



TRADE OPENNESS AND ECONOMIC GROWTH IN SOUTH AFRICA, ALGERIA, NIGERIA AND EGYPT

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Abstract

Persistent growth performance disparities among African economies despite increased trade openness put into question the effectiveness of trade openness in driving sustainable development. This study explores the influence of trade openness on economic growth in South Africa, Algeria, Nigeria, and Egypt (SANE) using data from annual data spanning 1986-2023 obtained from World Development Indicators. The study is based on the endogenous growth theory with trade openness, inflation, foreign direct investment (FDI), and gross fixed capital formation (GFCF) as explanatory variables. Using the Autoregressive Distributed Lag (ARDL) bounds testing method, long-run as well as short-run dynamics are estimated. The results indicate that trade openness is a strong supporter of long-run economic growth in South Africa and Algeria, whereas FDI and GFCF are the main drivers in Egypt. By contrast, none of the macroeconomic determinants have a persistent influence on growth in Nigeria with far-reaching implications for structural and institutional issues. Inflation always represents a negative contribution to growth in the majority of countries, which underscores the importance of macroeconomic stability. The study highlights the country-specificity of the macroeconomic variables' influence on growth. Based on this result, the paper recommends that certain policies encouraging greater trade integration, investment efficiency, and inflation control are required to guarantee long-term growth in the SANE region.

Keywords: Trade Openness, Economic Growth, SANE Countries

Background to the Study

The global economy is at the moment facing a number of long-term challenges, which sharpen the minds of policymakers, analysts, and economists. Among the biggest issues is ongoing geopolitical tensions, such as the Russia-Ukraine war and US-China tensions, that have disrupted global trade, supply chains, and investment flows. The disruptions have precipitated heightened uncertainty, energy and resource shortages, food shortages, and fragmented economic blocs, with geopolitical risks currently being one of the biggest threats to world growth (McKinsey & Company, 2024; Deloitte, 2024).

Another of the most important issues is the rise of protectionism and trade wars. New trade restrictions instituted in 2024 were five times as many as the average from 2010 to 2019, impeding growth among emerging markets. Trade policy changes, especially in North America and China,

have prompted production and logistics planning changes. Since these policies have been criticised by high-profile economists such as Joseph Stiglitz concerning uncertainty and discouragement of investment, even stagflation in some cases (Selcuk & Vasishtha 2025; Deloitte, 2024), another is emerging economies and developing economies remaining stuck in a loop of low per capita income growth coupled with high debt, poor financial infrastructure, inequality, and underinvestment. Since the 2010s, the pace at which these economies, excluding China and India, have been narrowing the gap with high-income economies has decelerated. The World Bank has warned of the worst economic downturn in 20 years for poorer countries (John, 2025).

Lastly, the relationship between economic growth and trade openness is firmly established. According to the World Bank's 2020 report, while openness to trade raises growth because of

improved access to markets, it also requires robust policies to mitigate external shocks. Second, open trade helps poor households by raising the supply of goods and services at reduced prices and linking domestic markets to global value chains, thereby driving growth and poverty reduction (World Bank 2020).

The South African, Algerian, Nigerian, and Egyptian SANE nations promote expansion through application of trade openness policies like market liberalization and reductions in tariffs. These policies, however, are likely to oppose the asymmetric character of global trade, whose high regulation levels by wealthy nations result in local industries' susceptibility to threats. This aligns with the infant industry theory, which opines that newly emerging economies need short-run protection in order to build up competitive domestic industries.

SANE nations have increasingly become part of the economic fabric of Africa and have undertaken a series of liberalization reforms in trade since the past decades. SANE nations have welcomed trade openness to varying degrees, while the effective contribution of this to the economic growth of their nations is still a matter of controversy. While South Africa and Egypt have developed more diversified trading networks, Nigeria and Algeria retain more commodity-intensive structures of export. Despite such differences, all the four economies also share the vision of harnessing trade to drive long-run growth (Silajdzic & Mehic, 2018).

However, liberalizing trade in the three countries has failed, in most instances, to generate the expected economic outcomes. The varying tendencies in economic performance, even in the adoption of open trade regimes, raise key questions on the empirical validity of the trade openness-growth nexus in the SANE context. This study is concerned with examining whether a statistically significant correlation exists between trade openness and economic growth for all these nations. This study is therefore concerned with providing empirical evidence of the correlation between economic growth and trade openness for South Africa, Algeria, Nigeria, and Egypt. By focusing exclusively on the nature and scope of

such a relationship, the study contributes to broad policy discussion on African development performance and trade liberalization within the region's large economies.

Literature Review

2.1 Conceptual Review

Trade openness refers to the degree to which a country integrates with the global economy through the exchange of goods and services, typically measured by the trade-to-GDP ratio. While this ratio captures export and import volumes, scholars argue that it provides only a partial view. Comprehensive assessments now include qualitative aspects such as the quality of trade policy, customs efficiency, and regulatory transparency (Dang, Fang, & Tang, 2021). In this sense, trade openness extends beyond tariff reductions and non-tariff barrier elimination to include institutional and infrastructural frameworks that facilitate cross-border trade (Tadesse & Worku, 2020). Open economies benefit from increased competition, access to larger markets, and advanced technologies.

Economic growth refers to the rise in the inflation-adjusted market value of the goods and services an economy is producing in a period of time. It is considered one of the most important economic goals because it can enhance the standard of living, reduce poverty, and raise national welfare. Though most commonly employed is real GDP growth, broader measures include productivity growth, investment, and per capita income (Barro & Sala-i-Martin, 2004). Economic growth can be triggered by many stimuli including capital accumulation, technological change, population growth, and trade.

Theoretical Linkages

Traditional and neoclassical economic models predict a positive relationship between trade openness and economic growth. As per David Ricardo's classical theory of comparative advantage, nations benefit by specializing to produce goods in which they have relative efficiency and exchange with others for those goods on which they are less efficient (Ricardo,

1817). Neoclassical theories of growth, for instance, the Solow-Swan model, suggest that openness to trade allows countries to acquire better technology, avoid risk, and share more markets and, therefore, maximize growth (Solow, 1956).

Endogenous growth models provide a richer explanation. Romer (1990) and Grossman and Helpman (1991) models have argued that trade openness can create spillovers from knowledge, increased competition, and innovation, all of which produce long-run economic growth. As firms get more exposed to the international economy, they are forced to improve efficiency, adopt new technology, and invest in human capital, which raises productivity and growth.

Empirical Review

In Nigeria, Omoke, Opuala-Charles, and Camarero (2021) examined the relationship between economic growth and trade openness from 1984 to 2017 based on the Autoregressive Distributed Lag (ARDL) model. Exports significantly and positively contributed to economic growth both in the short run and long run, while imports had a negative effect on economic growth in the long run. The study emphasized the central role of the quality of institutions in facilitating the trade-growth link, emphasizing that better institutions improve the gains from trade openness.

Similarly, Nwadike, Okezie, and Ugwuanyi (2020) employed time series data from 1970 to 2011 to investigate the long-run impact of openness to trade on economic growth in Nigeria. Employing cointegration analysis, they confirmed a statistically significant and positive relationship between openness (characterized by the trade-GDP ratio) and economic growth. Based on the research, liberal trade policy can be good for growth if accompanied by macroeconomic stability and institutional support.

Pradhan, Arvin, and Nair (2020) analyzed India's openness to trade using cointegration and vector autoregression (VAR) techniques for the period 1985-2018. The research determined that long-run economic growth in India was not achieved by trade openness. Rather, economic growth in India was significantly determined by

foreign direct investment, and it suggests that trade liberalization alone cannot fill long-run gaps unless supported by robust FDI attraction and domestic industrial growth.

In Egypt, during the year 2023, Nofal and Elhefnawy used the ARDL approach in a 1982-2020 study and confirmed that trade openness had positive and statistically significant impact on economic growth both in the short term and long term. The study emphasized how capital accumulation and the quality of institutions made the impact of trade liberalization in the economy more effective.

In Botswana, Magombeyi and Odhiambo (2020) used ARDL cointegration techniques to analyze the trade-growth nexus. Findings supported the trade openness hypothesis of enhancing economic performance through increased resource allocation. They also highlighted that macroeconomic policy stability positively dominates the master key to unleashing the growth-maximizing potential of trade.

In another recent panel analysis of G20 countries, Huq (2024) investigated the impact of trade openness and tariffs on growth using fixed-effects models. The study of 11 G20 economies found positive correlation between trade openness (using the ratio of trade to GDP as a proxy for trade openness) and growth. It also found the negative impact of tariffs on growth, with a call to reduce trade barriers with backing at the domestic level

3. Methodology

The research investigates the effect of trade openness on economic growth in Algeria, Nigeria, South Africa, and Egypt from 1986 to 2023. The data employed are yearly time series data, and they were obtained from the World Development Indicators (WDI, 2024). Economic growth is measured by gross domestic product growth rate (annual percent change), openness of trade by total trade as a percent of GDP, inflation by consumer price index, foreign direct investment (FDI) by net FDI inflow, and gross fixed capital formation (GFCF) in US current dollars.

Analytical foundation is based on the endogenous growth model developed by Lucas and Romer. This structure highlights the importance of capital accumulation and policy parameters, especially openness to trade, to promoting long-term growth. To allow for empirical estimation, the model is presented in log-linear terms. Inflation will have a negative effect on economic growth as it disrupts investment planning and savings. Conversely, FDI is expected to have a positive impact on growth via the provision of access to external capital, management capabilities, and advanced technologies. Similarly, GFCF is expected to have a positive impact on economic growth as greater investment in physical capital will generally enhance productive capacity and output.

$$\ln GDPGR_t = \sum_{i=1}^p \beta_1^i \Delta \ln GDPGR_{t-i} + \sum_{i=0}^{q1} \beta_2^i \Delta \ln TO_{t-i} + \sum_{i=0}^{q2} \beta_1^i \Delta \ln INF_{t-i} + \sum_{i=1}^p \beta_1^i \Delta \ln FDI_{t-i} + \sum_{i=1}^p \beta_1^i \Delta \ln GFCF_{t-i} + \lambda ECM_{t-i} + \mu_t$$

In this equation, Δ denotes the first difference operator, and ECM_{t-i} is the lagged error correction term obtained from the long-run model. The coefficient λ represents the speed of adjustment back to long-run equilibrium, while μ_t is the white-noise error term. This ARDL approach is appropriate for analyzing both short-run and long-run relationships when the variables are a combination of $I(0)$ and $I(1)$, provided none are integrated of order two.

Results and Discussions

Descriptive statistics reveal broad ranges of macroeconomic performance for Egypt, Algeria, Nigeria, and South Africa. Nigeria and Egypt recorded the maximum average growth rates in GDP of 4.44% and 4.17%, respectively, compared to that of South Africa at 2.06%. The most variable GDP growth was for Nigeria, which indicates higher growth at high levels and lower growth at low levels. Trade openness was highest for Algeria (56.04%) and South Africa (53.09%), which suggests high trade integration, while Nigeria had the lowest average openness of trade (32.77%),

The extended empirical model for long run ARDL is presented as:

$$\ln Y_t = \vartheta_0 + \phi \ln TO_t + \alpha \ln GFCF_t + \pi_1 \ln INF_t + \pi_2 \ln FDI_t + e_t$$

In this extended model, $\vartheta_0 = \ln A_0$ is the constant term, GFCF denotes gross fixed capital formation, INF is the inflation rate, FDI captures foreign direct investment inflows, $\phi, \alpha, \pi_1,$ and π_2 are coefficients measuring the respective impacts of inflation and FDI on growth, and e represents the error term accounting for unobserved shocks and omitted influences.

The short-run ARDL error correction model specification is as follows:

suggesting low participation in international trade. Inflation remained broadly low and stable in Algeria and South Africa, but Egypt and Nigeria experienced higher and more unstable inflation, suggesting vulnerability to inflationary shocks and macroeconomic instability.

Foreign direct investment flows were on average highest in Nigeria (19.80%) and Egypt (17.44%), but both of these were also the most volatile, indicating unbalanced investment flows in the long term. In contrast, South Africa and Algeria had lower but steadier FDI streams. Gross Fixed Capital Formation, as an approximation for investment in physical capital, was highest in Nigeria (29.09%) and Algeria (30.67%), against great capital accumulation efforts, while Egypt and South Africa lagged behind. The results of the Jarque-Bera test show non-normality in several variables, particularly inflation and FDI, due to high kurtosis and skewness, which indicate potential outliers or extreme values that must be taken into account in future empirical analysis.

Table i: Descriptive Statistics

	GDP	TO	INF	FDI	GFCF
South Africa					
Mean	2.0580	53.0946	0.9901	7.5881	18.4931
Maximum	5.6037	72.86539	5.983088	18.6549	23.5112
Minimum	-6.3411	37.4874	-0.2163	-0.6920	15.1502
Std Dev.	2.3880	8.2496	1.2408	4.3124	2.1324
Skewness	-1.2095	-0.0300	2.0976	0.8449	0.3636
Kurtosis	5.4354	2.6085	8.3302	3.1327	2.2916
Jarque-Bera	18.1663	0.2417	70.9349	4.4298	1.5892
Algeria					
Mean	2.3604	56.0409	0.8558	8.5032	30.6660
Maximum	7.2018	76.6845	2.3040	31.6696	43.0485
Minimum	-5.1000	32.6845	-0.3240	0.3391	20.6772
Std Dev.	2.4275	10.7686	0.7191	8.5378	6.94285
Skewness	-0.8151	-0.0782	0.2325	1.6396	0.4742
Kurtosis	4.0702	2.3572	1.9842	4.3914	1.7651
Jarque-Bera	5.8639	0.6746	1.9240	19.5629	3.7374
Nigeria					
Mean	4.1737	32.7721	1.8152	19.7983	29.0886
Maximum	15.329	53.2779	5.7908	72.8355	54.9482
Minimum	-2.0351	9.1358	0.3525	5.3822	14.1687
Std Dev.	3.8518	11.9099	1.2287	17.2589	13.6932
Skewness	0.5082	-0.2186	1.4007	1.7238	0.4176
Kurtosis	3.4601	2.0820	5.0372	4.7616	1.7568
Jarque-Bera	1.9192	1.5940	18.4986	23.1102	3.4579
Egypt					
Mean	4.4358	48.0943	2.5366	17.4402	20.2994
Maximum	7.1562	71.6806	9.3435	75.3108	34.1271
Minimum	1.1254	30.2465	-0.2045	2.2697	12.4456
Std Dev.	1.4768	9.5829	2.1303	17.4981	5.2840
Skewness	-0.2105	0.4323	1.6666	1.9467	0.7957
Kurtosis	2.5473	2.650217	5.8143	6.1413	3.001863
Jarque-Bera	0.5892	1.341296	29.3404	38.5841	3.904785

Source: Authors' computation, 2025

Correlation analysis for South Africa, Algeria, Nigeria, and Egypt show that openness in

trade is positively related to GDP growth in all four countries, with the strongest links in Algeria and

Nigeria. Inflation is negatively related to growth, especially in South Africa, Algeria, and Nigeria, with Egypt having a negative weak link. Foreign direct investment has a positive relationship with growth in Egypt and Algeria but a negative relationship in Nigeria and even weakly in South

Africa. Gross fixed capital formation has variable results with South Africa, Algeria, and Nigeria having weak negative relationships, while Egypt has a positive relationship denoting varying investment efficiency in different countries.

Table ii: Correlation matrix of SANE countries

SOUTH AFRICA	gdpgr	to	inf	fdi	gfcf
Gdpgr	1				
To	0.207	1			
Inf	-0.294	-0.459	1		
Fdi	0.175	0.444	-0.270	1	
Gfcf	-0.140	0.373	0.405	0.020	1
ALGERIA					
Gdpgr	1				
To	0.463	1			
Inf	-0.335	-0.349	1		
Fdi	0.239	0.434	-0.568	1	
Gfcf	-0.202	-0.095	-0.160	0.190	1
NIGERIA					
Gdpgr	1				
To	0.360	1			
Inf	-0.336	-0.100	1		
Fdi	-0.147	0.399	0.533	1	
Gfcf	-0.126	0.037	0.376	0.367	1
EGYPT					
Gdpgr	1				
To	0.266	1			
Inf	0.035	0.059	1		
Fdi	0.587	0.528	0.226	1	
Gfcf	0.260	0.237	-0.038	0.035	1

Source: Author's Computation, 2025

The Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) test statistics reveal that GDP growth is stationary at level ($I(0)$) across all four countries, i.e., it is not differenced. Whereas the remaining variables like trade openness, inflation, FDI, and GFCF are non-stationary at level but prove to be stationary upon first differencing and thus are integrated of order one ($I(1)$). This pattern is consistent in South Africa, Algeria, Nigeria, and

Egypt, with minor discrepancies between the ADF and PP results in a few instances. For example, FDI in South Africa is discovered to be stationary at level by means of the PP test but not using the ADF test. In total, the presence of a mix of $I(0)$ and $I(1)$ variables, and none $I(2)$ variables, justifies the relevance of the ARDL modeling approach, which is appropriate to handle regressors with different orders of integration.

Table iii: Unit root tests (ADF, and PP)

Variables	ADF		PP		Remark
	Levels	1 st Diff	Levels	1 st Diff.	
South Africa					
gdpg	-4.411***	-	-4.397***	-	I(0)
to	-2.251	-3.642**	-2.281	-6.556***	I(1)
inf	-2.997	-6.439***	-2.797	-11.825***	I(1)
fdi	-0.841	-7.555***	-4.639***	-	I(1)
gfcf	-2.327	-4.387***	-2.221	-4.169**	I(1)
Algeria					
gdpg	-5.081***	-	-4.302***	-	I(0)
to	-0.779	-6.069***	-0.574	-6.461***	I(1)
inf	-2.023	-5.081***	-2.202	-5.085***	I(1)
fdi	-2.806	-7.428***	-2.820	-7.428***	I(1)
gfcf	-2.485	-6.270***	-2.721	-4.894***	I(1)
Nigeria					
gdpg	-4.061***	-	-3.916**	-	I(0)
to	-2.482	-7.561***	-2.742	-20.703***	I(1)
inf	-3.356*	-5.642***	-3.373*	-6.513***	I(1)
fdi	-4.349***	-	-4.280***	-	I(0)
gfcf	-1.948	-6.023***	-1.829	-8.071***	I(1)
Egypt					
gdpg	-3.644***	-	-3.676**	-	I(0)
to	-2.689*	-6.042**	-2.564	-5.061***	I(1)
inf	-1.858	-4.298**	1.690	-6.043***	I(1)
fdi	-3.284**	-	-2.421**	-	I(0)
gfcf	-3.986**	-	-1.898	-5.762***	I(1)

Note: ***, ** and * denote rejection of null hypothesis at 1%, 5% and 10% significance levels respectively

Source: Author's Computation, 2025.

The ARDL bounds test confirms that economic growth and its determinants, i.e., trade openness, inflation, FDI, and capital formation, are related in the long run in South Africa, Algeria, Nigeria, and Egypt. South Africa, Algeria, and Egypt have large evidence of cointegration at the 1 percent significance level, whereas that for Nigeria

is at the 5 percent significance level. The findings suggest that the macroeconomic variables selected have a cumulative effect on long-run growth in the SANE nations, but the model specifications as well as short-run dynamics are heterogeneous across nations.

Table iv: Cointegration Test Results using ARDL Bound Test

Dependent variable: y	Functions				F-statistics	
	F(to, inf, fdi, gfcf)					
South Afri Model 3 ARDL (2, 0, 1, 0, 1)	1%		5%		10%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
Critical bound values for the models (k = 4)	3.81	4.92	3.05	3.97	2.68	3.53
Algeria Model 3 ARDL (1, 0, 0, 0, 0)	F(to, inf, fdi, gfcf)				5.643***	
	1%		5%		10%	

	$I(0)$	$I(1)$	$I(0)$	$I(1)$	$I(0)$	$I(1)$
Critical bound values for the models (k = 4)	3.07	4.44	2.26	3.48	1.90	3.01
Nigeria Model 3 ARDL (1, 0, 2, 2, 2)	F(to, inf, fdi, gfcf)					5.082***
	1%		5%		10%	
	$I(0)$	$I(1)$	$I(0)$	$I(1)$	$I(0)$	$I(1)$
Critical bound values for the models (k = 4)	4.4	5.72	3.47	4.57	3.03	4.06
Egypt Model 3 ARDL (1, 2, 2, 0, 0)	F(to, inf, fdi, gfcf)					9.1314***
	1%		5%		10%	
	$I(0)$	$I(1)$	$I(0)$	$I(1)$	$I(0)$	$I(1)$
Critical bound values for the models (k = 4)	3.07	4.44	2.26	3.48	1.9	3.01

Note: ***, ** and * denote rejection of null hypothesis at 1%, 5% and 10% significance levels respectively
Source: Authors' computation, 2025.

In the short run, trade openness has contradictory effects in the SANE countries. There are positive short-run advantages in the South African case, aligning with current evidence supporting trade liberalization (Shan et al., 2024; Ibrahim & Abdulmalik, 2023). Nonetheless, negative impacts are faced by Nigeria and Egypt, while Algeria reflects no obvious effect, an outcome consistent with more general observations that trade results in developing economies are largely a function of governance, institutional quality, and infrastructure (Wiredu et al., 2020). Inflation tends to contain growth in South Africa, Algeria, and Nigeria, validating its debilitating impact on investment and consumption. Most importantly, Egypt exhibits a healthy inflation-growth link, as observed in pandemic patterns and

where inflation was with demand-led growth (Vu et al., 2023).

Foreign direct investment yields short-run benefits, as per capital deepening and technology transfer theories, as in Algeria. In Nigeria, however, the short-run negative and long-run positive effects highlight the absorptive capacity and infrastructure role (Adeniyi, 2020). Gross fixed capital formation is helping in South Africa's growth but providing adverse impacts in Nigeria and Algeria, which lead to fear of wasteful public investment and implementation of projects (Wiredu et al., 2020). Lastly, negative and significant error correction terms across all countries indicate high dynamics of adjustment such that between 52% to 75% of deviations from long-run equilibrium were corrected every period, thereby proving the robustness of ARDL model.

Table v: Short-run Estimates of Trade Openness and Economic Growth in South Africa, Algeria, Nigeria and Egypt.

Country	Variables	Dependent Variable: Economic Growth (<i>gdpgr</i>)			
		Coefficient	Std Error	t-Statistic	Prob.
South Africa	$\Delta(gdpgr)$	0.3228	0.1342	2.4057	0.0239
	$\Delta(to)$	0.4821	0.1440	3.3479	0.0304
	$\Delta(inf)$	-0.3406	0.1308	-2.6025	0.0153
	$\Delta(gfcf)$	0.5916	0.2609	2.2671	0.0323
	ECT(-1)	-0.6503	0.2071	-7.9665	0.0000
Algeria	$\Delta(to)$	-0.0970	0.0926	-1.0572	0.3040
	$\Delta(to(-1))$	0.3601	0.2512	1.4337	0.1643
	$\Delta(inf)$	-0.2385	0.0678	-3.5311	0.0019

	$\Delta(\text{fdi})$	0.1791	0.0534	3.3485	0.0062
	$\Delta(\text{gfcf})$	-0.0904	0.0501	-1.7955	0.0863
	ECT(-1)	-0.5203	0.1807	-5.6444	0.0000
Nigeria	$\Delta(\text{to})$	-0.5829	0.2081	-2.8011	0.0017
	$\Delta(\text{inf})$	-0.2385	0.0419	-5.6803	0.0000
	$\Delta(\text{inf}(-1))$	0.0904	0.0357	2.5290	0.0191
	$\Delta(\text{fdi})$	-1.7529	0.5244	-3.3426	0.0029
	$\Delta(\text{fdi}(-1))$	1.2159	0.4527	2.6859	0.0135
	$\Delta(\text{gfcf})$	-0.5588	0.1940	-2.8797	0.0087
	$\Delta(\text{gfcf}(-1))$	-0.6086	0.2124	-2.8644	0.0090
	ECT(-1)	-0.6458	0.1178	-5.4802	0.0000
Egypt	$\Delta(\text{to})$	-0.1138	0.0359	-3.1679	0.0039
	$\Delta(\text{to}(-1))$	-0.0721	0.0347	-2.0766	0.0479
	$\Delta(\text{inf})$	0.1123	0.0394	2.8487	0.0085
	$\Delta(\text{inf}(-1))$	0.1920	0.0449	4.2719	0.0002
	ECT(-1)	-0.7452	0.1440	-7.2581	0.0000

Source: Author's computation, 2025.

Finding in the long run shows that openness of trade in South Africa has a positive and significant long-run effect on economic growth, as the theoretical expectations would have been that open trade increases productivity and market access. This finding is supported by Monyela and Saba (2024) and Huq (2024), who both emphasize the growth-inducing nature of openness in emerging markets. Inflation, as expected, has a significant negative effect, confirming that macroeconomic instability threatens long-run growth, as in He (2023). FDI and capital formation are not statistically significant, suggesting that these factors are less powerful in South Africa's long-run growth mechanisms.

Trade openness is also positive and significant in its effect in Algeria, confirming external integration theory to push growth. The finding is in line with Ibrahim and Abdulmalik (2023), confirming the necessity of trade in North African growth whenever it is supported by good institutions. Capital formation, inflation, and FDI are not, however, significant, possibly a reflection of Algeria's dependence on oil exports as well as lack of economic diversification.

In Nigeria, the long-term growth results reveal that capital formation, inflation, FDI, and trade openness are not significant drivers of

economic growth. This might be contrary to some previous research but concurs with Ogundairo (2023), who also established that FDI has a negative impact on growth, most likely due to structural and institutional flaws. The insignificance of capital formation reveals investment inefficiencies that will hinder long-term economic performance.

Both FDI and capital formation are positive and statistically significant in Egypt, affirming the theoretical expectation that investment is the focal point of long-term growth. Inflation is significantly and negatively related, while trade openness is not significant, which indicates that in the absence of supporting domestic policies, openness in and of itself may not be conducive to growth.

Overall, the results show that while trade openness has a highly positive influence on long-term growth in South Africa and Algeria, this is less so in Nigeria and Egypt. Investment and FDI are the most important factors in Egypt, while inflation remains a chronic inhibitor of growth in countries with high levels of inflation. These findings strongly support theoretical expectations as well as newer empirical evidence but also show that macroeconomic variable influences growth differently in countries depending on their structural as well as institutional settings.

Table vi: Long-run Estimates of Trade Openness and Economic Growth in S.A.N.E. Countries

Variables	Dependent Variable: Economic Growth (<i>gdpg</i>)			
	South Africa	Algeria	Nigeria	Egypt
to	0.1232** (0.0566)	0.0894*** (0.0239)	-0.1502 (0.1572)	-0.0259 (0.0214)
inf	-0.4117*** (0.1055)	-0.0694 (0.0487)	-0.2321 (0.1409)	-0.0632*** (0.0198)
fdi	-0.0887 (0.1944)	-0.1018 (0.6629)	-1.4571 (1.7539)	0.4716*** (0.1119)
gfcf	0.0536 (0.1470)	-0.0649 (0.0411)	-0.3918 (0.3221)	0.2601*** (0.0495)
Adjusted R ²	0.6974	0.4761	0.6899	0.5973
F-Stat	20.591***	15.395***	10.457***	9.129***
Durbin Watson	2.225	1.967	2.321	1.926

Note: ***, ** and * denote rejection of null hypothesis at 1%, 5% and 10% significance levels respectively.
Source: Author's computation, 2025.

Conclusion

The study discovers that the influence of trade openness, inflation, foreign direct investment, and gross fixed capital formation on economic growth varies significantly for South Africa, Algeria, Nigeria, and Egypt. Trade openness in South Africa and Algeria has a high positive long-term relationship with growth, confirming theoretical expectations and supporting the benefits of integration into the foreign economy. Egypt benefits more from FDI and investment in capital formation, while macroeconomic factors in Nigeria do not actually drive long-term growth reflecting structural and institutional inefficiencies. Inflation negatively affects growth in most countries on a persistent basis, adding weight to the imperative of macroeconomic stability preservation. ARDL bounds tests confirm cointegration in the four countries, and the highly significant error correction terms confirm mechanisms that are robust in eliminating short-run disequilibrium. These findings show the variability of growth determinants and the economic national context in setting the effectiveness of macroeconomic policies.

Recommendation

Policymakers in South Africa and Algeria have to remain open to trade while, at the same time, ensuring they offer stability to the macroeconomic environment to sustain its growth-supportive effect. In contrast, Nigeria and Egypt need to implement structural reforms that strengthen institutions, governance, and trade infrastructure to maximize the benefits of openness and investment. Inflation control should remain a top priority, particularly for Nigeria and Egypt, to stabilize economic fluctuations and anchor growth. Additionally, public spending must be oriented toward maximizing the efficiency and quality of public spending, especially in Nigeria and Algeria, and enhancing the absorptive capacity needed to optimize benefitting from the inflows of FDI. Targeted country-specific policy intervention would be required to achieve the full potential of these macroeconomic drivers of sustainable and inclusive economic growth in the SANE region.

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