

EMPLOYMENT EFFECTS OF IMPORT COMPETITION ON AGRO-BASED MANUFACTURING FIRMS IN NIGERIA

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Abstract. The rise in agricultural imports in Nigeria has raised concerns about its impact on employment in the agro-based manufacturing sector. This study examines how import competition affects employment in local agro-based manufacturing firms, focusing on labour trends, the impact of trade liberalisation, and the influence of terms of trade. The analysis is based on time series data spanning from 1986 to 2021, utilising both descriptive and inferential statistics. The findings reveal significant fluctuations in labour trends within Nigeria's agro-based manufacturing sector. Between 1986 and 1991, the sector employed more labour than other sectors. However, from 1991 to 2002, other sectors outpaced agro-based manufacturing in employment. From 2002 to 2021, the agro-based manufacturing sector saw a resurgence in employment, surpassing other sectors. The study identifies several factors influencing employment, including import competition, unit capital cost, labour cost, trade openness, and exchange rates, all of which negatively affect employment in the sector. In contrast, terms of trade, changes in trade, export competition, capital stock, inflation, and GDP all exert a positive and significant effect on employment. The study recommends the implementation of policies to safeguard the domestic agro-based manufacturing sector while simultaneously promoting exports in these industries.

Keywords: agribusiness, import competition, employment effects, trade, labour, trade liberalisation, agro-based manufacturing, Nigeria

INTRODUCTION

Unemployment remains a critical challenge for many developing countries, with Sub-Saharan Africa disproportionately affected. This region is home to a staggering 56% of the world's extremely poor population (World Bank, 2018; Beegle and Christiaensen, 2019). The high unemployment rate not only deepens poverty but also hinders economic growth, undermines social stability, and obstructs human development. The majority of the population lives in rural areas, where agriculture remains the primary source of income and livelihood.

Before Nigeria's independence, the agricultural sector was a cornerstone of its economy, contributing over two-thirds of its Gross Domestic Product (GDP) and providing employment for the majority of the workforce. However, since the oil boom, Nigeria's agricultural sector has seen a significant decline. Agriculture's contribution to GDP has dwindled, and trade in agricultural products has suffered (Desai and Rudra, 2018; Ogbalubi and Wokocha, 2013), leaving Nigeria as a net importer of agricultural goods. The country's import bill is dominated by food and raw materials that local agro-based industries are well-positioned to supply. This shift poses a serious threat to the survival

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of local industries and undermines their economic potential.

Despite these challenges, agriculture remains a key source of employment in Nigeria, accounting for 48.19% of total employment (National Bureau of Statistics, 2020). However, this sector has experienced a steady decline in employment since 2001 (Odozi, 2018). Nigeria's persistently high unemployment rate has been a significant barrier to economic growth (Austine et al., 2020). Specifically, the unemployment rate has consistently risen from 23.1% in 2018 to 27.1% in 2020 (National Bureau of Statistics, 2020). This upward trend presents considerable challenges to economic growth, social stability, and human development. The decline in agricultural employment can be partly attributed to import competition, which undermines the role of local agro-based manufacturing firms in Nigeria.

The third wave of globalisation, characterised by the rapid economic rise of East Asia – particularly China – has sparked a global shift in manufacturing, generating intense debate on the effects of international trade on domestic manufacturing sectors. While extensive research has explored the impact of import competition on manufacturing industries in countries like the United States and Turkey, there is a noticeable gap in studies addressing its effects on agro-based manufacturing firms, particularly in Nigeria. Acemoglu et al. (2016) and Autor et al. (2013) analyse the effects of import competition on employment in the U.S. manufacturing sector, while Akkuş (2014) studies trade's impact on Turkey's manufacturing jobs. Barone and Kreuter (2019) focus on the effects of import competition on wages in Italy, and Bloom et al. (2016) investigates how Chinese imports affect productivity and creativity. Bernard et al. (2006) explore the impact of import competition on American manufacturing plants and low-wage nations, while Pierola and Sanchez-Navarro (2019) provide insights into the effects of import competition in Peru's manufacturing sector. However, little attention has been paid to how import competition influences Nigeria's agro-based manufacturing sector, creating a critical gap in the literature.

This study aims to fill this gap by assessing the effects of rising import competition on employment in Nigeria's agro-based manufacturing firms. Specifically, it seeks to (1) examine trends in labour within the agro-based manufacturing sector in comparison to other manufacturing sectors over time, (2) evaluate the impact of import competition following trade liberalisation, and

(3) investigate the influence of terms of trade on employment in agro-based manufacturing.

Empirical evidence on the impact of import competition on local agro-based manufacturing firms is crucial for shaping policies that promote domestic production and employment. A deeper understanding of this relationship can inform strategies to limit the importation of agricultural commodities that can be produced locally, thereby driving job creation and economic growth. Protecting local agro-based manufacturing firms can foster expansion, generating more employment opportunities and incentivising domestic production of agricultural goods for local consumption and export. Ultimately, this approach can strengthen food security and improve the balance of payments, contributing to broader economic stability.

MATERIALS AND METHODS

Study Area

The study focuses on Nigeria, a West African country located between longitudes 2°40' and 14°41' East and between latitudes 4°16' and 13°53' North. Nigeria covers a total land area of 923,768.622 square kilometres and has an estimated population of approximately 210 million (National Bureau of Statistics, 2021).

Data Sources

This study utilises secondary time series data covering the period from 1986 to 2021 (35 years). Data on exchange rates, terms of trade, and trade openness were obtained from the Central Bank of Nigeria. Information on GDP, agro-based employment, real unit labour costs, real unit capital costs, capital stock, imports, and exports was sourced from the National Bureau of Statistics. Additionally, data on trade openness, inflation, and government expenditure were gathered from the World Bank and the World Bank Enterprise Survey (WBES).

Data Analysis

To assess the stationarity of the variables, we employed the Phillips-Perron (PP) and Augmented Dickey-Fuller (ADF) tests, following standard procedures for time series data. Descriptive statistics were used to examine trends in agro-based manufacturing employment relative to other manufacturing sectors over time. The impact of import competition on agro-based manufacturing employment, driven by a more liberalised trade regime, was analysed using regression-based labour demand

models. Similarly, these models were employed to estimate the effects of the terms of trade on agro-based manufacturing employment.

Model Specification

Augmented Dickey-Fuller

The unit root properties of the variables were tested using the Augmented Dickey-Fuller (ADF) test, specified as follows:

$$\Delta\gamma_t = X_t\beta + \delta\gamma_{t-1} + \alpha_i \sum_{i=1}^p \Delta\gamma_{t-i} + \varepsilon_t \quad (1)$$

Where:

Δ – Difference operator

γ_t – Vector of the n variables of interest (e.g., employment, import, productivity, trade openness, interest rate, inflation rate, and government expenditure). The price of agricultural goods (food prices) was not included as a variable of interest, as the study focused on macroeconomic factors. Additionally, variables such as the inflation rate indirectly account for agricultural goods' prices.

δ – Parameter

X_t – Optional exogenous regressors, which may include a constant or a constant trend

β – coefficients/parameters to be estimated

$\sum$ – summation

p – number of lags

ε_t – error term.

Regression-Based Models of Labour Demand

Before assessing the impact of import competition on agro-based manufacturing employment in Nigeria, it is essential to first estimate the level of import competition. Following Ngwudiobu et al. (2018), the ratio of imports to domestic demand was used as a proxy for import competition. This study employed econometric modelling of labour demand to examine the effects of import competition on employment in agro-based manufacturing industries. The employment equation is derived from the theoretical labour demand function by Trivedi and Alexander (1988) and is expressed as:

$$L = L(W/P_N, P_T/P_N, K_T, K_N) \quad (2)$$

Where:

W/P – real exchange rate,

P_T/P_N – relative price of tradables in terms of non-tradables

K_T and K_N – fixed amounts of sector-specific capital for tradables and non-tradables, assumed immobile between sectors.

Labour demand equations at the industry level were estimated by regressing employment against various explanatory variables, which were derived from conventional labour demand theory (Tuhin, 2015). The labour demand function (3), following Ngwudiobu et al. (2018), was transformed into an estimable equation, with some modifications informed by the structure of Nigeria's labour market, specifically for manufacturing employment. The model is represented as:

$$\begin{aligned} \log EMP_t = & \alpha_0 + \alpha_1 \log EMP_{t-1} + \alpha_2 \log IMCOM_t + \\ & + \alpha_3 \log EXCOM_t + \alpha_4 \log K_{t-1} + \alpha_5 \log RUCC_{t-i} + \\ & + \alpha_6 \log RUCL_{t-i} + \alpha_7 \log TO_t + \alpha_8 \log GE_t + \\ & + \alpha_9 \log INF_t + \varepsilon_t \end{aligned} \quad (3)$$

Where:

EMP_t – employment in the agro-based industry at time t

$IMCOM_t$ – import competition

$EXCOM_t$ – export competitiveness

K_{t-1} – lagged capital stock

$RUCL_{t-i}$ – real unit cost of labour, measured by the ratio of nominal wage to the consumer price index

$RUCC_{t-i}$ – real unit cost of capital, measured by the real lending rate

TO_t – trade openness

GE_t – government expenditure

INF_t – inflation rate

α_0 – constant coefficient (intercept)

α_1 to α_8 – parameters to be estimated (coefficients)

ε_t – error term

The second labour model, used to investigate the effect of the terms of trade on agro-based manufacturing employment, is represented as:

$$\begin{aligned} \log EMP_t = & \alpha_0 + \alpha_1 \log EMP_{t-1} + \alpha_2 \log TOT_t + \\ & + \alpha_3 \log TRADE_t + \alpha_4 \log GDP_t + \alpha_5 \log LOAN_t + \\ & + \alpha_6 \log EXR_t + \varepsilon_t \end{aligned} \quad (4)$$

Where:

EMP_t – Employment in the agro-based industry at time t

TOT – Terms of trade

$TRADE_t$ – Trade changes

GDP – Gross domestic product
 LOAN – Loans for the manufacturing sector
 α_0 – Constant coefficient (intercept)
 α_1 to α_6 – Parameters to be estimated (coefficients)
 ε_t – Error term

The PP test was employed to confirm the findings of the ADF test, particularly due to the potential for structural breaks (Perron, 2006).

The results showed that employment in the agro-based manufacturing industry exhibited non-stationary behaviour but became stationary after first differencing, indicating that it is I (1), meaning it has a unit root and requires one level of differencing to achieve stationarity. The stationarity of the variables was assessed using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. The results showed that import competition, export competition, capital stock, trade openness, and

RESULTS AND DISCUSSION

Unit Roots Test Results

To ensure the robustness of the results, the study examined the stationarity of variables using Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests.

Table 1. Augmented Dickey-Fuller and Philips-Perron test results

Variables	Augmented Dickey-Fuller		Philips-Perron	
	level	first difference	level	first difference
Agro-based employment	–0.926153 (0.7679)	–5.338468*** (0.0001)	–0.926153 (0.7679)	–5.333959*** (0.0001)
Import competition	–6.209607*** (0.0000)	–8.824391*** (0.0000)	–6.046655*** (0.0000)	–22.62678*** (0.0000)
Export competition	–3.838764*** (0.0059)	–4.247444*** (0.0028)	–3.761789*** (0.0072)	–17.09377*** (0.0000)
The real unit cost of labour	–1.724242 (0.4099)	–3.008093** (0.0442)	–1.852611 (0.3494)	–3.415431*** (0.0171)
The real unit cost of capital	–2.861429* (0.0603)	–3.062900** (0.0397)	–3.178403** (0.0299)	–5.905108*** (0.0000)
Capital stock	–3.561595** (0.0119)	–10.28647*** (0.0000)	–3.615875** (0.0104)	–10.28647*** (0.0000)
Trade openness	–4.325298*** (0.0016)	–7.985181*** (0.0000)	–4.325298*** (0.0016)	–8.839291*** (0.0000)
Inflation	–3.844590*** (0.0059)	–7.293581*** (0.0000)	–3.319971** (0.0215)	–7.254398*** (0.0000)
Government expenditure	–1.955653 (0.3042)	–7.975877*** (0.0000)	–1.821846 (0.3642)	–8.215169*** (0.0000)
GDP	–0.246311 (0.9229)	–4.695348*** (0.0006)	–0.313039 (0.9129)	–4.685923*** (0.0006)
Term of trade	–1.377002 (0.5822)	–5.424852*** (0.0001)	–1.416345 (0.5632)	–5.418927*** (0.0001)
Exchange rate	–2.542989 (0.1147)	–4.990801*** (0.0003)	–4.581614*** (0.0008)	–4.969465*** (0.0003)
Trade change	–5.152617*** (0.0002)	–12.76739*** (0.0000)	–5.203911*** (0.0001)	–18.99583*** (0.0000)

*, **, *** indicate significance levels at the 10%, 5% and 1% levels, respectively. The *p*-values are in parentheses.

Source: own elaboration.

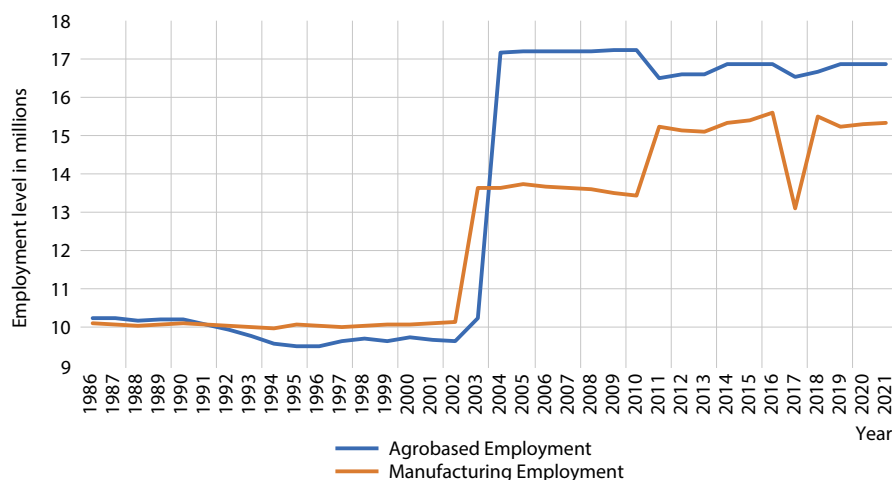


Fig. 1. Employment trends in the agro-based manufacturing sector relative to other manufacturing sectors
Source: own elaboration.

inflation were stationary in their level form, indicating these variables are integrated of order 0, $I(0)$. In contrast, the real unit cost of labour and government expenditure were non-stationary at the level form but became stationary after first differencing, implying that they are integrated of order $I(1)$. Notably, the real unit cost of capital was found to be stationary at level form.

The Augmented Dickey-Fuller and Phillips-Perron tests also revealed that Gross Domestic Product, terms of trade, and exchange rate were non-stationary at level form but became stationary after first differencing, suggesting they are integrated of order $I(1)$. Conversely, trade change was stationary at level form, indicating it is integrated of order 0, $I(0)$. In summary, the results display a mix of $I(0)$ and $I(1)$ variables.

Trends of Employment in the Agro-Based Manufacturing Sector Relative to Other Manufacturing Sectors

Figure 1 illustrates employment trends (measured in millions of workers per year) in the agro-based manufacturing sector versus other manufacturing sectors from 1986 to 2021, following the introduction of the Structural Adjustment Programme (SAP). Initially, employment in agro-based manufacturing surged, surpassing other manufacturing sectors due to strong demand for agricultural products. However, between 1991 and 2002, employment in the sector declined, driven by an exchange rate crisis, neglect of the agricultural sector,

and the residual effects of the oil boom. These factors led to reduced investment and labour demand in agro-based manufacturing firms, allowing other manufacturing sectors to employ more workers during this period.

Between 2002 and 2004, employment in both agro-based and other manufacturing sectors rose sharply, with agro-based manufacturing leading in workforce expansion. From 2004 to 2010, employment levels stabilised, with agro-based manufacturing maintaining a higher share of workers. Although the sector experienced a slight dip in 2011, employment rebounded between 2012 and 2013.

From 2014 to 2016, employment in other manufacturing sectors showed an upward trend, while agro-based manufacturing remained stable but retained its lead in workforce size. Both sectors faced a decline in 2017, but agro-based manufacturing recovered between 2018 and 2021, likely supported by government interventions aimed at revitalising the agricultural sector.

Overall, agro-based manufacturing consistently employed more workers than other manufacturing sectors, highlighting its significant contribution to Nigeria's labour market.

Effect of Import Competition on Agro-Based Manufacturing Employment Stemming from the Adoption of a More Liberalised Trade Regime

Table 2 shows the impact of various factors on employment in Nigeria's agro-based manufacturing sector. The

Table 2. Effect of import competition on agro-based manufacturing employment

Variable	Coefficient	Std. Error	t-Statistic
Agro-based employment (-1)	0.720135	0.112151	6.421145
Import competition	-0.519281**	0.196405	-2.643927
Export competition	0.061332**	0.022390	2.739248
Capital stock	0.331159**	0.136306	2.429528
The real unit cost of capital	-12.96077***	3.913717	-3.311627
The real unit cost of labour	-13.13876***	3.858474	-3.405171
The real unit cost of labour (-1)	1.165559	1.623533	0.717915
Trade openness	-2.904632***	0.935867	-3.103679
Trade openness (-1)	1.283825	0.842004	1.524725
Government expenditure	0.130835	0.329177	0.397462
Inflation	2.307890***	0.766158	3.012291
Constant	7.713598	9.254997	0.833452
R-square	0.743974		
Adjusted R-Square	0.717178		
S.E. of regression	1.031591		
Sum of square resid	24.47616		
Log-likelihood	-43.40400		
F-statistic	35.22912		
Prob(F-statistic)	0.000000		

***, ** denote significance at the 1% and 5% levels, respectively.

Source: own elaboration.

regression analysis reveals that import competition, export competition, real unit cost of labour, trade openness, and inflation all significantly influence sector employment. Import competition, in particular, has a significant negative effect on agro-based manufacturing sector employment at the 5% significance level (Author et al., 2013; Dauth et al., 2014). This suggests that increased import competition leads to reduced employment, limiting labour force participation and suppressing wages in local markets.

This finding is consistent with previous studies, such as Author et al. (2013), which found that rising import competition led to higher unemployment in the US manufacturing sector. Similarly, studies by Akkuş (2014), Balsvik et al. (2015), Blanco et al. (2020), and Citino and Linarello, (2021) have shown that import competition negatively affects employment in both developed and developing countries.

In contrast, export competition has a positive and significant effect on agro-based manufacturing sector employment. This suggests that increased export competition boosts production, which, in turn, drives employment growth. This finding aligns with research by Akkuş (2014) and Dauth et al. (2021), who found that export demand and competition led to increased labour demand in the manufacturing industries of Turkey and Germany, respectively.

Capital stock also has a positive and significant impact on agro-based manufacturing employment, suggesting that an increase in capital stock leads to higher employment (Arestis et al., 2007). This indicates that capital and labour are complementary inputs in the sector. Conversely, the real unit cost of capital negatively impacts employment, suggesting that higher capital costs reduce job availability. This occurs because increased capital costs reduce the revenue available for

salaries, thereby decreasing the demand for employment (Byoun et al., 2022).

The real cost of labour similarly has a negative and significant impact on employment in the agro-based manufacturing sector. Higher labour costs, when not accompanied by increased demand or production, reduce the industry revenue available for labour, thereby lowering labour demand. As noted by Bildirici (2004) and Byoun et al. (2022), high labour costs can increase unemployment rates. Firms may respond by reducing labour costs or laying off workers, ultimately reducing employment (Byoun et al., 2022; Agrawal and Matsa, 2013; Benmelech et al., 2019; Benmelech et al., 2021; Chodorow-Reich, 2014; Duygan-Bump et al., 2015).

Trade openness also has a negative and significant effect on employment in the agro-based manufacturing sector (Pierce and Schott, 2016; Liu et al., 2022). Increased trade openness results in higher competition from imported goods, which reduces the demand for locally produced agro-based products, leading to decreased employment (Kpognon et al., 2020; Asaley et al., 2017; Onifade et al., 2019). While some studies have reported mixed results (Hasan et al., 2011), the majority

suggest that trade openness harms employment in various countries, including Nigeria.

Inflation, however, has a positive and significant impact on employment in the agro-based manufacturing sector. This suggests that rising inflation leads to higher employment in the sector, as increased prices stimulate demand for products, prompting higher production and, consequently, a need for more labour. This supports the expectation that rising inflation can reduce unemployment, with higher employment rates boosting consumers' purchasing power, which in turn drives demand for goods and services. A similar finding was reported by Orji et al. (2015) in their study on the relationship between unemployment and inflation in Nigeria, where they found a significant positive relationship between these two variables.

Effects of Terms of Trade on Agro-Based Manufacturing Employment

Table 3 shows that terms of trade, trade changes, GDP, and exchange rates significantly impacted employment in Nigeria's agro-based manufacturing sector. Specifically, the terms of trade had a positive and significant effect on employment, suggesting that improved terms

Table 3. Effects of terms of trade on agro-based manufacturing employment

Variable	Coefficient	Std. Error	t-Statistic
Agro-based employment (-1)	-0.096561	0.104709	-0.922191
Term of trade	1.616888***	0.554821	2.914251
Trade change	0.011922***	0.002069	5.761680
GDP	0.612010***	0.108197	5.656433
Loan to the manufacturing sector	1.071373	1.574155	0.680602
Exchange rate	-0.394448***	0.121349	-3.250525
Exchange rate (-1)	-0.369479*	0.216776	-1.704426
Constant	-10.05131***	2.101823	-4.782184
R-square	0.757691		
Adjusted R-Square	0.725053		
S.E. of regression	0.430910		
Sum of square resid	5.199142		
Log-likelihood	-16.29290		
F-statistic	11.29815		
Prob(F-statistic)	0.000002		

***, ** denote significance at the 1% and 5% levels, respectively.

Source: own elaboration.

of trade increase employment. This finding aligns with Onifade et al. (2019), who found that a 1% improvement in the terms of trade could reduce unemployment by 0.35%, as favourable terms of trade signal a strong manufacturing-based economy.

Trade changes also had a positive and significant influence on agro-based manufacturing employment, implying that increased export demand or exportation boosts industry output and employment (Dauth et al., 2017). Additionally, GDP positively affected employment, indicating that economic growth drives demand for goods and services, thereby increasing labour demand in the agro-based manufacturing sector.

These results align with the International Monetary Fund's position that rising GDP is likely to increase employment but contradict Ani et al. (2019), who found that GDP positively influences unemployment in Nigeria. Conversely, the exchange rate had a negative and significant impact on agro-based manufacturing employment, suggesting that an increase in the exchange rate reduces employment. This occurs because exchange rate devaluation discourages exports, leading to reduced production and labour demand in the sector. This finding supports Ani et al. (2019), who found that the exchange rate negatively impacts employment in Nigeria, but contradicts Bakhshi and Ebrahimi (2019), who concluded that the exchange rate reduces unemployment in Iran.

CONCLUSIONS

This study provides important empirical evidence on the impact of import competition on employment dynamics in Nigeria's agro-based manufacturing sector. The findings indicate that import competition negatively affects employment, while factors such as terms of trade, export competition, and GDP have a positive impact. The study also establishes causal relationships between these variables and employment, demonstrating the predictive power of past values of import competition, export competition, trade changes, and trade openness on current employment levels.

These results have important implications for policymakers aiming to foster employment growth in Nigeria's agro-based manufacturing sector. Policymakers can enhance competitiveness by implementing protective trade policies, promoting export-oriented strategies, and investing in infrastructure and human capital development to reduce costs and increase productivity.

Although the study provides a solid foundation for policy recommendations, future research should address its limitations to further refine strategies for sustainable employment growth in the sector.

While the study offers a comprehensive analysis of the employment effects of import competition on agro-based manufacturing in Nigeria, it has some limitations that may impact the generalisability and robustness of its findings. The study relies on 1986–2021 time series data, which provides a long-term perspective but may overlook short-term fluctuations or recent economic changes affecting employment trends. The analysis focuses on import competition, trade openness, and terms of trade but excludes factors like technological advancements and political instability. Moreover, the findings are specific to Nigeria, limiting their applicability to other countries, particularly developed economies with different industrial structures and labour markets. These limitations suggest that while the study provides valuable insights, its findings should be interpreted with caution, and further research is needed to address these gaps.

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