Effect of Trade Liberalization on Inflation in West African Countries

Adewumi Samuel, Emeka Nkoro

University of Port Harcourt Nigeria

DOI: https://dx.doi.org/10.47772/IJRISS.2025.903SEDU0299

Received: 19 March 2025; Accepted: 26 March 2025; Published: 28 June 2025

ABSTRACT

The study explores the impact of trade liberalization on inflation in West African countries—Nigeria, Ghana, and Côte d'Ivoire—using panel data analysis with fixed effects for the period 1985 to 2023. The findings reveal that GDP growth and interest rates significantly reduce inflation, while foreign direct investment (FDI), trade openness (TO), and exchange rate depreciation exert upward pressure on prices. These results underscore the need for targeted policy measures. Policymakers should focus on fostering GDP growth through economic diversification and investment in productive sectors, such as manufacturing and agriculture, to curb inflation. Managing FDI strategically to enhance domestic capacity while mitigating inflationary pressures is vital. Furthermore, reducing reliance on imports via local production, stabilizing exchange rates, and implementing robust monetary policies are essential for maintaining price stability in the face of trade liberalization. While trade liberalization offers growth opportunities, it also introduces inflationary challenges. A balanced policy approach is crucial to harness the benefits of openness while safeguarding economic stability.

Keyword: Trade liberalization, Economic growth, Inflation, Foreign direct investment.

Jel Classification: F13, E31, O55.

INTRODUCTION

In today's global economy, most countries have moved away from autarky policies of self-sufficiency towards more integrated economic management strategies. Since the 1990s, there has been a notable shift towards economic growth driven by globalization (Dicken, 2003; Dicken, 2007). This trend is significant as it continuously integrates the world economy into a unified global village, with nations striving to open their markets to harness greater growth and development opportunities. This increasing integration has been argued to create pathways for growth in many countries, particularly those in the developing world (McMillan, Rodrik, & Verduzco-Gallo, 2014).

The belief that an open economy through trade is essential for economic prosperity is particularly strong among less developed countries (LDCs) (Dabús & Delbianco, 2019). Organizations such as the World Bank have emphasized this perspective, asserting that "a reduction in world barriers to trade could accelerate growth, provide stimulus to new forms of productivity-enhancing specialization, and lead to a more rapid pace of job creation and poverty reduction around the world" (World Bank Global Perspective, 2002). Reduced trade restrictions can benefit both developed and developing countries by facilitating access to cheaper raw materials for industries, thereby lowering production costs and enhancing efficiency. Conversely, LDCs can benefit from increased exports, which may stimulate local production in sectors such as agriculture through the adoption of advanced technologies from developed nations. This, in turn, can boost productivity, real incomes, and reduce poverty (Harrison & Rodríguez-Clare, 2010; Evenett & Fritz, 2015).

Trade liberalization has been a long-standing phenomenon with varying dynamics and challenges. For instance, during the colonial era, countries like Nigeria, Ghana, and Côte d'Ivoire primarily relied on agriculture for exports. Post-independence, many West African countries shifted focus towards import substitution strategies aimed at promoting local production and reducing dependence on foreign goods (Arthur, 2013; Nygren & Anell, 2013). However, the oil boom of the 1970s in Nigeria marked a significant shift in

trade policies, characterized by protective measures for local industries, which were later challenged by the oil glut of the 1980s.

The Structural Adjustment Program (SAP) introduced in Nigeria in 1986 signaled a move towards trade liberalization, involving reduced tariffs and the promotion of non-oil exports. Similar liberalization efforts have been observed in other West African countries, For instance, Ghana, Côte d'Ivoire, Senegal, and Benin have all pursued liberalization measures aimed at integrating their economies into global trade networks. In Ghana, the adoption of economic reforms and trade openness policies since the late 1980s has bolstered exports of cocoa, gold, and other primary goods. Côte d'Ivoire, a major exporter of cocoa and cashew nuts, has similarly embraced trade liberalization to diversify its economy, enhance productivity, and attract foreign direct investment (FDI). Senegal has focused on its agricultural exports, especially groundnuts, while Benin has pursued greater regional trade integration with its neighbors in the Economic Community of West African States (ECOWAS), leveraging its strategic position for transit trade. (Sulaiman, Migiro & Aluko, 2014; Bawa & Ateku, 2020). Côte d'Ivoire, with its robust agricultural sector, has also benefited from trade liberalization, while Benin has leveraged its geographical position to enhance trade within the region.

The involvement of Nigeria and its West African counterparts in various economic blocs, such as the Economic Community of West African States (ECOWAS), has further promoted regional economic integration. The adoption of the Common External Tariff (CET) in 2005 facilitated lower and standardized tariffs among member states, enhancing trade flows within the region. Nigeria's membership in the World Trade Organization (WTO) has also reinforced its commitment to international trade rules (Ekanayake, Mukherjee & Veeramacheneni, 2010; Robson, 2012; Kayizzi-Mugerwa, Anyanwu & Conceição, 2014).

Trade liberalization has long been posited as a key driver of productivity growth, fostering efficiency, competitiveness, and economic integration across both developed and developing nations (Bekaert, Harvey & Lundblad, 2011; Pilinkiene, 2016; Keho, 2017). Theoretically, as argued by Coibion, Gorodnichenko, and Wieland (2012), increased productivity from trade openness has the potential to moderate inflationary pressures, as enhanced efficiency and competition place downward pressure on price levels. Similarly, Keynesian economics underpins the notion that the net balance between exports and imports influences aggregate demand and, subsequently, price stability (Davidson, 2015). While a surplus in net exports may stimulate inflation through heightened aggregate demand, a deficit can counteract this effect by reducing inflationary tendencies.

However, in the West African context, this theoretical relationship between trade liberalization and inflation reveals significant complexities. Despite the adoption of liberal trade policies, countries like Nigeria and Ghana continue to grapple with persistent inflationary pressures, undermining the anticipated benefits of openness. For example, Nigeria’s dependency on oil revenues exacerbates its vulnerability to global price shocks, while Ghana, despite its relatively stable monetary policies, faces inflationary episodes tied to structural challenges within its economy. Côte d’Ivoire, on the other hand, demonstrates relatively better inflation management, although its inflation dynamics are significantly influenced by sectoral foreign direct investment (FDI) flows, particularly in the extractive industries.

Additionally, the region's reliance on primary commodity exports, as seen in countries such as Senegal and Benin, heightens exposure to global price volatility, amplifying inflationary risks rather than mitigating them. These dynamics underscore the multifaceted interplay between trade policies, sectoral dependencies, and macroeconomic stability within West Africa.

Complicating the narrative further, examples from nations like Taiwan, South Korea, and India suggest that significant economic growth and price stability can be achieved through alternative economic pathways. These countries have employed more restrictive trade policies, including controls on capital flows and protective measures for domestic industries, demonstrating that trade liberalization is not a one-size-fits-all solution (Shafaeddin, 2012; Siddiqui, 2015; Lal & Rajapatirana, 2019).

Moreover, trade liberalization has been critiqued for its potential to transmit economic shocks across borders, thereby destabilizing economies (Winters & Martuscelli, 2014; Dix-Carneiro, 2014; Dix-Carneiro & Kovak,

2017; Dix-Carneiro, Soares & Ulyssea, 2018). In the West African context, these shocks often manifest through volatile import prices and limited domestic resilience, further complicating the stabilization of inflationary trends.

Thus, there is an urgent need for a nuanced examination of the relationship between trade liberalization and inflation in West African economies, with a focus on the varying roles of import competition and FDI inflows. A comparative analysis of Nigeria, Ghana, and Côte d'Ivoire is particularly critical, as these countries present diverse economic structures and policy responses that can offer deeper insights into the effectiveness of trade liberalization in curbing inflation across the region.

LITERATURE REVIEW

Theoretical Literature

Absolute Advantage Theory

This theory was propounded by Adams Smith. The theory believes that a country will always have an absolute productive advantage in the manufacturing of a particular good over another nation (Porter, 2011). This productive difference becomes the determinant of trade. A country is said to have an absolute advantage if it can produce a product more efficiently, i.e. using fewer resources or the same resources to produce more output. With absolute advantage, countries can specialize and achieve greater output. The drawback of this theory is the fact that countries that don't have absolute advantages might not benefit from international trade.

Ricardo's Comparative Advantage Theory

This theory formed the basis for international trade, which was propounded by David Ricardo in the 19th century. This theory is also referred to as the opportunity cost theory. It explains how a country can engage and benefit from international trade even when the other country (trading partner) has an absolute advantage over the country. The focus of the theory lies in the relative efficiency and opportunity cost rather than absolute efficiency (Faccarello, 2015).

The theory posits that a country should produce and sell goods/services to another countries where it can produce at lower opportunity cost (Ricardo, 1817). Opportunity cost is the next best alternative forgone. In this context, it refers to the sacrifices that have to be made, in terms of one good, for the production of another good. Consider two countries A and B, country A can produce 10 units of wine and 16 units of cloth while country B can produce 15 units of wine and 30 units of cloth. Country B has an absolute advantage in the production of both commodities but in terms of comparative advantage, we estimate the opportunity cost.

The opportunity cost of producing a unit of cloth in country A is 0.625 units of wine and for a wine is 1.6 units of cloth, whereas the opportunity cost for a cloth in country B is 0.5 units of wine and for a unit of wine is 2 units of cloth. B. likewise, country B will produce clothes as they possess a lower opportunity cost of 0.5 compared to 0. From this illustration, though country B is more efficient in both goods, by comparative advantage, country A will produce wine as it has a lower opportunity cost of 1.6 units compared to 2 units in country 625 units of wine in country A.

The theory prioritized specialization as a means of increasing trade surplus and overall output. By specializing in the manufacturing of goods where countries have a comparative advantage, both countries will be better off and consume outside their production possibility frontier.

Heckscher-Ohlin (H-O) Model

The H-O model was developed by was developed by Eli Heckscher and Bertil Ohlin. The theory explained the reasons for international trade based on their factor endowments – resources like land (Ohlin, 1933). Countries should produce and export goods in which they have abundant resources and import goods in which they have scarce resources. Hence, the basis for specialization is based on resource endowment, as those countries will be

more efficient in the manufacturing of those goods for which they have the resources. Countries with a high labour force will produce goods that require labour intensive while capital-rich countries will produce capital-intensive products. The limitations of this theory span from the assumptions of perfect factor mobility, perfect competition and constant return to scale which might not be realistic in the real world.

New Trade Theory

The theory was pioneered by Paul Krugman to address the limitations of traditional theories like the Heckscher-Ohlin Model and Ricardo's Comparative Advantage (Krugman, 1980,1996). The theory attributes the importance of economies of scale and network effect in international trade. The theory posits that businesses that enjoy significant economies of scale – lower long-run average cost when a firm produces on a large scale – tend to dominate the international market. Hence, this leads to dominance and concentration of production in a few countries especially those that are technologically advanced and produce on a large scale without any other reference to resources endowment and comparative advantage.

It also examines the importance of network effect and first-mover advantage. The firms that first enter into a market tend to dominate the market due to scale economies. This breeds an imperfect market-like oligopoly market structure, which explains why some industries like aerospace and technology are concentrated in specific regions. Hence, by recognizing imperfection and economies of scale, the theory provides a more comprehensive pattern of trade in the real world.

Purchasing Power Parity (PPP)

The theory was developed by Gustav Cassel, built on the foundation of comparative advantage by David Ricardo. The theory posits that exchange rates between currencies would adjust in the long run such that identical products will have similar prices in different countries when priced in a common currency (Cassel, 1916). The theory viewed that in the absence of trade barriers and transport costs, identical products should have similar prices across different markets. PPP can be explained from absolute and relative. The absolute PPP suggest that the exchange rate will equalize the price levels of goods in other countries. While the relative PPP accounts for changes in price levels over time i.e. the rate of change in the exchange rate should equal the rate of change in inflation rate between those countries. The assumptions of this theory, however, pose a challenge to its reality as there are always transport costs, and trade restrictions in different markets for goods and services.

Cost-Push and Demand-Pull Inflation Theories

Cost-push inflation is the inflation that arises as a result of an increase in the cost of production. The driving force behind this inflation is an increase in the rental cost of capital, wage, raw materials input, and higher energy costs. An increase in the cost of production will increase the price of goods as sellers pass down the increase to the consumers. In Nigeria, the removal of subsidy in 2023 led to a rise in the cost of purchasing premium motor spirit which increased the price of goods in Nigeria (Adepoju, Balogun & Bekesuomowei, 2023).

Demand-pull inflation occurs due to an increase in aggregate demand above the level of productivity in the country (Machlup, 2020;Jain, Sharma & Kumar, 2022). This type of inflation is driven by a rise in consumers' income, investment, government expenditure and net export. An increase in demand above the level of productivity indicates that consumers are willing to pay higher prices for goods.

Monetary Theory of Inflation

This theory was propounded by Milton Friedman (Friedman, 1963). It posits that inflation occurs due to an increase in money supply. The theory believes that an increase in money supply above the productive capacity of a country results in inflation. The fundamental equation used is referred to as the quantity theory of money which is given as:

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume IX Issue IIIS June 2025 | Special Issue on Education

$$MV = PY$$

where

M *is the money supply*

V *is the velocity of money*

P *is the price level*

Y *is the economic output*

Since the classical school believes that output is constant in the long run (full employment equilibrium), and if the velocity of money is fixed or constant, then an increase in money supply will have a direct impact on the price level. Thus, more money chasing fewer goods which will result in inflation.

Structuralist Inflation Theory

This theory was developed by Latin American economists in the mid-20th century, notably Latin American economists, most notably Celso Furtado and Raúl Prebisch (Furtado, 1962; Prebisch, 1991-1993). It emerged due to the critics of the classical theory of inflation. The theory attributed inflation to entrenched systemic inefficiencies and structural imbalances within an economy. This inefficiency could span from limited supply in strategic industries like agriculture, manufacturing and poor infrastructure, which leads to an increase in price.

Also, constraints like inelastic supply could result in inflation when there's an increase in demand. Emphasis was also laid on market rigidity, especially in some markets like price control, monopolistic practices and wage rigidity which prevent the market from adjusting efficiently. Also, imbalances between the growth of the manufacturing sector and the agricultural industry could result in inflation. Hence, controlling inflation goes beyond changing the money supply to structural reforms, which could involve a rise in investment in agriculture, infrastructure, labour market reforms etc.

Endogenous Growth Theory

The theory was developed by Paul Romer and Robert Lucas (Romer, 1986; Lucas, 1988). The theory explains economic growth as a function of labour, capital, technology/innovation, and knowledge transfer. With emphasis on innovation and productivity, an increase in output fueled by the combinations of these factors can mitigate inflationary pressures. A boost in productivity propelled by technology will increase aggregate supply and reduce inflation. Also, technological advancement with a rise in knowledge of the labour force can lead to a more efficient production process, resulting in lower inflation. However, a rapid increase in economic growth propelled by investment in research and development can increase demand-pull inflation.

Empirical Literature

Uwubanmwen and Ugiagbe (2011) in examining the effect of trade openness on inflation in Nigeria, observed that the impact of trade openness on inflation defers between short-run and long-run. They observed that trade openness leads to an increase in inflation in the short run due to an upswing in import prices, whereas in the long run, the country would adjust and the inflation rate would be stable. This result was also found by Afolabi et al. (2017) who found that trade liberalization policies have a significant influence on economic growth and inflation. It causes a spike in inflation in the short run, but over time, it will increase competition and efficiency which will later stabilize the inflation rate.

A study by Oluwatoyin and Taiwo (2015) examines the inflationary impact of trade liberalization by focusing on the dynamics of imports and exports. They emphasized on the increase in imports at the point of liberalization as the main cause of inflation as the policy will encourage more demand for foreign goods. However, in the long run, an an increase in competition will lead to an improvement in exports which will stabilize the inflation rate, this is in line with Uwubanmwen and Ugiagbe (2011) and Afolabi et al. (2017).

The study of Alege and Ogundipe (2013) considers a broader view of the effect of trade openness on macroeconomic variables in Nigeria, employing econometrics tools of analysis, the result shows that trade liberalization promotes economic growth and stable inflation in the long run, but in the short-run, it pushes up inflation. The result is also in line with Uwubanmwen and Ugiagbe (2011), Oluwatoyin and Taiwo (2015) and Afolabi et al. (2017).

Romer (2010) also examines the relationship between trade openness and inflation rate, the result shows that trade liberalization enhances efficiency. His findings were also supported by Bowdler and Malik (2017) who also posit that trade openness leads to an increase in competition that reduces the cost of goods.

A study in Latin America conducted by Canavire-Bacarreza and Ortega (2014) analyzed the impact of trade liberalization on inflation using panel studies. The result also shows that trade liberalization leads to lower inflation in the long run as it improves market efficiencies and increases the availability of goods. Similarly, the empirical study of Ahmed and Suardi (2019) in South Asian economies emphasized that trade openness helps mitigate inflation by removing supply-chain constraints.

However, some researchers found a negative relationship between trade liberalization and inflation. For example, the empirical work of Lee and Yang (2018) undertaken in Asian countries found that trade openness in the short run leads to a rise in inflation due to a surge in income prices. However, in the long run, the economy would adjust to a stabilized inflation path. Also, the panel analysis carried out by López-Villavicencio and Saglio (2014) for African countries gave support for this finding that trade liberalization increases inflationary pressure in the short run, however, in the long run, the gains from competition and efficiency will offset the rate of inflation.

The study of Alemu (2013) for the Ethiopian economy also found a positive relationship between trade liberalization and inflation. This was attributed to the initial disruptions of the supply chain and the increase in the price of imports. However, in the long run, the economy would adjust to a stable inflation path. Also, Badinger (2013) investigated the relationship between trade liberalization and inflation in the Eastern European countries. The result shows that trade liberalization increases inflationary pressure in the short run, however, it could be mitigated through increases in market efficiency and economic policies.

The study by Jongwanich (2010) in Southeast Asia reveals that trade liberalization helps mitigate inflation by diversifying import sources and promoting competition among countries. However, Karras (2011) found that the relationship between trade liberalization and inflation is complex as the relationship could be affected by other economic factors such as exchange rate, interest rate and money supply.

The overall findings of the relationship between trade openness and inflation in developing countries show that it increases short-run inflationary pressure due to changes in import prices and structural adjustments, however, in the long run, trade liberalization is beneficial, leading to low inflation and more economic stability through an increase in competition and efficiency.

Ogujiuba, Nwogwugwu, and Dike (2011) conducted an in-depth study on trade liberalization and economic growth in Nigeria, employing time series analysis through econometric models to evaluate the relationship from 1970 to 2008. Their findings revealed a positive correlation between trade liberalization and economic growth, demonstrating that reducing trade barriers contributed to GDP growth. However, inflation persisted as a significant issue, indicating the influence of other macroeconomic factors on price levels. As a result, they recommended that the Nigerian government continue pursuing trade liberalization policies while simultaneously implementing measures to control inflation.

Bawa and Ateku (2020) examined the impact of trade liberalization on economic growth in West Africa, utilizing panel data analysis for ECOWAS countries through Fixed and Random Effects models. Their study concluded that trade liberalization positively influenced economic growth across the region, with notable effects observed in Ghana and Côte d'Ivoire. Inflation rates, however, displayed varied responses depending on external economic conditions. They emphasized the importance of strengthening regional trade agreements to maximize the benefits of liberalization while addressing inflationary challenges.

Keho (2017) explored the relationship between trade liberalization and inflation in West Africa through a panel data analysis using econometric techniques. His research revealed that trade liberalization generally reduced inflation rates, particularly in countries with strong regulatory frameworks. Nigeria, however, continued to experience persistent inflation, attributed to other macroeconomic challenges. He proposed that governments reinforce regulatory frameworks and improve monitoring mechanisms to mitigate inflationary risks associated with trade liberalization.

Aregbeyen and Kolawole (2015) analyzed trade liberalization and its effect on Nigeria's economic growth, using regression analysis to assess the impact from 1986 to 2013. Their findings demonstrated that while trade liberalization fostered economic growth, inflation remained elevated due to external shocks and structural inefficiencies in the economy. They suggested implementing structural reforms to enhance productivity and reduce inflation in parallel with liberalization policies.

Harrison and Rodríguez-Clare (2010) evaluated trade, foreign investment, and industrial policy in developing countries by reviewing empirical evidence on the effects of trade liberalization on economic growth and inflation. Their findings indicated that trade liberalization can encourage foreign investment and spur economic growth, but its impact on inflation varies significantly depending on country-specific factors. They recommended that developing countries adopt customized industrial policies to complement trade liberalization and manage inflation effectively.

Evenett and Fritz (2015) conducted a comprehensive analysis of trade liberalization and economic growth, combining a literature review with empirical insights. They concluded that trade liberalization generally supports economic growth, though its effects on inflation are complex and influenced by various external factors. They urged policymakers to create stable macroeconomic environments to maximize the benefits of liberalization.

Siddiqui (2015) analyzed the relationship between trade liberalization and inflation in South Asian countries using panel data analysis. The study revealed mixed outcomes, with some countries experiencing reduced inflation and others facing price increases due to external shocks. Siddiqui highlighted the importance of regional cooperation among South Asian nations to effectively manage the inflationary effects of trade liberalization.

Shafaeddin (2012) reviewed empirical studies on the impact of trade liberalization on economic growth, focusing on developing countries. The review found that while liberalization can stimulate economic growth, its influence on inflation is highly dependent on the individual country's economic context. Shafaeddin advised developing countries to adopt supportive policies alongside trade liberalization to minimize inflation-related risks.

Dix-Carneiro (2014) investigated trade liberalization and labor market dynamics in Brazil through econometric modeling. His study showed that liberalization positively impacted employment and wages in specific sectors, while inflation patterns were shaped by labor market adjustments. He recommended aligning labor market policies with trade liberalization efforts to achieve optimal economic outcomes.

Coibion, Gorodnichenko, and Wieland (2012) examined the interaction between monetary policy and inflation in the Eurozone through empirical analysis. Their findings suggested that effective monetary policy plays a crucial role in mitigating inflationary pressures resulting from trade liberalization. They recommended that central banks adopt flexible monetary approaches to manage inflation dynamics associated with liberalization policies.

In sum, the body of empirical research explores the complex interplay between trade openness and inflation across developing economies, yielding mixed outcomes. Short-term analyses (e.g., Uwubanmwen & Ugiagbe, 2011; Afolabi et al., 2017) highlight that trade openness can exacerbate inflation due to volatile import prices and transitional structural adjustments. However, long-term effects (Romer, 2010; Canavire-Bacarreza & Ortega, 2014) suggest inflationary stabilization driven by enhanced market competition, efficiency improvements, and economic diversification.

Regionally, in West Africa, Nigeria exhibits persistent inflationary pressures despite trade liberalization reforms (Ogujiuba et al., 2011; Keho, 2017). Conversely, Ghana and Côte d'Ivoire demonstrate superior inflation control under liberalized trade regimes (Bawa & Ateku, 2020). Beyond West Africa, regions such as Latin America and South Asia report long-term inflation containment (Ahmed & Suardi, 2019), while countries like Ethiopia and some parts of Eastern Europe face short-lived inflationary shocks (Alemu, 2013; Badinger, 2013).

Key gaps in the literature include the underutilization of multi-country panel analyses specific to the West African context. Existing studies predominantly adopt single-country frameworks (e.g., Nigeria, Ethiopia) or focus on non-African regions. While some works (e.g., Bawa & Ateku, 2020; Keho, 2017) employ ECOWAS panel data, they lack depth in analyzing country-specific institutional dynamics—such as Nigeria's oil dependency versus Ghana's robust monetary policies. Additionally, critical interaction effects, such as the influence of foreign direct investment (FDI), exchange rate regimes, and trade policy frameworks, are insufficiently explored. For instance, Côte d'Ivoire's inflationary trends linked to FDI appear sector-specific (e.g., extractive industries), a dimension overlooked in current models.

METHODOLOGY

The current work will adopt the Mundell-Fleming model of open economy. The Open Economy Mundell-Fleming Model examines the relationship between exchange rates, monetary policy, and fiscal policy in an open economy with capital mobility. The Mundell-Fleming (MF) Model extends the IS-LM framework to open economies by incorporating exchange rates (*E*) and capital mobility. The four foundation of this model is given as

Interest rate parity

$$i_t = i_t^* + \frac{E_{t+1}^e}{E_t} + \rho_t \quad ---(1)$$

Where

i_t^* = foreign interest rate

E_{t+1}^e = expected future exchange rate

ρ_t = country risk premium

The balance of payment (BOP)

$$NX(Y_t, Y_t^*, E_t + \emptyset(i_t - i_t^* - \rho_t) = 0 \quad ---(2)$$

Where:

NX = net export (increasing in E_t and decreasing in Y_t)

$\emptyset$ = capital mobility coefficient, this will be close to zero in underdeveloped countries.

The equilibrium in the goods market (IS curve) is given as

$$Y_t = C(Y_t - T_t) + I(i_t) + G + NX(Y_t, Y_t^*, E_t) + FDI_t \quad ---(3)$$

The above equation is a modified version with FDI_t representing autonomous investment component.

The money market (LM) curve is given as:

$$\frac{M_t}{P_t} = L(i_t, Y_t) \quad ---(4)$$

Where:

P_t = price level (which is related to inflation $\pi_t = \Delta P_t$

To derive the equilibrium, we combined the interest rate parity with balance of payment equations as follows:

$$NX(Y_t, Y_t^*, E_t) = -\emptyset\left(\frac{E_{t+1}^e}{E_t}\right) \quad ---(5)$$

To achieve equilibrium, Exchange rate E_t adjusts to equilibrate trade flows and capital mobility.

Linking the IS-LM with price level, from LM curve,

$$i_t = L^{-1}\left(\frac{M_t}{P_t}, Y_t\right) \quad ---(6)$$

Substituting equation (6) into (3) gives

$$Y_t = C(Y_t - T_t) + I\left(L^{-1}\left(\frac{M_t}{P_t}, Y_t\right)\right) + G + NX(Y_t, Y_t^*, E_t) + FDI_t \quad ---(7)$$

To introduce Inflation Dynamics (Modified Phillips Curve), we assume a hybrid Phillips curve for West Africa. This can be written as:

$$\pi_t = \underbrace{\beta_E \Delta E_t}_{Exchange\ rate\ pass-through} + \underbrace{\beta_Y (Y_t - Y_{po})\Delta E_t}_{Output\ gap} + \underbrace{\beta_{FDI}\Delta FDI_t}_{Supply-side\ FDI\ effect} + \epsilon_t \quad ---(8)$$

Where:

Y_{po} = potential output (productivity driven by FDI)

ΔE_t = exchange rate depreciation (for the purpose of this study, a rise in exchange rate means fall in the value of domestic currency, which increase the price of import).

To integrate other variable of interest, we begin with the exchange rate channel from equation 5,

$(\Delta E_t \propto NX, \emptyset, i_t^*)$:

$$\Delta E_t = f(TL_t, FDI_t, i_t) \quad ---(9)$$

Where:

TL_t = trade liberalization. Increase in trade openness or reduction in tariffs will increase net export and reduce exchange rate (E = domestic currency/foreign currency). This will reduce the cost of importing raw materials and reduce inflation.

Considering the output gap channel from the equilibrium IS-LM,

$$Y_t - Y_{po} = g(TL_t, FDI_t, G_t, M_t) \quad ---(10)$$

From equation 10, increase in FDI will increase the potential output – through technology – which will reduce the output gap and reduce inflation.

Also, considering the interest rate channel from the LM curve,

$$i_t = h(M_t, \pi_t^e) \quad ---(11)$$

An increase in interest rate will reduce output – through the IS – which will leads to fall in inflation rate. However, a rise in exchange rate has relationship with the exchange rate. Increase in interest rate will increase exchange rate – through the interest rate parity – which will increase inflation rate, offsetting the initial effect.

Substituting the exchange rate, output and interest rate channel, equation 9, 10, and 11 into equation 8 gives:

$$\pi_t = \beta_0 + \beta_1 TL_t + \beta_2 FDI_t + \beta_3 \underbrace{(Y_t - Y_{po})}_{GDPG_t} + \beta_4 \Delta EXC_t + \beta_5 i_t + \in_t \quad ---(12)$$

Converting equation 12 to panel data model gives:

$$\pi_{it} = \beta_0 + \beta_1 TL_{it} + \beta_2 FDI_{it} + \beta_3 \underbrace{(Y_t - Y_{po})}_{GDPG_{it}} + \beta_4 \Delta EXC_{it} + \beta_5 i_{it} + \varphi_{it} + \omega_{it} + \in_{it} \quad ---(13)$$

Where:

φ_{it} = time effect

ω_{it} = country specific effect

$\in_{it}$ = error term.

Equation 13 will be used in estimating the relationship between trade openness and inflation in West Africa.

DISCUSSION OF RESULT

We begin this section by examining the unit root Levin-Lin-Chu test, followed by cointegration test to ascertain the long-run relationship. The results are presented below.

Unit Root Test Result

Variable	T-Value (Level)	Prob.	T-Value (First Difference)	Prob.
Inflation	-3.8173	0.0010		
GDP Growth	-1.8117	0.0350		
Trade Openness	-2.2822	0.0111		
FDI	-0.7560	0.2240	-3,4329	0.0003
Exchange Rate	0.9400	0.8264	-5.5706	0.000
Interest Rate	-0.8675	0.1928	-7.4536	0.000

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume IX Issue IIIS June 2025 | Special Issue on Education

The result presented above shows that inflation, GDP growth, and trade openness were all stationary at the level form. However, FDI, exchange rate, and interest rate were stationary at their first difference.

Cointegration Test Result

The fact that the variables were not stationary at their level form made them unsuitable for short-run analyses. However, the variable can only be used to explain the long-run relationship only is there's evidence of long-run relationship. This test is carried out using the Westerlund ECM cointegration test. The result is summarized in the table below:

Statistic	Value	Z-value	P-value
Gt	-3.443	-2.119	0.017
Ga	-12.958	-0.278	0.390
Pt	-4.949	-1.383	0.083
Pa	-12.277	-0.925	0.178

Gt and Ga examine the group-mean statistics; Pt and Pa are panel statistics. Pt tests for cointegration across the entire panel, and Pa aggregates the results for the panel as a whole. Gt tests for cointegration in individual panel members, while Ga aggregates the results across the panel. Ga, Pt and Pa all have P-value greater than 5%, hence, we reject the null hypothesis of no cointegration and conclude that the variables have long-run cointegrating relationship.

Regression Result

Inf	Coefficient	T-value	P-value
C	-7241477	-0.14	0.890
GDPG	-0.3643343	-2.23	0.036
FDI	2.420302	4.18	0.000
TO	0.130937	2.01	0.056
EXC	0.0925269	3.09	0.005
INTR	-1.009207	-13.32	0.000

$$INF_{it} = -0.364GDPG_{it} + 2.42\text{FDI}_{it} + 0.131TO_{it} + 0.0925EXC_{it} - 1.0093INTR_{it}$$

The coefficient of GDP growth is -0.364, indicating that a 1% increase in GDP growth reduces inflation by 0.364%. This negative relationship makes sense because higher economic growth often enhances production capacity, stabilizing prices and reducing inflationary pressures. For instance, countries like Nigeria and Ghana, with diversified economies, may experience reduced inflation during periods of robust growth.

Foreign Direct Investment (FDI) had a coefficient of 2.42, meaning a 1% increase in FDI leads to a 2.42% increase in inflation. This positive relationship could be due to FDI fueling increased demand for goods and services without a corresponding immediate increase in supply, leading to inflationary pressures. For countries like Côte d'Ivoire, where FDI may focus on resource extraction, this inflow could drive localized price increases.

Trade Openness (TO) with coefficient of 0.131 shows that a 1% increase in trade openness increases inflation by 0.131%. This is because greater openness can lead to higher exposure to imported inflation, especially if the

countries rely heavily on imports. For example, Nigeria's dependence on imports for certain goods might cause price hikes if global prices rise.

Exchange Rate (EXC) has coefficient of 0.0925, suggesting that as the exchange rate depreciates (currency loses value), inflation increases. This is logical because weaker currencies make imports more expensive, leading to cost-push inflation. For instance, Ghana and Nigeria have experienced inflation spikes following currency devaluations.

Lastly, interest Rate (INTR) with coefficient of -1.009, indicates that a 1% increase in interest rates reduces inflation by 1.009%. This is consistent with economic theory—higher interest rates dampen consumer spending and borrowing, reducing demand-pull inflation. Central banks in these countries often use this tool to manage inflationary pressures.

Testing For Cross-Sectional Dependence/Contemporaneous Correlation: Using Pasaran Cross-Sectional Dependence (CD) Test

According to Baltagi (2008), cross-sectional dependence is a problem in macro panels with long time series (over 20-30 years). Pasaran CD test is used to test whether the residuals are correlated across entities. Cross-sectional dependence can lead to bias in tests results (also called contemporaneous correlation). The null hypothesis is that residuals are not correlated. The test is applicable only to the fixed effect model alone. The result is presented in the table below.

Pasaran Stat.	Prob.
0.0831	0.372

The model does not contain serial correlation.

Testing for Heteroscedasticity Modified Wald test for group wise heteroscedasticity in fixed effect regression model are invoked to examine whether the variances are constant overtime. The null hypothesis here is that the variances are constant overtime. The results are presented in the table below.

Chi-Square	**Prob.**
5.318	0.1499

From the result presented above, all the probabilities are less than 5 percent. Hence, we reject the H0 of homoscedastic, and we conclude that the model is homoscedastic.

SUMMARY, POLICY IMPLICATION, AND CONCLUSION

This work examine the impact of trade liberalization on inflation in West African Countries (Nigeria, Ghana, and Cote d'Voire, with the aim of ascertaining the real impact of liberalization on inflation in the region. Data were collated for these countries from 1985 to 2023. The result employed panel data analysis using fixed effect, and indicated by the Hausman test. The result shows that GDP growth and interest rate have negative impact on inflation, while FDI, TO, and exchange rate has negative impact.

The result obtained has some policy implication. Since higher GDP growth reduces inflation, governments of these region should focus on policies that drive economic diversification and growth. Investments in sectors that enhance production capacity, like manufacturing and agriculture, could help achieve this.

Also, the positive relationship between FDI and inflation highlights the need for strategic management of foreign investments. Policies could encourage FDI in sectors that increase domestic production capacity and mitigate inflationary pressures (e.g., infrastructure, agriculture, or industrialization). For example, resource-extractive FDI could be regulated to avoid localized price surges.

Furthermore, governments of trade-dependent countries should focus on reducing exposure to imported inflation. Promoting local industries to replace imports or negotiating favorable trade deals for essential goods can help stabilize prices. Trade policies should strike a balance between openness and protecting domestic economic stability.

More so, since depreciation leads to higher inflation, policymakers should aim to stabilize the exchange rate through sound fiscal and monetary policies. Diversifying foreign exchange earnings, controlling capital flight, and building robust reserves could help cushion against external shocks.

Lastly, the strong negative relationship between interest rates and inflation underscores the importance of monetary policy. Central banks should actively monitor inflation trends and adjust interest rates to maintain price stability while considering the broader impact on economic growth and borrowing costs.

In conclusion, while trade liberalization can lead to inflation through mechanisms like exposure to imported inflation, the key is in managing its implementation effectively. Policymakers should aim for a balanced approach by supporting local industries to reduce dependence on imports, negotiating favorable trade agreements, and implementing measures to stabilize prices. This way, countries can enjoy the benefits of trade openness—such as increased economic growth and market diversification—without disproportionately fueling inflation.

REFERENCES

1. Abdurehman, A. A., & Hacilar, S. (2016). The relationship between exchange rate and inflation: An empirical study of Turkey. International Journal of Economics and Financial Issues, 6(4), 1454-1459.
2. Adepoju, O. O., Balogun, A. Q., & Bekesuomowei, O. D. (2023). Impact of fuel subsidy removal on gross domestic product and transportation cost in Nigeria. European Journal of Theoretical and Applied Sciences, 1(5), 769-777.
3. Adetula, O. (2022). Structural Adjustments and Inflationary Effects of Trade Liberalization in Nigeria. Nigerian Journal of Economic and Social Studies.
4. Afolabi, L. et al. (2017). Impact of Trade Policy on Economic Growth and Inflation in Nigeria. Journal of Economics and Sustainable Development.
5. Ahmad, N., & Joyia, U. T. S. (2012). The relationship between inflation and economic growth in Pakistan: An econometric approach. Asian Journal of research in business economics and management, 2(9), 38-48.
6. Ahmed, S., & Suardi, S. (2019). Trade Openness and Inflation in South Asian Economies. Journal of Asian Economics.
7. Alege, P. O., & Ogundipe, A. A. (2013). Trade Liberalization and Economic Growth in Nigeria (1981-2009). Journal of Economics and International Finance.
8. Alemu, D. (2013). The Impact of Trade Liberalization on Inflation in Ethiopia. Ethiopian Journal of Economics.
9. Badinger, H. (2013). Trade Openness and Inflation in Eastern European Countries. Economic Systems.
10. Bawa, J., & Ateku, A. J. (2020). After the Structural Adjustment Programme for Africa's Economic Crisis What Next? A Look at Some Immediate African Alternative Development Strategies. A Look at Some Immediate African Alternative Development Strategies (May 30, 2020).
11. Bekaert, G., Harvey, C. R., & Lundblad, C. (2011). Financial openness and productivity. World development, 39(1), 1-19.
12. Bowdler, C., & Malik, A. (2017). Openness and Inflation Volatility: Panel Data Evidence. International Economic Journal.
13. Canavire-Bacarreza, G., & Ortega, D. (2014). Trade Liberalization and Inflation in Latin America. Economic Modelling.
14. Cassel, G. (1916). The present situation of the foreign exchanges I. Economic Journal, 26: 62–65
15. Chidakwa, A. M., & Chigumira, G. (2016). Pre-crisis macroeconomic performance and triggers of the economic crisis in Zimbabwe. Economic Management in a Hyperinflationary Environment: The Political Economy of Zimbabwe, 1980-2008, 23.

16. Coibion, O., Gorodnichenko, Y., & Wieland, J. (2012). The optimal inflation rate in New Keynesian models: should central banks raise their inflation targets in light of the zero lower bound?. Review of Economic Studies, 79(4), 1371-1406.
17. DabÃºs, C., & Delbianco, F. (2019). Exports, terms of trade and economic growth: Evidence from countries with different level of openness. *Journal of Reviews on Global Economics*, *8*, 327-336.
18. Davidson, P. (2015). Full Employment, Open Economy Macroeconomics, and Keynes' General Theory: Does the Swan Diagram Suffice?. Institute for New Economic Thinking Working Paper Series, (35).
19. Dicken, P. (2003). Global shift: Reshaping the global economic map in the 21st century. Sage.
20. Dicken, P. (2007). Global shift: Mapping the changing contours of the world economy. SAGE Publications Ltd.
21. Dix-Carneiro, R. (2014). Trade liberalization and labor market dynamics. Econometrica, 82(3), 825-885.
22. Dix-Carneiro, R., & Kovak, B. K. (2017). Trade liberalization and regional dynamics. American Economic Review, 107(10), 2908-2946.
23. Dix-Carneiro, R., Soares, R. R., & Ulyssea, G. (2018). Economic shocks and crime: Evidence from the brazilian trade liberalization. American Economic Journal: Applied Economics, 10(4), 158-195.
24. Doan Van, D. (2020). Money supply and inflation impact on economic growth. Journal of Financial Economic Policy, 12(1), 121-136.
25. Edwards, S. (1993). Openness, trade liberalization, and growth in developing countries. *Journal of economic Literature*, *31*(3), 1358-1393.
26. Ekanayake, E. M., Mukherjee, A., & Veeramacheneni, B. (2010). Trade blocks and the gravity model: A study of economic integration among Asian developing countries. Journal of Economic Integration, 627-643.
27. Faccarello, G. (2015). Comparative advantage. The elgar companion to David Ricardo, 69-77.
28. Farah, A. O. (2018). Inflation and economic growth in Uganda from 1976 to 2016 (Doctoral dissertation, Kampala International University, College of Economics and Management).
29. Friedman, M. (1963). Inflation: Causes and Consequences. Asia Publishing House.
30. Furtado, C. (1962). The economic growth of Brazil. University of California Press.
31. Jain, M. P., Sharma, A., & Kumar, M. (2022). Recapitulation of demand-pull inflation & cost-push inflation in an economy. Journal of Positive School Psychology, 2980-2983.
32. Jongwanich, J. (2010). Trade Openness and Inflation in Southeast Asia. Asian Development Review.
33. Karras, G. (2011). Trade Openness and Inflation: Evidence from Developing Countries. International Journal of Development Issues.
34. Kayizzi-Mugerwa, S., Anyanwu, J. C., & Conceição, P. (2014). Regional integration in Africa: an introduction. African Development Review, 26(S1), 1-6.
35. Keho, Y. (2017). The impact of trade openness on economic growth: The case of Cote d'Ivoire. Cogent Economics & Finance, 5(1), 1332820.
36. Kiganda, E. O. (2014). Relationship between inflation and money supply in Kenya. Journal of Social Economics, 2(2), 63-83.
37. Krugman, P. (1980). Theory of International Trade: A Dual, General Equilibrium Approach. Cambridge University Press.
38. Krugman, P. (1996). How to be a crazy economist. In S. Medema & W. Samuels (Eds.), Foundations of Research in Economics: How do Economists do Economics?
39. Lal, D., & Rajapatirana, S. (2019). Trade Liberalization and Economic Development. In Free Trade In The World Economy (pp. 204-332). Routledge.
40. Lee, J. W., & Yang, J. (2018). Trade Openness and Inflation: The Asian Perspective. Asian Economic Policy Review.
41. López-Villavicencio, A., & Saglio, S. (2014). Trade Liberalization and Inflation Dynamics in Africa. Journal of African Economies.
42. Lucas, R. E. (1988). On the mechanics of economic development. Journal of Monetary Economics, 22(1), 3-42.
43. Machlup, F. (2020). Another view of cost-push and demand-pull inflation. In Economic Semantics (pp. 241-268). Routledge.

44. Madesha, W., Chidoko, C., & Zivanomoyo, J. (2013). Empirical test of the relationship between exchange rate and inflation in Zimbabwe. Journal of economics and sustainable development, 4(1), 52-58.
45. McMillan, M., Rodrik, D., & Verduzco-Gallo, Í. (2014). Globalization, structural change, and productivity growth, with an update on Africa. *World development*, *63*, 11-32.
46. Ohlin, B. (1933). Interregional and International Trade
47. Okoye, L. U., et al. (2020). Trade Liberalization and Inflation Control in Nigeria: The Role of Policy Frameworks. African Journal of Economic Policy.
48. Oluwatoyin, M., & Taiwo, A. (2015). The Inflationary Impact of Trade Liberalization in Nigeria. International Journal of Development and Management Review.
49. Onoh, J. K. (2017). The Nigerian oil economy: From prosperity to glut. Routledge.
50. Özen, E., Özdemir, L., & Grima, S. (2020). The relationship between the exchange rate, interest rate, and inflation: the case of Turkey.
51. Pilinkiene, V. (2016). Trade openness, economic growth and competitiveness. The case of the central and eastern European countries. Incinerated ekonomika, 27(2), 185-194.
52. Porter, M. E. (2011). Competitive advantage of nations: creating and sustaining superior performance. simon and schuster.
53. Prebisch, R. (1991-1993). Obras 1930-1980. Fondo de Cultura Económica.
54. Ricardo, D. (1817). On the principles of political economy and taxation.
55. Robson, P. (2012). Economic integration in Africa. Routledge.
56. Romer, D. (2010). Openness and Inflation: Theory and Evidence. Quarterly Journal of Economics.
57. Romer, P. (1986). Increasing returns and long-run growth. Journal of Political Economy, 94(5), 1002-1037.
58. Salamai, A. A., Faisal, S. M., & Khan, A. K. (2022). The relationship between inflation and GDP with reference to oil based economy. International Journal of Multidisciplinary Research and Growth Evaluation, 3(01), 375-380.
59. Sasongko, G., & Huruta, A. D. (2018). Monetary policy and the causality between inflation and money supply in Indonesia. Business: Theory and Practice, 19, 80-87.
60. Shafaeddin, M. S. (2012). Trade liberalization and economic reform in developing countries: structural change or de-industrialization?. In The IMF, World Bank and policy reform (pp. 155-182). Routledge.
61. Siddiqui, K. (2015). Trade liberalization and economic development: A critical review. International Journal of Political Economy, 44(3), 228-247.
62. Sulaiman, L. A., Migiro, S., & Aluko, O. (2014). The structural adjustment programme in developing economies: pain or gain? Evidence from Nigeria. Public and Municipal Finance, 3(2), 41-48.
63. Tien, N. H. (2021). Relationship between inflation and economic growth in Vietnam. Turkish Journal of Computer and Mathematics Education (TURCOMAT), 12(14), 5134-5139.
64. Tuzova, Y., & Qayum, F. (2016). Global oil glut and sanctions: The impact on Putin's Russia. Energy Policy, 90, 140-151.
65. Uwubanmwen, A. E., & Ugiagbe, B. E. (2011). Trade Openness and Inflation in Nigeria: A Time Series Analysis. Journal of Emerging Trends in Economics and Management Sciences.
66. Winters, L. A., & Martuscelli, A. (2014). Trade liberalization and poverty: What have we learned in a decade?. Annu. Rev. Resour. Econ., 6(1), 493-512.
67. World Bank. (2002). Global economic prospects and the developing countries 2002. Washington, D.C.: World Bank.
68. Harrison, A., & Rodríguez-Clare, A. (2010). Trade, foreign investment, and industrial policy for developing countries. Handbook of development economics, 5, 4039-4214.
69. Evenett, S. J., & Fritz, J. (2015). The Tide Turns? Trade Protectionism and Slowing Global Growth. Global Trade Alert.–London: Centre for Economic Policy Research Press.
70. Siddiqui, K. (2015). Trade liberalization and economic development: A critical review. International Journal of Political Economy, 44(3), 228-247.