this study is further described using the Harmonized System (HS) codes. This provides a structured basis for examining the export dynamics of South African wine in East African markets.

The definition of key concepts is followed by an overview of wine production in South Africa, highlighting key production regions. A detailed review of related studies on the determinants of agricultural exports is then provided at both national and international levels. The review highlights the agricultural commodities or products under study, the study period, techniques used for empirical analysis, and key findings and their meaning. This provides an insight into factors affecting the export of various agricultural commodities or products. After a review of national and international studies, the main findings, including areas of commonalities, and literature gaps are discussed to provide a comprehensive understanding of the unexplored issues within the reviewed body of literature. Finally, previous findings on how selected factors affect agricultural exports are presented, providing a basis for explaining the expected influence of each factor on wine exports in this study.

2.2 Definition of key concepts

2.2.1 Exports

In international trade, exports refer to the process of selling goods or services produced in one country to buyers in another country. The individual, entity, or country that sells the goods is known as the exporter, while those purchasing the goods are referred to as importers (Joshi et al., 2018). Within the context of this study, exports specifically refer to the total value of wine that South Africa exports to the selected East African countries, namely Kenya, Tanzania, and Mauritius. In this regard, South Africa is the exporting country, and the selected East African countries serve as the importing countries.

Wine exports occur within the framework of international trade, which is a cross-border commerce involving sourced goods and services, encompassing both exports and imports (Krugman et al., 2018). This study focuses on wine exports, since exports are a crucial driver of economic growth and development. A strong export sector helps stabilise a country's current account balance, supports economies of scale, and fosters a comparative advantage (Malik et al., 2017; Phaleng, 2020). In line with Epaphra (2016), wine exports to the East African countries allow South Africa to expand its markets, profit from economies of scale, generate foreign exchange earnings, maximise output, and create jobs, resulting in economic growth.

2.2.2 Wine

Wine, one of the first historic goods traded globally by people of cross culture, holds a longstanding appeal. Early success in the wine industry depended on mastering demand and supply forces and meeting quality standards (Bisson et al., 2002). Today, wine is deeply embedded in diverse global culture, serving as a form of entertainment and a health-promoting beverage for some consumers (Robinson, 2015). Unlike many foods, wine's appeal lies in its shifting, subtle flavours, making it a complex sensory experience that remains associated with luxury (Anderson and Pinilla, 2017). Producers aim to offer not only a sensory delight but also a product that embodies quality and status (Charters and Pettigrew, 2006).

This study centres on fresh grape-based wines (including both still and sparkling varieties) in bottles of 2 litres or less, with an alcohol content exceeding 0.5%, categorised using the Harmonized System (HS) for accurate classification in international trade [HS Code: 220421]. This focus highlights the enduring appeal of wine in international trade, historically rooted in the ability of producers to align with both consumer preferences and quality standards (Bisson et al., 2002).

While wine has evolved from a traded commodity to a cultural staple, it remains associated with luxury, enjoyment, and complex sensory experiences, appealing to consumers for its nuanced flavours (Anderson and Pinilla, 2017). Today's consumers also value attributes beyond flavour, including design, quality, and healthfulness, which impact purchasing decisions and enhance the product's perceived status (Charters and Pettigrew, 2006; Bruwer and Buller, 2012). By focusing on bottled wines with specific size and alcohol characteristics, this study recognises the significance of

these intrinsic and extrinsic qualities, aligning with consumer expectations for a quality experience while also considering trends in sustainable and economically viable production (Charters and Pettigrew, 2006; Anderson et al., 2017).

2.3. Overview of wine production in South Africa

The Western Cape is the heart of South Africa's industry of wine, encompassing renowned regions such as Stellenbosch, Paarl, and Franschhoek. The Mediterranean climate, seasonal pattern, featuring rainy winters and dry summers, fosters ideal conditions for cultivating a variety of grape varietals, including Chenin Blanc, Sauvignon Blanc, Cabernet Sauvignon, and Pinotage (Wine-Searcher, 2023). Figure 2.1 shows a South African map, highlighting the wine regions.

Figure 2.1: Map of South African Wine Regions

Source: Macy's Wine Shop (2023)

The Northern Cape's wine regions, situated along the Orange River, include the Central Orange River and Douglas districts, benefit from the river's irrigation, enabling viticulture in this semi-arid area. The region is known for producing Chenin Blanc, Colombard, and Muscat varieties, contributing to both table and dessert wines (Vinerra, 2024). The Free State, while not traditionally known for extensive wine production, has seen emerging viticultural activities, particularly in the Rietrivier area. Vineyards in this area are managed carefully to adapt to the local climate, producing both table and wine grapes (Lottering, 2024).

Overall, South Africa's wine production is predominantly concentrated in the Western Cape, which accounts for approximately 97% of the nation's vineyards. The Northern Cape contributes around 3%, while the Free State and other regions collectively make up about 0.4% (SAWIS, 2024). These provinces collectively showcase the diverse landscapes and climatic conditions that contribute to the rich diversity of South African wine production (Lottering, 2024; SAWIS, 2024; Vinerra, 2024; Wine-Searcher, 2023).

2.4 Review of previous studies

2.4.1 Review of international literature

Iskandar et al. (2012) investigated the effects of cinnamon prices and foreign production on Indonesia's cinnamon exports to the United States from 1998 to 2010. Using multiple linear regression on primary and secondary data, the study assessed factors such as domestic cinnamon price, GDP, exchange rates, and export volume from the previous year. The results showed that export volume was significantly influenced by Indonesia's export price, the previous year's price, and exchange rates. These findings highlight the price sensitivity and exchange rate effects relevant to Indonesia's cinnamon exports, contributing to the literature on export responsiveness to economic factors.

Boansi et al. (2014) aimed to inform future trade policies to revitalise Ghana's fresh pineapple export industry, addressing declines in export volumes and values since 2004. The study analysed determinants of fresh pineapple exports from 1984 to 2009 by separately examining export volume and value, utilising secondary data and ordinary least squares (OLS) regression to assess factors such as production, domestic demand, export prices, terms of trade, exchange rates, competitiveness index, and foreign direct investment (FDI). Results indicate that Ghana's pineapple export industry has a competitive advantage, with exports being more responsive to price than volume. Export values rise with higher export prices, although export volumes show no significant response. To revitalise the industry, the study recommends enhancing production conditions, improving export quality, increasing trade openness, and avoiding FDI that focuses on domestic market capture and tariff evasion.

Tang (2019) examined the role of export sophistication in bilateral trade using an extended panel gravity model framework for Mauritius from 1995 to 2013. The study aimed to investigate whether export sophistication could serve as a driver of trade, in addition to its well-established relationship with economic growth. The analysis focused on the export sophistication of Mauritius and its trading partners. The findings showed that the sophistication of both domestic and trading partner countries significantly influences export performance. Additionally, the study revealed that Mauritius's exports are positively related to preferential trade agreements, colonial and island links, and the income of trading partner countries. The results suggest that export sophistication plays a crucial role in sustaining exports, highlighting the importance of fostering advanced export structures for trade expansion.

Eshetu and Mehare (2020) identified the determinants of Ethiopian agricultural exports amid persistent trade and fiscal deficits despite government efforts to improve the sector. Using the imperfect substitutes' model and applying the system generalised moment method on data from 1998 to 2018, the study assessed factors influencing export performance. Results showed that GDP, exchange rate, road network, corruption index, lagged export value, indirect tax revenue, and domestic savings positively impacted Ethiopian agricultural exports, while foreign direct investment (FDI) and labour force exhibited a significant negative relationship with exports. These findings suggest that enhancing economic growth, currency devaluation, promoting domestic savings, lowering export tariffs, and reducing corruption could improve export performance. Additionally, managing population growth and focusing FDI on agriculture may further boost Ethiopian agricultural exports.

Gbetnkom and Khan (2020) focused on Cameroon's agricultural exports, specifically cocoa, coffee, and bananas, from 1971/72 to 1995/96. They used ordinary least squares (OLS) regression to estimate the impact of various determinants on export supply. Findings showed a positive but modest responsiveness of export supply to relative price changes, reflecting price limitations in international markets for these commodities. Improved road networks and increased credit access for crop exporters significantly enhanced export supply, while rainfall positively impacted cocoa and coffee production. Structural adjustment policies (SAP) had a positive effect on export supply. The study suggests that boosting Cameroon's agricultural exports requires a

focus on improving credit access, road infrastructure, and policy measures beyond price incentives, which alone are insufficient to drive desired export growth.

Sato (2020) analysed the factors determining Kenya's tea exports to its top 15 trading partners from 1990 to 2017 using a gravity model. The study used secondary data from official sources such as the United Nations and other reliable databases. Key findings indicated that the economic size of importing countries, and the depreciation of the Kenyan shilling positively influenced tea exports. Conversely, higher population and per capita GDP in importing countries reduced the demand for tea, thereby lowering exports. The study also found that distance, as a proxy for transportation costs, negatively affected tea exports. Additionally, having a common border with trading partners or engaging with non-landlocked countries reduced transportation costs, thereby enhancing export flows. Countries sharing a colonial history with Kenya and members of COMESA tend to import more Kenyan tea. These findings offer valuable insights for trade policy formulation aimed at optimizing Kenya’s tea export potential to support economic growth and job creation.

Reaz et al. (2023) examined the relationship between agricultural exports and the performance of agricultural firms in Malaysia from 2002 to 2016. Using system GMM models to test dynamic linkages, the study found that agricultural exports positively influenced firm performance, although agricultural raw materials did not have a significant effect. The study suggests that promoting agricultural exports can enhance the performance of firms in the sector, contributing valuable insights for policy design.

Wani (2024) aimed to identify the drivers of export supply in the South Asian Association for Regional Cooperation (SAARC) countries, specifically focusing on Afghanistan from 2008 to 2021. Using the export demand model and an augmented export supply model with pooled time-series data, the study evaluated whether export supply decisions aligned with traditional trade factors, emerging trade dynamics, or macroeconomic variables. Fixed effects analysis revealed that production capacity, variable costs, and relative pricing were pivotal in influencing export supply. Trade liberalisation positively impacted export growth, while issues such as energy sector inefficiency and corruption hindered export performance. The study calls for adaptive export policies to improve export performance in the context of evolving economic conditions.

Wanzala et al. (2024) examined the influence of exchange rate volatility on Kenyan coffee exports from 2001 to 2020. Using data from the Coffee Directorate, the International Coffee Exchange, and the Central Bank of Kenya, they applied the gravity model to assess trade flows and estimated exchange rate volatility using Purée and Steinherr's model. Robustness checks were conducted using quantile regression. Findings revealed that exchange rate volatility negatively impacted Kenyan coffee exports, with fluctuations in the real exchange rate significantly influencing export volumes. The results imply that exchange rate volatility poses a significant challenge to Kenya's coffee export sector by creating uncertainty in earnings and pricing.

2.4.2 Review of national literature

Idsardi (2013) examined the determinants of agricultural export growth in South Africa from 2004 to 2008, focusing on high-value products such as wheat, soybeans, and nuts. Employing the gravity model, the study found that South Africa's GDP, population, and importer GDP were positively associated with export growth. As South Africa's economy expanded, its agricultural exports also increased, suggesting that production capacity and importer demand drive export potential. The study contributes insights into how economic factors and market size influence South African agricultural exports.

Mosikari and Eita (2016) studied South Africa's exports of agriculture, forestry, and fishing products to 14 SADC countries from 2005 to 2014, using gravity model analysis. Results indicated that importer GDP and South Africa's population positively influenced exports, showing that economic growth in partner countries boosts South Africa's trade. This study highlights the significance of regional economic dynamics within SADC for South Africa's agricultural sector.

Potelwa et al. (2016) aimed to investigate the factors driving the growth of South Africa's agricultural exports to key global markets from 2001 to 2014. Using a gravity model to assess trade flows, the study evaluated the impact of economic and demographic factors on export performance. The findings indicate that increases in South Africa's and its trading partners' GDP led to a rise in agricultural exports, while geographic distance and political stability were found to have no significant effect on export growth. Additionally, the importer's population size and South Africa's export

capacity positively influenced agricultural export growth. Trade agreements, such as AGOA and the TDCA with the EU, were also shown to enhance export performance. These results suggest that South Africa should target markets with expanding GDP and population to further grow and diversify its agricultural exports.

Mamashila (2017) assessed South Africa's sugar export trends from 1996 to 2014, focusing on the Tripartite Free Trade Area (TFTA). Using Porter's Diamond model and the Johansen test, the study found that factors such as infrastructure, governance, and tariffs significantly impacted sugar exports. A positive correlation between production and export volumes was observed, illustrating that production constraints like tariffs and limited skilled labour hinder export performance. This study enhances the literature on the structural challenges facing South Africa's agricultural exports.

Phaleng (2020) examined factors influencing South African fruit exports to West Africa from 1994 to 2016, focusing on fruits like pears and apples. Using the gravity model, the study showed that production capacity, importer GDP, and import duty significantly affected fruit exports. Higher production led to increased exports, while tariffs (AVE) influenced fruit prices, impacting demand in importing countries. This study provides insights into how production and trade policies shape South African agricultural exports.

Seti (2023) aimed to identify constraints potentially hindering the long-term success of the African Continental Free Trade Area (AfCFTA) by investigating fundamental barriers limiting intra-African agricultural trade. Using panel data from 2000 to 2021, this study employed an augmented gravity model to examine the impact of variables on South African agricultural exports within African markets. Key findings revealed that South Africa's agricultural exports positively correlate with the GDP of both the importer and exporter, while an inverse relationship exists with geographic distance. Additionally, dummy variables such as infrastructure and regional bloc participation were found to significantly promote export growth. These findings underscore the critical role of structural policies, especially in infrastructure development, to enhance export participation, contributing to a better understanding of intra-African trade determinants under the AfCFTA.

Mamashila (2024) aimed to investigate the determinants of South Africa's agri-food export performance and challenges associated with these exports. The study set two specific objectives: to identify factors influencing export performance using Porter's Diamond framework, and to assess determinants impacting exports to key African trading partners through a gravity model, covering the period from 1996 to 2017. Using both primary data from structured interviews with 117 respondents and secondary data, the study identified primary barriers, including limited skilled labour, high costs of skilled labour, electricity availability, raw material costs, advanced technology expenses, transportation costs, scientific research institutions, pricing, tariffs, language barriers, and crime. The gravity model analysis, covering exports to 28 countries, revealed that economic size, geographic proximity, and currency devaluation significantly affect South Africa's agri-food exports. These findings highlight the economic and structural factors critical to enhancing South Africa's agri-food export performance.

2.4.3 Key pointers from literature review

The reviewed studies consistently highlight several determinants influencing agricultural exports, with common factors including export price, exchange rate, GDP of importing countries, population size, production capacity, and infrastructure. Across various contexts, macroeconomic factors, production capabilities, and market size emerge as essential drivers of agricultural export growth.

Internationally, studies by Iskandar et al. (2012) and Eshetu and Mehare (2021) revealed that export prices and currency valuations significantly impact agricultural export volumes, underlining the global trade sector's sensitivity to economic shifts in pricing and currency. Similarly, Wani (2024) found that GDP, exchange rates, and trade liberalisation drive export supply in SAARC countries, while Bekatfech and Mehare (2020) noted that currency devaluation, domestic savings, and reduced export tariffs boost Ethiopia's agricultural exports. These studies consistently suggest that macroeconomic stability, favourable exchange rates, and strong GDP growth in exporting and importing countries enhance agricultural export performance.

In the case of South Africa, studies such as Idsardi (2013) and Phaleng (2020) found that South Africa's GDP, production capacity, and demand from importing countries are critical in boosting exports. Potelwa et al. (2016) also demonstrated that both South Africa's and its trading partners' GDP positively influence agricultural exports, while Seti (2023) highlighted the role of infrastructure and regional bloc participation under the African Continental Free Trade Area (AfCFTA) in enhancing export potential. Commonalities across these studies indicate that larger market sizes, measured by population and GDP, and structural support, such as trade agreements and infrastructural development, positively impact South Africa's agricultural exports.

Several studies emphasised the role of infrastructure, governance, and regional trade agreements in supporting agricultural exports. For instance, Eshetu and Mehare (2021) observed that improved road networks significantly facilitate Ethiopian agricultural exports. Gbetnkom and Khan (2020) similarly noted that better road infrastructure and credit access are crucial for Cameroon's export growth, while structural adjustment policies further boosted export supply. In the South African context, Seti (2023) and Mamashila (2024) stressed the importance of infrastructure, regional participation, and structural policies in enhancing export growth, particularly under AfCFTA and SADC. This shared emphasis on infrastructure improvements and trade agreements highlights their role in increasing competitiveness and facilitating trade logistics.

Other commonalities include the impact of domestic demand and production conditions on export performance. For instance, Boansi et al. (2014) identified that domestic demand negatively affects fresh pineapple exports from Ghana, a trend also observed by Reaz et al. (2023) in Malaysia's agricultural sector. Additionally, Bekatfech and Mehare (2020) and Gbetnkom and Khan (2020) found that supportive production environments, including credit availability and policy incentives, significantly enhance export supply, reflecting a common understanding that domestic conditions and incentives shape export capacities.

Overall, the reviewed literature revealed that agricultural exports were consistently influenced by a combination of macroeconomic factors (e.g., GDP, exchange rates), structural conditions (e.g., infrastructure, governance), and market characteristics

(e.g., production capacity, trade agreements). While these factors were broadly applicable across different commodities and countries, the influence of regional trade policies, infrastructure development, and governance was particularly highlighted as crucial in both international and South African contexts.

2.4.4 Critical analysis of the reviewed literature

A review of both international and national studies revealed a predominant focus on the factors influencing the export of raw agricultural commodities rather than final or value-added products, such as wine. In particular, most studies on South Africa's agricultural exports have concentrated on raw commodities and have examined various regional contexts. For instance, Phaleng (2020) focused on fruit exports to West Africa, Mamashila (2017) investigated sugar exports within the Tripartite Free Trade Area (TFTA), and Mosikari and Eita (2016) studied exports within the Southern African Development Community (SADC).

Similarly, research by Potelwa et al. (2016) explored broader agricultural export factors to key global markets, and concluded that GDP, population size, and trade agreements are influential but did not extend their analysis to value-added products. Seti (2023) identified infrastructural and policy-related constraints to intra-African agricultural trade under the African Continental Free Trade Area (AfCFTA) but did not address export factors specific to value-added products. Furthermore, Mamashila (2024) analysed agri-food export performance and structural barriers such as labour costs, electricity availability, and transportation expenses. While these studies provide valuable insights into structural and economic factors affecting South African agricultural exports, they predominantly focused on raw agricultural products or broader agricultural trade without addressing final, branded products like wine.

The existing research does not fully address the unique dynamics surrounding the export of value-added products, such as wine, which depend on factors beyond economic metrics. As such, previous South African studies do not offer insight into factors affecting South African wine exports to the selected East African countries. For example, the demand for wine in markets such as Kenya, Tanzania, and Mauritius is often intertwined with tourism and local consumer trends, which are less relevant for raw agricultural exports.

Additionally, studies on agricultural exports did not account for the variations in regional economic and trade conditions across East African nations, such as GDP, inflation, exchange rates, trade policies, and ad valorem equivalent (AVE) tariffs, which further influence demand for wine as a final good. These unique conditions highlight the need for a focused analysis on wine exports, as traditional drivers in raw commodity exports may not fully capture the determinants influencing demand for branded, value-added goods like wine.

In conclusion, there is a significant gap in the literature regarding factors that impact South Africa's wine exports to East Africa. This study seeks to address this gap by investigating factors affecting South Africa's wine exports to the selected East Africa African markets, thereby contributing a new understanding of the factors driving value-added agricultural exports. These factors are discussed in the following section, highlighting previous findings on how each factor affects agricultural exports and paving the way for explaining the expected influence of the explanatory variables on wine exports in this study.

2.4.5 Review of selected factors affecting agricultural exports

2.4.5.1 Importers' GDP

GDP reflects the overall monetary value of all goods and services generated within a country over a given time frame, typically measured annually or quarterly (Mankiw, 2020). A higher GDP in an importing country suggests greater economic activity and purchasing power, often translating to increased demand for goods, including imports. In this study, as the GDP of Kenya, Tanzania, and Mauritius rises, it is expected that their demand for imported goods, including South African wine, would also grow. This is based on studies by Phaleng (2020), Mosikari and Eita (2016), Bekatfech and Mehare (2020), and Wani (2024), which demonstrated a positive relationship between the GDP of importing countries and export levels, highlighting that an expanding GDP enhances export potential for the supplier country. Thus, for South Africa, the expectation is that higher GDP levels in these East African countries would have a positive effect on wine exports, as increased economic prosperity (GDP) in the import markets is likely to boost demand for South African products.

2.4.5.2 Importers' population

Previous studies have consistently shown that population size in the importing countries is a crucial factor influencing export demand. For instance, studies by Matyas (1997) and Thuong (2018) indicated that a higher population in the importing nation correlates with increased demand for goods and services from exporting countries. This is further supported by Mamashila (2017), who found that the population of the importing country can boost exports and stimulate production in the exporting country. Similarly, Idsardi (2013), Potelwa (2016), Bekatfech and Mehare (2020), and Wani (2024) observed a positive relationship between population size and export levels, suggesting that a larger population enhances export potential.

In the context of South Africa's wine exports, a growing population in Kenya, Tanzania, and Mauritius implies a potentially larger consumer base, thereby increasing demand for imported goods, including South African wine. As demand rises, it is likely to drive up production and supply, allowing South Africa to expand its wine exports to these markets. Therefore, in this study, the importers' population is expected to have a favourable effect on South Africa's wine exports to the selected East African countries, as a larger population may contribute to greater consumption and market potential for South African wine.

2.4.5.3 Importers' foreign direct investment

Foreign Direct Investment (FDI) refers to investments made by a country or company into business assets in another country, often with the intent of establishing lasting interest and influence (OECD, 2008). In the context of this study, the FDI variable focuses on the investment levels in the selected East African countries aimed at enhancing their economic activities and potentially increase their demand for imported goods, including wine. For this study, FDI is measured by the net inflows of investment as a percentage of the country's GDP (World Bank, 2024). This measure reflects the level of international economic integration and the capacity of the importing country to engage in foreign trade (OECD, 2008).

A higher FDI in these East African countries generally indicates greater economic openness and increased purchasing power, potentially resulting in a higher demand for imported goods, including South African wine. On the other hand, lower FDI may

suggest limited economic integration and reduced import demand, which could restrict opportunities for South African wine exports.

Previous studies have shown that FDI positively influences import demand in the host country. Keho (2020) found that an increase in FDI within an importing country supports its need for foreign goods, particularly when these goods are not produced domestically. For example, if the importing country lacks local wine production, FDI could indirectly support South African wine exports as the country relies on imports to meet consumer demand. Hassan (2002), Mukhtarov (2019), and Karimov (2020) similarly argue that countries dependent on primary goods or raw materials tend to rely on foreign trade for manufactured or specialised products.

In this study, FDI is expected to have a positive effect on South Africa's wine exports. The rationale is that as FDI increases, these economies become more integrated with global markets and potentially more reliant on imports for both domestically unavailable products and internationally produced goods.

2.4.5.4 Import duty

In this study, an import duty is a fixed percentage of imposed on the value of exported wine. Import duty is anticipated to have an unfavourable effect on South Africa's wine exports to the selected African countries, as it increases the overall cost of wine for importers, potentially reducing demand and making South African wine less competitive compared to local or alternative international suppliers. However, South Africa's shared trade union membership with these importing countries may lower effective customs fees, thereby facilitating wine exports despite nominally higher duties (SARS, 2021).

2.4.5.5 Importers' trade openness

Trade openness refers to a country's non-restrictive trade policies that allow a smooth flow of goods from exporting nations. The Trade Openness Index measures the degree of openness by calculating the ratio of a country's total trade (exports + imports) to its GDP, expressed as a percentage (IMF, 2024). For South Africa's wine exports, a higher Trade Openness Index in selected East African countries suggests these markets are more receptive to imports, which may facilitate easier entry and potentially increase demand for imported wine. Conversely, a lower index value

indicates a more restricted trade environment, potentially challenging the expansion of South African wine exports to these markets.

Research by Azhar (2014) and Yang et al. (2022) supports the idea that trade openness positively impacts export performance, indicating that a country tends to export more goods in response to open trade policies. In the context of this study, as the selected East African countries increase their trade openness, South Africa's wine exports are expected to rise. Therefore, the trade openness of importing countries is anticipated to have a positive effect on South African wine exports in this analysis.

2.4.5.6 The inflation rate of the importing countries

The inflation rate measures the rate at which the general level of prices for goods and services rises in an economy over a specified period, typically expressed as an annual percentage. It is calculated using the Consumer Price Index (CPI), which tracks the changes in the price of a basket of goods and services over time (IMF, 2024). For South Africa's wine exports, a higher inflation rate in the importing countries (Kenya, Tanzania, and Mauritius) indicates that goods and services produced domestically in those countries become more expensive. This environment often leads to increased imports, as consumers and businesses in high-inflation countries may turn to foreign products, which are relatively cheaper than their domestically produced counterparts.

Empirical studies by Ball (2005) and Okpe and Ikpesu (2021) found that high inflation rates in importing countries can lead to a rise in imports due to increased domestic prices, reducing local competition and driving demand for imported goods. This suggests that when the inflation rate in the selected East African countries is high, they may import more South African wine in order to benefit from the relatively lower production costs and stable prices of South African products. Similarly, Herrera and Baleix (2010) found that an importing country's high inflation rate, combined with a low inflation rate in the exporting country, has a positive and significant influence on exports. In this study, inflation rates in Kenya, Tanzania, and Mauritius are expected to have a positive effect on South Africa's wine exports. This is because higher inflation in these East African countries may drive demand for imported wine, as local prices rise, and consumers seek relatively affordable alternatives from South Africa.

2.4.5.7 Exchange rate

The exchange rate indicates the value of the South African currency against currencies of the importing countries (IMF, 2009). In the context of exports, the exchange rate can play a significant role, as it determines the relative cost of South African goods, such as wine, in foreign markets. According to Mundell-Fleming's model, fluctuations in exchange rates, specifically the appreciation or depreciation of a currency, can impact both exports and imports (Phaleng, 2020). For instance, when the South African rand depreciates, South African wine becomes more affordable to importers, which could lead to an increase in wine exports to countries like Kenya, Tanzania, and Mauritius. Conversely, an appreciation of the rand would make South African wine more expensive abroad, potentially reducing demand.

However, as noted by Phaleng (2020), theoretical frameworks for agricultural exports are limited due to the relatively price-inelastic nature of agricultural and food products, as discussed by Idsardi (2013). This suggests that, although currency depreciation can make exports more attractive, demand may not increase as significantly for agricultural goods as it might for other products. Nonetheless, for South Africa's wine industry, a stable or low exchange rate is likely advantageous, making wine more affordable and appealing to importers in East African countries. In this study, the exchange rate variable is anticipated to have a negative effect on South Africa's wine exports to the selected East African countries. This means that, as the exchange rate (value of the rand relative to other currencies) decreases or stabilises at a lower level, it would likely increase export volumes by making South African wine more competitively priced in East African markets. Conversely, a higher (stronger) rand would reduce competitiveness, potentially leading to lower export volumes.

2.4.5.8 Price of wine

According to Mosikari and Eita (2016), when the price level of domestic goods rises in an importing country, foreign goods can appear more affordable, leading to an increase in import demand. In the case of South Africa's wine exports, if the price at which South African wine is sold in countries like Kenya, Tanzania, and Mauritius increases, it may impact demand based on the responsiveness of consumers in these markets. Ogede et al. (2022) further indicate that prices can be influenced by inflation, causing price fluctuations that can either positively or negatively affect demand.

In line with economic demand theory, consumers generally tend to buy less when prices are high. Thus, if the price of South African wine rises in these East African markets, demand might decrease as local consumers seek more affordable options. Conversely, if the price remains competitive, South African wine could capture greater market share as a cost-effective choice. Therefore, in this study, the price at which South African wine is sold in importing countries is anticipated to have a favourable effect on exports if kept at an attractive level, encouraging demand in Kenya, Tanzania, and Mauritius.

2.5 Chapter summary

This section provided a comprehensive foundation for the study by first defining the key concepts of exports and wine. The definitions were expanded to include the economic, cultural, and health significance of wine, emphasising its importance and justifying why wine exports were chosen as the subject of analysis. The section then specified the type of wine under study using Harmonized System (HS) codes, offering a standardised framework for the export analysis.

Following the key concepts, the section presented an overview of wine production in South Africa, including key production regions, to contextualise the country's role in the wine industry. It then systematically reviewed existing studies on agricultural export determinants at both national and international levels, summarising each study's commodities, period, analytical techniques, and main findings. This review highlighted factors influencing agricultural exports, helping to identify consistent patterns and gaps in the literature. The section concluded by discussing previous findings related to the factors affecting agricultural exports, establishing a basis for understanding how these factors might influence South African wine exports to East African markets in this study. This structured approach provided both a contextual and analytical foundation for the research. The next chapter details the research methodology, including the study area, data sources, and analytical techniques used for analysis.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter on research methodology offers an overview of the study area, starting with descriptions of the exporting country, South Africa, and the importing countries, Kenya, Tanzania, and Mauritius, and then outlining the data sources. Next, the chapter details the analytical techniques employed in the analysis, including pre-analysis steps such as trend analysis, descriptive statistics, correlation analysis, multicollinearity assessment, and unit root testing. This is followed by a theoretical overview of the gravity model and the empirical models used to estimate it. The chapter concludes with a description of the diagnostic tests applied to ensure the reliability and robustness of the empirical results.

3.2 Study area

3.2.1 Description of the exporting country

The study concentrates on South Africa's wine export to selected East African countries. South Africa is made up of nine provinces, and each province produces a variety of agricultural commodities, shaped largely by regional climates and environmental factors. The diversity in climate across provinces enables a range of other agricultural outputs (Agribook, 2024). The Northern Cape, Western Cape, and Free State are especially prominent for their wine and grape production (Lottering, 2024; SAWIS, 2024; Vinerra, 2024; Wine-Searcher, 2023). Figure 3.1 below presents a map of South Africa.

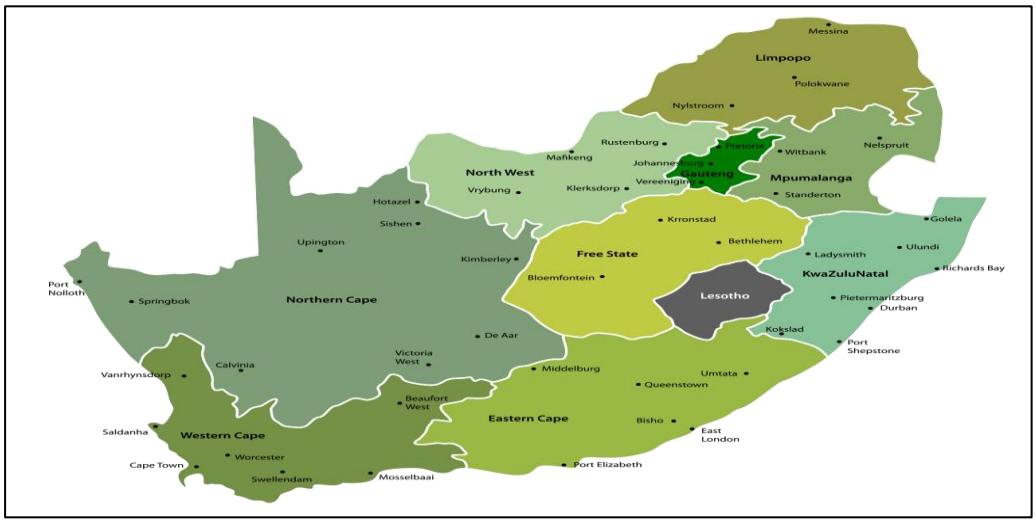

Figure 3.1: South African map

Source: Explore South Africa (2024)

The Northern Cape and Free State play significant roles in viticulture, with the Northern Cape's Orange River region being notable for grape cultivation. Beyond viticulture, the Free State is a major producer of maize, while Limpopo excels in citrus fruits, and KwaZulu-Natal is known for sugarcane production. Additionally, the Northern Cape, Western Cape, and Free State remain prominent for wine and grape production, with the Western Cape leading in wine production due to its Mediterranean climate, ideal for vineyards (Agribook, 2024).

3.2.2 Description of the selected East African countries

Geographically, East Africa is located in the Eastern region of the continent, and most of the East African Countries are in Sub-Saharan Africa (SSA). East Africa is made up of 13 countries (African Development Bank, 2024), and is dictated by the Great Rift Valley and the high mountains and the highlands of Ethiopia (Low and Marcus, 2024). "These countries, listed alphabetically, are: "Burundi, Comoros, Djibouti, Ethiopia, Eritrea, Kenya, Rwanda, Seychelles, Somalia, South Sudan, Sudan, Tanzania, and Uganda" (African Development Bank, 2024)." A map of East Africa is presented in Figure 3.2 below.

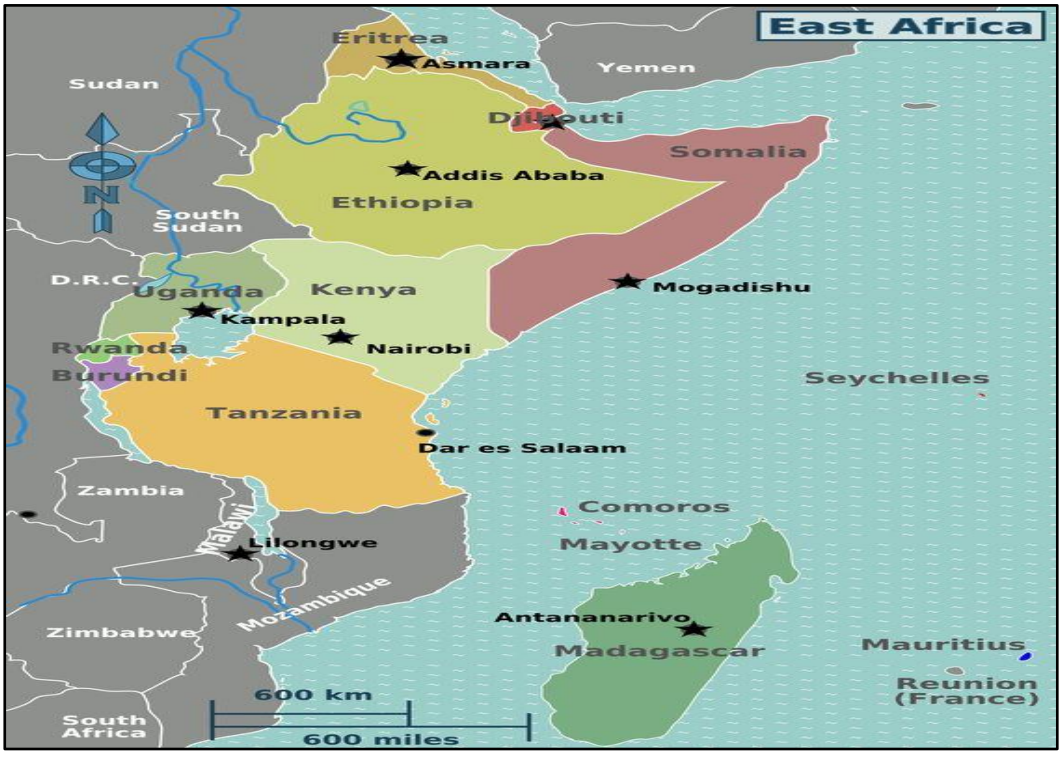

Figure 3.2: Map of East African countries

Source: Wikimedia foundation (2024)

East Africa primarily comprises countries in the easternmost region of the African continent but also includes a region situated offshore. Thus, East Africa is part of the six island countries, which are Mauritius, Seychelles, Madagascar, Réunion, Mayotte, and Comoros (World Population Review, 2024), as shown in Figure 3.2. Given this, the selected East African countries within this analysis are Kenya and Tanzania, which are found in the easternmost region of Africa, and Mauritius, an island country situated off the South-eastern coast of Africa in the Indian Ocean. Thus, while Mauritius is not geographically part of mainland East Africa, it is positioned on the South-eastern coast of Africa.

For this reason, it is frequently included in the regional economic analysis of Eastern and Southern Africa, given its membership in both the Common Market for Eastern and Southern Africa (COMESA) and the Southern African Development Community (SADC) (SADC, 2022; African Regional Integration Index, 2024). Thus, the selected East African countries are appropriate for studying the factors affecting South Africa's wine exports to the East African region. These countries were selected based on being among the largest importers of South African wine and their increase in tourism (Statista, 2021; Kenya Tourism, 2022; WESGRO, 2023), which could lead to the demand for South African wine and drive South Africa’s export of wine to these countries.

3.2.3 Trade bloc membership of Kenya, Tanzania, and Mauritius with South Africa

Kenya, Tanzania, and Mauritius are members of various trade blocs aimed at facilitating both regional and international trade. For instance, Mauritius and Kenya are part of the Common Market for Eastern and Southern Africa (COMESA), which promotes regional integration via trade and investment in Eastern and Southern Africa (COMESA, 2024). Additionally, Mauritius, Tanzania, and South Africa share membership in the Southern African Development Community (SADC), focused on socio-economic integration and cooperation among Southern African nations (SADC, 2022). The common trade bloc between South Africa and the three importing countries is the African Continental Free Trade Area (AfCFTA), a continental agreement aimed at facilitating intra-African trade and creating a single market for goods and services across Africa (AfCFTA, 2018; Erasmus, 2023). Although South Africa is not a member

of the East African Community (which includes Kenya and Tanzania) or COMESA (which includes Kenya and Mauritius), AfCFTA serves as the main trading bloc linking these nations, fostering trade and economic integration across the continent.

3.3 Dataset and sources

This study utilises secondary time-series data from 2011 to 2022 to examine factors affecting the exportation of South African wine to selected East African countries. The period of analysis from 2011 to 2022 is justified by significant developments in South Africa's wine export industry during this timeframe. Between 2012 and 2021, various factors influenced the production, supply, and export of wine, including market dynamics, trade policies, and external shocks such as the COVID-19 pandemic (Lameez, 2022). In 2020, stringent lockdown restrictions led to a temporary prohibition on the sale and export of wine, severely disrupting the industry. However, 2021 marked a period of recovery as restrictions eased, allowing wine exports to rebound, particularly in African markets, where demand surged past pre-pandemic levels (Donna, 2021). Countries like Kenya, Tanzania, and Mauritius played a key role in this recovery, reflecting the increasing importance of regional markets in South Africa's wine trade.

The data covers the period from 2011 to 2022 and encompasses annual wine exports along with relevant influencing factors for selected East African countries. Thus, the overall total sample size for the study across the three selected East African countries (i.e., panel) is 36. This sample size meets the recommended minimum of 30 to 50 observations for reliable time-series modelling, ensuring sufficient statistical power and robustness in the analysis (Gujarati and Porter, 2009).

Data were sourced from reputable international organisations to ensure reliability and comprehensiveness. Wine export data were obtained from the International Trade Centre (ITC), and import duty data were sourced from the International Trade Administration (ITA). Key economic indicators, including GDP, population, inflation, trade openness, foreign direct investment (FDI), and exchange rates, were drawn from the World Bank's World Development Indicators (WDI), with the Trade Openness Index from WDI being particularly useful for quantifying trade openness.

Data on South Africa's production capacity and wine prices were sourced from the South African Wine Industry Information and Systems (SAWIS). Together, these sources provide a comprehensive dataset for modelling factors affecting South African wine exports to the selected East African countries. This justifies the rationale for selecting these authoritative sources to ensure accuracy and relevance in the analysis of export factors. Table 3.1 shows the variables and data sources.

Table 3.1: Variables and data sources

Variables	**Source of data**
Wine exports	The International Trade Centre (Trade Map)
GDP of importing countries	World Bank's World Development Indicators (WDI)
Population of importers	World Bank's World Development Indicators (WDI)
Import duty)	International Trade Administration
Production capacity of the exporter	SAWIS
The inflation rate of the importers	World Bank's World Development Indicators (WDI)
Exchange rate between the exporter and importer	World Bank's World Development Indicators (WDI)
Price of exported South African wine	SAWIS
Importers' trade openness	World Bank's World Development Indicators (WDI) (Trade Openness Index)
Importers' FDI	World Bank's World Development Indicators (WDI)

Source: Author's compilation (2024)

3.4 Analytical techniques

3.4.1 Trend analysis

The trend analysis was conducted to identify trends over time in the exportation of South African wine to the selected East African countries over the study period, thereby achieving the first objective of the study. Specifically, the trends highlight the direction of change over time, measuring whether South Africa's wine exports to the

selected East African countries have increased, decreased, or remained stagnant. The trend analysis covers South Africa's wine export to Africa, the top ten African importers of South African wine, South Africa's wine export to Africa, the top East African importers of South African wine, including the selected East African countries. This provides insight into how well South Africa has been performing in terms of value of wine exported to the African continent, especially in East Africa, which justifies the need for this study to focus on the selected East African countries.

3.4.2 Descriptive analysis

Descriptive statistics were used to summarise and describe key characteristics of the data for empirical analysis, providing an overview of central tendencies and variability within the dataset (Wooldridge, 2016). Specifically, these statistics capture measures such as the mean, median, standard deviation, minimum, maximum (Gujarati and Porter, 2009), and other relevant metrics for variables likely to affect the exportation of South African wine. This approach offers a clear understanding of the range and typical values for each variable, establishing a foundation for empirical analysis.

3.4.3 Correlation analysis

After conducting descriptive analysis, correlation analysis was performed to examine the relationships between wine exports and explanatory variables, as well as multicollinearity among the explanatory variables, using a correlation matrix (Field, 2013). This matrix measures the strength and direction of linear associations between each pair of variables (Hair et al. 2010), offering insight into potential interactions that may influence South Africa's wine exports to East African countries. Specifically, the correlation results indicate the intensity and direction of relationships between wine exports and each explanatory variable, as well as among the explanatory variables themselves, to assess multicollinearity (Hair et al. 2010; Field, 2013).

Correlation can be positive, negative, or weak (Cohen, 1988). A positive correlation, with values closer to +1, suggests a direct relationship, where increases in one variable correspond to increases in another. Specifically, positive correlation values between 0.1 and 0.3 indicate a weak positive relationship, values from 0.3 to 0.5 indicate a moderate positive relationship, and values above 0.5 suggest a strong positive relationship. Conversely, a negative correlation, with values closer to -1, indicates an inverse relationship, where increases in one variable correspond to

decreases in another. For negative correlations, values between -0.1 and -0.3 reflect a weak negative relationship, values from -0.3 to -0.5 reflect a moderate negative relationship, and values below -0.5 suggest a strong negative relationship. Finally, a weak correlation, with values closer to 0, indicates a minimal or negligible association between the variables (Cohen, 1988; Evans, 1996).

3.4.4 Multicollinearity testing

Following correlation analysis, a multicollinearity test was conducted to provide an in-depth assessment and confirm results from the correlation analysis. Correlation analysis examined preliminary relationships among the variables and served as an initial multicollinearity check, while the multicollinearity testing provided confirmation. According to Farrar and Glauber (1967), multicollinearity occurs when two or more independent variables in a regression model exhibit high correlation with each other.

For the analysis, the Variance Inflation Factor (VIF) analysis was conducted to assess multicollinearity among predictor variables. VIF helps identify which predictors contribute to multicollinearity, ensuring that the regression model is reliable, consistent, and interpretable (Gujarati and Porter, 2009; Wooldridge, 2013).

A high VIF value for a predictor suggests that it is significantly influenced by other predictors in the model. This may necessitate adjustments, such as adding or removing variables, to improve the model's performance and interpretability. According to Shrestha (2020), the common cut-off point for VIF is 10; a value above 10 indicates a serious multicollinearity issue. In such cases, combining or eliminating highly collinear variables should be considered. Conversely, VIF values below 5 suggest that multicollinearity is not a significant concern, while values between 5 and 10 indicate moderate but often acceptable levels of multicollinearity (Kutner et al., 2005).

3.4.5 Unit root testing

Stationarity testing was conducted using the Im-Pesaran-Shin (IPS) test to confirm that the data were stationary, thereby minimising the possibility of erroneous regression findings. Since the study used panel data, unit root testing was essential, as certain variables could exhibit time-dependent trends, making it necessary to verify stationarity. By applying the IPS test, we ensured that the time series components are

stationary, allowing for valid inference within the time-dependent gravity model framework. The standard format of the IPS test equation is as follows (Im et al., 2003):

$$\Delta y_{it} = \alpha_i + \beta_i y_{i,t-1} + \sum_{j=1}^{p} \gamma_{ij} \Delta y_{i,t-j} + \epsilon_{it} \quad (1)$$

Where: y_{it} is the variable of interest for unit i at time t, α_i represents individual fixed effects, β_i is the coefficient on the lagged level of $y_{i,t-1}$, $\Delta y_{i,t-j}$, are lagged differences accounting for serial correlation, *p* is the lag length, and ϵ_{it} is error term (Im et al., 2003).

The IPS test was preferred because it is designed specifically for panel data and can handle cross-sectional heterogeneity, providing reliable stationarity results across countries and over time. Unlike the ADF test, which is suitable for individual time series, the IPS is more appropriate for panel data within a gravity model. Alternative panel unit root tests, such as the Levin-Lin-Chu (LLC) and Fisher-type tests, are also available. However, IPS is particularly suitable for smaller panel datasets, as in this study, due to its greater flexibility and robustness with limited observations.

3.4.6 Gravity model

The gravity model was used to analyse factors affecting South Africa's wine exports to selected East African countries from 2011 to 2022, thereby achieving the second objective of the study. As a technique of export analysis, the gravity model employs historical data to conduct econometric analyses of trade flows. First applied by Tinbergen (1962) and Pöyhönen (1963) to examine global trade, the gravity model calculates trade flows between two countries based on their economic size and the inverse of their physical distance. The model posits that the larger the GDP of the two countries, the higher the trade volume between them, as bigger economies tend to trade more due to greater production capacity and demand. In terms of economic size, the model assumes that higher GDP indicates higher income among citizens, which increases demand for imported goods. Conversely, the greater the distance between two countries, the lower the expected trade volume, as distance typically raises transportation costs and trade barriers, discouraging imports and exports.

Hatab et al. (2010) highlight the gravity model as a valuable tool for analysing bilateral trade flows, extensively used in empirical literature to determine bilateral trade and export factors. In its conventional form, the gravity model predicts bilateral trade flows based on economic size and geographical distance between two countries (Anderson and van Wincoop, 2003). The basic gravity model formula is as follows (Tinbergen, 1962):

Trade ij= G α $\frac{y_i y_j}{Dij}$ (2)

Where:

Trade ij= is the quantity of trade betwixt two countries i and j

Y_i = is the country i GDP

Y_j = is the country j GDP

D_{ij} = is the distance that separates the two countries i and j

G = is the normalising constant

α = assumed to be a positive number

To simplify for econometric analysis, logarithmic transformations convert Equation (3.1) into a linear form as follows (Anderson and van Wincoop, 2003):

$$In_{Xij} = In_{\alpha 0} + \alpha In_{Yi} + \alpha In_{Yj} + \alpha In_{Dij} + \mu_{ij} \quad (3)$$

In this study, the functional form of the gravity model incorporates additional explanatory variables to better capture factors affecting wine exports as follows:

$$\ln X_{ij} = \beta 0 + \beta 1_{(lnGDPjt)} + \beta 2_{(lnPOPjt)} + \beta 3_{(lnFDIjt)} + \beta 4_{lnTOjt} + \beta 5_{(lnIDUjt)} + \beta 6_{(lnPCit)} + \beta 7_{(lnIRjt)} + \beta 8_{(lnXRijt)} + \beta 9_{(lnPWjt)} + \varepsilon_{ijt} \quad (4)$$

where: β_0 is the intercept, β_1 – β_{10} are regression parameters for each independent variable, ln represents the natural logarithm of independent variables, t indicates the time period (2012–2021), j represents the importing East African countries, i denotes South Africa as the exporting country, and ε_i, is the error term accounting for unobserved factors. The variables and parameters used in the model, along with the corresponding expected influence of the explanatory variables, are described in Table 3.2 below.

Table 3.2: Description of variables and parameters

Variable/ parameter	Description	Expected sign
Exports (X_{ij})	Value of wine exported to East African countries in ZAR millions	
Common intercept (β_0)	The overall intercept coefficient in the model	
GDP of the importing countries (GDP_{jt})	GDP value of the importing East African countries (j) at time t in ZAR billions	(+)
Population of the importing countries (POP_{jt})	Population size of the selected East African Countries (j) at time t in millions	(+)
FDI of the importing countries (FDI_{jt})	Net inflows of investment as a percentage of GDP of the selected East African countries (j) at time t	(+)
Trade openness of the importing countries (TO_{jt})	Selected East African countries' ratio of total trade (exports + imports) to their GDP in percentage	(+)
Import duty (IDU_{jt})	Import duty imposed on South African wine imports in percentage	(-)
Production Capacity of the exporting country (PC_{it})	Gross litres of wine produced in South Africa	(+)
Inflation Rate (IR_{jt})	Inflation rate in the selected East African countries (j) at time t in percentage	(+)
Exchange Rate (XR_{ijt})	South Africa's exchange rate against the selected East African countries at time t, in ZAR (average annual) in ZAR	(-)
Price of wine (PW_{jt})	Average price of wine sold in bulk in ZAR	(+)
Error Term (ε_{iit})	Error term accounting for unobserved factors	

Source: Adapted from Phaleng (2020)

The gravity model was chosen over alternative models due to its robustness in capturing bilateral trade factors (Anderson and van Wincoop, 2003), which are critical in understanding trade dynamics between South Africa and East African countries. Unlike other models, the gravity model effectively accounts for economic size and distance, both highly relevant in international trade contexts (Tinbergen, 1962). By incorporating additional variables like foreign direct investment (FDI), trade openness (TO), and population, this study's gravity model enhances its explanatory power (Bergstrand, 1985; Deardorff, 1998), providing detailed insights into South Africa's wine exports.

3.4.7 Gravity model estimation

In this study, the pooled Ordinary Least Squares (OLS) estimator, random effects, and fixed effects models were considered for estimating the theoretical gravity model. The pooled OLS estimator is less desirable due to its assumption of homogeneity across nations, as it treats the dataset as a single cross-section, ignoring country-specific effects and risking omitted variable bias (Baltagi, 2008).

Alternatively, the fixed effects model was preferred, as it addresses unobserved factors that vary between countries but remain constant over time, effectively controlling for time-invariant characteristics like institutional factors. By using dummy variables for each exporter and importer, the fixed effects approach accommodates country-specific factors that may correlate with explanatory variables, enhancing the reliability and consistency of trade determinant estimates (Feenstra, 2015; Wooldridge, 2010). The fixed effects model equation is derived by incorporating $ui,$ which represents the unobserved country-specific effects, into the functional form of the gravity model, as follows:

$$\ln X_{ij} = \beta 0 + \beta 1_{(lnGDPjt)} + \beta 2_{(lnPOPjt)} + \beta 3_{(lnFDIjt)} + \beta 4_{lnTOjt} + \beta 5_{(lnIDUjt)} + \beta 6_{(lnPCit)} + \beta 7_{(lnIRjt)} + \beta 8_{(lnXRijt)} + \beta 9_{(lnPWjt)} + \mu_i + \varepsilon_{ijt} \quad (5)$$

where: *ln/in* is the natural logarithm of the value of wine exports from South Africa (country i) to the selected East African countries (country j), lnGDPjt – lnPWjt are the independent variables, all in their natural logarithmic form, μi represents the country-specific fixed effects (unobserved factors that remain constant over time but vary across countries), and ϵit is the error term that captures other unobserved factors not included in the model. This equation accounts for the country-specific fixed effects μi that may affect wine exports, improving the reliability of the results by controlling for time-invariant factors.

Additionally, a Redundant Fixed Effects Likelihood Ratio (LR) test was conducted to confirm the necessity of fixed effects over a simpler pooled model. In contrast, the random effects model assumes country-specific effects are uncorrelated with explanatory variables, allowing time-invariant factors such as geographical distance to be included (Greene, 2012). When this assumption holds, the random effects model offers efficient estimates by incorporating both within- and between-country variations

(Binh et al., 2011). To determine whether fixed or random effects were more suitable, a Hausman test was performed, guiding the choice between models by testing for correlation between country-specific effects and explanatory variables (Hausman, 1978; Greene, 2012). In conclusion, this study employed fixed and random effects, with the Hausman test guiding the choice to ensure the most suitable model for analysing South African wine exports, while accounting for unobserved heterogeneity and country-specific effects.

3.4.8 Results validation

The Dumitrescu and Hurlin Panel Granger Causality Test, developed by Dumitrescu and Hurlin (2012), was conducted to validate the empirical results by assessing potential causal relationships between the identified factors and wine exports. This test is suitable for panel data analysis, as it evaluates causality across cross-sectional units over time, which aligns well with the study's goal of examining time-dependent relationships in wine exports across multiple countries (Dumitrescu and Hurlin, 2012). Several studies demonstrated the utility of the Dumitrescu and Hurlin Panel Granger Causality Test in validating fixed effects results by investigating directional causality in relationships involving economic, environmental, and policy variables across time and different regions or countries (Sinha et al., 2018; Zhang and Chen, 2019; Udi et al., 2020). Conducting the Granger causality test helps determine if the identified factors directly influence export volumes over time, offering a clearer understanding of causality within these relationships.

Additionally, diagnostic tests were carried out to validate the accuracy of the study's results. These included tests for serial correlation, heteroscedasticity, normality, stability, and functional form (Greene, 2018). The heteroscedasticity test evaluated the consistency of error variances among variables, while the serial correlation test checked for correlation between error terms across different periods in the time series. A stability test confirmed the reliability of the dataset over time, supporting the foundation for decision-making and policy recommendations. Additionally, a functional form test was conducted to ensure the model was correctly specified, verifying that the relationship between variables was accurately captured in the analysis (Gujarati and Porter, 2009).

3.5 Chapter summary

This chapter on research methodology provided an overview of the study area, beginning with descriptions of the exporting country (South Africa) and the importing countries (Kenya, Tanzania, and Mauritius), followed by an outline of the data sources. The chapter then detailed the analytical techniques employed in the analysis, including pre-analysis steps such as trend analysis, descriptive statistics, correlation analysis, multicollinearity assessment, and unit root testing. A theoretical overview of the gravity model and the empirical models used to estimate it was subsequently presented. The chapter concluded with a description of the diagnostic tests applied to ensure the reliability and robustness of the empirical results. The following chapter presents the findings from trend analysis, pre-testing procedures, descriptive statistics, empirical results, and validation of the empirical results.

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1 Introduction

This section presents an analysis of the trends in South Africa's wine exports, addressing the first objective of the study by examining export patterns from 2011 to 2022, measured in rand. This trend analysis includes an overall view of exports to Africa, identifies the top ten African importers, and provides a focused examination of South Africa's wine exports to East Africa, including the top East African importers and the selected countries of interest. These insights highlight the performance of South African wine exports across the continent, particularly in East Africa, supporting the study's focus on the selected East African countries.

In addition to trend analysis, this section details the results of analytical techniques employed to examine factors affecting the exportation of South African wine to the selected East African countries, thereby achieving the second objective of the study. This includes the results from pre-analysis steps such as descriptive statistics, correlation analysis, multicollinearity testing, and unit root testing. The results from the empirical estimations of the gravity model are also presented in this section. Thereafter, the results of the Dumitrescu and Hurlin panel Granger causality test, along with diagnostic test results, are presented to ensure the reliability and robustness of the empirical findings. All of these analyses were conducted using EViews software, which facilitated the implementation of these tests and the estimation of the gravity model.

4.2 Trend analysis results

4.2.1 Overall trend in South Africa's wine exports to Africa

South Africa's annual wine export to Africa from the period of 2011 to 2022 is represented in Figure 4.1 below. The trend analysis for the African continent indicates a general upward trend in South African wine exports, particularly notable between 2013 and 2015. This growth is likely due to increased demand within Africa, expansion into new markets, and favourable trade conditions. However, a decline in exports is observed from 2017 to 2018, potentially attributed to economic challenges, policy changes, or reduced demand in key African markets. Between 2019 and 2020, export levels appear relatively stable, suggesting steady demand despite market uncertainties. A more significant downturn in 2020 is attributed to the COVID-19

pandemic, which impacted trade and consumer spending on non-essential goods. A recovery phase is seen in 2021 and 2022, with exports possibly trending upward as trade resumed post-lockdown.

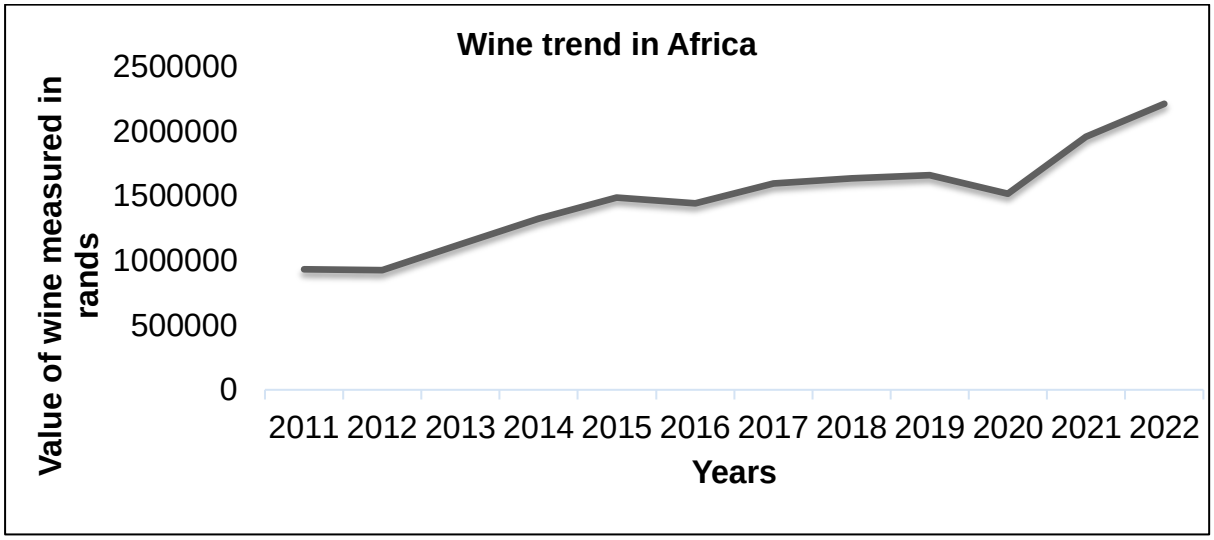

Figure 4.1: Trend in South Africa's wine exports to Africa

Source: Trade Map (2023)

4.2.2 Trend in South Africa's wine exports to African regions

Figure 4.2 shows the trend of South African wine exports to different regions within Africa (South, West, Middle, and East) from 2011 to 2022, measured in rand. In Southern Africa, there is a general upward trend in wine exports with some fluctuations. Exports rose steadily from 2012 to 2015 and peaked around 2020, possibly due to a surge in demand or favourable market conditions. After 2020, exports declined slightly but remained relatively high, indicating sustained demand in this region.

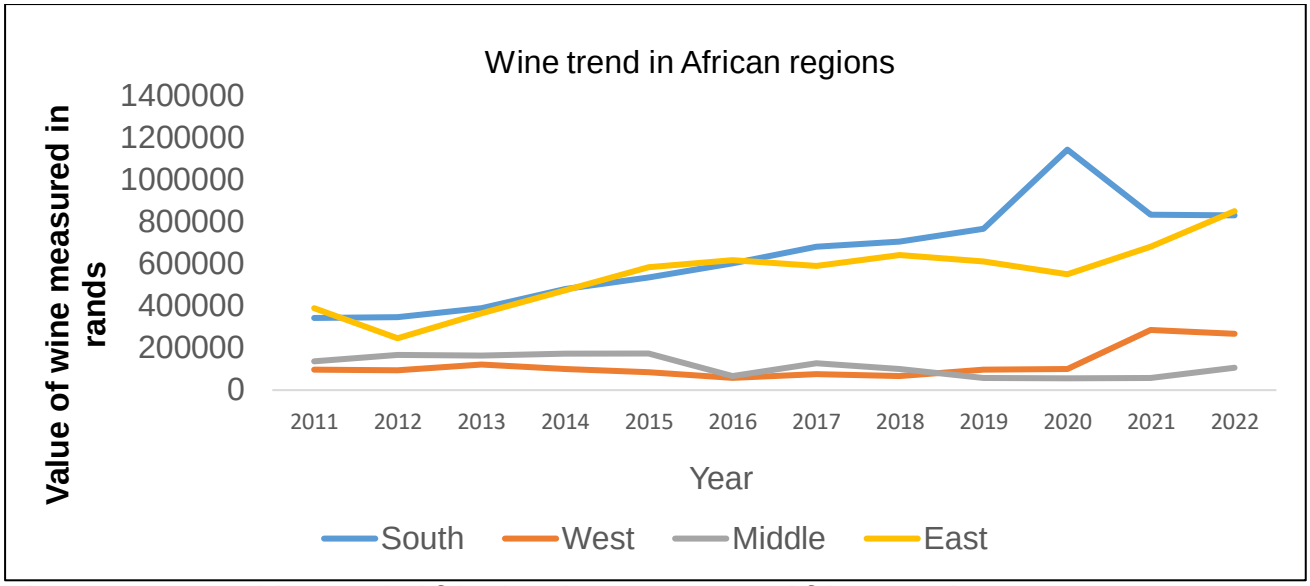

Figure 4.2: Trend in South Africa's wine exports to African regions

Source: Trade map (2023)

East Africa also displays an upward trend, especially from 2013 to 2015, with some fluctuations afterward. A significant peak appears in 2022, suggesting a recent rise in demand for South African wine, potentially due to economic growth or shifting consumer preferences in East Africa. In contrast, West Africa shows relatively low and stable export values throughout the period, with a minor increase around 2021. This stability may indicate limited demand or possible competitive barriers in the region, making it a less significant market for South African wine exports.

Similarly, Middle Africa maintains a low and stable trend in exports, with minimal changes over the years. Although there was a slight increase around 2017, export values remained modest compared to Southern and Eastern Africa. Overall, the data reveal that Southern and Eastern Africa are the main markets for South African wine exports, with consistent growth and occasional peaks. This justifies the study's focus on East Africa. Conversely, West and Middle Africa show limited and stable demand, suggesting constrained market expansion opportunities for South African wine in these regions.

4.2.3 Trend in South Africa's wine exports to top East African countries

Figure 4.3 illustrates South African wine exports to top ten East African countries from 2011 to 2022, with export values measured in rand. Kenya shows a relatively steady and high level of imports compared to other East African countries, with notable peaks around 2015, 2017, and 2021. The import values fluctuate, but Kenya consistently

remains one of the top importers of South African wine in East Africa, suggesting a stable demand and potential market growth. Tanzania follows a pattern similar to Kenya but at slightly lower values. There are fluctuations with peaks in 2015 and 2021, suggesting variability in demand but a general trend of significant importation.

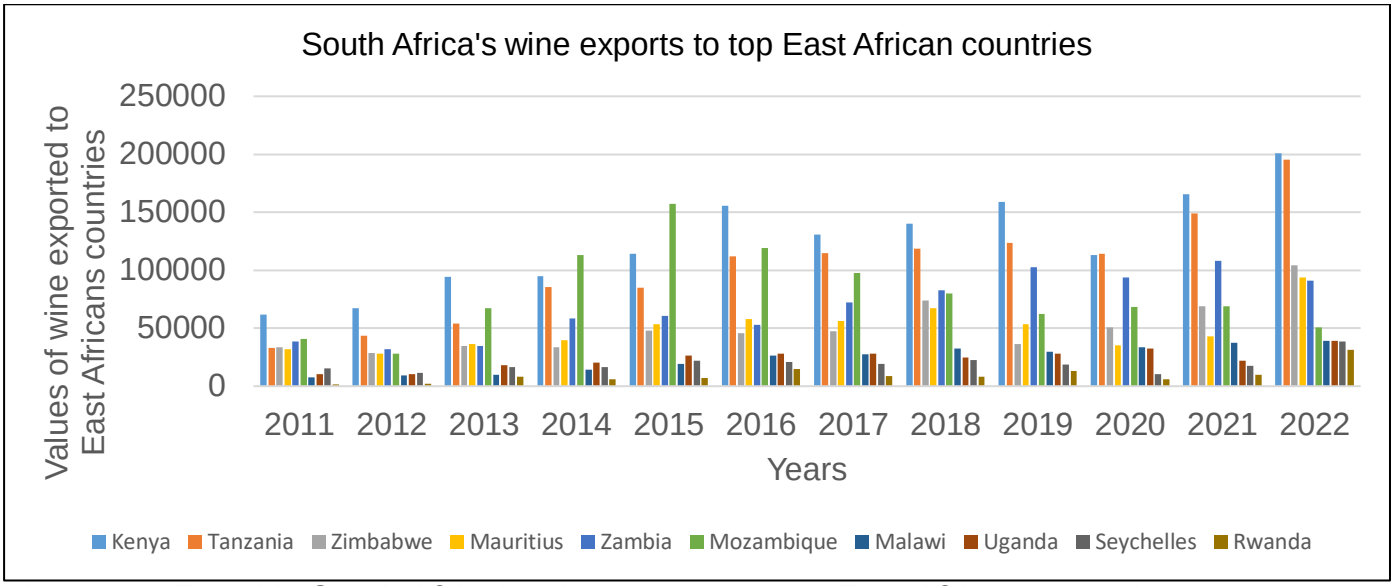

Figure 4.3: Trend in South Africa's wine exports to top East African countries

Source: Trade Map (2023)

Like Kenya, Tanzania represents a strong market for South African wine in East Africa. Zimbabwe shows notable import values, particularly in 2014, 2016, and 2020. However, there is more variation in Zimbabwe's imports compared to Kenya and Tanzania, indicating an inconsistent demand that may be influenced by economic factors. Mauritius has a relatively consistent import level across the years, though it is lower compared to Kenya and Tanzania. The stable trend suggests a modest but steady demand for South African wine in Mauritius.

Zambia shows some peaks, especially in 2013 and 2015, but overall import levels are moderate. This suggests that Zambia has a fluctuating demand, with occasional high import years followed by lower levels. Mozambique's import values remain low relative to other countries, with minor fluctuations over the years. This suggests limited demand or purchasing power for South African wine in Mozambique. Malawi, Uganda, Seychelles, and Rwanda exhibit low import values throughout the period with minimal fluctuation. The low and stable values suggest a limited or niche market for South African wine in these countries.

Overall, Kenya and Tanzania stand out as the most consistent and significant markets for South African wine exports in East Africa, showing stable or increasing demand over the period. Zimbabwe, Mauritius, and Zambia represent secondary markets with moderate demand and some fluctuations, while Mozambique has low but steady imports. Malawi, Uganda, Seychelles, and Rwanda have minimal import values, indicating limited demand for South African wine in these countries.

Overall, trend results suggest that South Africa has a strong wine market presence in Kenya and Tanzania and a substantial market in Mauritius. In contrast, other East African countries exhibit varied demand, potentially influenced by economic conditions, cultural preferences, and market accessibility. This study's focus on Tanzania, Kenya, and Mauritius is justified by their relatively consistent and higher import levels, indicating strong demand and potential growth opportunities for South African wine compared to other East African markets. Understanding these three countries' markets provides valuable insights into the factors driving South African wine exports and highlights strategies for expanding into similar markets.

4.3 Descriptive statistics

Table 4.1 provides descriptive statistics for variables likely to influence the exportation of South African wine to Mauritius, Kenya, and Tanzania. It summarises key characteristics such as mean, median, maximum, minimum, and standard deviation for each variable, including Export values, Import Duty (IDU), Foreign Direct Investment (FDI), Population (POP), Gross Domestic Product (GDP), Interest Rate (IR), Trade Openness (TO), Exchange Rate (XR), and Price of Wine (PW). These statistics offer insights into central tendencies and variability across the three countries, establishing a basis for understanding their economic profiles in relation to wine exports.

Table 4.1: Descriptive statistics for the selected East African countries

	Mean	**Median**	**Maximum**	**Minimum**	**Std.Dev**
PW	345.04	340.67	437.75	212.03	65.50
PC	1.08	1.09	1.18	0.960	0.07
Mauritius					
EX	8.29	9.25	11.08	1.12	3.78
IDU	0.00	0.00	0.00	0.00	0.00

FDI	0.78	0.71	1.55	0.14	0.46
POP	1.26	1.26	1.27	1.25	4.422
GDP	157.22	170.65	211.50	83.51	39.23
IR	3.67	3.38	10.77	0.41	2.76
TO	106.77	101.31	119.50	85.83	10.69
XR	0.32	0.32	0.33	0.30	0.01
Kenya					
EX	9.15	9.56	11.42	5.80	3.43
IDU	25	25	25	25	0.00
FDI	1.173	0.86	3.10	-0.01	0.86
POP	48.60	48.60	54.25	42.75	3.7
GDP	1.12	1.10	1.87	339.8	487.13
IR	7.17	6.44	14.02	4.69	2.53
TO	40.43	36.88	58.40	27.24	9.48
XR	0.08	0.08	0.13	0.06	0.02
Tanzania					
EX	8.68	9.56	11.42	0.63	4.13
IDU	0	0	0	0	0.00
FDI	2.573	1.946	4.572	1.428	1.09
POP	54.93	54.73	64.71	46.03	5.94
GDP	744.21	721.90	1.24	251.26	309.87
IR	6.42	5.25	16.0	3.29	4.00
TO	39.37	35.21	56.17	27.96	8.82
XR	0.05	0.05	0.05	0.04	0.0

4.3.1 South Africa's Production Capacity (PC)

South Africa’s mean production capacity for wine is high, at approximately 1.08 billion litres, reflecting strong export potential. The maximum production capacity reached 1.18 billion litres, while the minimum was 0.96 billion litres (960.16 million litres). The small standard deviation of 0.07 billion litres (70 million litres) indicates relatively stable production capacity over the period, suggesting that South Africa’s wine production has remained consistent, which could positively influence stable export levels.

4.3.2 Price of wine (PW) (Average prices of wine sold in bulk)

The mean price for wine exported in bulk between 2011 and 2022 was moderately high, at approximately 345.04, indicating a strong base price for the country's wine exports. The maximum bulk price reached 437.75, while the minimum was 212.03. The small standard deviation (65.50) suggests relatively stable bulk wine prices over the period. The stability in pricing suggests that South Africa can offer consistent wine prices, which is attractive to importers in key East African markets, specifically Kenya, Tanzania, and Mauritius. It should be noted that these prices are standard and not final, as importing countries will add additional costs, such as import duties, excise duties, VAT, and other applicable fees. Consequently, the final cost of South African wine in each market varies, as these added charges influence the retail price of imported wine.

4.3.3 Exports (EX) (value of wine exports from South Africa to East African countries)

For Mauritius, Kenya, and Tanzania, South Africa’s wine export values show notable differences. Exports to Mauritius have a mean of 8.29 million ZAR, with a maximum of 11.08 million ZAR and a minimum of 1.12 million ZAR. The standard deviation of 3.78 million ZAR indicates moderate variability, suggesting consistent but relatively moderate demand. In Kenya, the mean export value is slightly higher at 9.15 million ZAR, with a maximum of 11.42 million ZAR and a minimum of 5.80 million ZAR, reflecting steadier demand as indicated by a lower standard deviation of 3.43 million ZAR. For Tanzania, the mean export value is 8.68 million ZAR, with a wider range between a maximum of 11.42 million ZAR and a minimum of 0.63 million ZAR, showing higher variability with a standard deviation of 4.13 million ZAR. This variability may reflect fluctuating demand patterns.

4.3.4 Import Duty (IDU)

Mauritius and Tanzania impose no import duty on South African wine, maintaining a consistent 0% rate with no variability (standard deviation of 0.00) across all years. This exemption is due to the membership of South Africa, Mauritius, and Tanzania in the Southern African Development Community (SADC), which, under the Free Trade Area (FTA) agreement, generally does not impose import duties on goods originating within member states. This zero-duty policy makes South African wine more affordable in Mauritius, supporting imports. In contrast, Kenya consistently apply a 25% import duty

on wine imports (i.e., finished good), as per the East African Community Common External Tariff. This results in an overall average import duty of 25% across the three East African countries. This uniform duty structure in Kenya poses a potential barrier to imports, potentially impacting the price competitiveness of South African wine in these markets. Additionally, it should be noted that while Mauritius and Tanzania exempt wine imports from import duties, all three countries apply excise duties and VAT on imported wine at varying rates, which also affect the final cost of South African wine in each market.

4.3.5 Importers' Foreign Direct Investment (FDI)

Mauritius exhibits a relatively stable FDI level at 0.78% of GDP (mean), with a median of 0.71%, a maximum of 1.55%, and a minimum of 0.14%. The standard deviation is 0.46, indicating little variability in FDI. This suggests a stable investment climate that may support steady economic demand and reduce the risk of sudden fluctuations in foreign investment. Kenya has a lower mean FDI at 1.18% of GDP, with values ranging from -0.01% to 3.10% and a standard deviation of 0.86. This variability points to fluctuations in investment inflows, which might reflect changing economic conditions. These fluctuations could potentially impact consumer purchasing power and overall economic stability. Tanzania shows a higher mean FDI of 2.57% of GDP with a standard deviation of 1.09, and values ranging from 1% to 4.57%. This relatively higher and variable FDI may signal a growing economy, with periods of increased investment potentially boosting demand for imports like wine. The higher standard deviation suggests greater fluctuations in investment, which might reflect an evolving economic landscape.

4.3.6 Importers' population (POP)

The population size provides insight into the potential consumer base for South African wine in each country. Mauritius has a small, stable population, averaging 1.26 million, with minimal variability (standard deviation of 4,422 people, or 4.42 thousand). This indicates a limited market size with little fluctuation. Kenya, with a larger population mean of 48.60 million and variability of 3.7 million (standard deviation), represents a broader market with gradual population growth. Tanzania has the largest average population of 54.93 million, with moderate variability (standard deviation of 5.94 million), indicating a considerable potential consumer base that continues to grow over time.

4.3.7 Importers' GDP

Kenya has the highest mean GDP among the three countries at 1.12 trillion ZAR, with a maximum of 1.87 trillion ZAR and a minimum of 0.34 trillion ZAR (339.80 billion ZAR), and a standard deviation of 0.49 trillion ZAR (487.13 billion ZAR). This indicates that Kenya has a significantly larger economy, with greater variability, which could affect its capacity for consistent wine imports. Tanzania has a mean GDP of 744.21 billion ZAR, with a maximum of 1.24 trillion ZAR and a minimum of 251.26 billion ZAR, and a standard deviation of 309.87 billion ZAR. While Tanzania's economy is larger than Mauritius' but smaller than Kenya's, its moderate variability indicates potential for growth, which may offer future opportunities for wine imports. Mauritius, on the other hand, has the lowest mean GDP at 157.22 billion ZAR, with a maximum of 211.50 billion ZAR and a minimum of 83.51 billion ZAR, and a standard deviation of 39.23 billion ZAR. Despite having a lower GDP than Kenya, Mauritius has a relatively stable economic environment, which could support steady wine imports, though still at a smaller scale compared to Kenya.

4.3.8 Importers' Inflation Rate (IR)

Mauritius has the lowest average inflation rate of 3.67%, ranging from 0.41% to 10.77%, with a standard deviation of 2.76. This variability indicates periods of economic stability mixed with inflation spikes, which could affect consumer purchasing power and, in turn, influence demand for imports like wine. Tanzania has a more moderate inflation mean of 6.42%, with values ranging from 3.29% to 16%, and a standard deviation of 4.00. This reflects some degree of economic fluctuation, potentially influencing consumer demand for imported goods, including wine. Kenya has a higher average inflation rate of 7.17%, with a range between 4.69% and 14.02%, and a standard deviation of 2.53%. This suggests considerable price instability, which could constrain consumer spending and reduce the affordability of imported goods like wine.

4.3.8 Importers' Trade Openness (TO)

Mauritius is highly open to trade, with an average trade openness of 106.77% of GDP, a maximum of 119.50%, a minimum of 85.83%, and a standard deviation of 10.69. This high level of openness indicates that total trade activity regularly exceeds the country's GDP, which is typical for smaller, open economies that rely heavily on

international trade. Such a favourable trade environment supports substantial import flows, creating a strong market for South African wine imports. Kenya has lower trade openness, with a mean of 40.43% of GDP, a maximum of 58.40%, and a minimum of 27.24%, along with a standard deviation of 9.48. This indicates relatively moderate integration with global markets, suggesting that while Kenya's openness is not as high as Mauritius, there is still a reasonable level of trade activity to support imports like wine. Tanzania shows an intermediate level of openness, with a mean of 39.37% of GDP, a maximum of 56.17%, a minimum of 27.96%, and a standard deviation of 8.82. This suggests a reasonable level of trade engagement conducive to imports, though it remains slightly lower than Kenya's trade openness, indicating a more conservative trade policy environment.

4.3.9 Exchange Rate (XR)

The exchange rate values, all expressed in ZAR, highlight differences in price competitiveness across the three East African markets for South African wine imports. For Mauritius, the mean exchange rate is 0.32 ZAR, with a maximum of 0.33 ZAR and a minimum of 0.30 ZAR, showing minimal fluctuation with a standard deviation of 0.01. This stability in the exchange rate supports consistent import pricing, which is beneficial for market predictability and could encourage steady wine imports. Kenya has a lower mean exchange rate of 0.08 ZAR, with a range between 0.06 ZAR and 0.13 ZAR, and a standard deviation of 0.02. This indicates moderate stability, which supports relatively predictable pricing for imports, although the exchange rate is lower than Mauritius, possibly making imports more affordable but with slightly higher volatility. Tanzania exhibits the lowest average exchange rate of 0.05 ZAR, with a narrow range from 0.04 ZAR to 0.05 ZAR and a very small standard deviation of 0.0007. This reflects high currency stability, but due to the weak exchange rate, imports may become more costly for Tanzanian consumers, potentially impacting the demand for South African wine.

4.4 Correlation analysis results

Following the descriptive analysis, correlation analysis was conducted to assess the relationships between wine exports and the explanatory variables, as well as to check for multicollinearity among the explanatory variables, using a correlation matrix. This matrix provides a measure of the strength and direction of linear associations between each pair of variables, offering insight into how factors may interact in influencing

South Africa’s wine exports to East African countries. Table 4.2 summarises the correlation coefficients, which indicate whether relationships between South Africa’s wine exports and the explanatory variables are positive, negative, or weak.

Table 4.2: Correlation coefficients

	EX	TO	GDP	POP	IDU	FDI	IR	PC	XR	PW
EX	1.0									
TO	-0.5	1.0								
GDP	0.54	0.44	1.0							
POP	0.89	0.7	0.05	1.0						
IDU	0.12	0.15	0.21	0.13	1.0					
FDI	-0.16	0.19	0.27	0.55	0.28	1.0				
IR	0.24	0.26	0.12	0.25	0.18	0.24	1.0			
PC	0.61	0.3	0.2	0.48	0.7	0.14	0.18	1.0		
XR	-0.44	0.1	0.03	0.34	0.08	0.06	0.2	0.15	1.0	
PW	-0.12	-0.18	0.04	0.09	0.04	0.06	0.12	0.19	0.2	1.0

Source: Author's compilation (2024)

4.4.1 Correlation between wine exports and the explanatory variables

The correlation matrix in Table 4.2 presents the intensity and direction of the linear relationships between wine exports and the explanatory variables. The correlation coefficient between Exports (EX) and Trade Openness (TO) is -0.50. This indicates a moderately strong negative relationship, implying that as exports increase, trade openness among importers tends to decrease. This inverse relationship may suggest that higher exports are associated with more closed or protectionist import markets, potentially due to trade barriers.

The correlation coefficient between South Africa's wine exports and importers’ GDP (GDP) is 0.54, indicating a moderately strong positive relationship. This suggests that as the GDP of these East African importing countries rises, their import capacity for South African wine also tends to increase. This relationship implies that economically

stronger markets in these countries have a greater capacity to import, which supports higher volumes of South African wine exports.

The correlation coefficient between South Africa's wine exports and the population (POP) of Mauritius, Kenya, and Tanzania is 0.89, reflecting a strong positive relationship. This suggests that larger populations in these East African markets drive greater demand for South African wine, thereby increasing export volumes. The correlation coefficient between South Africa's wine exports and the import duty (IDU) is 0.12, indicating a very weak positive relationship. This minimal association implies that tariff rates in these importing markets do not significantly impact the volume of South African wine exports.

The correlation coefficient between South Africa's wine exports and Foreign Direct Investment (FDI) in these countries is -0.16, showing a weak negative relationship. This suggests that FDI inflows in Mauritius, Kenya, and Tanzania have a minimal inverse effect on South Africa's wine exports, possibly because FDI does not directly boost import demand for South African wine. The correlation coefficient between South Africa's wine exports and Inflation Rate (IR) in these countries is 0.24, signifying a weak positive relationship. This indicates that rising inflation rates in these importing countries are slightly associated with higher levels of wine imports from South Africa, although the effect is limited.

The correlation coefficient between South Africa's wine exports and Production Capacity (PC) is 0.61, indicating a moderately strong positive relationship. This suggests that as production capacity in these East African countries grows, wine export volumes from South Africa also tend to increase, possibly due to an overall boost in economic activity that supports higher imports. The correlation coefficient between South Africa's wine exports and Exchange Rate (XR) is -0.44, suggesting a weak negative relationship. This implies that as wine exports increase, there may be a slight depreciation in the South African rand relative to these East African currencies, potentially indicating a competitive edge due to currency shifts. The correlation coefficient between South Africa's wine exports and Price (P) is -0.12, indicating a weak negative relationship. This suggests that as South African wine export volumes increase, prices may decrease slightly, though this effect is limited.

In conclusion, the correlation analysis provides valuable insights that justify the inclusion of the selected explanatory variables in modelling South Africa's wine exports to Mauritius, Kenya, and Tanzania. The positive correlations between South Africa's wine exports and variables such as Importers' GDP, Population, and Production Capacity demonstrate the critical role of economic size, demand potential, and production efficiency in shaping export volumes. These economic and demographic indicators serve as fundamental drivers, making their inclusion essential for capturing the primary factors influencing demand for South African wine in these East African markets.

Similarly, variables such as Trade Openness and FDI, although negatively correlated, are essential in the model as they reflect the potential constraints or facilitators affecting South Africa's access to these markets. Trade openness reveals the influence of market access conditions on exports, while FDI serves as an indicator of economic integration that may impact local consumption patterns and competition, even if its effect is limited.

Factors like Exchange Rate and Inflation Rate, though weaker in correlation, are also justifiable as they capture price competitiveness and purchasing power effects, which could influence consumer behaviour and trade dynamics. The Exchange Rate, in particular, adds depth by illustrating the competitiveness of South African wine prices against local alternatives, and Inflation Rate reflects broader economic stability and its potential impact on demand. Overall, the inclusion of these explanatory variables is well-justified, as they provide a comprehensive framework for understanding the various economic, demographic, and policy-related factors that influence the demand for South Africa's wine exports to these East African countries.

4.4.2 Correlation among explanatory variables

The correlation matrix in Table 4.2 also provides insight into the extent of multicollinearity among the explanatory variables based on correlation coefficients, which indicate the strength of the linear relationships between pairs of variables. Weak multicollinearity is suggested by correlation coefficients below 0.5, indicating a low level of association between variables (Hair, et al., 2014). For instance, the coefficients between Foreign Direct Investment (FDI) and Importers' GDP (GDP) at 0.27, as well

as between Exchange Rate (XR) and Importers' GDP at 0.03, fall below this threshold, suggesting minimal risk of multicollinearity.

Moderate multicollinearity generally corresponds to coefficients between 0.5 and 0.7 (Gujarati and Porter, 2009). Accordingly, some coefficients, such as that between Importers' Population (POP) and Trade Openness (TO) at 0.70, as well as Importers' Population (POP) and Foreign Direct Investment (FDI) at 0.55, suggest a moderate level of association. Severe multicollinearity is typically indicated by coefficients above 0.7, where the association between variables is high enough to risk model instability (Greene, 2018).

In Table 4.2, no coefficient exceeds this threshold, suggesting that severe multicollinearity is not present among the explanatory variables. Overall, the correlation matrix reveals that while some moderate correlations exist, they do not reach levels that would indicate severe multicollinearity. This supports the inclusion of all explanatory variables, as they are likely to contribute unique and independent information to the model without significantly inflating variance in the estimates.

4.5 Multicollinearity results

The Variance Inflation Factor (VIF) was used to confirm the correlation analysis results, providing a more comprehensive check for multicollinearity among predictor variables. According to the decision rule, VIF values below 5 indicate that multicollinearity is not a major concern, a rating of 5-10 indicate moderate severity but acceptable multicollinearity, and ratings higher than10 indicate serious multicollinearity issues that may require adjustments (Shrestha, 2020; Kutner et al., 2005). The VIF results for each variable are summarised in Table 4.3 below.

Table 4.3: Multicollinearity results

Variables	Coefficient	VIF	Tolerance
POP	5.3305	1.226	0.993
GDP	11.4354	1.6553	0.975
IR	1.6710	3.334	0.900
TO	5.0008	2.360	0.940
PW	4.9197	4.064	0.89
PC	1.2511	1.607	0.941
IDU	6.5709	1.4978	0.96
FDI	2.1111	1.467	0.978
XR	2.484	3.296	0.918
TO	4.9308	5.1454	0.787

The VIF values for most variables fall below 5, indicating that multicollinearity is not a significant concern for these predictors. The variable TO (International Trade Openness) has a VIF of 5.1454, suggesting moderate but acceptable multicollinearity. Since no VIF values exceed the threshold of 10, no serious multicollinearity issues are present in this model, and adjustments to the predictor variables are not necessary. Additionally, all tolerance values are above 0.1, further suggesting that multicollinearity is not a major concern. This aligns with the VIF results, confirming that the predictors are mostly independent of each other, ensuring reliability and interpretability of the model results. These findings confirm the initial correlation analysis, which also suggested no severe multicollinearity among the variables. Therefore, the model results remain reliable, consistent, and interpretable for further analysis.

4.6 Unit root test results

The Im-Pesaran-Shin (IPS) test was conducted to assess the stationarity of the panel data, ensuring valid inference within the gravity model by minimising the risk of spurious regression results. In the IPS test, the null hypothesis assumes the presence of a unit root (non-stationarity), while the alternative hypothesis suggests that the data series is stationary. If the p-value is less than 0.05, we reject the null hypothesis, confirming that the data are stationary; if the p-value is greater than 0.05, we fail to reject the null, indicating non-stationarity (Im et al., 2003). The W-statistic, a standardised version of the IPS test statistic, is primarily used to determine the p-value and guide the decision to accept or reject the null hypothesis of a unit root. This statistic provides a clearer, standardised metric that accounts for cross-sectional heterogeneity, making it preferable for interpreting overall stationarity in panel data compared to the t-statistic (Baltagi, 2008). The results of the IPS test are presented in Table 4.4 below, showing the overall W-statistic, p-value, and expected values (E(t) and E(Var)) under the null hypothesis of no unit root.

Table 4.4: IPS test results (overall panel)

Statistic	Value
W-statistic	-4.01201
p-value	0.000***
E(t)	-1.488
E(Var)	1.255

Source: Author's compilation (2024)
Note: *** Indicates significance at the 1% level

The overall W-statistic for the panel is -4.0829, a strongly negative value, suggesting evidence against the null hypothesis of a unit root and implying that the panel data is likely stationary. This is confirmed by a p-value of 0.000, which is below the common significance level of 0.05. This means a rejection the null hypothesis of non-stationarity (unit root) at the 5% significance level. The E(t) and E(Var) values represent the expected t-statistic and variance under the null hypothesis of non-stationarity. The W-statistic, which is calculated in relation to these expected values, serves as a standardised measure to test for unit roots. A significant deviation of the W-statistic from the null hypothesis expectations (indicated by a low p-value) confirms the rejection of the null hypothesis and supports the conclusion that the panel data is stationary (Im et al., 2003).

Overall, the IPS test results provide strong evidence of stationarity, minimising the risk of spurious regression results and ensuring that the gravity model's estimates are valid for inference. The stationarity of the data supports reliable interpretation of time-dependent relationships within the model, allowing for the robustness of further analyses conducted in this study.

4.7 Gravity model estimation results

In this study, the estimation of the gravity model involved evaluating three panel data approaches: pooled OLS, random effects, and fixed effects models. The pooled OLS model is considered less desirable for the analysis in this study due to its assumption of homogeneity across countries, which disregards country-specific characteristics and can lead to omitted variable bias. Therefore, to ensure the most suitable model was selected, both a Redundant Fixed Effects Likelihood Ratio (LR) test and a Hausman test were performed.

The Redundant Fixed Effects test was used to compare the pooled model to the fixed effects model, with a null hypothesis that the pooled model was appropriate. The results confirmed that fixed effects are necessary to capture country-specific heterogeneity. Subsequently, the Hausman test was used to compare the fixed and random effects models to determine if random effects were appropriate. The test results supported the use of the fixed effects model. The detailed results for the LR test, Hausman test and fixed effects are presented and discussed in this section.

4.7.1 Redundant Fixed Effects LR test results

The Redundant Fixed Effects LR test was applied to determine whether the fixed effects model offered a significant improvement over the pooled OLS model. The LR results are presented in Table 4.5. The hypotheses are as follows:

- Null Hypothesis (H_0): The pooled effects model is appropriate.
- Alternative Hypothesis (H_1): The fixed effects model is appropriate.

Table 4.5: LR test results

Effects test	**Statistic**	**Prob**
Cross section F	8.569113	0.0015***
Cross-section chi-square	20.738059	0.0000***

Source: Author's computation (2024)
Note: *** Indicates significance at the 1% level

The LR test results indicate a Cross-section F statistic of 8.569 with a p-value of 0.0015, and a Cross-section chi-square of 20.7381 with a p-value of 0.0000. Since both p-values are below the 0.05 significance level, we reject the null hypothesis. This confirms that the fixed effects model is more suitable than the pooled model, as it accounts for country-specific effects that enhance the model's explanatory power. Subsequently, the Hausman test was used to compare a suitable model between the fixed and random effects models. The results are presented in the next section.

4.7.2 Hausman test results

Following the LR test results, the Hausman test was conducted to choose between the fixed and random effects models. The Hausman test results are as displayed in Table 4.6. The hypotheses for the Hausman test are as follows:

- **Null Hypothesis (H_0)**: The random effects model is appropriate.
- **Alternative Hypothesis (H_1)**: The fixed effects model is appropriate.

Table 4.6: Hausman test results

Statistic	**Value**	**P-value**
Chi-square test statistic	21.200480	0.0000***

Source: Author's computation (2024)

Note: *** Indicates significance at the 1% level

The Hausman test results show a significant test statistic of 21.20 with a p-value below 0.05, leading to rejection of the null hypothesis. This means that the random effects model is not appropriate for empirical analysis. Thus, the result supports the use of the fixed effects model, as it indicates a correlation between country-specific effects and explanatory variables, which the fixed effects model can account for. Thus, the Hausman test results confirmed fixed effects model as appropriate for examining factors affecting South African wine exportation to the selected East African countries. The results are presented in the section that follows.

4.8 Empirical gravity model results

This section presents a comprehensive analysis of the factors affecting South African wine exports to the selected East African countries. It begins by examining key model diagnostics, including the Durbin-Watson statistic, R-squared, and Adjusted R-squared, to evaluate model fitness and the presence of autocorrelation. The discussion then shifts to significant results in the fixed effects model, exploring the role of various factors in determining South African wine exportation. Additionally, the section addresses insignificant results, offering insights into why certain factors do not substantially affect wine exports. Finally, the main findings are summarised to underline both the consistencies with and divergence from previous studies and the unique regional dynamics shaping the demand for South African wine in these East African markets. Table 4.7 displays the gravity model results estimated using the pooled, random, and fixed effects models.

Table 4.7: Empirical gravity model results

Variables	Pooled Model	Random Effects Model	Fixed Effects Model
PC	14.016 (0.028)**	14.016 (0.050)*	10.051 (0.027)**
PW	21.406 (0.7003)	21.406 (0.7003)	16.129 (0.7523)
TO	-44.246 (0.3323)	-16.220 (0.6437)	-33.617 (0.3307)
IR	-24.97 (0.1309)	-17.28 (0.115)	-22.94 (0.0478)**
POP	0.005 (0.010)**	0.002 (0.100)	0.3770 (0.020)**
GDP	20.742 (0.0249)*	41.887 (0.080)*	41.975 (0.1101)
FDI	-14.129 (0.005)***	-8.280 (0.007)***	-8.353(0.0156)**
IDU	21.235 (0.010)**	47.358 (0.6484)	23.959 (0.020)**
XR	63.203 (0.001)***	23.284 (0.006)***	30.1229 (0.030)**
Number of observation	36	36	36

R-Squared	0.7614	0.7210	0.855
Adjusted R-squared	0.7210	0.6034	0.821
F-statistic	67.7701	52.987	42.8964
Durbin-Watson stat	2.3052	2. 2806	2.0598

Source: Author's computation (2024)
Notes: * = 10%, ** = 5%, and *** = 1% significance levels

4.8.1 Goodness-of-fit evaluation

The Durbin-Watson statistic, the R-squared, and the Adjusted R-squared for the fixed effects model provide insights into autocorrelation and the model's explanatory power. The Durbin-Watson (DW) statistic for the fixed effects model is 2.0598, which is close to the ideal value of 2 (Baltagi, 2008). This suggests that the errors are relatively independent and not correlated over time, which is important for ensuring reliable coefficient estimates in panel data analysis (Wooldridge, 2010).

The R-squared for the fixed effects model is 0.855, indicating that 85.5% of the variation in the dependent variable (South African wine exports to Kenya, Tanzania, and Mauritius) is explained by the model's independent variables. This high R-squared value suggests that the model effectively captures the relationship between the dependent variable (South African wine exports) and its independent variables, as shown in Table 4.7.

The Adjusted R-squared for the fixed effects model is 0.821, which, while slightly lower than the R-squared, still indicates strong explanatory power. This adjusted value accounts for the number of predictors, showing that the model explains most of the variation in exports after adjusting for the number of predictors. Overall, high values of R-squared and Adjusted R-squared suggest that the fixed effects model has the best explanatory power among the three models (Pooled, Random, and Fixed Effects). This validates the fixed effects model as the best-performing model in terms of fit, which aligns with earlier findings from the Likelihood Ratio (LR) test and the Hausman test, both of which favoured the fixed effects specification by confirming its suitability over the other models. Accordingly, the fixed effects results are discussed in the next section.

4.8.2 Discussion of significant fixed effects results

Statistically significant positive effect of production capacity (PC) at the 5% level demonstrates its substantial role in driving South African wine exports to Kenya, Tanzania, and Mauritius. With a coefficient of 10.051, the findings show that a 1% increase in production capacity corresponds to a 10.051% rise in wine exports, *all else being equal*. This reinforces the idea that expanding production capacity within South Africa's wine industry enhances its export potential to these East African markets. These results align with previous studies by Idsardi (2013), Phaleng (2020), and Wani (2024), which also found that increased production capacity strengthens the export performance of agricultural goods.

The inflation rate (IR) of the importing countries has a negative coefficient of -22.94, with statistical significance at the 5% level. This suggests that a 1% increase in inflation corresponds to a 22.94% decrease in South African wine exports, *ceteris paribus*. This means that higher inflation in these countries reduces their purchasing power, leading to a decline in demand for imported goods like South African wine. While some empirical studies, such as those by Ball (2005), Okpe and Ikpesu (2021), and Herrera and Baleix (2010), have found that high inflation rates in importing countries can sometimes boost demand for imports, due to rising domestic prices making foreign goods relatively more attractive, this effect does not hold in this study. The negative effect suggests that inflationary pressures in Kenya, Tanzania, and Mauritius lower consumer demand, overshadowing any potential for imports to appear more cost-competitive. Therefore, in this study, as inflation rises in these East African markets, the demand for South African wine declines, possibly due to constrained budgets and reduced affordability for non-essential imports like wine.

The population of the importing countries (POP) has a coefficient of 0.37 and is significant at the 5% level. This means that a 1% increase in population corresponds to a 0.37% increase in South African wine exports, all else being equal. This result implies that larger populations in Kenya, Tanzania, and Mauritius support greater demand for imported goods, including South African wine, by expanding the consumer base and enhancing market potential. This positive effect of population on export demand is consistent with findings from studies by Matyas (1997) and Thuong (2018), which show that a higher population in importing countries drives demand for exports.

Mamashila (2017) similarly found that population growth can increase export volumes, encouraging production in the exporting country. Studies by Idsardi (2013), Potelwa (2016), Bekatfech and Mehare (2020), and Wani (2024) also support the link between population size and export potential, reinforcing that a larger population enhances export opportunities. Therefore, as the populations in Kenya, Tanzania, and Mauritius expand, South Africa's wine industry stands to benefit from increased demand, with a broader consumer base contributing to higher export volumes and stronger market potential in these East African countries.

The coefficient for importers' FDI is -8.35, and significant at the 5% level, indicating an inverse relationship between FDI and South African wine exports to Kenya, Tanzania, and Mauritius. This means that a 1% increase in FDI in these East African countries is associated with an approximate 8.35% decrease in South African wine exports, holding other factors constant. This significant negative effect is contrary to the expectation that increased FDI would support higher demand for imports, including South African wine. Typically, higher FDI is associated with greater economic openness, increased purchasing power, and enhanced demand for foreign goods, especially where local production is limited.

Previous studies, such as those by Keho (2020), Hassan (2002), Mukhtarov (2019), and Karimov (2020), suggest that FDI generally boosts import demand by increasing reliance on foreign products when these are not produced domestically. However, the large negative coefficient in this study implies that as FDI grows, these East African countries might be channeling investment into strengthening domestic industries, reducing the need for imported wine from South Africa. This suggests that higher FDI could lead to import substitution effects, where local production increasingly meets demand, thereby reducing reliance on South African wine imports. Thus, while FDI often signifies economic openness, in this context, it may also reflect shifts towards self-sufficiency in wine production.

The coefficient for the import duty (IDU) is 23.96, and significant at the 5% level. This means that, although import duty is a fixed percentage, a 1% increase in the import duty corresponds to an approximate 23.96% increase in South African wine exports to Kenya, Tanzania, and Mauritius, holding other factors constant. This positive elasticity suggests that a high import duty, implying higher customs fees, correlates

with increased wine exports, even though it raises import costs for the receiving country. This result contrasts with typical expectations that increased trade barriers would lower export potential. This unexpected relationship may indicate that trade agreements or mechanisms that reduce or waive customs fees are supporting wine exports, making South African wine more attractive and competitive in these markets.

In contrast, Phaleng (2020) found that import duties had a negative effect on South African fruit exports to West Africa, where higher duties increased costs and reduced competitiveness. The positive effect on wine exports to East Africa may reflect unique demand, market structure, or favourable trade terms. Additionally, South Africa's shared trade union membership with these importing countries may lower effective customs fees, thereby facilitating wine exports despite nominally higher duties (SARS, 2021). For example, South Africa, Tanzania, and Mauritius are members of SADC with a Free Trade Area (FTA) agreement, where goods traded within the region, such as South African wine, often receive reduced or zero-rated customs duties. Thus, while nominal import duties may appear high, SADC agreements allow South Africa to leverage reduced effective duties, boosting its wine export potential in Tanzania and Mauritius.

The coefficient for the exchange rate (XR) is 30.12, and significant at the 5% level. This means that a 1% depreciation of the South African rand leads to an approximate 30.12% increase in wine exports to Kenya, Tanzania, and Mauritius, all else being equal. This suggests that a weaker rand boosts demand for South African wine by making it more affordable in these markets. According to the Mundell-Fleming model (Phaleng, 2020), currency depreciation enhances export competitiveness by lowering prices abroad. While agricultural exports like wine may have relatively inelastic demand (Idsardi, 2013), the positive relationship implies that rand depreciation still significantly supports export volumes by enhancing South African wine's affordability in the selected East African countries. However, Phaleng (2020) established a positive association among the exchange rate and South Africa's exportation of fruits to West Africa, meaning that the effect of exchange rates on export demand may vary across products and regions.

4.8.3 Discussion of insignificant fixed effects model results

The insignificance of importers' GDP in this study suggests that economic growth in Kenya, Tanzania, and Mauritius may not directly translate into increased demand for South African wine. This deviation from prior studies, such as those by Phaleng (2020), Mosikari and Eita (2016), Bekatfech and Mehare (2020), and Wani (2024), may be due to cultural preferences or limited awareness, which restrict wine demand regardless of overall economic prosperity. In other words, while GDP growth boosts purchasing power, it does not necessarily increase consumption of specific imports like wine in these East African markets, which may be more niche or non-essential for consumers.

The lack of significance for trade openness implies that even when these East African countries are relatively open to trade, other non-tariff barriers or local competition might limit the benefits for South African wine exports. Although trade openness generally eases the entry of imports, as per Azhar (2014) and Yang et al. (2022), this result suggests that wine, as a product, faces unique barriers, potentially related to regional preferences, or regulations that restrict its market penetration. Thus, trade openness in general does not automatically translate to higher demand for South African wine specifically.

The insignificance of the price of wine (PW) variable indicates that price changes may not strongly affect consumer demand for South African wine in these countries, possibly due to a niche market base with inelastic demand. While economic theory suggests that higher prices reduce demand, this result could indicate that consumers in Kenya, Tanzania, and Mauritius who purchase South African wine are less sensitive to price changes. Alternatively, it may suggest that these markets have limited awareness or access to competitive price points, which diminishes the expected effect.

4.8.4 Summary of the main findings

The results from the fixed effects analysis on South African wine exports to the selected East African countries share similarities with prior studies. For instance, as with prior studies, this study highlighted the importance of production capacity, importers' GDP, population size, exchange rates, and trade conditions (like import duty) on export values. The significant positive effect of production capacity aligns well with previous findings by Idsardi (2013), Phaleng (2020), and Wani (2024), indicating

that greater production enhances export performance, a consistent theme across the reviewed agricultural export literature.

However, some findings diverged from typical expectations, with both significant and insignificant results providing insights into trade dynamics specific to wine exports. For significant, while FDI often positively affects import demand, as noted by Keho (2020), Mukhtarov (2019), and Karimov (2020), in this study, FDI had a robust negative relationship with wine exports. This shows that increased investment may focus on local industries, reducing dependency on imports, which could indicate an import substitution trend. Additionally, the negative significant effect of importers' inflation contrast with studies by Ball (2005) and Okpe andIkpesu (2021), which found that inflation boosts demand for imports due to cost competitiveness. In this case, inflation instead appears to suppress wine imports, which likely reflects non-essential status of wine and constrained budgets in East African markets.

For the insignificant results, while importers' GDP is often found to positively affect import demand, as highlighted by Phaleng (2020), Mosikari and Eita (2016), Bekatfech and Mehare (2020), and Wani (2024), in this study, importers' GDP did not show a significant impact on South African wine exports. This deviation may be due to specific preferences or limited demand for non-essential imports like wine, which may not directly respond to general economic growth.

Similarly, trade openness has typically been linked to higher import flows in studies by Azhar (2014) and Yang et al. (2022). However, in this study, trade openness did not significantly affect wine exports, possibly due to product-specific barriers, such as local preferences or non-tariff restrictions, which can limit the expected effect of trade openness on wine imports.

Lastly, while economic theory generally suggests that price changes affect consumer demand. This study found no significant effect of wine price on demand, a deviation from expectations of price sensitivity. This suggests that demand for wine in the selected East African countries might be more inelastic or niche-specific, where price fluctuations have less influence on consumer behaviour.

In summary, while the results reflect shared patterns in production capacity, population size, and economic growth (aligning with findings by Idsardi, Potelwa, and others),

unique regional factors, particularly FDI impacts and inflationary effects, add new insights to understanding trade dynamics specific to wine exports in East Africa. This underscores the need for tailored trade strategies that consider both common economic drivers and context-specific influences.

4.9 Validation of the fixed effects results

4.9.1 The Dumitrescu and Hurlin panel Granger causality test

Table 4.8 shows the Dumitrescu and Hurlin results for validation of the fixed effects results by assessing potential causal relationships between the identified factors and wine exports. The test's null hypothesis specifies that there is no causal relationship among the variables, whereas the alternative hypothesis asserts that causality exists. According to the decision rule, if the p-value is less than 0.05, the null hypothesis is rejected, indicating a statistically significant causal relationship between the factors and wine exports. The null and alternative hypotheses for testing the assumption of no causality are as follows (Dumitrescu and Hurlin, 2012).

- Null hypothesis (H_0): There is no Granger causality from one variable to another across all cross-sectional units in the panel.
- Alternative hypothesis (H_1): There is Granger causality from one variable to another in at least one cross-sectional unit in the panel.

Table 4.8: Dumitrescu and Hurlin test results

Null hypotheses	P-value	W-stat	Zbar-stat	Causality
FDI–Export	0.5898	0.83867	3.6798	No
Export–FDI	0.0235**	2.49053	0.0245	Yes
GDP–Export	0.588	3.285	1.6248	No
Export–GDP	2.05	3.04567	1.8726	No
POP–Export	0.41	2.1373	0.7256	No
Export–POP	0.511	3.39743	1.5600	No
IR–Export	0.7979	3.2566	1.5878	No
Export–IR	0.04**	4.5129	3.1793	Yes
PC–Export	0.70	2.6289	0.62480	No

Export–PC	0.01**	3.86399	2.30248	Yes
PW–Export	0.58	3.2189	1.5582	No
Export–PW	0.01**	3.8694	2.4049	Yes
XR–Export	0.88	2.6209	0.2498	No
Export–XR	0.71	3.3154	1.950	No
IDU–Export	0.52	3.28479	1.4908	No
Export–IDU	0.79	3.25903	1.4859	No
TO-Export	0.51	0.54	0.64	No
Export-TO	0.16	2.02	1.39	No

Source: Author's computation (2024)

Notes: ** Indicates significance at the 5% level

The findings suggest no bidirectional causality among South Africa's wine exports and the explanatory variables. Instead, the causality identified is primarily unidirectional, with exports influencing certain variables rather than these variables influencing exports. Specifically, significant causality was found from Exports to FDI, IR, PC, and PW, suggesting that wine exports Granger-cause foreign direct investment, inflation rates, production capacity, and wine prices in the selected East African countries.

However, no reverse causality was detected for these variables, as all p-values for the direction from Foreign Direct Investment (FDI), Inflation Rate (IR), Production Capacity (PC), and Price of Wine (PW) to Exports were not significant. This suggests that while exports Granger-cause these factors, the factors themselves do not drive the exportation of South African wine to the selected East African countries. Additionally, no causal relationships were detected between exports and Gross Domestic Product (GDP), Population Size (POP), Trade Openness (TO), Exchange Rate (XR), or Import Duties (IDU) in either direction, indicating limited influence of these factors on export volumes or vice versa.

The fixed effects results identified factors like Inflation Rate (IR), Foreign Direct Investment (FDI), Production Capacity (PC), Population Size (POP), Import Duties (IDU), and Exchange Rate (XR) as significant drivers of wine exports, whereas the Granger causality test suggests that these factors do not necessarily cause changes in wine exports. Instead, exports influence some variables, such as Foreign Direct Investment (FDI), Inflation Rate (IR), Production Capacity (PC), and Price of Wine

(PW), indicating that causality primarily flows from exports to these factors rather than the other way around. This divergence suggests that while these factors correlate with wine exports in a fixed effects model, they do not all serve as direct causal drivers of exports in the Granger causality framework.

For variables that had no significant effect on wine exports, such as Trade Openness (TO) and Importers' Gross Domestic Product (GDP), the Granger causality results align with the fixed effects model findings, as no causality was detected in either direction. This suggests that these variables neither drive nor are driven by wine exports to the selected East African countries. However, a significant causality was detected from Exports to Price of Wine (PW), indicating that while wine prices did not significantly impact exports in the fixed effects model, changes in wine exports Granger-cause shifts in wine prices. This highlights a directional influence from exports to wine prices but no reciprocal effect.

4.9.2 Diagnostic test results

In addition to Granger causality testing, various diagnostic tests were conducted ensure the validity and accuracy of the fixed effects model results. The Jarque-Bera test assessed the normality of the residuals, the Breusch-Godfrey test checked for serial correlation, and the Breusch-Pagan-Godfrey test evaluated heteroscedasticity. Additionally, the Ramsey Regression Equation Specification Error Test (RESET) was employed to assess the functional form of the model. Together, these diagnostic tests served to verify that the model specification and assumptions were appropriate. This enhances the robustness and reliability of the fixed effects results for factors affecting South African wine exports to selected East African countries. The results for each test are presented below.

4.8.2.1 Normality test results

Figure 4.1 below shows the normality test results for the residuals during the sample period. The statistical measures include central tendency indicators (mean and median), measures of dispersion (standard deviation), as well as skewness, kurtosis, the Jarque-Bera test statistic, and its associated p-value. The null and alternative hypotheses for normality assumption were stated as follows:

- Null hypothesis (H_0): The random error term is normally distributed.

- Alternative hypothesis (H_1): The random error term is not normally distributed.

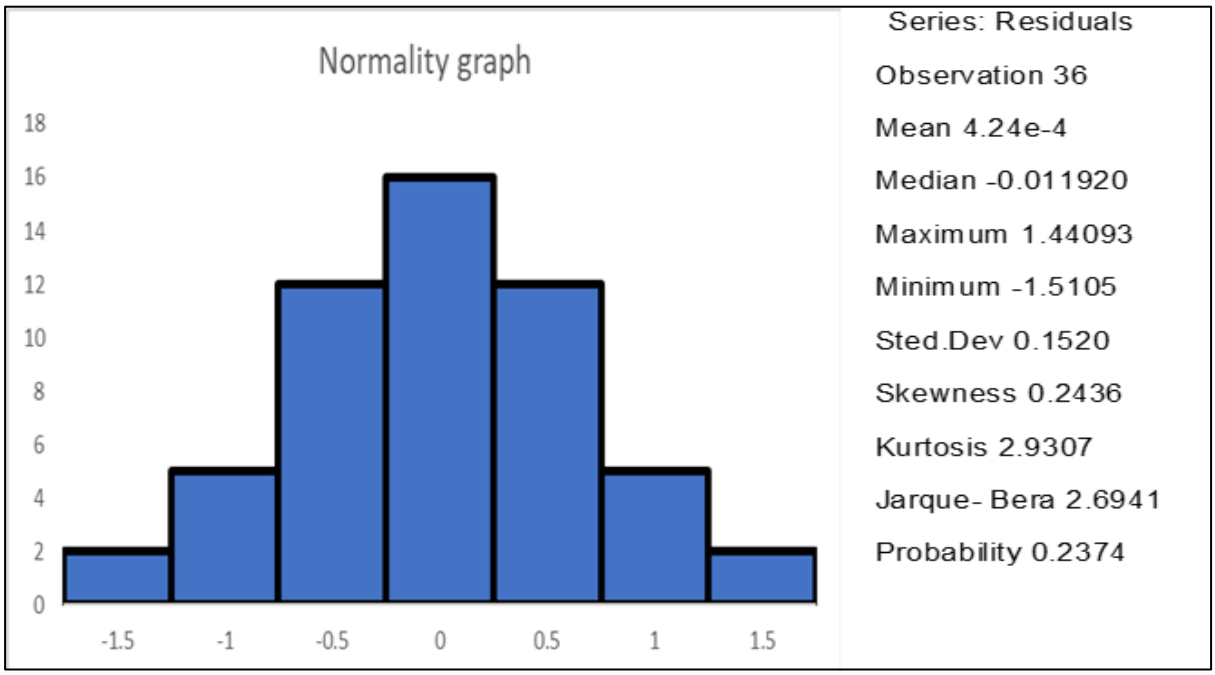

Figure 4.1: Normality test results

Source: Author's compilation (2024)

The histogram of residuals in Figure 4.1 shows a symmetrical, bell-shaped distribution, indicating an approximate normal distribution of the residuals in this study. The Jarque-Bera test yielded a statistic value of 2.69307 with a probability value of 0.2374. Given that the p-value exceeds the 0.05 significance level, we do not reject the null hypothesis of normality. This suggests that the residuals are normally distributed, thereby supporting the normality assumption and enhancing the reliability of the fixed effects model results in this study.

4.8.2.2 Serial correlation test results

Table 4.9 below demonstrates the findings of serial correlation tests. The table reports the F-statistic, Observed R-squared, and their associated p-values. The null and alternative hypotheses for testing the assumption of no presence of serial correlation are as follows:

- Null hypothesis (H_0): There is no serial correlation (the residuals are uncorrelated over time).

- Alternative hypothesis (H_1): There is serial correlation (the residuals are correlated over time).

Table 4.9: Serial correlation test results

F-statistics	2.2603	Prob. F stats	0.1520
Obs* R-squared	5.9135	Prob. Chi-square	0.1270

The serial correlation test results show an F-statistic of 2.2603 and a corresponding p-value of 0.1520. Given that this p-value exceeds the 0.05 significance level, we do not reject the null hypothesis, indicating no substantial evidence of serial correlation in the residuals. Similarly, the Obs* R-squared value is 5.9135, with a probability value of 0.1270. With this p-value also exceeding 0.05, we again fail to reject the null hypothesis, further indicating the absence of serial correlation. These results confirm that the model does not exhibit significant serial correlation, supporting the validity of the fixed effects model results in this study.

4.8.2.3 Heteroscedasticity test results

Table 4.10 below demonstrates the heteroscedasticity test results. The test statistics include the F-statistic, Obs*R-squared, and the Scaled Explained Sum of Squares, along with their corresponding p-values. The null and alternative hypotheses for testing the assumption of constant variance of error terms (homoscedasticity) are as follows:

- Null hypothesis (H_0): Heteroscedasticity does not exist (Homoscedasticity, i.e., the variance of the errors is constant).
- Alternative hypothesis (H_1): Heteroscedasticity exists (the variance of the errors is not constant, i.e., non-homoscedastic).

Table 4.10: Heteroscedasticity test results

F-statistics	0.3001	Prob.F-statistic	0.9744
Obs* R-squared	3.8583	Prob. Chi-square	0.9535
Scaled explained SS	12.0533	Prob. Chi-square	0.2815

Source: Author's compilation (2024)

The results for heteroscedasticity indicate that the F-statistic is 0.3001, with a probability value (p-value) of 0.9744. Since this p-value is greater than the 0.05 significance level, we fail to reject the null hypothesis, suggesting no significant evidence of heteroscedasticity in the model. Additionally, the Obs* R-squared value is 3.8583, with a probability value of 0.9535, which also exceeds 0.05. This further supports the absence of heteroscedasticity. The Scaled Explained Sum of Squares (SS) test yields a Chi-square statistic of 12.0533 with a p-value of 0.2815, which is also above the 0.05 threshold. Collectively, these results confirm that the model does not exhibit significant heteroscedasticity, supporting the reliability of the fixed effects model results in this study.

4.8.2.4 Functional form test results

Table 4.11 displays the results of the Ramsey RESET test, which evaluates whether the functional form of the fixed effects model is appropriately specified. The test outputs include the t-statistic, F-statistic, and Likelihood Ratio, each accompanied by their respective p-values. The null and alternative hypotheses for the Ramsey RESET test on model specification are as follows:

- Null hypothesis (H_0): The model is correctly specified (no functional form misspecification).
- Alternative hypothesis (H_1): The model is misspecified (functional form misspecification exists).

Table 4.11: Functional form test results

Statistic	Value	P-value
T-statistic	0.3785	0.6988
F-statistic	0.8156	0.6699
Likelihood Ratio	0.0846	0.6396

Source: Author's compilation (2024)

The results for the Ramsey RESET indicate that the t-statistic is 0.3785, with a probability value (p-value) of 0.6988. Since this p-value is greater than the 0.05 significance level, we fail to reject the null hypothesis, indicating no evidence of misspecification in the model's functional form. The F-statistic is 0.8156, with a p-value of 0.6699, which also exceeds the 0.05 significance threshold. This further supports

that the model's functional form is correctly specified. The Likelihood Ratio yields a statistic of 0.0846 with a p-value of 0.6396, which again surpasses the 0.05 level, confirming the absence of significant functional form misspecification. Overall, the Ramsey RESET test results confirm that the model's functional form is appropriate, supporting the validity of the specified model in this study.

Overall, the fixed effects model applied in this study has undergone through diagnostic testing to ensure robustness and reliability in assessing factors affecting South African wine exports to selected East African countries. The normality, serial correlation, and heteroscedasticity tests confirmed that model assumptions were met, with no significant issues detected in the residuals. Additionally, the Ramsey RESET test verified the model's functional form, supporting its validity. Together, these results strengthen confidence in the accuracy of the fixed effects model, underscoring its suitability for empirical analysis.

4.10 Chapter summary

This section presented an analysis of the trends in South Africa's wine exports, addressing the first objective of the study by examining export patterns from 2011 to 2022, measured in rand. The trend analysis included an overall view of exports to Africa, identified the top ten African importers, and provided a focused examination of South Africa's wine exports to East Africa, including the top East African importers and the selected countries of interest.

Additionally, the findings of several analytical techniques used to examine factors influencing South African wine exports to selected East African countries were presented, addressing the study's second objective. This entailed pre-analysis steps, including descriptive statistics, correlation analysis, multicollinearity testing, and unit root testing, which provided foundational insights and ensured the suitability of the data for further analysis. Following this, the empirical estimations of the gravity model were discussed, highlighting key relationships within the data. To confirm the robustness and reliability of these findings, the section concluded with results from the Dumitrescu and Hurlin Panel Granger Causality Test, along with diagnostic test results, which ensured the empirical model's validity and the accuracy of its conclusions. The subsequent section offers a summary, conclusions, and

recommendations based on the study's results, along with the delimitations and suggestions for future research.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter comprises the key findings and issues discussed in each chapter of the study. By doing so, it serves as a comprehensive summary that highlights important aspects addressed throughout the research. Additionally, it presents concluding remarks, policy recommendations, delimitations, and suggestions for future research.

5.2 Summary

This study investigated factors affecting South African wine exports to selected East African countries, namely Tanzania, Kenya, and Mauritius, using secondary time-series data from 2011 to 2022. For the analysis, data were obtained from reputable organisations, including the International Trade Centre (ITC), International Trade Administration (ITA), World Bank's World Development Indicators (WDI), and the South African Wine Industry Information and Systems (SAWIS). These authoritative sources were selected to ensure reliability, comprehensiveness, and relevance in the analysis, providing robust data essential for accurately modelling the factors influencing South African wine exports to these markets.

The trend analysis was conducted to identify trends over time in the exportation of South African wine to the selected East African countries over the study period, thereby achieving the first objective of the study. This included an overall trend in South Africa's wine exports to Africa, East Africa, and the top East African importers of South African wine, including the selected countries of interest. Overall, the trend results showed that South African wine exports to Africa exhibited an upward trend, with notable growth between 2013 and 2015 and a recovery in 2021 after the pandemic-related decline in 2020. Southern and Eastern Africa emerged as the main markets, with steady growth in demand, while West and Middle Africa showed low and stable export values, indicating limited expansion potential. Kenya and Tanzania stood

out as the strongest markets with consistent demand, while Mauritius showed moderate demand, supporting the study's focus on these East African markets.

Various analytical techniques were employed to examine factors affecting the exportation of South African wine to the selected East African countries, thereby achieving the second objective of the study. Specifically, correlation matrix revealed no severe multicollinearity among the explanatory variables. VIF and tolerance confirmed the initial correlation analysis, which also suggested no severe multicollinearity among the variables. This supports the inclusion of all explanatory variables in the analysis. Additionally, the correlation analysis revealed that South Africa's wine exports were positively associated with GDP, population, and production capacity, indicating that economic size and demand potential drove exports. Weaker associations with trade openness, FDI, inflation, exchange rate, and price highlighted additional but limited influences on export volumes.

Overall, the IPS test results provided strong evidence of stationarity, minimising the risk of spurious regression results and ensuring that the gravity model's estimates were valid for inference. The Redundant Fixed Effects LR test confirmed that the fixed effects model was more suitable than the pooled model, as it accounted for country-specific effects that enhanced the model's explanatory power. The Hausman test supported the use of the fixed effects model.

The fixed effects model results indicated that several factors inhibited South African wine exports to the selected East African countries. Specifically, the inflation rate (IR) and foreign direct investment (FDI) negatively influenced wine export volumes. Higher inflation rates in importing countries, such as Kenya, Tanzania, and Mauritius, decreased consumer purchasing power, thereby reducing demand for non-essential goods like wine. Similarly, FDI exhibited a negative effect, suggesting that increased investments in these countries may focus on strengthening local industries, reducing reliance on imported wine from South Africa through import substitution.

Conversely, certain factors positively affected South African wine exports. Increased production capacity (PC) within South Africa showed a significant positive effect, reinforcing the idea that greater production enables higher export volumes. Population size (POP) in the importing countries also had a positive effect, as larger populations in East African markets likely expanded the consumer base and heightened demand

for imported goods like wine. Additionally, despite high nominal import duties (IDU), the effect was positive, likely due to trade agreements that reduce effective duties, making South African wine more competitive in these markets. A favourable exchange rate (XR), with a weaker rand, further boosted export demand by making South African wine more affordable in East Africa.

Several factors showed no significant effect on wine exports. Importers' GDP did not significantly influence wine demand, possibly due to wine's status as a non-essential good. Similarly, trade openness (TO) did not significantly affect wine exports, likely due to local preferences or non-tariff barriers that limit wine imports despite generally open trade conditions. The price of wine (PW) also had no significant effect, suggesting that demand may be niche or inelastic, with consumers in these countries showing limited sensitivity to price changes.

While certain factors correlate with South Africa's wine exports, the causality primarily flows from exports to variables like Foreign Direct Investment (FDI), Inflation Rate (IR), Production Capacity (PC), and Price of Wine (PW), rather than the reverse, with no bidirectional relationships detected. Overall, diagnostic test results confirmed the robustness and validity of the fixed effects model, ensuring its reliability in analysing factors affecting South African wine exports to selected East African countries.

5.3 Conclusion

The study had one hypothesis for the second objective, which stated that identified factors do not significantly affect South Africa's wine exports to the selected East African countries over the study period. This hypothesis is rejected, as fixed effects results revealed that inflation rate (IR) and foreign direct investment (FDI) had a negative and significant effect on South Africa's wine exports. These findings indicate a strong inverse relationship with South Africa's wine exports, supported by low p-values (i.e., less than 0.05 across) and negative coefficients, implying rejection of the null hypothesis that these factors do not significantly affect exports.

Additionally, fixed effects results showed that production capacity (PC), population size (POP), import duties (IDU), and exchange rate (XR) had a positive and significant effect on South Africa's wine exports. These findings indicate a proportional relationship with exports, supported by low p-values (i.e., less than 0.1 across) and

positive coefficients, further rejecting the null hypothesis. Overall, the hypothesis is rejected, as the fixed effects results confirmed that the identified factors significantly affect South Africa's wine exports to the selected East African countries over the study period.

5.4 Recommendations

The empirical results revealed inhibiting and enabling factors affecting South African wine exports to selected East African countries. Given this, the following policy strategies are recommended to address inhibiting factors and promote enabling factors.

5.4.1 Strategies for addressing inhibiting factors

(a) Mitigate effect of inflation

To counter the negative effect of high inflation rates in the importing countries, it is recommended that importing country governments incorporate pricing flexibility or hedging strategies to help stabilise wine prices. This highlights the importance of proactive trade policies to address inflationary pressures in importing countries. Additionally, South African wine exporters could explore more affordable wine options tailored to lower-income consumer segments, which would help maintain demand during inflationary periods.

(b) Manage the negative effect of FDI on exports

Since increased FDI in these countries supports domestic industries and leads to import substitution, South African wine exporters could establish partnerships or joint ventures with local businesses in East Africa. These collaborations could enable partial local production, ensuring a South African presence in the wine market while aligning with local investment priorities and fostering mutual growth.

5.4.2 Strategies for promoting enabling factors

(a) Expand production capacity

The positive relationship between production capacity and wine exports suggests that South African wine producers should continue investing in the wine industry to boost production efficiency and capacity. Policies supporting technological advancements, sustainable farming practices, and workforce training should be promoted by South

African government agencies and industry associations to strengthen production and ensure a consistent supply to meet East African demand.

(b) Leverage population growth

As population size positively affects exports, South African wine exporters should focus on marketing strategies that raise awareness and demand among the expanding middle-income consumer groups in East Africa. Promotional campaigns, wine-tasting events, and packaging that appeals to local preferences can be promoted by wine industry marketers and trade promotion agencies to broaden the consumer base.

(c) Optimise trade agreements

The positive effect of import duties, likely facilitated by trade agreements, underscores the importance of South Africa's government actively participating in regional trade partnerships, such as the Southern African Development Community (SADC) and the African Continental Free Trade Area (AfCFTA). Continued advocacy for reduced tariffs and non-tariff barriers will ensure that South African wine exporters maintain competitive pricing in East African markets.

(d) Enhance exchange rate competitiveness

Given the positive effect of a weaker rand on exports, South African wine exporters should closely monitor exchange rates and adjust pricing strategies accordingly to maintain pricing advantages. This could include setting export prices in local currencies or adopting exchange rate hedging techniques to protect against fluctuations that might otherwise impact competitiveness. Industry associations can also offer guidance on best practices for navigating exchange rate volatility.

These strategies aim to mitigate challenges posed by inflation and FDI while leveraging production capacity, market potential, and trade agreements to sustain and grow South Africa's wine exports to East Africa. By targeting the relevant stakeholders in the proposed recommendations, the strategies can foster a collaborative approach to overcoming the identified challenges and driving long-term export success.

5.5 Delimitations and suggestions for future research

The study has several delimitations, which present opportunities for further research. The period of analysis (2011–2022) limits insights into long-term trends. Expanding

this timeframe could reveal how factors influencing South African wine exports evolve. Additionally, although factors like population, GDP, inflation rate, exchange rate relative to the South African currency, and trade openness vary across these countries, the analysis was conducted on a panel basis rather than individually. Accurate country-specific analyses would require an expanded dataset, as the current timeframe provides insufficient sample size for individual countries.

Additionally, the inclusion of dummy variables, such as trade bloc membership, highlights another limitation. South Africa shares trade union membership with Mauritius and Tanzania through SADC, granting duty-free access for wine exports to these countries, while exports to Kenya face import duties. However, since the analysis was conducted on a panel basis, it assumes uniform application of import duties across all three countries, which does not reflect reality. In practice, the costs of wine exports differ due to these variations in trade policies, underscoring the need for individual country-level analyses to account for such disparities.

The geographic focus on Kenya, Tanzania, and Mauritius restricts the study's scope. Future research could explore additional African markets to assess broader applicability. Additionally, non-tariff barriers, consumer preferences, and cultural factors were excluded. Future studies could incorporate these aspects for a comprehensive view of export dynamics. Finally, using only a fixed effects model restricts insights into dynamic relationships. Future research could apply models like Vector Autoregression (VAR) or dynamic panel data to capture time-varying effects on exports.

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