Effects of Exchange Rate, Inflation, and Interest Rates on Tea Exports in Kenya

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ABSTRACT

The international tea market exhibits significant price volatility, creating challenges for household incomes, food security, and government revenues in tea-producing nations. As a leading global tea exporter, Kenya faces similar risks due to fluctuations in tea export prices. This study explored the impact of selected macroeconomic variables, namely inflation rate, interest rates, and exchange rates, on Kenyan tea export prices, aiming to understand how these factors influence prices in international markets. Its objectives were to examine the effect of exchange rate changes, assess inflation's influence, and evaluate the impact of interest rates on tea export prices. Using a quantitative research design, the study analyzed quarterly time-series data from 2000 to 2022, incorporating quarterly dummy variables (with the fourth quarter as the reference) to account for seasonal variation. Descriptive statistics and the Augmented Dickey-Fuller (ADF) test ensured stationarity, while Ordinary Least Squares (OLS) regression estimated the relationships between each macroeconomic variable and tea export prices. Findings indicated that exchange rates and inflation significantly drove short-term price fluctuations, with exchange rate depreciation linked to price changes, and inflation showing a positive same-quarter effect but a negative effect in later quarters, reflecting delayed market adjustments. Interest rates had no significant impact. The study also noted price persistence and seasonal trends, particularly higher price changes in the third quarter. It concludes that stabilizing exchange rates and inflation, especially during high-demand quarters, is crucial for sustaining tea export earnings, while recognizing the influence of unobserved factors on price variability.

INTRODUCTION

Background of the Study

Tea is the second most widely consumed beverage globally after water (FAO, 2022b). The global tea production market exceeded USD 17 billion annually, while international tea trade was valued at approximately USD 9.5 billion, making it a critical export commodity for emerging and low-income economies (FAO, 2022a). The industry was projected to grow at a compound annual growth rate (CAGR) of 5.7 percent from 2021 to 2026 (Caro, 2020; Mordor Intelligence, 2023b). Rising incomes in developing countries and increasing demand for organic and specialty teas were key drivers of this growth, which significantly contributed to rural income generation and food security in tea-producing nations (FAO, 2022a).

According to the Food and Agriculture Organization of the United Nations (FAO, 2022), approximately 13 million people were employed globally in the tea sector, with smallholder farmers in developing nations accounting for 9 million of these workers and producing 60% of the world's tea in 2022 (Bolton, 2022). Over the past decade, global tea consumption rose by 2.5% per capita, with notable growth in regions such as East Asia, Africa, Latin America, the Caribbean, and the Near East. This growth counterbalanced declining consumption trends in Europe, North America, and Russia (Caro, 2020; FAO, 2022a).

African countries played a significant role in global tea exports, with tea production serving as a key contributor to their economies. Among the 13 African countries cultivating tea, many were classified as Low Human Development Countries (LHDCs). The tea industry supported the livelihoods of 13 million people, 9 million of whom were smallholder farmers (International Institute for Sustainable Development, 2019).

Kenya ranked as the third-largest tea producer globally, after China and India, and remained the world leader in tea exports, making tea a critical commodity for the country's economy (FAO, 2017). The agriculture sector, which included tea farming, contributed 24% of Kenya's GDP, provided 75% of industrial raw materials, generated 60% of export earnings, and accounted for 65% of total exports (Republic of Kenya, 2017). Smallholder farmers in Kenya cultivated tea on approximately 100,000 hectares of farmland (Cosmas & Changwony, 2014).

The Kenya Vision 2030 development plan identified agriculture as one of the pillars of economic growth, categorizing it into livestock and fisheries, industrial crops, food crops, and horticulture. Tea farming fell under the industrial crops sub-sector, which was a major driver of the economic pillar (Republic of Kenya, 2022). Tea contributed 23% of Kenya's foreign exchange earnings and 2% of the agricultural GDP (Republic of Kenya, 2022). This contribution remained vital in enhancing foreign exchange reserves, supporting revenue generation, and maintaining a favorable balance of payments.

Kenya produced over 450 million kilograms of tea annually, generating export earnings of more than KES 120 billion and local sales of about KES 22 billion (Republic of Kenya, 2022). The tea industry supported the livelihoods of 5 million people, including 650,000 small-scale farmers who relied on tea as their primary source of income (Republic of Kenya, 2022). Over the past decade, the Kenyan tea industry demonstrated steady growth in both production volumes and export earnings. For example, production rose from 430 million kilograms in 2012 to 528 million kilograms in 2020, while export revenues increased from KES 112 billion to KES 120 billion over the same period (Tea Board of Kenya, 2021). This growth reflected the resilience of Kenya's tea sector and its ability to adapt to changing domestic and global market conditions.

In 2023, Kenya's tea exports rose by 16% in volume, increasing from 450.33 million kilograms in 2022 to 522.92 million kilograms (Tea Board of Kenya, 2023). Favorable macroeconomic conditions, including a strong exchange rate and stable global prices, contributed to a 31% growth in export earnings, reaching a record KES 180.57 billion, up from KES 138.09 billion in 2022 (TBK, 2023). Although the export unit price in USD declined from USD 2.62 per kilogram in 2022 to USD 2.47 in 2023, the favorable exchange rate of KES 139.85/USD (compared to KES 117.87/USD in 2022) led to higher local revenue. As a result, the unit price in Kenyan shillings rose from KES 306.64 per kilogram in 2022 to KES 345.32 per kilogram in 2023 (TBK, 2023).

According to the Tea Board of Kenya (2023), the quantity of tea offered at auction increased to 592.29 million kilograms, up from 506.47 million kilograms in 2022. However, the absorption rate declined to 60%, compared to 76% in 2022 and 84% in 2021. The average auction price dropped to USD 2.24 per kilogram, down from USD 2.49 in 2022. Despite this decline, smallholder factories secured slightly higher prices for main grades, averaging USD 2.73 per kilogram, an increase from USD 2.72 in 2022 (TBK, 2023).

The tea industry remained a cornerstone of Kenya's economy, contributing to foreign exchange earnings, supporting livelihoods, and driving economic growth. Its performance was closely tied to various macroeconomic variables, including inflation, interest rates, and exchange rate fluctuations, which influenced tea export prices. Inflation affected demand by reducing the purchasing power of importing countries while increasing local production costs, potentially impacting profitability (Republic of Kenya, 2022). Interest rates influenced borrowing costs for exporters and buyers, affecting trade volumes and pricing strategies (Cosmas & Changwony, 2014). Exchange rate fluctuations altered the competitiveness of Kenyan tea in global markets; a depreciating shilling might have enhanced local export revenues but could have also raised concerns about broader economic stability (Tea Board of Kenya, 2023). This study examined the effects of inflation, interest rates, and exchange rate fluctuations on tea export prices in Kenya, highlighting their role in shaping policies that stabilized and strengthened the tea export market.

Tea Sector Policies and Strategies in Kenya

Over the past decade, Kenya implemented a series of policy reforms aimed at improving the competitiveness and sustainability of its tea sector. The establishment of the Kenya Tea Development Authority (KTDA) in 1964, replacing the Special Crops Development Authority under the Agriculture Act (Cap 318, Section 91, and

Legal Notice No. 42), marked a significant milestone. This transformation greatly enhanced smallholder tea production, supported by stable market conditions and effective marketing strategies. Consequently, small-scale tea growers experienced improved market access, higher productivity, and expanded economic opportunities, all contributing to the growth of Kenya's tea industry.

In 2000, the KTDA underwent privatization, leading to the formation of the Kenya Tea Development Agency Ltd. under the Companies Act CAP 486. As outlined in Sessional Paper No. 2 of 2000, this shift aimed to strengthen management practices and promote active farmer participation in the tea value chain. The privatization improved factory management, empowered farmers in governance processes, and expanded processing capacity, thereby narrowing the income gap between smallholder farmers and large estate owners (Mbadi & Owuor, 2008). A subsequent restructuring in 2009 established Kenya Tea Development Agency Holdings Ltd., which undertook operational reforms, diversified investment portfolios, enhanced governance frameworks, and deepened engagement with smallholder growers (Tea Board of Kenya, 2022).

Further regulatory changes were introduced with the formation of the Agriculture and Food Authority in 2014. Despite this, challenges such as bureaucratic inefficiencies and governance concerns persisted. In response, the drafting of a Tea Bill began in 2018, culminating in the enactment of amendments in December 2020. These reforms were designed to strengthen governance structures, ensure transparency in price discovery, and address evolving sectoral issues. The enactment of the Tea Act of 2020 introduced key regulatory provisions on licensing, tea levies, value addition, and auction processes, all aimed at fostering accountability and sectoral growth.

Kenya's Bottom-Up Economic Transformation Agenda (BETA) underscored the tea sector's pivotal role in driving economic progress while tackling challenges such as climate change, limited access to finance for smallholders, and inadequate value addition. To support the sector's development, the government prioritized strategies including market diversification, infrastructure development to lower operational costs, and regulatory reforms to boost efficiency and transparency. These initiatives were aligned with BETA's overarching goal of promoting inclusive and sustainable economic growth within Kenya's tea industry (Republic of Kenya, 2023; Kenya Vision 2030).

Trends in Tea Export Prices in Kenya

Kenya's tea destined for export is traded in US dollars through the East Africa Tea Trade Auction (EATTA) located in Mombasa, the world's second-largest tea auction. This auction plays a central role in the global tea trade and involves key stakeholders including brokers, buyers, producers, and packers. Approximately 84% of Kenya's tea exports are channeled through this platform, which handles nearly one-third of the world's tea exports, underscoring its significance in the international market (EATA, 2022). However, tea export prices at the Mombasa Auction have exhibited erratic movements, directly affecting the overall net earnings of farmers, commonly referred to as "bonuses" (Kimani, 2016). The volatility in tea prices poses a significant challenge for tea producers and other market actors.

Figure 1: Illustrates the fluctuations in the quarterly global price of Kenyan tea, measured in U.S. cents per kilogram, from 2000 to 2023 (source: International Monetary Fund).

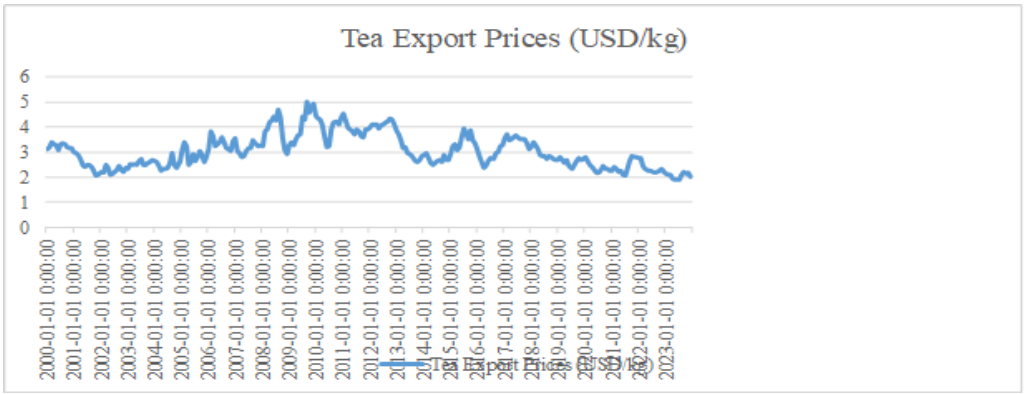

Figure 1. Presents the quarterly fluctuations in the global price of Kenyan tea, expressed in USD per kilogram, from 2000 to 2023, as reported by the International Monetary Fund. The data reveals consistent episodes of price instability, shaped by a combination of market dynamics, external shocks, and broader macroeconomic conditions influencing Kenya's tea export sector. Between 2000 and 2006, prices demonstrated moderate variability, initially declining before experiencing a slight recovery. The period from 2007 to 2011 witnessed heightened volatility, with sharp upward price movements that peaked around 2010–2011. This was followed by a notable decline and increased price swings between 2012 and 2015, characterized by cyclical fluctuations and intermittent peaks. From 2016 onward, tea prices showed a general downward trend, albeit with intermittent price movements. Between 2020 and 2023, tea export prices declined further, interspersed with brief recoveries. This persistent volatility over time reflects the underlying influence of macroeconomic factors, global trade dynamics, and shifting policy environments on Kenya's tea export performance.

Overview of Kenya's Macroeconomic Situation.

Macroeconomic variables referred to factors that affected the economy as a whole at the regional or national level, influencing large populations rather than individual units (Brinson et al., 1991). These variables included gross domestic product (GDP), inflation, interest rates, unemployment rates, exchange rates, foreign direct investment (FDI) inflows, government fiscal policies, and trade balances. Collectively, they provided a comprehensive overview of a country's economic health and stability, guiding decisions by policymakers, investors, and businesses (Mankiw, 2019).

Several vital macroeconomic indicators shaped Kenya's economy, such as GDP growth, inflation, interest and exchange rates, FDI inflows, public debt, and the performance of key sectors like agriculture and services. According to data from the Kenya National Bureau of Statistics (KNBS, 2022-2023), total government revenue as a percentage of GDP fell from 17.5% in 2018/2019 to 15.7% in 2020/2021. This decline was mainly due to the rise of hard-to-tax economic activities and the negative impact of COVID-19 restrictions. However, with the gradual lifting of these restrictions and subsequent economic recovery, revenue increased again to 17.3% of GDP by 2021/2022. The broader macroeconomic environment encompassed overall economic activities in Kenya, including income, production, employment trends, and sectoral linkages (Maghyereh, 2002).

Government spending and lending as a share of GDP slightly underperformed in 2018/2019 but grew in subsequent years due to recovery efforts and COVID-19 response measures. This growth contributed to widening fiscal deficits, pushing public debt to 63.0% of GDP by 2021/2022. Despite these fiscal challenges, Kenya demonstrated resilience through prudent monetary and fiscal policies. Since 2018, savings targets were not fully met, yet inflation remained within the target range of 5% ± 2.5%, aided by interventions from the Central Bank of Kenya. The current account deficit stayed relatively steady, supported by robust export performance, an expanding services sector, and steady remittance inflows. While foreign reserves were below the optimal threshold, they still satisfied the legal minimum of covering at least four months of imports (Republic of Kenya, 2023).

Key macroeconomic factors such as inflation, interest rates, and exchange rates significantly impacted Kenya's agricultural export sector, especially tea, which was a major source of foreign exchange. Inflation affected consumer purchasing power, production costs, and the real exchange rate, all of which influenced the international competitiveness of Kenyan exports (Dornbusch, Fischer, and Startz, 2014). Interest rates determined the cost of capital, influencing production expenses and export competitiveness (Mankiw, 2019). Exchange rate fluctuations affected export pricing, where currency depreciation tended to improve competitiveness, while appreciation could reduce it (Krugman, Obstfeld, and Melitz, 2018). These variables were crucial for understanding and managing factors affecting Kenya's tea export performance.

Like other agricultural commodities, Kenya's tea exports were sensitive to macroeconomic changes, including shifts in global demand and price volatility stemming from economic uncertainties. Examining key indicators such as interest rates, inflation, and exchange rates was vital for crafting policies aimed at enhancing stability and growth in the tea export sector. These factors directly influenced pricing and global competitiveness, making them central to Kenya's broader economic development. (Ghosh, 2014).

Interest Rate

Interest rates have played a significant role in determining tea export prices in Kenya, affecting production expenses, investment levels, and the accessibility of financing within the industry. Interest rates established by the Central Bank of Kenya (CBK) and commercial banks directly influenced borrowing costs for tea growers, impacting their capacity to invest in cultivation, processing, and distribution infrastructure (Nelson et al., 2014). Elevated interest rates raised borrowing expenses, which in turn decreased profitability and restricted investment in productivity-enhancing technologies. On the other hand, lower lending rates stimulated investment, improved operational efficiency, and increased export volumes.

Access to affordable financing remained a major challenge for Kenya's tea sector. The agricultural sector was notably underfinanced, with personal and household loans constituting 28.6% of total loans in 2020, whereas trade, manufacturing, and transport sectors collectively received 38.85% (CBK, 2020). The interest rate control legislation from 2016 to 2019 limited credit availability for agricultural producers, including small and medium enterprises, negatively affecting their ability to invest and expand production capacity (Mbaka, 2020). The repeal of this law in 2019 altered credit access and borrowing costs within the tea sector, subsequently influencing export pricing strategies.

This study revealed that variations in Kenya's interest rates had a notable impact on tea export prices during the period analyzed. Declines in interest rates reduced borrowing costs, enabling greater investment in production capabilities, enhancing competitiveness, and boosting export volumes. Conversely, increases in interest rates raised production costs, which could diminish export profitability. By examining the connection between interest rate movements and tea export prices, the study underscored the crucial role of monetary policy in supporting Kenya's tea export price.

Figure 2: Depicts the quarterly trends in interest rates from the Central Bank of Kenya (CBK) 2005-2023 alongside the quarterly tea export prices (IMF) in USD per kilogram from 2000 to 2023

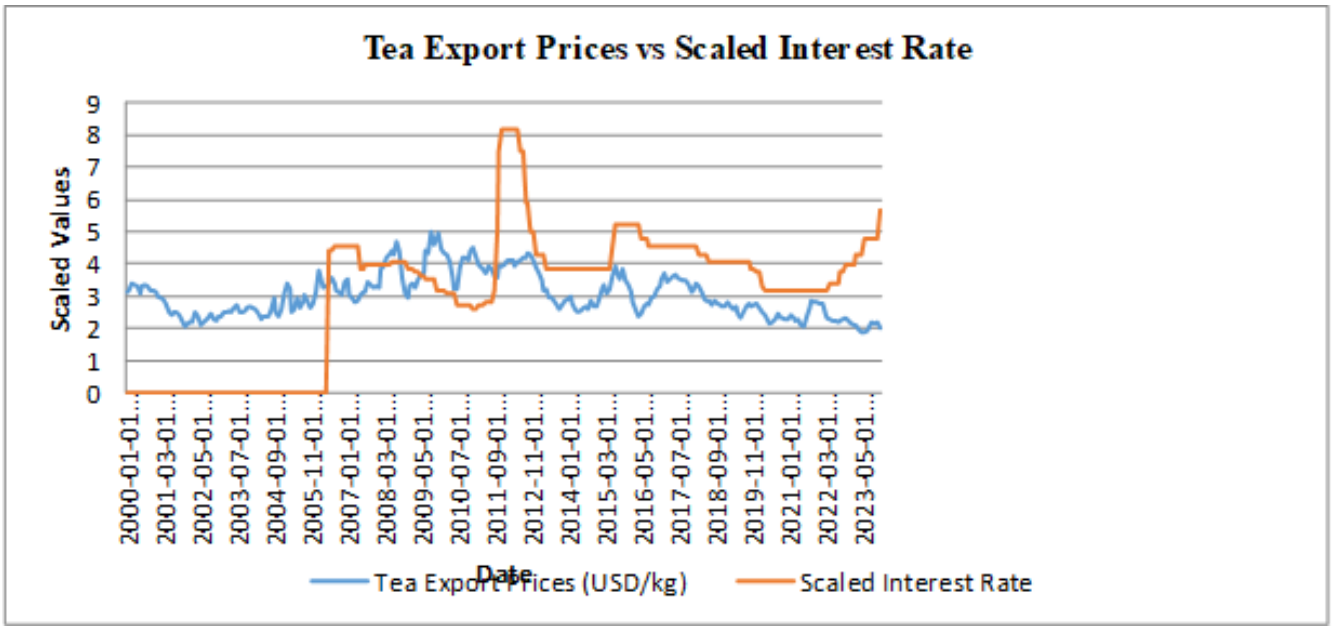

Figure 2 illustrates quarterly trends in tea export prices (USD/kg) and scaled interest rates in Kenya from 2000 to 2023. The relationship between the two variables was dynamic, with periods of alignment and divergence. From 2000 to 2006, tea prices declined then rose, while interest rates remained stable. Between 2006 and 2010, both moved somewhat in tandem, suggesting a loose correlation. However, the 2011–2012 spike in interest rates did not affect tea prices significantly, indicating divergence. From 2015 onwards, a positive association appeared, though inconsistently—such as in 2019, when tea prices rose despite falling interest rates. Overall, the relationship varied over time, suggesting that other macroeconomic factors likely influenced tea export prices beyond interest rates alone.

Inflation

Inflation, defined as a sustained increase in the general price level over time (Haberler, 1960), was examined in relation to its potential impact on Kenya's tea export prices. In this study, inflation was measured using the Consumer Price Index (CPI), which reflected changes in the cost of living and production expenses relevant to the tea industry (Winfred, 2013). The analysis hypothesized that rising inflation in Kenya would contribute to increased production costs such as labor, fuel, and agricultural inputs which might subsequently influence tea export prices. Specifically, cost-push inflation was considered a likely mechanism, whereby higher input costs prompted producers to adjust export prices upward to sustain profit margins (Kasau & Marks, 2011; Basu, 2011). By exploring the relationship between inflation and tea export prices, the study aimed to assess the extent to which inflationary pressures influenced the competitiveness and profitability of Kenya's tea exports.

Figure 3: illustrates the trends in Kenya's inflation rate from 2005-2024 from the (CBK) versus the Kenya tea export prices (IMF) from 2000- 2023

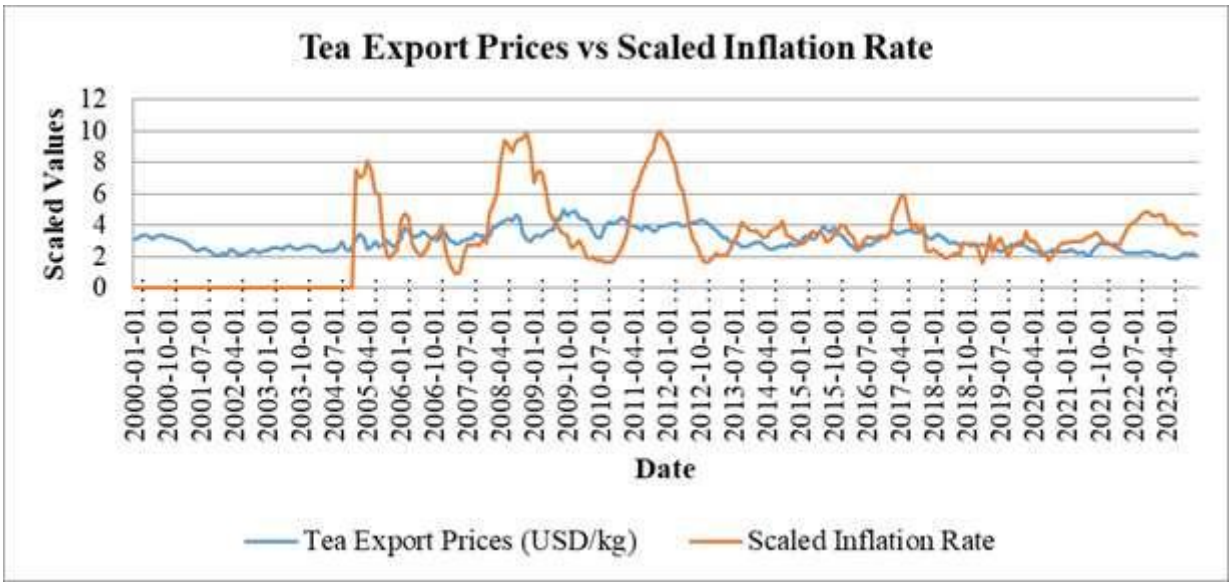

Figure 3 presents quarterly trends of Kenya's inflation rate, scaled, from 2005 to 2024 alongside tea export prices in USD per kilogram from 2000 to 2023. The relationship between the two variables was mixed, showing both periods of alignment and divergence. Between 2005 and 2009, inflation experienced notable fluctuations, while tea export prices followed a relatively steady upward trend. From 2008 to 2012, inflation spiked sharply, especially around 2011 and 2012, with some coinciding volatility in tea prices, suggesting partial alignment. However, the link was inconsistent across time. After 2013, inflation showed multiple cycles of increase and decline, occasionally corresponding with minor tea price movements, though at times tea prices remained stable despite inflation volatility. From 2017 to 2023, inflation volatility declined, while tea prices fluctuated modestly. These trends offer partial support for the view that inflation influences tea export prices through production cost pressures. However, the inconsistent correlation over time highlights the likely role of additional macroeconomic factors

Exchange rate

Exchange rates, as defined by Nydahl (1999), represented the amount of local currency required to obtain one unit of foreign currency. In floating exchange rate systems, these rates exhibited significant fluctuations, which posed risks for international trade (Todani & Munyama, 2005). For Kenya, where tea exports were denominated in U.S. dollars, movements in the exchange rate played a crucial role in influencing export performance during the study period. This study hypothesized that depreciation of the Kenya Shilling would make tea exports more competitive internationally, as the resulting lower prices in foreign currency terms would stimulate demand and increase export earnings. Conversely, appreciation of the Shilling was expected to reduce competitiveness by raising the cost of Kenyan tea for foreign buyers, thereby potentially decreasing demand and earnings (Cherop & Changwony, 2014).

To stabilize the local currency and manage exchange rate volatility, the Kenyan government maintained foreign reserves equivalent to at least four months' worth of imports, primarily held in U.S. dollars, Euros, and British Pounds (Kamau & Ngugi, 2014). During periods of currency depreciation, tea export prices in Kenya Shilling terms tended to rise, as foreign exchange conversions yielded higher returns, even if export volumes remained unchanged. In contrast, appreciation of the local currency was associated with lower tea export prices, which could negatively affect export revenues. Fluctuations in the Kenya Shilling–U.S. Dollar exchange rate also influenced cash flows for international payments, potentially affecting global demand for Kenyan tea. A stronger Shilling raised the effective price of Kenyan tea abroad, which might have led to reduced market demand and diminished export performance. This study examined the historical relationship between exchange rate dynamics and tea export prices, highlighting the importance of exchange rate stability for enhancing trade competitiveness and sustaining the economic resilience of Kenya's tea sector.

Figure 4: shows the trends in the normalized KES/USD exchange rate (2000–2023) from (CBK) and tea export prices in USD/kg from (IMF)

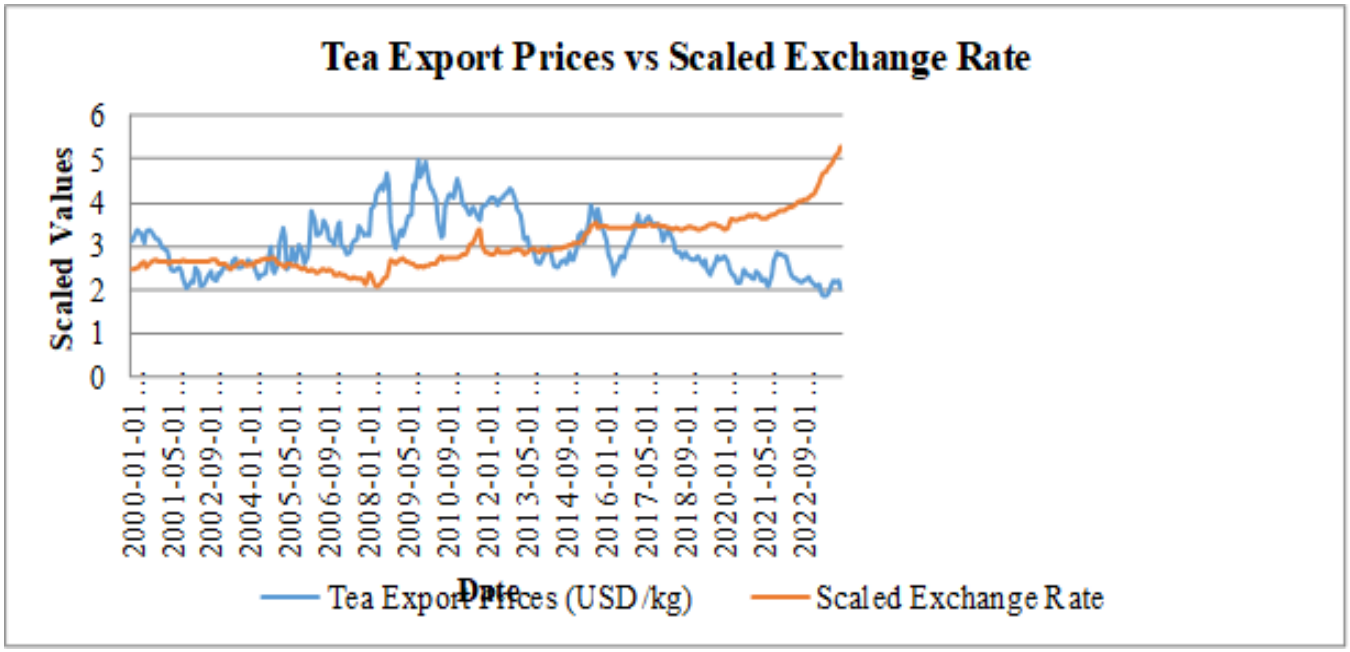

Figure 4 illustrates the quarterly trends of the Kenya Shilling to the U.S. Dollar exchange rate, scaled, alongside tea export prices in USD per kilogram from 2000 to 2023. The patterns show both alignment and divergence, offering partial support for the idea that exchange rate depreciation may influence export prices. From 2000 to 2008, the exchange rate showed a gradual upward trend, indicating moderate depreciation, while tea export prices rose steadily with minor fluctuations. Between 2008 and 2011, sharper depreciation coincided with increased volatility in tea prices, particularly around 2011 and 2012. From 2013 onward, the Shilling continued to weaken, but tea prices showed no clear upward trend, instead declining notably from 2017. Between 2020 and 2023, the exchange rate rose more sharply, while tea export prices generally fell. These trends suggest that while certain periods reflect a connection between exchange rate changes and tea prices, the relationship is not consistent across time.

Statement of the problem

The tea industry remains a vital pillar of Kenya's economy, contributing significantly to foreign exchange earnings and supporting millions of livelihoods. Between 2012 and 2020, tea production rose from 430 million to 528 million kilograms, while export earnings increased from KES 112 billion to KES 120 billion (Tea Board of Kenya, 2021). In 2023, tea exports expanded by 16%, growing from 450.33 million kilograms in 2022 to 522.92 million kilograms. Export earnings surged by 31% to KES 180.57 billion (TBK, 2023). Furthermore, the volume of auctioned tea increased from 506.47 million kilograms in 2022 to 592.29 million kilograms in 2023, although the absorption rate declined to 60%, down from 76% in the previous year.

To boost competitiveness and encourage value addition, the Government of Kenya has implemented several policy frameworks since the privatization of KTDA in 2000, which led to the establishment of the Kenya Tea

Development Agency Ltd. under the Companies Act CAP 486 and a series of sector reforms. Notably, the Kenya National Export Development Strategy (2018) and the Bottom-Up Economic Transformation Agenda (BETA) have emphasized infrastructure development and market diversification as critical pillars for enhancing the sustainability and profitability of the tea industry (Republic of Kenya, 2023).

Despite these strategic efforts, volatility in tea export prices remains a persistent challenge, reflecting the sector's exposure to macroeconomic dynamics such as fluctuations in interest rates, inflation, and exchange rates. Given the industry's reliance on bank financing, changes in interest rates may influence production decisions and marketing strategies. Inflationary pressures affect input costs and consumer purchasing power, thereby influencing both supply-side dynamics and global demand. Likewise, fluctuations in the Kenya Shilling to U.S. Dollar exchange rate impacts the international competitiveness of Kenyan tea, collectively influencing tea export price behavior.

Although substantial research exists on Kenya's tea sector, limited studies have explored the impact of macroeconomic indicators using seasonal or quarterly data. Most rely on annual datasets, which fail to capture intra-year variations driven by seasonality, climate variability, and global market changes, all of which directly influence production and pricing. This study addresses that gap by incorporating quarterly dummy variables (Q1, Q2, Q3, with Q4 as the base) to isolate and quantify the seasonal effects on tea export pricing. This methodological approach enables a more granular understanding of how each macroeconomic factors interact with seasonal dynamics.

The core objective of this research is to examine the complex interplay between each macroeconomic variable, interest rates, inflation, and exchange rates, and their respective effects on tea export prices in Kenya. The ultimate goal is to provide practical, data-driven insights and policy recommendations for stakeholders, exporters, and decision-makers, thereby strengthening the competitiveness and long-term resilience of the tea export sector.

Research questions

1 What is the effect of exchange rate fluctuations on tea export prices in Kenya?
2 How does inflation influence the pricing of tea exports in Kenya?
3 To what extent do changes in interest rates affect tea export prices in Kenya?

Objective of the study

The objective of this study is to examine the impact of key macroeconomic indicators, specifically exchange rates, inflation, and interest rates, on tea export prices in Kenya.

Specific objectives

1. To investigate the effect of exchange rate fluctuations on tea export prices in Kenya
2. To assess the impact of inflation on tea export prices in Kenya.
3. To examine the influence of interest rate changes on tea export prices in Kenya.

Significance of the Study

Macroeconomic variables refer to broad economic factors that affect entire populations at the regional or national level. This study offers valuable insights into how key macroeconomic factors such as exchange rate, inflation, and interest rate influence tea export prices in Kenya. It provides data driven evidence to support policy formulation, guide investment decisions, and help stakeholders enhance the competitiveness and sustainability of the tea industry. In addition, the study addresses a methodological gap by using quarterly data with seasonal adjustments, offering more precise insights than studies based on annual data.

Organization of the Study

The study is structured into five chapters. Chapter one presents the background of the study, the problem statement, research questions, objectives, and the significance of the study. Chapter Two provides a review of relevant theoretical and empirical literature. Chapter Three outlines the research methodology employed in the study. Chapter Four presents the empirical findings. Chapter Five summarizes the study, draws conclusions, and offers recommendations.

LITERATURE REVIEW

Introduction

This chapter examined the relationship between macroeconomic variables and tea export prices in Kenya. It reviewed relevant literature to understand how these macroeconomic factors affect tea export prices. The chapter detailed the extent to which researchers have explored this connection, encompassing sections such as the theoretical review, other determinants of financial performance, empirical review, and summary of the literature review.

Theoretical Review

Bhatt (2009) defines a theory as a set of established facts, propositions, or assumptions designed to provide a coherent explanation for causal relationships among observed phenomena. This research drew upon three key theories to examine the relationship between macroeconomic variables and tea export prices. These are the Keynesian theory on interest rates and investments (Keynes, 1936), the Keynesian theory on inflation (Keynes, 1936), and the Exchange Rate Pass-Through (ERPT) theory (Goldberg & Knetter, 1997). These theoretical frameworks formed the foundation for analyzing the effects of interest rates, inflation, and exchange rate fluctuations on export pricing**.**

The Keynesian Theory of Interest Rate

Keynesian theory on inflation, introduced by John Maynard Keynes in The General Theory of Employment, Interest, and Money (1936), described inflation as a demand-pull phenomenon that arose when aggregate demand surpassed aggregate supply. Keynes asserted that heightened consumer and investment spending during periods of strong economic activity created excess demand, leading to rising prices (Keynes, 1936). The theory highlighted that the extent of resource utilization determined the inflationary effects. In underutilized economies, increased spending boosted production and lowered unemployment without causing significant price hikes. Over time, this theory evolved to include factors like cost-push inflation, global supply chain influences, and inflation expectations. The theory assumed that inflation primarily resulted from demand outpacing supply, with short-term price rigidity delaying supply adjustments. It also posited that monetary and fiscal policies could manage inflation by influencing aggregate demand. The Keynesian theory's merits included its practical explanation of short-term inflation trends and its utility in guiding policies to stabilize prices and employment. Nonetheless, it had limitations, such as its focus on demand-side factors while underestimating supply-side challenges. This theory was particularly applicable to understanding Kenya's tea export prices, as it explained how domestic inflation influenced production costs and pricing strategies. Rising inflation increased input costs, driving up export prices, whereas low inflation stabilized costs, enabling exporters to maintain competitive pricing. Comprehending these dynamics was crucial for ensuring the tea sector's competitiveness and profitability in global markets. The Keynesian theory thus provided a solid framework for analyzing how inflation impacted the cost structure of tea production, shaping export prices and the stability of Kenya's tea industry.

Keynesian Theory on Inflation

Keynesian theory on inflation, introduced by John Maynard Keynes in The General Theory of Employment, Interest, and Money (1936), describes inflation as a demand-pull phenomenon that arises when aggregate demand surpasses aggregate supply. Keynes asserted that heightened consumer and investment spending

during periods of strong economic activity creates excess demand, leading to rising prices (Keynes, 1936). The theory highlights that the extent of resource utilization determines the inflationary effects. In underutilized economies, increased spending boosts production and lowers unemployment without causing significant price hikes. Over time, this theory has evolved to include factors like cost-push inflation, global supply chain influences, and inflation expectations. The theory assumes that inflation primarily results from demand outpacing supply, with short-term price rigidity delaying supply adjustments. It also posits that monetary and fiscal policies can manage inflation by influencing aggregate demand. The Keynesian theory's merits include its practical explanation of short-term inflation trends and its utility in guiding policies to stabilize prices and employment. Nonetheless, it has limitations, such as its focus on demand-side factors while underestimating supply-side challenges. This theory is particularly applicable to understanding Kenya's tea export prices, as it explained how domestic inflation influenced production costs and pricing strategies. Rising inflation increased input costs, driving up export prices, whereas low inflation stabilized costs, enabling exporters to maintain competitive pricing. Comprehending these dynamics was crucial for ensuring the tea sector's competitiveness and profitability in global markets. The Keynesian theory thus provided a solid framework for analyzing how inflation impacted the cost structure of tea production, shaping export prices and the stability of Kenya's tea industry.

Exchange Rate Pass-Through (ERPT) Theory

Exchange Rate Pass-Through (ERPT) theory analyzed the extent to which changes in exchange rates were transmitted to the prices of imported and exported goods. Originally introduced by Goldberg and Knetter (1997), this theory explored how firms adjusted their pricing in response to exchange rate fluctuations. It differentiated between complete pass-through, where exchange rate changes were fully reflected in prices, and partial pass-through, where only a portion of the fluctuation was incorporated into pricing. Factors such as market competition, pricing-to-market strategies, and the degree of market integration significantly influenced the extent of ERPT. In highly competitive markets, exporters often absorbed exchange rate variations in profit margins to maintain market share, resulting in partial pass-through (Goldberg & Knetter, 1997). Over time, the use of ERPT theory broadened to include factors like globalization, the pricing power of multinational corporations, and the influence of exchange rate regimes. Researchers highlighted the growing significance of global value chains and the elasticity of demand for exported goods in determining the extent of ERPT (Campa & Goldberg, 2005). The theory also evolved to address the asymmetry of pass-through, where exchange rate appreciation and depreciation might have had differing effects on prices. The ERPT theory operated on several key assumptions. It assumed that firms adjusted their pricing in response to exchange rate fluctuations and that market competition significantly influenced the degree of pass-through. It also presumed that firms used pricing strategies, such as absorbing exchange rate shocks, to maintain competitiveness, and that the elasticity of demand in international markets affected the extent of pass-through. While the theory provided a structured approach for analyzing the effects of exchange rate fluctuations on trade prices and offered insights for policymakers, it had limitations. These included its reliance on simplistic assumptions about uniform firm behavior, a narrow focus on price adjustments while neglecting other factors such as production costs, and its limited ability to fully explain the asymmetric effects of currency appreciation and depreciation (Campa & Goldberg, 2005). The ERPT theory was crucial for understanding Kenya's tea export prices due to the sector’s sensitivity to exchange rate changes. A depreciation of the Kenyan shilling made tea more competitive in global markets by lowering its price in foreign currencies. However, if the pass-through effect was incomplete, exporters absorbed some of the depreciation's impact to stabilize prices, affecting both demand and revenue. The ERPT theory offered valuable perspectives on how exchange rate fluctuations influenced Kenya's tea export prices, which was crucial for ensuring the industry’s stability and growth in a competitive global market.

Empirical Literature

Njiri P K (2023) examined the relationship between tea production, the balance of payments, and exchange rate volatility in Kenya using annual data from 1996 to 2018. The study employed OLS regression, unit root tests, and Granger causality, finding a significant negative relationship between tea production and the balance of payments, but a weak and insignificant relationship with exchange rate volatility. However, it did not

address tea export prices, which were critical for market performance. This study filled that gap by analyzing the effect of exchange rate, inflation, and interest rate on tea export prices in Kenya. It used quarterly data from 2000 to 2022 and included seasonal dummy variables to capture within-year variations. The study placed particular focus on how changes in interest rates influenced tea pricing decisions. After testing for stationarity using the Augmented Dickey Fuller method, OLS regression was applied to estimate the impact of each macroeconomic variable on average tea export prices

Kibet and Kiprop (2022) investigated the influence of inflation, investment, and openness on Kenya's export performance from 1997 to 2021 using time-series data and the ARDL model. Their findings showed that openness, investment, and comparative advantage positively affected exports in both the short and long run, while inflation, exchange rates, and interest rates had a negative impact. Although relevant, their study focused on aggregate exports without isolating commodity-specific trends. In contrast, the current research focused on tea export prices and examined how inflation, interest rates, and exchange rate fluctuations influenced these prices using quarterly data from 2000 to 2022. By incorporating seasonal dummy variables and applying ADF and OLS methods, the study provided a more targeted approach to understanding price volatility in Kenya's tea export prices.
Kimani (2016) examined the effect of inflation, exchange rates, GDP growth, and bank lending interest rates on the financial performance of Kenya's tea sector using quarterly data from 2007 to mid-2016 and applying regression analysis. The study found that exchange rate and interest rate increases led to higher tea prices, while inflation and GDP growth had negative effects. While this research highlighted how macroeconomic variables influenced average tea prices, it did not distinguish between domestic and export prices or account for export price volatility. In contrast, the current study focused specifically on tea export prices and investigated how inflation, interest rates, and exchange rate fluctuations influenced these prices over a longer period (2000, 2022), using seasonal dummy variables and OLS regression to reveal both short-term and long-term macroeconomic effects on Kenya's tea export prices.

Muthamia and Muturi (2015) investigated the determinants of earnings from tea exports in Kenya, focusing on real exchange rates, inflation, and foreign income. Using time-series analysis that included unit root tests, cointegration, and an error correction model (ECM), they found that real exchange rates, tea prices, and agricultural value-added had a positive influence on export earnings, while inflation showed no significant effect. Although their study shed light on key macroeconomic drivers of export revenues, it centered on earnings rather than export price volatility. The current research differed by specifically analyzing the impact of macroeconomic variables, exchange rates, inflation, and interest rates, on tea export prices. It further applied quarterly data from 2000 to 2022, included seasonal dummy variables, and used OLS regression to provide a more targeted and time-sensitive understanding of price behavior in Kenya's tea export prices.

Adhiambo and Wekesa (2014) examined the effects of macroeconomic variables, tea valuation pricing, exchange rates, interest rates, and inflation, on the financial performance of tea-buying firms at the Mombasa Tea Auction using a cross-sectional survey of 120 respondents and secondary data. Their analysis, based on multiple regression, found that these variables significantly affected firm profitability, with exchange rate and inflation fluctuations notably impacting costs and revenues. However, the study focused on firm-level financial performance and did not address national-level tea export price volatility or the transmission mechanisms of macroeconomic factors on export pricing. In contrast, the current research applied a quantitative time-series approach using quarterly data from 2000 to 2022, incorporating seasonal dummy variables and unit root testing to ensure stationarity before employing OLS regression to analyze how macroeconomic variables influenced tea export prices over time.

Chirchir, Muse, and Jagongo (2015) investigated the effects of exchange rate volatility and domestic tea prices on the export performance of KTDA-managed tea firms in Kenya, analyzing data from 54 firms between 2008 and 2012. Their results showed that exchange rate fluctuations and domestic tea prices significantly influenced export performance, while tea substitute prices had no significant effect. Although the study provided useful policy insights on stabilizing export earnings, it did not address export price volatility or consider a broader range of macroeconomic factors. The current research addressed this gap by focusing on national-level tea

export prices, incorporating inflation and interest rates, and employing quarterly time-series data from 2000 to 2022.

Overview of Literature

The literature highlighted the significant impact of macroeconomic variables on Kenya's tea export prices. This study was grounded in three key theories: the Keynesian theory of interest rates and investments (Keynes, 1936), the Keynesian theory of inflation (Keynes, 1936), and the Exchange Rate Pass-Through (ERPT) theory (Goldberg & Knetter, 1997). These frameworks helped analyze the effects of interest rate fluctuations, inflation, and exchange rate changes on tea export pricing in Kenya. While other research explored the impact of macroeconomic variables like exchange rates, inflation, and interest rates across sectors, a gap remained in understanding their specific effects on Kenya's tea export prices. This study filled this gap by analyzing how key macroeconomic factors influenced tea export prices; it further applied quarterly data from 2000 to 2022, included seasonal dummy variables, and highlighted the role of each macroeconomic factor in boosting Kenya's competitiveness in the global tea market.

RESEARCH METHODOLOGY

Introduction

This section outlined the methodology employed for data collection and analysis in the research. It covered the research design, sampling techniques, population, data collection instruments and procedures, as well as the study's reliability and validity. Additionally, it detailed the data processing and analysis methods, along with the ethical considerations taken to achieve the research objectives.

Research design

This study employed a quantitative, longitudinal causal research design to analyze how macroeconomic indicators influenced tea export prices in Kenya. As noted by Mugenda (2013), a research design offered structure and guidance for conducting systematic investigations. The analysis used quarterly time-series data from 2000 to 2022, a period considered adequate to capture key macroeconomic and market shifts. To evaluate the specific effects of inflation, interest rates, and exchange rates on tea export prices, the study utilized linear regression analysis. Seasonal variations were accounted for using quarterly dummy variables, with the fourth quarter as the baseline. Descriptive statistics and the Augmented Dickey-Fuller (ADF) test were first applied to assess data stationarity, after which the Ordinary Least Squares (OLS) method was used to estimate the relationship between each macroeconomic factor and export prices.

THEORETICAL FRAMEWORK

This study was grounded in three established economic theories that provide a conceptual foundation for examining the effects of macroeconomic variables on tea export prices in Kenya. These include the Keynesian theory on interest rates and investment (Keynes, 1936), the Keynesian theory on inflation (Keynes, 1936), and the Exchange Rate Pass-Through (ERPT) theory (Goldberg & Knetter, 1997). Each of these theories offers a unique lens for understanding the interactions between interest rates, inflation, and exchange rate fluctuations and their subsequent impact on tea export pricing. By integrating these theoretical perspectives, this study conceptualized the relationship between macroeconomic variables and tea export prices. The insights derived from these theories guided the development of hypotheses tested empirically. The Keynesian theory on interest rates informed the observed relationship between borrowing costs and production decisions in the tea sector. Similarly, the Keynesian inflation theory underpinned the analysis of how price level changes influenced production costs and demand for tea exports. Lastly, the ERPT theory was used to explore how exchange rate movements translated into export price adjustments in international markets. This theoretical framework served as the foundation for structuring the study and developing hypotheses that addressed the key research objectives, ensuring a robust and comprehensive approach to understanding the dynamics of tea export pricing in Kenya.

The Keynesian Theory of Interest Rate

This study examined the connection between interest rates and tea export prices, using the Keynesian theory of

interest rates and investment as a framework. Keynes (1936) suggests that interest rates play a key role in shaping investment decisions, with higher rates generally leading to a reduction in investment because of the increased cost of borrowing.

$$I_t = \propto - \beta_1 IR_t + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots .. (\ i\ )$$

I_t -Investment capacity

$\propto$ - Baseline level of investment when interest rate is 0

β_1- Measure how much investments increase of decrease

IR_t- Interest- rate at time

ε_t- Error term at time

Equation (i) implied that when the interest rate increased, investment decreased because borrowing became more expensive. The negative relationship between interest rates and investment was central to Keynesian economic theory.

The subsequent equation linked investment to production costs, showing that increased investment in the tea export sector lowered production costs by improving technology and efficiency. Conversely, higher interest rates could reduce investment, leading to inefficiencies, decreased production capacity, and higher production costs, ultimately driving up export prices. This highlighted the critical impact of interest rates on production costs and export prices.

$$PC_t = y_1 - y_2 I_t + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots .. (\ ii\ )$$

PC_t- Production cost

y_1 -baseline when no additional investment is made

y_2 -measure how much production cost decreases with every unit increases

I_t– Investment from equation (i)

ε_t- Error term

The relationship suggested that higher investment led to lower production costs since investment typically brought improvements like better technology, better practices, or economies of scale that reduced the costs of production.

Equation (iii) illustrated the connection between production costs and export prices. When production costs rose, export prices might also increase, as exporters were compelled to raise prices in order to cover the higher expenses incurred in tea production.

$$EP_t = \delta + \theta PC_t + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (iii)$$

EP_t –Export prices

δ –baseline of export prices when production cost are 0

θ –measure how much price increases for every unit of production cost

$PC_{\ t}$ -production cost

$\varepsilon_{\ t}$– Error term

This equation implied that as production costs rose, export prices also rose because exporters passed on the higher costs to consumers in the form of higher prices.

The study then combined all the equations to examine how interest rates impacted export prices. This was done by substituting one equation into another.

Substituted Equation (i) into Equation (ii)

$$PC_t = y_1 - y_2 \,.\, (\propto - \beta_1 IR_t + \varepsilon_t) + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots . (iv)$$

$y_1 \ - y_2 \,.\, \propto$- The baseline production cost that occurs when there is no investment

$y_2 \,.\!\propto - \beta_1 IR_t$- Shows how interest rates affect production costs. As interest rates increase, investment decreases, which causes production costs to rise.

The error term ε_t accounted for other factors affecting production costs, and it can be adjusted by subtracting $y_2 \,.\, \varepsilon_t$ to account for the effect of investment on these other factors.

By simplify equation (iv)

$$PC_t = (y_1 - y_2 \propto) + y_2 \beta_1 \, IR_t + (\varepsilon_t - y_t \varepsilon_t) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots . (v)$$

Defined a new error term $\varepsilon_t^{\prime} = \varepsilon_t - y_t . \varepsilon_t$ now the equation becomes;

$$PC_t = (y_1 - y_2 \propto) + y_2 \beta_1 \, IR_t + \varepsilon_t^{\prime} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots . (vi)$$

Substituted equation (vi) to equation (iii)

$$EP_t = \delta + \theta((y_1 - y_2 \propto) + y_2 \beta_1 \, IR_t + \varepsilon_t^{\prime}) + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (vii)$$

Simplified equation (vii)

$$EP_t = \delta + \theta(y_1 - y_2 . \propto) + \theta . y_2 . \beta_1 . IR_t + (\theta . \varepsilon_t^{¦} + \varepsilon_t) \dots\dots\dots\dots\dots\dots\dots\dots (viii)$$

EP_t- Export prices at time

δ- Baseline export price when production costs are 0.

$(y_1 - y_2 . \propto)$-Baseline terms related to production costs and investment.

θ- Sensitivity of export prices to changes in production costs.

$y_2 . \beta_1$.- Combined sensitivity of investment to interest rates and production costs to investment.

IR_t- Interest rate at time which affects investment and production costs.

$\varepsilon_t^{¦} + \varepsilon_t$ -Error terms that account for other unobserved factors influencing export prices, production costs, and investment.

This study hypothesized that higher interest rates reduced investment in tea production, which increased production costs for tea exporters. These increased production costs were subsequently passed on to export prices, resulting in higher tea export prices.

Keynesian Theory on Inflation

To analyze the relationship between inflation and tea export prices, this study drew from Keynesian theory on inflation, particularly cost-push inflation, to examine how local inflation rates influenced production costs. Inflation caused by rising production costs often led to higher prices for goods and services (Keynes, 1936).

The model specification progressed systematically, starting with the connection between inflation and production costs, followed by linking production costs to export prices, and ultimately hypothesizing a direct relationship between inflation and tea export prices.

$$PC_T = \alpha IN_T + M \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (\ i\ )$$

PC_T–production cost

α- sensitivity of production cost to changes in inflation rate

IN_T - Inflation rate M - A markup that include profit margin

As inflation rose, production costs increased due to higher prices for raw materials, labor, and other inputs. The markup (M -) accounted for fixed components, ensuring a baseline production cost even when inflation was zero.

The next equation linked production costs to export prices. Export prices could be influenced by the cost of production because it could become expensive to produce tea; in this case, domestic inflation therefore high production costs could translate to high tea export prices.

$$EP_t = \delta + \theta PC_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots . (\,ii\,)$$

EP_t - Export prices

PC_t - Production cost from equation (i)

δ- A base price level

θ – Coefficient that shows how strongly production cost affects export prices

Equation (ii) indicated that production costs rose in proportion to inflation, adjusted by a markup. As inflation drove up production expenses, exporters transferred these increased costs to consumers in international markets, resulting in higher export prices.

The substitution of production costs into the export prices equation showed that inflation affected prices directly; the study substituted Equation (i) into Equation (ii).

Substituted $PC_T = \alpha IN_T + M$ into $EP_t = \delta + \theta PC_t$

$$EP_t = \delta + \theta(\alpha IN_t + M) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (\,iii\,)$$

Simplified:

$$EP_T = \delta + \theta\alpha IN_t + \theta M \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots . \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots .. (\,iv\,)$$

$\theta\alpha$ - Represented how strongly inflation affects export prices through production costs.

θM -Adjusted for the markup in export prices.

IN_t – Inflation rate at time

EP_T –Export prices

Defined constants for simplification**:**

$y_0 = \delta - \theta M$ -which included the fixed components of export prices and markup.

$y_1 = \theta\alpha$ -Which represented the sensitivity of export prices to inflation through production costs.

Substituted constants into the expanded equation:

Replaced $\delta - \theta M$ with y_0 and $\theta\alpha$ with y_1

The final equation links export prices to inflation directly.

$$EP_t = y_0 + y_1 IN_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots . \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots .. \ldots\ldots\ldots\ldots .. (\,v\,)$$

EP_t –tea export prices at time

y_0 - represents fixed export price components, including markup.

y_1 - $(\theta\alpha)$ showed how strongly inflation affects export prices through production costs.

IN_t –inflation rate at time

ε_t –Error term

The equation hypothesized a direct and linear relationship between inflation and export prices, mediated by production costs. As inflation rose, production costs increased, and exporters passed these costs onto consumers in international markets, leading to higher export prices.

Exchange Rate Pass-Through (ERPT) Theory

Exchange Rate Pass-Through (ERPT) theory explained how exchange rate fluctuations affected the prices of traded goods. ERPT could be either full, where a 1% change in the exchange rate resulted in a 1% change in export prices, or partial, where the price change was smaller. The theory was based on three key principles: exchange rate changes influenced export pricing, exporters adjusted prices to maintain competitiveness or profit margins, and the degree of adjustment was measured by the pass-through coefficient (β₁) (Goldberg & Knetter, 1997).

$$EP_t = fEX_t + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots. (\, i \,)$$

EP_t- Export price at time

fEX_t- A function that determines how exchange rates influence export price

Assumed is fEX_t linear, so:

$$EP_t = \alpha + \beta_1 EX_t + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (\, ii \,)$$

When exchange rates fluctuate, exporters must decide how to respond. They can choose to pass through the changes by adjusting export prices to reflect the exchange rate variations.

In some contexts, exporters absorb exchange rate changes to remain competitive. If the domestic currency depreciates, exporters might lower their prices to retain market share.

Modeled as:$EP_t = \alpha - EX_t + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (\, iii)$

The **negative sign** of β_1 indicates an **inverse relationship**: as (exchange rate) increases, (export price) decreases.

EP_t – Tea export price at time

α – intercept indicating the baseline export price when exchange rate has no effect

β_1 – The coefficient of exchange rate pass-through, showing how sensitive export prices are to changes in exchange rates.

$\beta_1 = 1$- There is full pass-through: a 1% change in the exchange rate results in a 1% change in export prices.

$0 < \beta_1 > 1$- There is partial pass-through: a 1% change in the exchange rate results in a less than 1% change in export prices.

$\beta_1 = 0$- There is no pass-through: export prices are unaffected by exchange rates

EX_t – Exchange rate at time

ε_t – Error term

The study hypothesized that exchange rate fluctuations impacted export prices either fully or partially, with the effect quantified by a specific coefficient. Examining the magnitude and direction of this coefficient offered valuable insights into the dynamics of Exchange Rate Pass-Through (ERPT) for tea export prices.

Model specification

Tea export prices were analyzed using a linear regression model, with inflation rate, interest rate, and exchange rate as independent variables. This method estimates how each of these macroeconomic factors influence tea export prices over time (Wooldridge, 2016). Keynes (1936) posits that interest rates significantly influence investment decisions. Building on this premise, the model examined how variations in interest rates affected tea export prices, hypothesizing that higher interest rates reduced investment, thereby influencing export price dynamics.

The model was specified as

$$EP_t = \delta + \theta(y_1 - y_2.\propto) + \theta.y_2.\beta_1.IR_t + (\theta.\varepsilon_t^{!} + \varepsilon_t) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (viii)$$

EP_t- Export prices on time

δ- Baseline export price when production costs are 0.

$(y_1 - y_2.\propto)$-Baseline terms related to production costs and investment.

θ- Sensitivity of export prices to changes in production costs.

$y_2.\beta_1$.- Combined sensitivity of investment to interest rates and production costs to investment.

IR_t- Interest rate at times which affects investment and production costs.

Tea export prices were analyzed using a linear regression model, with inflation rate, interest rate, and exchange rate as the independent variables. This approach aimed to estimate how these macroeconomic factors influenced tea export prices over time (Wooldridge, 2016). Keynes (1936) argued that interest rates significantly impact investment decisions. Building on this theoretical foundation, the model assessed how fluctuations in interest rates could affect tea export prices, under the hypothesis that higher interest rates might reduce investment, thereby influencing pricing dynamics in the export sector. Additionally, quarterly dummy variables were included in the model to account for seasonal variations, allowing for a more accurate estimation of macroeconomic impacts across different periods of the year.

The model was specified as:

$$D\_EP_t = \beta_\theta + \beta_1(D\_IR_t) + \beta_2(D\_IR_{t-1}) + \beta_3(D\_EP_{t-1}) + y_1(q_{1t}) + y_2(q_{2t}) + y_3(q_{3t}) +$$

$$\varepsilon_t \dots\dots\dots..(ix)$$

Variable Definitions:

D_EP_t: First difference of tea export prices at time t (change in export prices, USD/kg), ensuring stationarity.

D_IR_t: First difference of the inflation rate at time t (change in CPI or PPI, %), capturing cost pressure shifts.

D_IR_{t-1}: Lagged first difference of inflation, reflecting delayed cost pass-through.

(D_EP_{t-1}): Lagged first difference in export prices, capturing persistence.

(q_{1t}) (q_{2t}) (q_{3t}) : Quarterly dummies, with (q_{2t}) (q_{3t}) significant in OLS and ARCH models, respectively. Control for seasonal patterns showing significance.

β_θ: Constant term for baseline price changes.

β_1: Coefficient for immediate inflation effects.

β_2: Coefficient for lagged inflation effects.

β_3: Coefficient for price persistence.

y_1 y_2 y_3 : Coefficients for quarterly effects.

ε_t: Error terms for unobserved factors.

(Keynes, 1936), Rising inflation often increases production costs, which, in turn, can influence export prices.

The relationship is modeled as follows:

$$EP_t = y_0 + y_1 IN_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (v)$$

EP_t –tea export prices at time

y_0 - represents fixed export price components, including markup.

y_1 - $(\theta\alpha)$ shows how strongly inflation affects export prices through production costs.

IN_t –inflation rate at time

ε_t –Error term

The original model linked inflation to prices via production costs in levels (equation v). The revised model uses first differences, lagged terms, and quarterly dummies, directly modeling inflation's effect on price changes.

$$D\_EP_t = \beta_\theta + \beta_1(D\_IN_t) + \beta_2(D\_IN_{t-1}) + \beta_3(D\_EP_{t-1}) + y_1(q_{1t}) + y_2(q_{2t}) + y_3(q_{3t}) +$$

$$\varepsilon_t \ldots\ldots\ldots\ldots (vi)$$

Variable Definitions:

D_EP_t: First difference of tea export prices at time t (change in export prices, USD/kg), ensuring stationarity.

D_IN_t: First difference of the inflation rate at time t (change in CPI or PPI, %), capturing shifts in cost pressures.

(D_IN_{t-1}): Lagged first difference of inflation, reflecting delayed cost pass-through.

(D_EP_{t-1}): Lagged first difference of export prices, capturing persistence.

(q_{3t}) (q_{2t}) q_{1t} : Quarterly dummies for seasonal effects, with Q3 and Q2 significant in OLS and ARCH models, respectively.

β_θ: Constant term for baseline price changes.

β_1: Coefficient in the immediate effect of inflation changes on price changes.

β_2: Coefficient for lagged inflation effects.

β_3: Coefficient for price persistence.

y_1 y_2 y_3 : Coefficients for quarterly effects.

ε_t: Error terms for unobserved factors.

The exchange rate pass-through effect explained how variations in exchange rates affect export pricing strategies, highlighting adjustments aimed at preserving profitability or competitiveness (Goldberg & Knetter, 1997). The relationship is expressed as:

$$EP_t = \alpha - EX_t + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (iii)$$

The **negative sign** of β_1 indicates an **inverse relationship**: as (exchange rate) increases, (export price) decreases.

EP_t – Tea export price at time

α – intercept indicating the baseline export price when exchange rate has no effect

β_1 – The coefficient of exchange rate pass-through, showing how sensitive export prices are to changes in exchange rates.

EX_t – Exchange rate at time

ε_t – Error term

The revised model uses first differences, lags, and dummies, reflecting the negative pass-through found empirically.

$$D\_EP_t = \beta_\theta + \beta_1(D\_EXRATE_t) + \beta_2(D\_EXRATE_{\ t-1}) + \beta_3(D\_EP_{t-1}) + y_1(q_{1t}) + y_2(q_{2t}) + y_3(q_{3t}) + \varepsilon_t \dots\dots\dots..(iv)$$

Variable Definitions:

D_EP_t: First difference of tea export prices at time t (change in export prices, USD/kg), ensuring stationarity.

(D_EXRATE_t): First difference of the exchange rate at time t (change in KES/USD), addressing non-stationarity

$D\_EXRATE\ _{t-1}$: Lagged first difference of the exchange rate, capturing delayed pass-through.

D_EP_{t-1}: Lagged first difference in export prices, reflecting persistence.

$(q_{3t})\ (q_{2t})\ q_{1t}$: Quarterly dummies, with Q3 (OLS) and Q2 (ARCH) significant.

β_θ: Constant term for baseline price changes.

β_1: Coefficient in the immediate effect of inflation changes on price changes.

β_2: Coefficient for lagged inflation effects.

β_3: Coefficient for price persistence.

$y_1\ y_2\ y_3$: Coefficients for quarterly effects.

β_1< 0: Negative coefficient indicates inverse pass-through (depreciation lowers USD prices).

ε_t: Error terms for unobserved factors.

The revised models incorporated first differences(D_EXRATE_t), $\_IN_t$,D_IR_t to ensure stationarity, addressing potential non-stationarity in macroeconomic variables like exchange rates. Lagged terms$D_EXRATE\ _{t-1}$, $(D\_IN_{t-1})\ D\_IR_{t-1}$ are included to capture price persistence and dynamic effects, allowing for delayed responses in the tea export market. Quarterly dummies $(q_{3t})\ (q_{2t})\ q_{1t}$ account for seasonal patterns, such as those driven by tea harvest or auction cycles. By bypassing unmeasured intermediates like investment and production costs, the models directly link interest rates, inflation, and exchange rates to price changes, maintaining theoretical coherence with Keynesian and ERPT frameworks while aligning with the empirical structure required for robust regression analysis.

Description and measurement of variables

Dependent Variable - Tea Export Price: Tea export prices were measured quarterly as the average price per kilogram of tea exported from Kenya. This captured fluctuations in the prices at which tea was sold to international markets.

Independent Variables

Inflation: In this context, local inflation was measured on a quarterly basis using Kenya's Consumer Price

Index (CPI), which monitors the rate of price changes for a basket of goods and services in the Kenyan economy.

Interest Rates: Interest rates were measured quarterly using the Central Bank's lending rate, which represents the cost of borrowing for businesses, including those in the tea sector.

Exchange Rates: Exchange rates were measured quarterly as the nominal exchange rate between the Kenyan Shilling and the US Dollar, reflecting the value of the Kenyan currency in international markets.

Data analysis

Data analysis followed a structured process to ensure clarity and accuracy. Variables were organized and coded: inflation was measured using the Consumer Price Index (CPI), interest rates by the Central Bank Rate (CBR), and exchange rates as the nominal KES/USD rate. Missing values were addressed, and data were cleaned for consistency. Descriptive statistics (means, standard deviations, trends) were computed to summarize key variables. Stationarity was tested using the Augmented Dickey-Fuller (ADF) test. A multiple linear regression model was initially applied to assess the direct effects of inflation, interest rates, and exchange rates on tea export prices. To capture both short-term and long-run dynamics, the Autoregressive Distributed Lag (ARDL) model was employed, with cointegration verified using the bounds test. Quarterly dummy variables controlled for seasonality. This comprehensive approach provided robust insights into how macroeconomic factors affected tea export prices in Kenya.

Sampling Design

This study adopted purposive sampling, a non-probability sampling method, to select data based on its relevance to the research objectives. The sample consisted of quarterly macroeconomic data for Kenya, specifically inflation rates, interest rates, and exchange rates, covering the period from 2002 to 2022. This timeframe ensured the inclusion of recent trends and developments that impacted Kenya's tea export industry.

Data type and sources

This study utilized secondary data to analyze the relationship between macroeconomic factors and tea export prices in Kenya. The dataset comprised quarterly observations on tea export prices (per kilogram), inflation rates, bank interest rates, and exchange rates spanning the period from 2002 to 2022. To ensure accuracy and reliability, data was obtained from reputable sources. Inflation, interest, and exchange rate data was sourced from the Central Bank of Kenya (CBK), while tea export price data was collected from the Tea Board of Kenya and the International Monetary Fund (IMF).

Data Analysis Interpretation And Discussion

Introduction

This chapter presents the analysis of secondary data and interprets the results in relation to existing literature. It uses quarterly data from 2000 to 2022, with quarterly dummy variables included (using the fourth quarter as the reference) to capture seasonal effects. Descriptive statistics and the Augmented Dickey-Fuller (ADF) test were applied to check for stationarity, while Ordinary Least Squares (OLS) regression was used to estimate the impact of each macroeconomic variable on tea export prices.

Descriptive Statistics

Descriptive statistics played a vital role in summarizing and interpreting data by revealing key trends, patterns, and relationships within variables (Loeb et al., 2017). These statistics were commonly expressed through measures of central tendency, such as the mean, and measures of dispersion, including the standard deviation, minimum, and maximum values (Sharma, 2019). In this study, the mean was used to indicate the central value of each independent variable, while the degree of variability was evaluated using the standard deviation alongside the observed minimum and maximum values. Table 1 below presented the descriptive statistics for

the key variables used in the analysis, summarizing their central tendencies and dispersion characteristics over the study period.

Table 1: Summary of the study Variables

Statistic	Exchange Rate (EXRATE)	Inflation Rate (IN)	Interest Rate (IR)	Tea Export Prices (EP)
Mean	90.03229	6.001806	15.12080	3.034618
Median	84.87167	5.685000	13.93000	2.861363
Maximum	153.3900	19.18667	24.76333	4.779230
Minimum	62.95333	0.000000	11.87667	1.904398
Standard Deviation	17.78050	4.656632	2.853984	0.667184
Skewness	1.107261	0.866879	1.051439	0.573154
Kurtosis	4.307649	3.775785	3.493880	2.524254
Jarque-Bera	26.45623	14.43104	18.66407	6.161428
Probability (JB Test)	0.000002	0.000735	0.000089	0.045926
Sum	8643.100	576.1733	1451.597	291.3233
Sum of Squares Dev.	30033.88	2080.001	773.7964	42.28777
Observations	96	96	96	96

Source: Author's computation

This section presented the descriptive statistics for tea export prices (EP), exchange rate (EXRATE), inflation (IN), and interest rate (IR), based on quarterly data from 2000 to 2022 (N = 96). As shown in Table 1, the average tea export price was USD 3.03 (SD = 0.67), with a near-normal distribution (Jarque-Bera p = 0.0459). The exchange rate averaged 90.03 KES/USD (SD = 17.78) and was non-normally distributed (p = 0.000002). Inflation averaged 6.00% (SD = 4.66), and interest rates averaged 15.12% (SD = 2.85), both showing non-normal distributions (p = 0.0007 and p = 0.0001, respectively). These results indicated substantial variation across the macroeconomic variables, justifying their inclusion in the regression and volatility analysis.

Time Series Properties Tests Results

Stationarity – The Augmented Dickey-Fuller (ADF) Test

This study applied the Augmented Dickey-Fuller (ADF) test to check whether the variables contained a unit root, which would indicate non-stationarity. The null hypothesis (H_0) assumes the presence of a unit root, while the alternative hypothesis (H_1) suggests the series is stationary.

The results of the ADF unit root tests for all variables, including their first differences where necessary, were presented in Table 2 below.

Table 2: ADF Unit Root Test Results

Variable	t-Statistic	1% Critical Value	5% Critical Value	10% Critical Value	P-Value	Stationary at Level or After Differencing?
Exchange Rate	2.199671	-3.501445	-2.892536	-2.583371	0.9999	Not stationary at level (contains a unit root)

First Difference of Exchange Rate	-7.634812	-3.501445	-2.892536		0.0304	Stationary after first differencing
Inflation Rate	-4.003581	-3.501445	-2.892536	-2.583371	0.0021	Stationary at level
Interest Rate	-3.281149	-3.501445	-2.892536	-2.583371	0.0198	Stationary at level
Tea Export Prices	-9.286310	-3.503049	-2.893230	-2.583740	0.0000	Stationary at level

Source, Authors computation

The Augmented Dickey-Fuller (ADF) test was used to check the stationarity of the variables. The results in Table 2 showed that the exchange rate was non-stationary at level (p = 0.9999) but became stationary after first differencing (p = 0.0304). Both the inflation rate and interest rate were stationary at level with p-values of 0.0021 and 0.0198, respectively. Tea export prices were also stationary at level (p = 0.0000). These results confirmed that all variables were stationary and suitable for regression analysis.

OLS Regression Analysis

This section presented the results of the Ordinary Least Squares (OLS) regression conducted to assess the impact of selected macroeconomic variables on the first-differenced Kenyan tea export prices (D_EP) over the period 2000Q3 to 2023Q4 (N = 94). The analysis aimed to determine the short-run effects of exchange rates (EXRATE), inflation (IN), and interest rates (IR) on changes in tea export prices. To capture dynamic effects and temporal influences, the model incorporated lagged values of the independent variables, D_EXRATE_LAG1, D_IN_LAG1, and D_IR_LAG1, as well as the lagged dependent variable (D_EP_LAG1). Additionally, seasonal dummy variables (Q1, Q2, and Q3) were included to control quarterly fluctuations in tea export prices, with Q4 serving as the base category. The results of the Ordinary Least Squares (OLS) regression analysis were summarized in Table 3 below, which presented the estimated effects of exchange rates, inflation, and interest rates, including their lagged terms, on the first-differenced tea export prices (D_EP), along with seasonal dummy variables for quarterly variations.

Table 3: OLS Regression Results

Variable	Coefficient	Standard Error	t-Statistic	P-Value
First Difference of Exchange Rate (D_EXRATE)	-0.036537	0.011774	-3.111	0.0025
Lagged D_EXRATE (D_EXRATE_LAG1)	0.011949	0.012789	0.934	0.3527
First Difference of Inflation (D_INFLATION)	0.027151	0.012133	2.238	0.0278
Lagged D_INFLATION (D_INFLATION_LAG1)	-0.026596	0.012338	-2.156	0.0339
First Difference of Interest Rate (D_INTEREST_RATE)	-0.003401	0.043106	-0.079	0.9373
Lagged D_INTEREST_RATE (D_INTEREST_RATE_LAG1)	-0.019696	0.012749	-1.545	0.1260
Lagged D_EP (D_EP_LAG1)	0.254066	0.105581	2.406	0.0182
Dummy for Quarter 1 (Q1)	0.111082	0.089952	1.235	0.2202
Dummy for Quarter 2 (Q2)	-0.124361	0.090630	-1.372	0.1735

Dummy for Quarter 3 (Q3)	0.285363	0.095806	2.979	0.0038
Constant	-0.057525	0.066369	-0.867	0.3885

Source author's computation

Table 3 presented the OLS regression estimates of the model that examined the relationship between changes in tea export prices and selected macroeconomic indicators, namely exchange rate, inflation, and interest rates, including their lagged values. The model also incorporated quarterly dummy variables (Q1, Q2, and Q3) to capture seasonal effects and included the lag of the dependent variable to account for persistence in tea export price movements. The regression was estimated using quarterly data from 2000Q3 to 2023Q4 (N = 94).

Breusch-Godfrey Test for Autocorrelation

To ensure the validity of the Ordinary Least Squares (OLS) regression estimates, it was essential to test for the presence of autocorrelation in the residuals. This subsection presented the results of the Breusch-Godfrey Serial Correlation LM Test, which assessed whether residuals from the OLS model were serially correlated. The test was conducted up to two lags to verify that the model satisfied one of the core OLS assumptions that the residuals were independently distributed. The results were summarized in Table 4 below.

Table 4: Breusch-Godfrey Serial Correlation LM Test Results

Model (Regressor)	F-Statistic	Probability (F-statistic)	Probability (Chi-Square)	Presence of Serial Correlation
First Difference of Exchange Rate	2.880692	0.0616	0.0506	No
First Difference of Inflation	2.721003	0.0714	0.0591	No
First Difference of Interest Rate	2.397355	0.0971	0.0813	No

Source author's computation

The Breusch-Godfrey test results showed no evidence of serial correlation in the residuals of all three models at the 5% significance level. Both the F-statistics and Chi-Square p-values were above 0.05, confirming that the OLS regression assumptions were upheld, and the model estimates were reliable.

Breusch-Pagan Test for Heteroscedasticity

This section examined whether the residuals from the OLS regression models exhibited constant variance using the Breusch-Pagan-Godfrey Test, an essential diagnostic for confirming the homoscedasticity assumption, which ensures the reliability and efficiency of OLS estimates. The results, summarized in Table 5, indicated whether heteroscedasticity was present in each model.

Table 5: Breusch-Pagan-Godfrey Test for Heteroscedasticity Results

Model (Regressor)	F-Statistic	Probability (F-statistic)	Probability (Chi-Square)	Evidence of Heteroscedasticity?
First Difference of Exchange Rate	1.497551	0.1885	0.1852	No
First Difference of Inflation Rate	0.480641	0.8211	0.8068	No
First Difference of Interest Rate	0.680647	0.6650	0.6477	No

Source author's computation

The Breusch-Pagan-Godfrey test results showed no evidence of heteroscedasticity in any of the three models at the 5% significance level. All p-values were above 0.05, confirming that the residuals had constant variance and validated the reliability of the OLS estimates. The OLS regression analysis for the period 2000Q3 to 2023Q4 indicated that changes in Kenyan tea export prices (D_EP) were significantly affected by two main factors. First, exchange rate depreciation had a negative and statistically significant effect on export prices (-0.036537, p = 0.0025), suggesting that a weaker shilling lowered tea prices. Second, inflation exerted mixed effects, positively influencing prices in the current period (0.027151, p = 0.0278) but having a negative impact in the following quarter (-0.026596, p = 0.0339). The lagged value of tea export prices (0.254066, p = 0.0182) was also significant, indicating price persistence over time. Seasonal variation was evident, with significantly higher prices recorded in the third quarter (Q3) compared to the fourth (Q4) (0.285363, p = 0.0038). Interest rates and other lagged variables did not have a statistically significant effect on tea export prices. Diagnostic tests supported the model's robustness, showing no signs of autocorrelation (Breusch-Godfrey p-values > 0.05) or heteroscedasticity (Breusch-Pagan p-values > 0.05), confirming the reliability of the estimated short-run dynamics.

SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

Introduction

This chapter provided a summary of the study findings, drew conclusions, and offered policy recommendations based on the analysis of the volatility of Kenyan tea export prices. It also highlighted areas for further research to deepen the understanding of tea price dynamics and their implications for Kenya's economy.

Summary

The tea sector is a vital contributor to Kenya's economy through foreign exchange earnings and employment. However, tea export prices were vulnerable to macroeconomic fluctuations, which could destabilize the industry. This study investigated the impact of exchange rates, inflation, and interest rates on Kenyan tea export price changes using quarterly data from 2000Q3 to 2023Q4 (94 observations), sourced from the Central Bank of Kenya and the World Bank. Descriptive statistics revealed that exchange rates were highly volatile and non-normally distributed, while tea export prices were relatively stable and approximately normal. Unit root tests showed that the exchange rate was non-stationary at levels but became stationary after first differencing. Inflation, interest rates, and tea export prices were stationary at levels. OLS regression results indicated that exchange rate depreciation significantly reduced tea export price changes, reflecting the adverse impact of a weaker Kenyan shilling. Inflation had a significant positive contemporaneous effect, while its lagged value had a negative impact, suggesting delayed price adjustments. Interest rates and their lagged terms had no significant influence. The lagged dependent variable was significant, showing price persistence. Seasonal effects were also observed, with higher price changes in the third quarter compared to the fourth. Diagnostic tests confirmed no serial correlation or heteroscedasticity, affirming the reliability and validity of the estimated model.

CONCLUSIONS

The study concluded that exchange rates and inflation were significant determinants of short-run fluctuations in Kenyan tea export prices. A depreciation of the Kenyan shilling lowered export prices, likely due to competitiveness pressures in global markets. Inflation raised export prices through cost-push effects, although this impact weakened in the subsequent quarter. Interest rates did not significantly affect tea export prices, suggesting they were not a major driver of price variation in this context. Tea export prices also demonstrated persistence, with past price changes influencing current movements. Seasonal patterns were evident, particularly with higher prices observed in the third quarter. The diagnostic tests confirmed the reliability of the model, showing no evidence of serial correlation or heteroscedasticity. Nonetheless, the model explained only part of the variation in export price changes, indicating the presence of other contributing factors not captured in the analysis.

Policy Implications

To enhance the stability of Kenyan tea export prices, policymakers were advised to consider strategies to mitigate exchange rate volatility. Interventions such as strengthening foreign exchange reserves through instruments like foreign exchange market interventions or incentivizing diaspora remittances could have reduced the adverse impact of currency depreciation on tea export earnings. In response to inflation's cost-push effects, targeted measures such as improving efficiency in supply chains and offering subsidies or tax relief on key production inputs were recommended to help lower operational costs, thereby supporting price stability in the tea export market. Given the observed persistence in price changes and the seasonal nature of export price movements, particularly the price elevation in the third quarter, there was scope for implementing price stabilization mechanisms. These could have included minimum price guarantees or buffer stock schemes to safeguard producers against unfavorable price fluctuations. Aligning export strategies to capitalize on seasonal peaks was suggested to optimize foreign exchange earnings during high-price quarters. Although interest rates were found to have no direct influence on tea export prices, maintaining a stable and predictable monetary policy environment remained essential, as it supported broader economic conditions conducive to sustained growth in the tea sector.

Areas for Further Research

This study examined the effects of exchange rates, inflation, and interest rates on the volatility of Kenyan tea export prices, but it was likely that additional macroeconomic and structural factors contributed to price dynamics. Future research could extend the analysis by incorporating variables such as gross domestic product (GDP) growth, fiscal policy measures, and external shocks, including geopolitical events and global commodity cycles. Furthermore, investigating the role of global tea demand trends, technological advancements in tea production, and evolving international trade policies could yield deeper insights into price dynamics. Studies focusing on the socio-economic implications of export price fluctuations, particularly their impact on smallholder farmers, rural livelihoods, and income distribution, could inform the development of targeted policy interventions.

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Abbreviation and Acronyms ssssss

AFFA: Agriculture, Fisheries and Food Authority

APA: Automated Public Auction

CBK: Central Bank of Kenya

CPI: Consumer Price Index

EATTA: East Africa Tea Trade Auction

GDP: Gross Domestic Product

KNBS: Kenya National Bureau of Statistics

KES: Kenya Shilling

KTDA: Kenya Tea Development Agency

KTDA (M/S): Kenya Tea Development Agency – Management Services

KTGA: Kenya Tea Growers Association

CAADP: Comprehensive Africa Agriculture Development Programme

ERPT: Exchange Rate Pass-Through

TBK: Tea Board of Kenya

TRF: Tea Research Foundation

GARTCH: Generalized Autoregressive Conditional Heteroscedasticity