

# IMPACT OF TRADE OPENNESS ON INDUSTRIAL GROWTH: EVIDENCE FROM LOW-INCOME ECONOMIES IN ECOWAS

<sup>1</sup>Victoria Oluwaseye Gboyinde; <sup>2</sup>Emmanuel Dele Balogun; <sup>3</sup>Anthonia Taye Odeleye

## Abstract

This study investigates the impact of trade openness on industrial growth in low-income economies within the ECOWAS region. Secondary data were sourced from the World Development Indicators (WDI) for the eight low-income ECOWAS countries identified by the World Bank, covering the period 1998–2023. The analysis was based on panel data from these eight countries and estimated using the Driscoll and Kraay regression technique, which corrects for cross-sectional dependence, heteroskedasticity, and serial correlation. The findings reveal that while trade openness does not have a significant impact on industrial growth, gross capital formation and real exchange rates have positive and significant impacts. Conversely, foreign direct investment (FDI) and inflation negatively affect industrial growth in these countries. Therefore, the study concludes that trade openness alone is insufficient to drive industrial growth in low-income ECOWAS countries. It recommends policies that promote capital formation, maintain exchange rate stability, improve the quality and productivity of foreign direct investment, and keep inflation at stable levels to support industrial growth.

**Keywords:** Trade Openness, Industrial Growth, Industrialisation, Low-Income Countries, ECOWAS

**JEL Classification:** O14, F14, O55, E22

## 1. Introduction

As a cornerstone of economic development, industrialisation is a key driver of structural transformation and increased productivity through diversification (Odeleye and Olunkwa, 2019; Agility et al., 2025). Diversification towards industrialisation is key to building a strong, resilient economy (Afolabi, 2022). For instance, industrialisation not only fosters innovation and technological progress but also strengthens economic resilience. The benefits of industrialisation, from improved infrastructure to better access to markets, offer profound opportunities for both developed and developing nations to prosper. China, Singapore, Malaysia, and South Korea, among others, are notable economies that employed this route to drive structural economic transformation and competitiveness (Adeoti, 2020). While shocks are somewhat inevitable, industrialised economies are often less affected by both internal and external shocks than natural resource-based economies or some emerging economies. Many Sub-Saharan African countries rely heavily on natural resources, are import-dependent, and have small open economies (Ogunjimi, 2020). By embracing industrial growth, African nations have the potential to reduce poverty, improve living conditions, and strengthen their global competitiveness in an increasingly interconnected world.

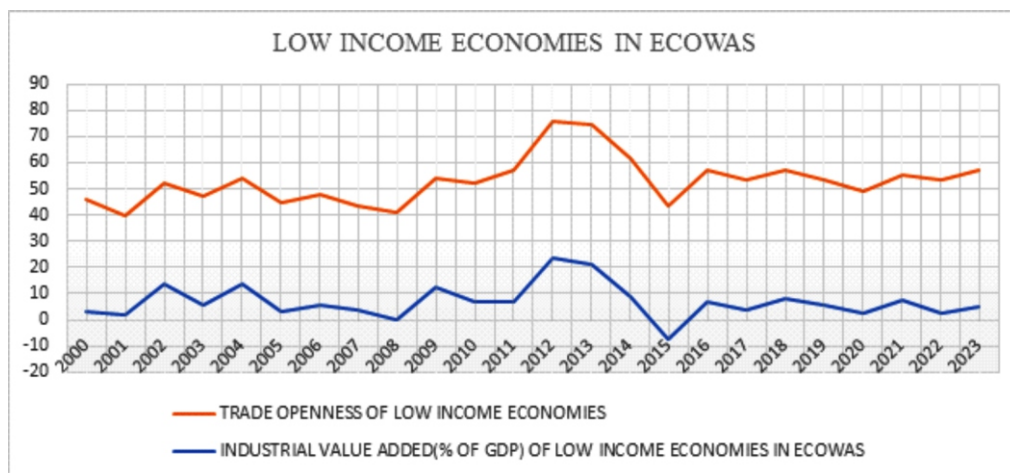
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• Corresponding Author: Victoria Oluwaseye Gboyinde  
Email: vicoluwaseye@gmail.com  
<sup>1,2,3</sup> Department of Economics; University Of Lagos, Lagos, Nigeria

In the same vein, trade openness is fundamental for enhancing industrial growth as it connects countries to global markets, technology, and capital. By opening up to international trade, countries can leverage comparative advantages, attract foreign investment, and promote innovations (Ikechi, Chinedum, & Nwokoro, 2022). Industries benefit from trade openness because it enhances access to production inputs, leading to greater efficiency and productivity (Abinabo & Abubakar, 2023). Moreover, exposure to global competition drives local industries to adopt more advanced technologies, which is essential for industrial expansion. Furthermore, trade openness is a strong component that contributes to economic performance (Wiredu *et al.*, 2020). Largely, a country's trade potential is signified by its GDP growth, which attracts foreign investment and thus creates more trade opportunities.

Empirical studies have, over the years, had mixed reactions on the impact of trade openness on industrial growth. For instance, some studies have revealed that trade openness has a positive effect on industrial output growth (Muhamad & Khadim, 2017; Fahad & Ergun, 2017). Contrarily, other empirical studies argued that trade Openness has a significant and negative impact on output (Adu-Gyamfi *et al.*, 2020; Akorsu and Okyere, 2023). In this connection, Figure 1 is a graphical presentation of Trade Openness and Industrial Value Added of Low-Income Economies in ECOWAS

**Figure 1:** Trade Openness and Industrial Value Added of Low-Income Economies in ECOWAS



**Source:** Authors' Computation from the World Development Indicator, 2025

Between 2000 and 2005, the industrial value-added fluctuated significantly. It started at 3.38% in 2000 and had a sharp decline in 2001 to about 1.74%. It rose to 13.66% in 2002 before falling again in 2003. These indicate an inconsistency in industrial performance across the region. The period from 2005 to 2015 saw more notable fluctuations as well. For example, in 2008, which was the period of global economic downturn experienced a drastic drop to 0.33%, followed by a rise to 12.68% in 2009. It declined again to -7.4% in 2015

during the global oil price shock, reflecting a contraction in industrial activity. After the downturn in 2015, the industrial value-added rebounded in 2016 to about 6.95%. The sector's performance became relatively more stable, though it remained below the peaks of 2012 and 2013. By 2023, the figure stood at 4.80%, reflecting modest industrial output but significantly lower than the early 2010s.

From 2000 to 2015, trade openness, measured by total trade as a percentage of GDP, trended upward in the low-income ECOWAS economies. It grew steadily from 42.59% to 53.63% in 2013. This reflects an increasing engagement in international trade, with ECOWAS low-income economies becoming more integrated into global markets. Trade openness dipped in 2015, which could be due to the global oil shock. From 2016, it kept fluctuating slightly till 2020 but remained relatively high. The highest value of 52.93% occurred in 2014, with a modest decline to 46.58% in 2020. However, by 2023, trade openness rebounded to 52.15%, showing a resilient recovery and continuing reliance on global trade.

However, despite the potential benefits of trade openness, the relationship between trade openness and industrial growth remains complex, particularly in low-income economies. Most of the member states in ECOWAS have been ranked lowest in terms of openness to trade on the continent and the world at large (Ikechi, Chinedum, & Nwokoro, 2022). Despite the importance of openness to trade in aiding economic development, it seems to have a low impact on low-income countries and ECOWAS at large. Similarly, Low-income economies in ECOWAS have struggled with fluctuating industrial growth despite increasing trade openness. This reveals that trade liberalisation has not always led to the desired industrial expansion in many of these countries. Factors such as inadequate infrastructure, limited access to financing, and the persistence of high trade barriers—both domestic and international—often hinder the full benefits of trade openness. Furthermore, low-income economies face the challenge of competing with more advanced industrialised nations that dominate global markets. As a result, their potential to foster industrial growth in these nations is often unachievable. This brings about the question of what factors limit the impact of trade on industrial development. This paper seeks to explore the degree of relationship between trade openness and industrial growth in low-income economies.

Additionally, some existing literature on the impacts of trade openness and industrial growth focuses more on high-income or emerging economies, with limited attention given to low-income countries. In particular, low-income nations in ECOWAS, which are Burkina Faso, Gambia, Guinea-Bissau, Liberia, Mali, Sierra Leone, Niger, and Togo, remain underexplored. This research seeks to fill this gap by providing empirical evidence from low-income ECOWAS nations, exploring how trade openness impacts industrial growth in this selected region.

## 2. Literature Review

Generally, the impact of trade openness on industrialisation has generated mixed results over the years. Some studies have found positive relationships between trade openness and industrial growth. For instance, Agility et al. (2025) found that trade openness has a positive

impact on industrial growth. Similarly, Omoregbee et al. (2025) confirmed from their studies that trade openness induces sectoral performance, especially industrial growth. Contrarily, Fankem & Feyom (2023) examined the effects of trade openness on industrialisation in Sub-Saharan Africa. They discovered that trade openness negatively affected industrialisation in Sub-Saharan Africa. They observed that the negative impact was particularly significant in countries with low levels of foreign direct investment and inadequate human capital. Likewise, Ikechi, Chinedum, and Nwokoro (2022) studied trade relations and openness among ECOWAS member nations from 2000 to 2019. They found that trade within ECOWAS remains low, despite efforts to enhance economic integration and trade openness among member states. Another study is that of Akintunde et al. (2021), who analysed the impact of trade openness on manufacturing performance in West Africa and found a negative relationship between trade openness and manufacturing output. Similarly, Ugoke et al. (2016) also found that trade openness negatively affected industrial production in Nigeria.

Many other studies focused on the impact of trade openness on economic growth. While recent studies such as Akorsu & Okyere (2023) and Adu-Gyamfi *et al* (2020) posited that trade Openness has a significant negative impact on GDP, Oloyede (2021) also investigated the relationship between trade openness and macroeconomic outcomes in Africa's regional economic communities (RECs), specifically focusing on ECOWAS and SADC. The study revealed a positive, but statistically insignificant, link between trade openness and economic growth in both ECOWAS and SADC. Other studies found that trade openness has a positive impact on economic growth. For example, Ijirshar (2019) studied the influence of trade openness on economic growth among ECOWAS countries and found that trade openness positively impacted long-term growth. Similarly, Saibu (2004) focused on the causality between trade openness and economic growth in Nigeria. Through causality tests, Saibu found a unidirectional relationship, where increased trade openness led to economic growth, although this effect depended on the level of economic development.

In the same manner, among other macroeconomic variables that affect industrial output growth are: Gross capital formation, foreign direct investment inflow, exchange rate, and inflation. For instance, Oyegun and Chibuzor (2023) identified a positive and significant relationship between gross capital formation and output growth, whereas Ajose and Oyedokun (2018) reported a negative, insignificant relationship between the two variables. Keji (2023) discovered a negative impact of FDI on industrial growth, while Amire (2022) reported that FDI had no significant effect on industrial performance. Also, Obani & Agu (2024) discovered that FDI has a long-term positive effect on the growth of the manufacturing sector in Sub-Saharan Africa. Ukuwanna, Ihugba & Okoro (2022), Oseni, Adekunle, and Alabi (2019), Akinmuregun and Falana (2018), and Simon-Oke & Aribisala (2010) all found a significant positive impact between exchange rate and industrial output growth. In contrast, Okafor, Adegbite, and Busari (2018) discovered that exchange rates negatively impact industrial growth, despite inflation having a positive effect. Modebe and Ezeaku (2016), however, found inflation to have a negative but statistically insignificant impact on industrial growth.

While some evidence supports the positive effects of trade openness on industrial growth, several studies have also discovered negative effects. This mixed effect persists, particularly in regions with low levels of foreign investment and human capital, such as low-income ECOWAS economies. These previous findings reveal the complex nature of the relationship between trade openness and industrial growth, specifically in low-income economies. This study also fills a gap by providing more current data, providing a fresh insight into the topic.

### 3. Methodology

#### 3.1 Theoretical Framework

This study is anchored on the Endogenous Growth Theory developed by Romer (1986, 1990) and Lucas (1988). The theory explains long-run economic growth as a process driven by factors within an economy. For instance, human capital accumulation, innovation, technological progress, and knowledge creation. Unlike the Solow growth model, which treats technological progress as an exogenous factor, the Endogenous Growth Theory argues that economic growth depends on deliberate investment decisions and policies that promote research and development, education, learning, and knowledge accumulation. These activities generate spillover effects that improve productivity and sustain long-run growth.

The theory further argues that policies that strengthen the productive capacity of an economy can influence long-term growth. In this regard, trade openness can serve as a channel through which firms gain access to larger markets, advanced technologies, improved production methods, and intermediate inputs. Greater exposure to international markets can also increase competition, encourage innovation, and promote efficiency, thereby supporting industrial development. From this perspective, trade openness contributes to industrial growth when domestic industries have the capacity to absorb and utilise the knowledge and technologies that accompany international trade.

The Endogenous Growth Theory provides an appropriate framework for this study because it links trade openness with the mechanisms through which industrial growth can occur. Specifically, it explains how increased trade integration may improve industrial performance by facilitating technology transfer, knowledge diffusion, productivity enhancement, and capital accumulation. These channels are consistent with the study's objective of examining whether trade openness influences industrial growth in the eight low-income ECOWAS countries. The theory therefore offers a sound basis for analysing the relationship between trade openness and industrial growth in these economies.

#### 3.2 Model Specification

The empirical model for this study is adapted from the work of Agility et al. (2025), which was specified as:

$$IND_{it} = \alpha_0 + \alpha_1 TRD_{it} + \alpha_2 FDI_{it} + \alpha_3 EXR_{it} + \alpha_4 INF_{it} + \alpha_5 GDP_{it} + \mu_t + \varepsilon_t \quad (3.1)$$

Where IND is industrial development, EXR is the exchange rate, FDI is foreign direct investment, GDP is economic growth, and INF is the inflation rate. This is further modified

and specified in the equation. 3.3. The notations in equation The functional form of the model is specified as follows:

$$ING = F(GCF, FDI, REEX, TOP, INF) \quad (3.2)$$

The equation is expressed as:

$$IN_{it} = \beta_0 + \beta_1 GCF_{it} + \beta_2 TOP_{it} + \beta_3 FDI_{it} + \beta_4 REEX_{it} + \beta_5 INF_{it} + U_t \quad (3.3)$$

Where ING is industrial growth, TOP is trade openness, FDI is foreign direct investment, REEX is the exchange rate, and INF is the inflation rate. For this study, capital stock is replaced with gross capital formation (GCF).  $U$  represents the error term, and  $t$  represents time, while  $\beta_0$  is the constant.  $\beta_1$  to  $\beta_5$  are the parameters to be estimated.

Cross-sectional dependence is a common issue in panel data analysis because countries may be exposed to common shocks, regional spillovers, or shared economic conditions. When cross-sectional dependence is present, conventional fixed-effects and random-effects estimators may produce inconsistent standard errors, leading to unreliable statistical inference. To examine this issue, the study first applied Pesaran's (2004) cross-sectional dependence test. Accordingly, the study employed the Driscoll and Kraay (1998) estimator. The Driscoll-Kraay estimator extends the fixed-effects model by producing standard errors that are robust to cross-sectional dependence, heteroskedasticity, and serial correlation. This approach is suitable for macro-panel data where countries are likely to experience common shocks that induce correlation across cross-sectional units. Consequently, the Driscoll-Kraay estimator provides a reliable basis for statistical inference in the presence of these econometric issues.

### 3.3 Population and Sources of Data

The low-income countries in ECOWAS as of 2023 were considered based on data availability. The time series data are from 1998 to 2023. These countries include Gambia, Togo, Liberia, Mali, Sierra Leone, Burkina Faso, Guinea-Bissau, and Niger. Data are collected from the World Bank Development Indicators. The sources of data, description, and measures of variables are well summarised in Table 1.

**Table 1: Sources and Description of Data**

| Variables                    | Code | Description                              | Measurement | Source   |
|------------------------------|------|------------------------------------------|-------------|----------|
| Industrial growth            | ING  | Gross industrial value added as % of GDP | %           | WDI,2025 |
| Gross capital formation      | GCF  | Gross capital formation as % of GDP      | %           | WDI,2025 |
| Foreign direct investment    | FDI  | Total FDI as % of GDP                    | %           | WDI,2025 |
| Real effective exchange rate | REER | Real effective exchange rate index       | Index       | WDI,2025 |
| Trade openness               | TOP  | Total trade as a percentage of GDP.      | %           | WDI,2025 |
| Inflation                    | INF  | Consumer price index                     | Index       | WDI,2025 |

**Source:** Compilation from World Development Indicators

#### 4. Results and Discussion

This section presents the results of the descriptive analysis, diagnostic tests, and regression estimation, and discusses their implications in relation to the study objectives and the existing literature.

Table 2 reports the descriptive statistics for the variables used in the analysis. Industrial growth (ING) averaged 17.286, with moderate variation across the sample. Trade openness (TOP), measured as total trade (exports plus imports) as a percentage of GDP, recorded a mean of 45.473%, indicating that trade accounted for nearly half of economic output on average, although the relatively large standard deviation points to substantial differences in trade integration across countries and over time. Gross capital formation (GCF) averaged 17.082%, suggesting moderate investment levels during the study period. Foreign direct investment (FDI) exhibited considerable variability, reflecting significant fluctuations in capital inflows across the sample. Similarly, the real exchange rate (REEX) showed wide dispersion, indicating notable differences in exchange rate movements among the countries. Inflation (INF) averaged 5.182%, with the observed range showing that the sample experienced both periods of deflation and episodes of relatively high inflation.

**Table 2 Descriptive Statistics**

| Variable | Mean   | Std. Dev. | Min    | Max     |
|----------|--------|-----------|--------|---------|
| ING      | 17.286 | 6.548     | 3.243  | 31.074  |
| TOP      | 45.473 | 21.066    | 29.54  | 107.751 |
| FDI      | 6.189  | 13.387    | -2.575 | 103.337 |
| INF      | 5.182  | 5.886     | -3.503 | 47.643  |
| REEX     | 39.916 | 53.496    | 27.56  | 196.62  |
| GCF      | 17.082 | 9.069     | 12.84  | 42.075  |

**Source:** Authors' computation

The Pesaran (2004) cross-sectional dependence test was conducted to determine whether the error terms were correlated across the panel units. The test produced a CD statistic of -2.286 with a p-value of 0.0223. Since the p-value is less than the 5% level of significance, the null hypothesis of no cross-sectional dependence is rejected. This indicates the presence of cross-sectional dependence among the low-income ECOWAS countries, suggesting that shocks affecting one country may also influence others. Consequently, the study employed the Driscoll and Kraay estimator, which provides robust standard errors in the presence of cross-sectional dependence, heteroskedasticity, and serial correlation.

**Table3 Cross-Sectional Dependence Test**

| Test            | Statistic | p-value | Decision                                                   |
|-----------------|-----------|---------|------------------------------------------------------------|
| Pesaran CD Test | -2.286    | 0.0223  | Reject H <sub>0</sub> : Cross-sectional dependence exists. |

**Source:** Authors' computation

Table 4 presents the regression results of the study. The model is statistically significant, as indicated by the F-statistic of 23.37 ( $p = 0.0001$ ), suggesting that the explanatory variables are jointly significant in explaining industrial growth. The R-squared value of 0.032 indicates that the model explains 3.2% of the variation in industrial growth.

**Table 4: Driscoll/Kraay Panel Regression**

| DV= ING                     | Coef.  | Std. Err. | T      | P>t   | [95% Conf. Interval] |        |
|-----------------------------|--------|-----------|--------|-------|----------------------|--------|
| <b>TOP</b>                  | 0.032  | 0.035     | 0.910  | 0.370 | -0.040               | 0.104  |
| <b>GCF</b>                  | 1.22   | 0.501     | 2.435  | 0.022 | 0.619                | 2.225  |
| <b>FDI</b>                  | -0.311 | 0.032     | -9.72  | 0.000 | -0.497               | 0.035  |
| <b>INF</b>                  | -0.082 | 0.030     | -2.760 | 0.011 | -0.143               | -0.021 |
| <b>REEX</b>                 | 0.421  | 0.154     | 2.740  | 0.011 | 0.011                | 0.741  |
| <b>CONS</b>                 | 12.673 | 2.279     | 5.560  | 0.000 | 7.980                | 17.366 |
| <b>Within R<sup>2</sup></b> | 0.032  |           |        |       |                      |        |
| <b>Probability</b>          | 0.0001 |           |        |       |                      |        |
| <b>F-Statistics</b>         | 23.37  |           |        |       |                      |        |
| <b>Observation</b>          | 208    |           |        |       |                      |        |

**Source:** Authors' computation; significant at 1%, 5%, and 10% respectively.

Surprisingly, trade openness has no significant impact on industrial growth in low-income countries. This contradicts similar studies by Fankem & Feyom (2023) and Ijirshar (2019), who found that trade openness has a negative impact on industrial growth. This could be a result of the limited scope of the study, as it focuses mainly on Nigeria. This result also came as no surprise because countries in the sub-region are import-dependent, especially on consumable goods, which has discouraged industrialization. Gross Capital Formation has a positive and significant impact on industrial output growth in the sub-region. As GCF in the sub-region increases, industrial growth increases. This lends credence to a similar study by Oyegun and Chibuzor (2023) but contradicts Ajose and Oyedokun (2018), whose findings reveal a negative impact. It is obvious from the coefficient that the low-income countries in the ECOWAS region have consistently recorded low performance in the industrial sector because, among other factors, the level of domestic investment is low. Interestingly, foreign direct investment has a negative impact on industrial growth. This is similar to the discovery of Keji (2023), who found a negative impact of FDI on industrial growth, and, contrarily, Obani & Agu (2024) found that FDI has a long-term positive effect on industrial growth. The real effective exchange rate is positively significant. As the domestic currency appreciates relative to that of the trading partners, industrial output grows in the low-income countries of the ECOWAS region. The spillover effect comes from the low cost of importing raw materials for domestic firms. However, aside from the fact that exports become more expensive, the value of the coefficient shows a minimal impact. By implication, aside from that, exporting industrial output might be too expensive, and the quality is not at par with

international standards, which perhaps creates demand for importing similar products. This finding agrees with Akinmuregun and Falana (2018), Ukuwanna, Ihugba & Okoro (2022), and Oseni, Adekunle, and Alabi (2019), while it contradicts Okafor, Adegbite and Busari (2018). The structure of the African economy makes it highly vulnerable to external price shocks. Interestingly, inflation has a negative impact on industrial growth. Inflation drives up the average cost of production, which also trickles down to the prices of consumable goods, with no exception to industrial growth.

## **5. Conclusion and Recommendations**

The study concludes that trade openness is not a significant determinant of industrial growth in the low-income ECOWAS countries. Instead, industrial growth is significantly influenced by gross capital formation, foreign direct investment, inflation, and the real exchange rate. It recommends policies that promote capital formation, maintain exchange rate stability, improve the quality and productivity of foreign direct investment, and keep inflation at stable levels to support industrial growth. In addition, governments should strengthen the macroeconomic environment to encourage productive investment and sustained industrial development.

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