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DETERMINANTS OF EXPORTS IN CÔTE D'IVOIRE

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ABSTRACT

Purpose- Given the critical role of exports in fostering economic growth, this study aims to investigate the determinants of exports in Côte d'Ivoire over the period 1970-2024. Specifically, the study examines the effects of trade openness, agricultural output, final consumption expenditure, and the exchange rate on export performance in Côte d'Ivoire. By analyzing influences of these macroeconomic factors, the study seeks to provide deeper insights into the key drivers of export growth in the Ivorian economy.

Methodology- Annual time series data over the period 1970-2024 were employed in this study. The data are obtained from the World Bank. The VAR model has been utilized in this study to test for cointegration among the variables and to examine the key determinants of exports in Côte d'Ivoire. The ADF unit root test, Johansen cointegration test, Granger causality test, and CUSUM test were applied to analyze the data. The ADF unit root test is applied to ensure the stationarity of time series data and prevent spurious regression. The Johansen cointegration test examines the presence of long-run equilibrium relationships among non-stationary variables, while the Granger causality test identifies the direction of causal and predictive relationships over time. The CUSUM test is used to evaluate the stability of model coefficients throughout the study period.

Findings- The Johansen cointegration test revealed that exports are positively related to trade openness and agriculture output, but it is related negatively with final consumption expenditure, and exchange rate. Agriculture output has the biggest effect on exports. The Granger causality test results showed that there are unidirectional short-run causality relationship running from exports to trade openness, and bidirectional short-run causality relationship between agriculture output and exports, but there is no evidence of any short-run causality relationship between final consumption expenditure, exchange rate and exports. Besides, there are bidirectional long-run causality relationships between trade openness, agriculture output, exchange rate and exports, and unidirectional long-run causality relationship running from final consumption expenditure to exports. Lastly, CUSUM test indicated that there are no structural changes in the model.

Conclusion- The study concluded that a coordinated policy approach that promotes trade openness, enhances agricultural production, manages domestic consumption, and ensures exchange rate stability is essential for strengthening Côte d'Ivoire's export sector and achieving sustainable economic growth.

Keywords: Côte d'Ivoire, Ivory Coast, international trade, trade liberalization, agricultural sector
JEL Codes: O11, E20, G15

1. INTRODUCTION

Trade, the exchange of goods and services through imports and exports, is widely recognized as a key driver of economic growth and development. Exports, in particular represent one of the earliest and most significant forms of international economic engagement. Their growing importance is reflected in an increasing share of global output. Export activities promote economic growth by boosting productivity, lowering production costs, enabling economies of scale through access to larger markets, fostering international integration, and attracting foreign direct investment.

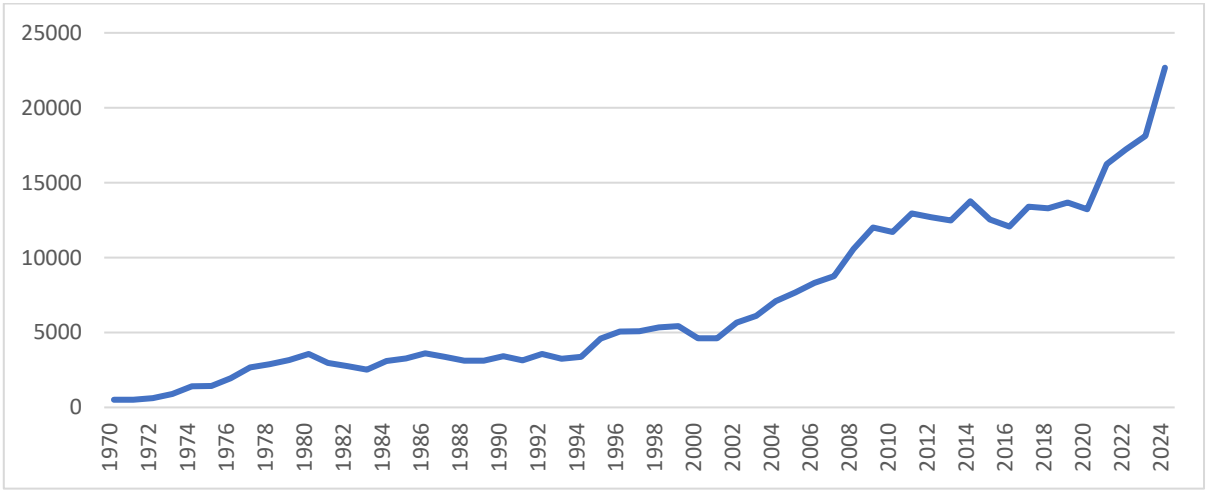
In this context, Côte d'Ivoire, located in West Africa and covering approximately 322,462 square kilometers, stands out as one of the largest economies within the West African Economic and Monetary Union (WAEMU). Over the past decade, the country has experienced a remarkable economic transformation, achieving one of Sub-Saharan Africa's fastest growth rates. As the world's leading producer and exporter of cocoa, Côte d'Ivoire maintained strong economic expansion, with GDP growth averaging 8.2% between 2012 and 2019. Despite global challenges and tighter financial conditions following the COVID-19 pandemic, economic momentum remained resilient, reaching 6.2% in 2023 and rising to 6.5% in 2024, supported by strong public and private investment, particularly in infrastructure and agriculture (Dago and Pei, 2025). Agriculture remains the backbone of the Ivorian economy, contributing over 16% of GDP and employing roughly 45% of the labor force, while playing a central role in export earnings and income generation (World Bank, 2024).

Côte d'Ivoire's economic performance is closely linked to its integration into the global trading system through multilateral, regional, and bilateral agreements that enhance market access, competitiveness, and sustainable development. Since joining the World Trade Organization (WTO) in 1995, the country has adhered to international rules on trade in goods and services and intellectual property, promoting transparency and predictability (WTO, 2023). Regionally, as a founding member of the Economic Community of West African States (ECOWAS) and participant in the West African Economic and Monetary Union (WAEMU/UEMOA), it benefits from a free trade area, a common external tariff, and the free movement of goods, capital, and persons, supported by coordinated fiscal and monetary policies (ECOWAS, 2022; UEMOA, 2022). On the continental level, Côte d'Ivoire has been part of the African Continental Free Trade Area (AfCFTA) since 2021, which aims to create a single African market by gradually eliminating tariffs and non-tariff barriers, fostering regional value chains, economic diversification, and industrial development (African Union, 2021). Additionally, the country has signed bilateral agreements, most notably the Economic Partnership Agreement (EPA) with the European Union, provisionally applied since 2016, granting duty-free and quota-free access to European markets while supporting agricultural and agro-industrial exports and long-term economic growth (European Commission, 2023).

As a major commercial hub in West Africa, foreign trade accounts for approximately 51% of Côte d'Ivoire's GDP. Nevertheless, the country's export structure remains highly concentrated in primary commodities, particularly agricultural products, which represent around 54.5% of total exports. This pronounced concentration reflects a structural reliance on cocoa as the dominant export commodity, accounting on its own for 35% of total exports, alongside natural rubber (12%) and fruits and nuts (7.5%). Such an export pattern entrenches the rent-based, agro-export orientation of the Ivorian economy, thereby heightening its exposure to volatility in global commodity prices and to climate-related shocks. In parallel, extractive industries contribute approximately 30.5% of total exports, split between gold (15%) and mineral fuels (15.5%), underscoring the growing role of natural resources in sustaining the trade balance and generating foreign exchange earnings. By contrast, manufactured and semi-manufactured goods together account for only 15% of total exports (10% and 5%, respectively), highlighting the limited depth of domestic industrialization and the persistently low level of value added embodied in Ivorian exports (World Bank, 2024).

Figure 1 illustrates the evolution of exports in Côte d'Ivoire from 1970 to 2024. Overall, the trend exhibits a steady upward trajectory, reflecting the growing significance of exports in the national economy. Export values increased from USD 520.6 million in 1970 to USD 3,163.8 million in 1979, indicating a period of relative economic stability and sustained production growth. However, between 1980 and 1983, exports declined from USD 3,561.6 million to USD 2,527.4 million. This downturn can be attributed to adverse external shocks, including global price volatility, rising energy costs, fluctuating interest rates, and severe droughts that reduced agricultural output and weakened global demand.

Figure 1: Export of goods and services in Cote d'Ivoire, at current prices, in million USD, 1970-2024 (World Bank, 2025)



From 1984 onward, exports recovered and expanded significantly, reaching USD 5,333.5 million in 1998. This resurgence was largely driven by government reforms aimed at liberalizing trade, reducing export barriers, and promoting international integration. Nevertheless, subsequent periods were characterized by further fluctuations. Between 1999 and 2001, exports fell from USD 5,423.1 million to USD 4,617.8 million due to political and military instability, which disrupted production, particularly in the agricultural sector. Exports rebounded to USD 12,000.3 million in 2009 but weakened again in 2010 following the post-electoral crisis, before recovering to USD 12,699.5 million in 2012.

Further fluctuations occurred after 2013, driven mainly by declines in global prices for key export commodities such as cashew nuts and cocoa. As a result, exports fell to USD 12,532.9 million in 2015 and USD 11,798.4 million in 2016. From 2017 onward, export activity resumed an upward trajectory, reaching a peak of USD 13,918.5 million in 2019. This was followed

by a decline to USD 13,221.6 million in 2020, largely due to the COVID-19 pandemic, which disrupted global trade through travel restrictions and supply-chain interruptions. Exports subsequently rebounded strongly, rising to USD 22,673.5 million by 2024.

Recognizing the pivotal role of exports in national economic growth, the Ivorian government has implemented a range of measures to enhance export performance, including trade liberalization, tariff reductions, and the modernization of production technologies. Despite these efforts, the export sector faces both structural and external challenges. Agricultural exports remain highly vulnerable to climatic variability, land degradation, and pest outbreaks, such as cocoa swollen shoot disease (Dago and Pei, 2025). Additionally, limited access to modern technologies, inadequate infrastructure, and high production costs constrain productivity and weaken international competitiveness (Kouakou, 2020). Political and economic instability also continues to impede production continuity and the efficient marketing of exports.

Against this backdrop, this study aims to investigate the determinants of exports in Côte d'Ivoire over the period 1970-2024. The study is organized as follows: the next section presents a comprehensive literature review, followed by a discussion of the methodology. Subsequently, the empirical results are reported, and the final section concludes the study.

2. LITERATURE REVIEW

Several studies have examined the determinants of exports across countries using various econometric approaches. This section reviews selected empirical studies tested the effect of trade openness, agriculture output, final consumption expenditure, and exchange rate on exports of different country, which are relevant to the present research.

Regarding trade openness, numerous studies have extensively documented its impact on both export performance and economic growth, although the strength of this effect varies across different contexts. Zahonogo (2016), using a dynamic panel threshold model for Sub-Saharan African countries, found that trade openness enhances economic growth and exports up to a critical threshold, beyond which the effect weakens, highlighting the importance of supportive domestic conditions. Similarly, Keho and Wang (2017) and Guei and le Roux (2019) provided evidence from Côte d'Ivoire and ECOWAS countries, respectively, that trade openness significantly strengthens export performance and contributes to long-run economic growth. Country-specific studies further confirm these findings. Khalid (2016) showed that trade openness positively affects exports in Turkey in the short run, while long-run effects depend on structural factors. Onafowora and Owoye (1998) and Were (2015) supported the export-led growth hypothesis, emphasizing that openness promotes exports and growth, with stronger effects in developed and emerging economies. At the micro level, Kinuthia (2016) demonstrated that trade liberalization increases firm-level export participation in Kenya.

More recent evidence from Namibia by Sunde et al. (2023) confirmed a positive short- and long-run relationship between trade openness and exports. Chabi and Saygılı (2024) also found that trade liberalization can enhance export performance in West African economies, although its effects vary across sectors. Similarly, Onuogu et al. (2025) highlighted that trade openness promotes export-led growth in West Africa, particularly when human capital reaches a certain threshold. Besides, Samuel and Nkoro (2025) investigated the broader effects of trade liberalization on economic variables in West Africa, demonstrating that greater openness positively affects export dynamics and overall trade performance, even when the primary focus was on inflation. However, Rigobon and Rodrik (2005) argue that the effectiveness of trade openness in promoting exports critically depends on institutional quality, suggesting that openness alone is insufficient to ensure sustained export growth. Hence, the empirical literature largely supported a positive relationship between trade openness and export performance across countries. However, the impact of trade openness on exports is influenced by country-specific factors such as institutional quality, level of development, and complementary economic policies.

Moreover, a substantial body of empirical studies has examined the relationship between agricultural output and export performance, particularly in developing and agrarian-based economies. Using time-series data for Ethiopia, Tadesse (2008) found that growth in agricultural output significantly increases export earnings, underscoring the importance of productivity-enhancing policies. Similar evidence from Ethiopia's horticultural sector by Adugna and Zewdu (2015) indicated that non-traditional agricultural products increasingly contribute to export growth. Studies from other developing countries reinforced these findings. Dorosh and Haggblade (2003) showed that agricultural output growth in Bangladesh positively affects exports of traditional commodities, facilitating structural transformation and export diversification. In Nigeria, Oyekale and Egbetokun (2009) and Nwafor and Ugwu (2013) confirmed a strong short- and long-run relationship between agricultural output and export performance, despite policy inconsistencies. Further evidence from Rwanda, South Africa, and Chile demonstrates that agricultural output expansion significantly improves export earnings when accompanied by modernization, technological adoption, and institutional support (Murekezi & Bizoza, 2017; Lewin et al., 2004; Gomez & Ricketts, 2003). Panel and cross-country studies also supported this relationship. Shahbaz et al. (2015), Fulginiti and Perrin (1998), and Audu (2010) found that higher agricultural output and productivity positively influence exports, particularly where agro-processing linkages, supportive trade policies, and adequate infrastructure exist.

Evidence from South Asia further confirmed that output growth enhances agricultural exports, although limited diversification, price instability, and infrastructural constraints may restrict the full export potential (Ramachandran &

Swaminathan, 2008; Al-Mahmood & Rao, 2002). In Somalia, Abdi and Mohamed (2024) highlighted that higher agricultural output significantly increases both the volume and value of exports, emphasizing production capacity as a key driver of trade performance. Similarly, Aragie et al. (2023) found that in Ethiopia, Kenya, and Uganda, increases in agricultural production are strongly linked to greater export capacity, although potential trade-offs with domestic food prices exist. In the Southern African Development Community (SADC), Mabeta et al. (2025) demonstrated that foreign direct investment enhances agricultural output, which in turn leads directly to higher export levels. In Bangladesh, Hasan et al. (2022) indicated that growth in agricultural production positively influences export performance, contributing to overall economic growth. Collectively, these studies generally argued that increases in agricultural production enhance export capacity by expanding surplus availability, improving competitiveness, and strengthening foreign exchange earnings. However, the magnitude and direction of the relationship differ across countries depending on structural characteristics, policy frameworks, and levels of value addition.

Furthermore, many empirical literatures examined final consumption expenditure as a key determinant of export performance in both developed and developing economies. Evidence from time-series and panel studies indicated that rising domestic consumption may crowd out exports by diverting resources toward domestic markets. Consistent with this view, Baharumshah and Thanoon (2006), Boyd et al. (2001), Ahmed and Gupta (2009), and Al-Mahmood (2004) reported a negative effect of final consumption expenditure on exports in Malaysia, India, and Pakistan. Similar findings are documented for Sub-Saharan Africa and Bangladesh, where consumption-driven demand constrained export growth (Nkusu, 2004; Rahman, 2015). Evidence from Europe, East Asia, and Latin America further supported this view, indicating that high consumption expenditure reduces export growth in economies characterized by strong domestic demand and high import content of consumption (De Vita & Abbott, 2004; Lee & McKibbin, 2010; Zezza & Carfagna, 2017). However, some studies reported mixed or positive effects. Ali and Hammoudeh (2010) found that consumption expenditure exerted a positive long-run but insignificant short-run effect on exports in Egypt, while Qureshi and Ahmed (2010) showed that in Turkey, strong domestic demand may enhance export performance through scale and productivity effects.

Furthermore, In Albania, Akermi et al. (2024) showed that final consumption expenditure, along with domestic investment and imports, significantly affects exports in both the short and long run, highlighting the importance of consumption-driven demand on trade outcomes. Similarly, Sirajuddin (2025) found that in Austria, final consumption expenditure interacts with exports and other macroeconomic variables to shape economic performance, illustrating the broader link between domestic demand and export growth. In Egypt, Rashdan (2024) demonstrated that government final consumption expenditure can influence macroeconomic indicators, including export capacity, suggesting that public consumption policies may indirectly support trade. Moreover, in India, Srivastava et al. (2025) revealed that private and government consumption expenditures are closely linked with trade flows, indicating that higher consumption can stimulate export activity. Besides, Muda et al. (2025) showed that household and nonprofit institutional final consumption expenditure positively impacts exports of goods and services, emphasizing the direct role of domestic consumption in enhancing trade performance. Overall, the literature presents mixed evidence; however, the prevailing view suggested that although final consumption expenditure may stimulate production and support exports in certain contexts, high domestic consumption generally constrains export growth by absorbing productive resources.

Finally, exchange rate is one of the most extensively studied macroeconomic determinants of export performance, due to its direct influence on international price competitiveness. A large body of empirical literature has supported the view that exchange rate depreciation enhances export performance by improving price competitiveness. Using cointegration and error correction models, Marwah and Klein (2004) found that an overvalued real exchange rate significantly reduces Pakistan's export growth. Similar results were reported for South Africa, Turkey, Ghana, Nigeria, Sri Lanka, and Pakistan, where real exchange rate depreciation was shown to increase export volumes or earnings across various sectors (Armah et al., 2010; Kasman & Duman, 2006; Donkor, 2012; Akinlo, 2006; Athukorala & Sen, 2002; Mehmood & Farooq, 2015). Panel evidence from middle-income countries further confirmed that depreciation of the real effective exchange rate positively affects exports, although the magnitude of the response varies across countries and income levels (Bahmani-Oskooee & Ratha, 2004; Bopape & Krugell, 2007). Nonetheless, several studies highlighted that exchange rate effects are not uniform. Short-run export responses are often unstable due to external shocks and policy uncertainty, while long-run effects depend on structural conditions, sectoral composition, and global demand (Donkor, 2012; Akinlo, 2006).

Moreover, comparative analyses indicated country-specific heterogeneity in export responsiveness to exchange rate movements, particularly between Pakistan and India and across manufacturing sectors in Turkey (Choudhry et al., 2015; Gumus, 2007). In Nigeria, Gold and Yusuf (2025) found that exchange rate depreciation significantly boosts non-oil exports, highlighting the importance of currency valuation in enhancing trade performance. Similarly, in Mauritania, Elhadj and Koang (2024) showed that fluctuations in the exchange rate have a positive and significant effect on exports, suggesting that effective exchange rate management can support export growth. Focusing again on Nigeria, Gelle et al. (2025) highlighted that exchange rate volatility plays a critical role in shaping non-oil export outcomes, emphasizing the importance of stable yet flexible currency policies. Finally, in Kenya, Chepkwisich (2025) found that both short-run and long-run exchange rate fluctuations significantly influence coffee exports, illustrating how sector-specific exports are sensitive to currency

movements. Collectively, these studies highlighted that while exchange rate depreciation generally enhances export performance by improving price competitiveness, the strength of this effect varies across countries. Moreover, structural characteristics, exchange rate regimes, and external demand conditions significantly shape the export response to exchange rate changes.

3. DATA AND METHODOLOGY

In this study, the Vector Autoregression (VAR) model is employed as the primary econometric framework. The VAR model is particularly well suited for analysing, describing, and forecasting the behaviour of economic and financial time series. It captures the dynamic interactions among multiple endogenous variables by modelling each variable as a function of its own lagged values and those of the other variables in the system. This framework enables the analysis of the dynamic effects of random shocks on the variables, as well as the assessment of their interdependencies over time. In addition, the VAR model provides a flexible and relatively unrestricted approach, as it does not require strong a priori assumptions regarding the direction of causality among variables. This flexibility makes it especially appropriate for empirical investigations involving complex economic relationships. In the context of this study, the VAR methodology is utilized to test for cointegration among the variables and to examine the key determinants of exports in Côte d'Ivoire.

Our model consists of five variables: exports (EXP), trade openness (OPEN), agriculture output (AGR), final consumption expenditure (FCE), and exchange rate (EXR). This model with EXP as the dependent variable is presented as follows:

$$\ln EXP = \beta 0 + \beta 1\, OPEN + \beta 2\, \ln AGR + \beta 3\, \ln FCE + \beta 4\, \ln EXR + \varepsilon t \quad (1)$$

where β0 is the intercept, β1, β2, β3, and β4 are the slope coefficients, lnEXP is the natural log of exports (USD), OPEN is the trade openness as an indicator of the trade liberalization (the percentage of total exports and imports to GDP), lnAGR is the natural log of agriculture output (USD), lnFCE is the natural log of final consumption expenditure (USD), lnEXR is the natural log of exchange rate (CFA to USD), and εt is the error term (see Table 1). The a priori expectations of the slope coefficients of the export model in equation (1) are $\beta 1 > 0$, $\beta 2 > 0$, $\beta 3 < 0$, and $\beta 4 < 0$.

Annual time series data of Cote d'Ivoire over the period 1970-2024 will be used in this study. The data are obtained from the World Bank (WB). All variables in this study are expressed in the logarithmic form, except for trade openness (OPEN). There are many indicators of trade openness such as tariffs, the percentage of exports to GDP, the percentage of imports to GDP, the percentage of the trade balance to GDP, and the percentage of total exports and imports to GDP. The percentage of total exports and imports to GDP will be used in this study as an indicator of trade openness.

Table 1: The Variables

Variables		Definitions
Exports	EXP	Exports are goods and services produced in one country and sold to buyers abroad.
Trade Openness	OPEN	Trade openness is the process of reducing or eliminating restrictions on international trade, such as tariffs, quotas, and other barriers, to allow goods and services to move more freely between countries.
Agriculture Output	AGR	Agricultural output refers to the total quantity of crops, livestock, and other agricultural products produced by a country over a specific period.
Final Consumption Expenditure	FCE	Final consumption expenditure is the total spending by households, governments, and non-profit organizations on goods and services for direct use, rather than for producing other goods or investment.
Exchange Rate	EXR	Exchange rate is the price of one country's currency (CFA) in terms of another currency (USD), determining how much of one currency can be exchanged for another.

Because this study involves time series data, it is necessary to begin the analysis with the unit root tests. Augmented Dickey-Fuller (ADF) unit root tests will be conducted on each variable in the model to find out whether the time series data are stationary at the level or first difference. After testing for stationarity and confirming the order of integration of each time series, and if the variables in the model are found to be integrated of the same order, the Johansen cointegration test will be applied to establish whether there is any long-run or equilibrium relationship between the variables in the model (Engle and Granger, 1987; Johansen, 1991). If the variables are found to be cointegrated, then the Granger causality tests will be conducted based on the Vector Error Correction Model (VECM) to determine the long and short-run causality relationships among the variables in the model (Sims, 1980). However, the VECM will be subjected to the residual diagnostics, namely, the normality, serial correlation, heteroskedasticity and Ramsey RESET tests first to ascertain the statistical adequacy of the model before running the Granger causality tests. On the other hand, if the Johansen test results indicate no cointegration among the variables in a particular model, then the Granger causality tests will be based on the VAR model. Lastly, a stability

test based on the cumulative sum (CUSUM) will be applied to determine whether the parameters of the model are stable over the period of the study.

4. FINDINGS AND DISCUSSIONS

This section presents and discusses the empirical results of this study. They include the various econometric tests and estimations, namely, ADF unit root test, Johansen cointegration test, statistical diagnostic tests, Granger causality test and stability test based on the cumulative sum (CUSUM).

4.1. ADF Unit Root Test Results

In the first step of the analysis, we carried out the ADF unit root test to determine whether the variables in the model are stationary or non-stationary at the levels. Table 2 shows that all the variables in the model are not stationary at the level, but became stationary after first differencing at 1% or 5% level of significance. Hence, all the variables in the model are integrated into order one, or I(1).

Table 2: ADF Unit Root Test Results

	Level			First difference		
	lntercept	Trend and intercept	No trend & no intercept	Intercept	Trend and intercept	No trend & no intercept
lnEXP	0.276268	-2.448250	3.252157	-3.764514***	-3.675249**	-1.543151**
OPEN	-0.957736	-2.163058	3.245078	-7.231644***	-6.732617***	-3.787245***
lnAGR	-1.860145	-1.752514	6.204257	-4.831409**	-5.143288**	-1.326231**
lnFCE	-2.313084	-1.137213	1.840707	-3.331074***	-3.963527***	-1.864202***
lnEXR	-1.380608	-2.345061	0.124109	-5.735154***	-5.743347***	-5.782152***

Note: *** denotes significance at the 1 percent level, and ** at the 5 percent level.

4.2. Johansen Cointegration Test Results

Since all the variables are stationary in the first difference, we can apply the Johansen multivariate cointegration test to determine if there is any cointegration or long-run equilibrium relationship between the variables in the model. However, before running the cointegration test we need to run the VAR model first to determine the optimal lag length, which is 3 based on the minimum AIC.

After having determined the optimal lag length, we then proceeded with the cointegration test for the model. Table 3 indicates that there are at most five cointegration equations based on the trace test and maximum eigenvalue test. In other words, the results reveal that there is more than one long-run relationship among the variables in the system comprising lnEXP, OPEN, lnAGR, lnFCE, and lnEXR.

Table 3: Johansen Cointegration Test Results

No. of CE(s)	Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value
r = 0	201.6321***	0.0000	64.15204***	0.0000
r ≤ 1	127.5648***	0.0000	40.53241***	0.0083
r ≤ 2	88.13601***	0.0000	34.43126***	0.0004
r ≤ 3	62.56358***	0.0000	26.45372**	0.0145
r ≤ 4	12.54357**	0.0131	11.53542**	0.0152

Notes: *** denotes significance at the 1 percent level, and ** at the 5 percent level.

After having found a cointegration relationships among the variables lnEXP, OPEN, lnAGR, lnFCE, and lnEXR, the cointegrating equation was normalized using the export variable.

Table 4: Cointegration Equation Normalized with respect to lnEXP

lnEXP	OPEN	lnAGR	lnFCE	lnEXR	C
1.000000	-0.56357	-0.62630	0.534264	0.556321	0.843075
	(0.00256)	(0.02210)	(0.07280)	(0.05263)	(0.00137)

From Table 4, the long-run lnEXP equation can be written as:

$$lnEXP = - 0.843 + 0.564\ OPEN + 0.626\ lnAGR - 0.534\ lnFCE - 0.556\ lnEXR \quad (2)$$

The cointegration equation given by equation (2) above shows that lnEXP is positively related to OPEN, and lnAGR, but it is related negatively with lnFCE and lnEXR.

The coefficient of OPEN indicates that for every one percent increase in trade openness, the export of Cote d'Ivoire will increase by 0.564 percent. It is clear that trade openness plays a crucial role in enhancing export performance in Côte d'Ivoire by reducing trade costs, expanding market access, improving productivity, and attracting foreign investment. The reduction of tariff and non-tariff barriers lowers transaction and export costs, while greater openness facilitates access to higher-quality intermediate inputs, capital goods, and modern technologies, thereby improving productivity and export quality. This enables domestic firms to meet international standards and strengthen their export capacity. Moreover, trade openness attracts export-oriented foreign direct investment, particularly in agro-processing industries, which increases productive capacity, promotes value-added exports, and supports export diversification. Finally, through regional integration within ECOWAS and trade agreements with the European Union, Côte d'Ivoire has gained improved access to foreign markets, leading to increased external demand for key exports such as cocoa, cashew nuts, rubber, and palm oil. Similar results were found by Zahonogo (2016), Khalid (2016), Keho and Wang (2017), Guei and le Roux (2019), and Sunde et al. (2023).

The coefficient of lnAGR indicates that for every one percent increase in agriculture output, the export of Cote d'Ivoire will increase by 0.626 percent. Agricultural output has a positive effect on exports in Côte d'Ivoire due to the central role of agriculture in the country's export structure. Increases in agricultural production expand the supply of exportable commodities, particularly cocoa, cashew nuts, rubber, and palm oil, enabling the country to meet both international demand and contractual export commitments. Higher output also improves export competitiveness by reducing unit production costs and supporting economies of scale. Moreover, increased agricultural output supports the development of agro-processing industries, especially in cocoa grinding and cashew processing. A larger and more stable supply of raw agricultural products encourages investment in processing activities, leading to higher exports of value-added agricultural products. This contributes to export diversification and higher export earnings. The same result is obtained by Fulginiti and Perrin (1998), Dorosh and Haggblade (2003), Tadesse (2008), Shahbaz et al. (2015), and Murekezi and Bizoza (2017)

The coefficient of lnFCE indicates that for every one percent increase in final consumption expenditure, the export of Cote d'Ivoire will decrease by 0.534 percent. Final consumption expenditure exerts a negative effect on exports in Côte d'Ivoire by diverting domestically produced goods from external to internal markets. When domestic consumption increases, a larger share of agricultural and industrial output is absorbed by local demand, reducing the surplus available for export. This effect is particularly relevant in Côte d'Ivoire, where key export commodities such as cocoa, cashew nuts, and palm oil are also used for domestic consumption and agro-processing. In addition, higher final consumption expenditure may lead to upward pressure on domestic prices, making Ivorian products less competitive in international markets. Increased domestic demand can also encourage producers to prioritize the local market, where transaction costs and risks are lower, rather than exporting. From a macroeconomic perspective, rising consumption may reduce national savings and investment in export-oriented sectors, thereby weakening export capacity. Consequently, in Côte d'Ivoire, higher final consumption expenditure negatively affects exports by reducing exportable surplus, increasing domestic prices, and limiting resources available for export-driven production. This result is consistent with Boyd et al. (2001), Baharumshah and Thanoon (2006), Ahmed and Gupta (2009), and Rahman (2015).

The coefficient of lnEXR indicates that for every one percent increase in exchange rate, the export of Cote d'Ivoire will decrease by 0.556 percent. Exchange rate movements have a negative effect on exports in Côte d'Ivoire, particularly through real exchange rate appreciation. An appreciation of the exchange rate increases the foreign-currency price of domestically produced goods, thereby reducing their price competitiveness in international markets. For Côte d'Ivoire, whose exports are largely concentrated in price-sensitive agricultural commodities, higher export prices can lead to a decline in external demand. Additionally, exchange rate appreciation reduces export profitability by lowering revenues earned in domestic currency, particularly when production costs are largely domestic. This weakens incentives for export-oriented production and investment in tradable sectors. Consequently, in Côte d'Ivoire, real exchange rate appreciation negatively affects exports by reducing price competitiveness, dampening external demand, and discouraging export-oriented investment. Similar findings were reported by Athukorala and Sen (2002), Marwah and Klein (2004). Akinlo (2006), Donkor (2012), Armah et al. (2010), and Mehmood and Farooq (2015).

4.3. Statistical Diagnostic Tests Results

Since the variables in the model are cointegrated, we have estimated the VECM to model the short-run dynamics. However, it is essential to subject the VECM to a number of diagnostic tests, namely, the normality (JB), serial correlation (LM), heteroskedasticity (BPG and ARCH) and Ramsey RESET to ascertain the model's statistical adequacy. A 5% level of significance will be used in all these tests. The results of the diagnostic tests are reported in Table 5.

The VECM with lnEXP, OPEN, lnAGR, and EXR as the dependent variable passed the normality, serial correlation, heteroskedasticity (BPG and ARCH) and Ramsey RESET tests. However, the VECM with lnFCE as the dependent variables passed the normality, heteroskedasticity (BPG and ARCH) and Ramsey RESET tests, but did not pass the serial correlation LM test. To address the serial correlation problem, the lag length was increased; however, serial correlation persisted. Consequently, Newey–West heteroskedasticity and autocorrelation consistent (HAC) standard errors were employed to correct for this issue before conducting the t- and F-tests for long-run and short-run Granger causality.

Table 5: Results of the statistical diagnostic tests on the VECM

	Dependent variables				
	lnEXP	**OPEN**	**lnAGR**	**lnFCE**	**lnEXR**
JB test	0.609178	0.357628	4.033942	2.048561	0.566061
	(0.728976)	(0.828476)	(0.120541)	(0.348059)	(0.745155)
LM test	1.644303(2)	1.051743(2)	0.023627(2)	0.24193(2) **	2.861922(2)
	(0.098488)	(0.112188)	(0.905488)	(0.002588)	(0.068688)
BPG test	1.864901	1.364399	0.407525	0.315701	0.85876
	(0.272688)	(0.259088)	(0.709788)	(0.864488)	(0.430988)
ARCH test	1.554411(1)	0.178542(1)	1.536739(1)	0.066942(1)	0.545961(1)
	(0.196488)	(0.660388)	(0.199088)	(0.796188)	(0.464812)
RESET test	0.069063(1)	4.217235(1)	0.982103(1)	0.408839(1)	0.013952(1)
	(0.811688)	(0.074512)	(0.367288)	(0.692788)	(0.969488)

Notes: ** denotes significance at the 1 per cent level and * at the 5 per cent level.

4.4. Granger Causality Test Results

Since the variables in the model are cointegrated, and the VECM satisfies the residual diagnostic tests, Granger causality tests based on the VECM are used to examine the short- and long-run causality relationships among the variables in the model. The F-test results show the significance of the short-run causal effects, while the significance of the coefficient of the lagged error correction term [ect(-1)] shows the long-run causal effect.

The Granger causality test results based on the VECM are shown in Table 6. It is clear that there are unidirectional short-run causality relationship running from lnEXP to OPEN, and bidirectional short-run causality relationship between lnAGR and lnEXP, but there is no evidence of any short-run causality relationship between lnFCE, lnEXR and lnEXP. On the other hand, there are bidirectional long-run causality relationships between OPEN, lnAGR, lnEXR and lnEXP, and unidirectional long-run causality relationship running from lnFCE to lnEXP in Côte d'Ivoire.

Table 6: Granger Causality Test Results

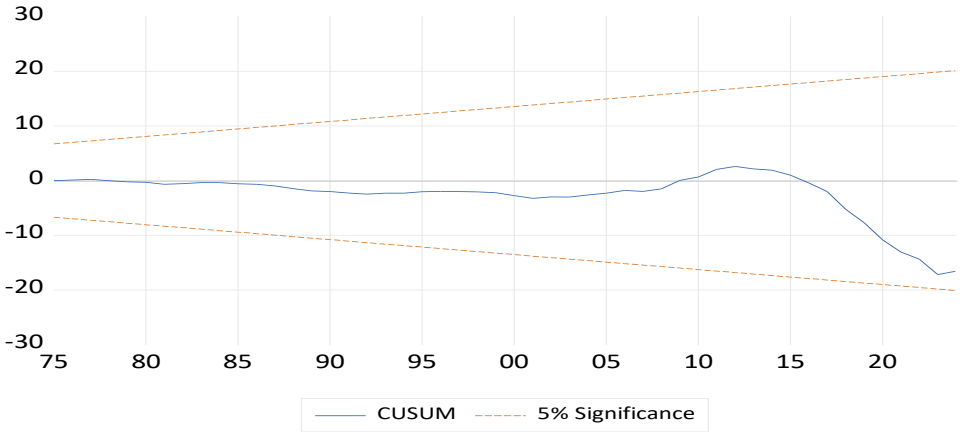
Dependent variables	**Independent variables**					
	∑Δ lnEXP	**∑Δ OPEN**	**∑Δ lnAGR**	**∑Δ lnFCE**	**∑Δ lnEXR**	**ect(-1)**
Δ lnEXP	-	0.130681	0.102876*	0.857206	0.264209	0.017214**
Δ OPEN	-3.24657**	-	0.446948	2.573409	2.643141**	0.274136**
Δ lnAGR	-1.34028**	-0.062312	-	0.866303	1.310550**	0.123261**
Δ lnFCE	-0.103724	-0.032842	-0.013576	-	0.052463	0.021648
Δ lnEXR	-1.247300	-0.263130	-0.295088	3.276244**	-	-0.02371**

Notes: ** denotes significance at the 5 per cent level and * at the 10 per cent level.

4.5. The Stability Test Result

CUSUM statistic is used in determining the parameter stability of the model in this study. The decision about parameter stability is based on the position of the plots relative to the 5 % critical bounds. If the plots of the CUSUM statistics stay within the area in the two critical lines, then the parameters of the model are stable over the period of the study. As illustrated in Figure 2, the CUSUM plot remains entirely within the 5% critical bounds over the study period. This result provides evidence that the parameters of the model are stable and that there are no structural breaks affecting the estimated relationships among the variables. Consequently, the model can be considered reliable for inference and policy analysis over the sample period.

Figure 2: CUSUM Test Results



5. CONCLUSION AND IMPLICATIONS

This study investigated how the exports in Côte d'Ivoire is affected by trade openness, agriculture output, final consumption expenditure, and exchange rate, from 1970 to 2024. The model consists of five variables, with export as the dependent variable. The ADF unit root test, Johansen cointegration test, Granger causality test, and stability tests were used in this study.

The ADF unit root test revealed that all the variables in the model are integrated by order one. The Johansen multivariate cointegration test revealed that exports are positively related to trade openness and agriculture output, but it is related negatively with final consumption expenditure, and exchange rate. Agriculture output has the biggest effect on exports. The Granger causality test results showed that there are unidirectional short-run causality relationship running from exports to trade openness, and bidirectional short-run causality relationship between agriculture output and exports, but there is no evidence of any short-run causality relationship between final consumption expenditure, exchange rate and exports. On the other hand, there are bidirectional long-run causality relationships between trade openness, agriculture output, exchange rate and exports, and unidirectional long-run causality relationship running from final consumption expenditure to exports in Côte d'Ivoire. Lastly, the stability tests indicated that there are no structural changes in the model.

Based on the findings of this study, trade openness and agricultural production play a significant positive role in enhancing exports. Trade liberalization facilitates integration into global markets, improves competitiveness, and stimulates export-oriented production. Similarly, growth in agricultural output, particularly in key commodities such as cocoa, cashew nuts, and palm oil, increases the exportable surplus, contributing substantially to export earnings and economic growth. These findings highlight the critical importance of export-oriented policies and investments in the agricultural sector to strengthen Côte d'Ivoire's position in international markets. Conversely, final consumption expenditure and exchange rate movements have been shown to exert negative effects on exports. Rising domestic consumption diverts locally produced goods from external to internal markets, reduces the exportable surplus, and can lead to higher domestic prices, thereby lowering international competitiveness. Similarly, exchange rate appreciation or volatility diminishes the price competitiveness of Ivorian exports, weakening their performance in global markets.

To enhance export performance, several policy measures are recommended. First, maintaining an open trade regime and reducing barriers to international markets can encourage export diversification and competitiveness. Second, strengthening agricultural productivity through modern farming techniques, improved access to inputs, and investment in agro-processing can increase the volume and quality of exportable commodities. Third, managing domestic consumption through policies that balance local demand and export supply, alongside promoting savings and investment in export-oriented sectors, can mitigate the crowding-out effect on exports. Finally, adopting a stable and competitive exchange rate policy, combined with measures to reduce currency volatility, can support consistent export growth. In conclusion, a coordinated approach that promotes trade openness, boosts agricultural production, manages domestic consumption, and ensures exchange rate stability is essential for strengthening Côte d'Ivoire's export sector and achieving sustainable economic growth.

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