POPULATION AGE COMPOSITION, SAVINGS, AND ECONOMIC GROWTH IN NIGERIA: AN EMPIRICAL ANALYSIS

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Abstract

This study examines the interrelationship among population age composition, savings, and economic growth in Nigeria from 1983 to 2022 using a Vector Autoregression (VAR) econometric model. The research explores how demographic shifts, particularly the dependency ratios (young and old) and labour force participation, influence savings behavior and economic performance. Findings reveal that Nigeria's youthful dependency ratio is significantly high, resulting in lower household savings due to increased consumption needs. Additionally, while labour force participation has grown, under-utilization remains a challenge, limiting its contribution to economic expansion. The study confirms that high dependency rates negatively impact savings in the short run, which in turn affects capital accumulation and economic growth. However, strategic investments in education, vocational training, and job creation could help Nigeria harness its demographic dividend. The study recommends policies aimed at increasing workforce productivity, expanding financial inclusion, and implementing macroeconomic stability measures to enhance savings and investment. These findings provide valuable insights for policymakers seeking to optimize Nigeria's demographic structure for sustainable economic growth.

Keywords: Population age composition, savings, economic growth, dependency ratio, Nigeria

JEL Classification: E0, O4

1. INTRODUCTION

The major sign of the development of a country is its economic growth, which reflects improvements in general health, income, and productivity. Numerous factors influence economic growth, including investment rates, labour force participation, technological advancements, and demographic trends. Among these, population age distribution and savings play a crucial role in shaping long-term economic performance. The population structure of a country, i.e., the young, working population and elderly individuals, dictates supply, consumption pattern, and capital formation, all of which exert influence on economic growth.

Economists for centuries have debated the economical nexus between population growth and economic performance; the debate is credited to Malthus in 1803, when he presented the view that population growth would have a detrimental effect on the standard of living of individuals in the long run. Malthus believed that the finite nature of land would ultimately cause the per capita resources to decline, and this would result in mass starvation. Still, this view doesn't consider the role of technological progress, which has the potential to increase productivity and, in turn, improve personal well-being as a counterbalance to the negative effects of population growth.

The initial economic theories suggested that high birth rates and huge population growth among poor nations would hinder economic development by distracting scarce capital from savings and investment. The theory was based on the belief that parents would allocate more funds to education and healthcare for their children, thus reducing the funds available for investment (Akinbode et al., 2017). Later studies, however, such as those by Kuznets (1967) and Simon (1981), were unable to find a significant link between per capita income growth and population growth.

The division of a population into several age groups is known as population age distribution. It is further divided into independent and dependent categories. We regard the labour force as an active population group and the people below and above working age as dependent population groups. According to WDI (2022), Nigeria's reliance and active working groups are categorized as young dependency (ages 0–14), old dependency (ages 65 and above), and the labour force or active population groups, which fall between the ages of 15 and 64.

A nation with a greater share of dependents will tend to have a slower or even a negative rate of economic growth, while the other nation, with a higher share of independent workers, will enjoy growth because the number of workers is more than sufficient to increase the economy's productivity (Bloom et al., 2000; Mason, 2001; Bloom & Finjay, 2009). The alternate way to put it is that the demographic dividend occurs when the proportion of the working-age population in a nation increases parallel to that country's growth.

In economic conduct, savings refers to the portion of income that remains unconsumed and set aside for future use. It constitutes money deposited in financial institutions, investment in financial instruments, or any other form of stored value that can be utilized or accessed at a future time. Historically, Nigeria has exhibited low savings rates, which have been impacted by various elements, including economic volatility, elevated inflation rates, and restricted access to financial services (IMF, 2021). A high fertility rate in Nigeria contributes to a youthful population, with a large proportion of dependents. This demographic structure can lead to lower savings rates, as households with more dependency may have higher consumption needs and less disposable income to save. According to Aidi et. al. (2016). Conversely, changes in mortality rate and migration patterns can also impact on the labour force and savings behavior, influence overall economic performance.

The most populous nation in Africa, Nigeria, is grappling with significant challenges relating to its rapidly shifting population structure. Both age dependency and labour force significantly affect the country's economic environment. These population factors are closely linked to savings behavior and economic growth, yet their precise relationships are still the major issues among economists and policy makers; this hinders the creation of effective policies to promote sustainable economic improvement. While the intricacies of the relationship between population growth and economic growth have been extensively studied, there is still considerable disagreement regarding the exact consequences arising from such a relation. This situation has prompted critical thinking to examine the interrelationship among population age composition, savings, and economic growth in Nigeria from 1983 to 2022.

2. LITERATURE REVIEW

Preston et al. (2001) describe population age structure as the distribution of individuals over different ages at a particular time. Continuing in this vein, Kefitz and Caswell (2005) state that population age distribution is "the composition of a population in terms of age groups, a fundamental characteristic that influences growth, dependency ratios, and the trajectory of future demographic change." Hence, age structure is the distribution of individuals across different age groups.

Bloom et al. (2011) say that population age structure is how the different age groups are spread out in the population. This, in turn, affects labour supply, consumption, and saving behavior, all of which have different effects on economic growth. High fertility rates suggest a young population, while low fertility rates combined with high life expectancy lead to an aging population. Migration, influenced by the age characteristics of migrants, plays a significant role in determining age structure. A young population significantly strains resources like healthcare and education due to the reliance burden imposed by age distribution.

Savings are that portion of income that is not consumed and rather kept aside in the form of money assets such as money kept in banking companies, bonds, or other types of investment instruments for future purposes. Keynes (1936) defined savings as simply the portion of disposable income that isn't used for consumption. Savings refers to the leftover money after taxes, set aside for future use instead of consumption. Additionally, savings is "the portion of income that is retained rather than spent on consumption, serving as a critical source of funds for investment and long-term economic growth," according to Robert & Sala-i-Martin (2004). This concept influences the scale of investments, economic growth trajectories, and fiscal policymaking, making it relevant to macroeconomic analysis. Savings also play a very significant part in individual financial welfare and overall economic growth. Saving some part of income rather than consuming it currently, corporations and households accumulate a financial cushion that can be utilized for future expenditure, unexpected emergencies, and investment.

RELATIONSHIP AMONG POPULATION DYNAMICS, SAVINGS, AND ECONOMIC GROWTH

Economic growth is a dynamic process that is closely related to population dynamics and an economy's saving pattern rather than a singular occurrence. The overall pattern of saving changes along with the population's makeup, which impacts investment and long-term growth. Based on the life-cycle hypothesis proposed by Ando and Modigliani (1963), people would save through their working lives and dissave through retirement. More working-age individuals lead to higher aggregate savings; hence, "the pattern of saving and dissaving over an individual's lifetime is determined by the need to smooth consumption," whereas an aging society is one where a greater proportion of people are past retirement age. This nexus is central to the Solow-Swan growth model.

Mankiw, Romer, and Weil (1992) expanded Solow's method by showing that changes in the savings rate have a large impact on capital accumulation and, thus, production per worker. As they state, “differences in saving patterns between countries can account for a sizeable share of the disparity in their growth rates for a long time.” A falling population of working-age people (due to population aging or lower fertility) tends to lower national savings, which limits investment in physical and human capital— two essential components of growth. Bloom, Canning, and Fink (2011) support these views with the statement that, “Population aging provides a contractionary shock to macroeconomic activity by lowering the fraction of people of working age, which ultimately decreases total saving and investment."

Empirical data demonstrates that while nations with an aging population run the risk of experiencing a demographic drag that impedes economic growth, those with a younger demographic profile typically enjoy a demographic dividend, a time of higher savings and strong growth. The relationship between population dynamics, savings, and economic growth is cyclical. An aging population tends to result in lower savings, which restrict capital accumulation and slow down the pace of growth; conversely, a favorable age structure promotes investment and saving, which stimulate growth. To sustain growth, states need to either reduce the adverse effects associated with an aging population or exploit productivity increases.

The relationship between population dynamics and economic growth has been extensively studied, with different models addressing variations across times and economic contexts. Villaverde (2001) analyzed England’s demographic transition, demonstrating that capital-specific technological advancements played a major role in decoupling income and population growth. A decline in capital costs explained a significant portion of both fertility decline and per capita income growth, while reductions in mortality alone were insufficient to account for these trends.

Becker (1960) and Brezis (2011) examined how traditional population models often reflect developed-country family structures. Brezis adapted Becker’s framework to account for intergenerational resource flows in poorer nations, where child labour and reverse financial support from children to parents influence fertility and economic growth. The study found that the relationship between fertility and economic growth varies significantly between rich and poor nations.

Dhanya (2015) applied the Harrod-Domar growth model to Botswana, finding a strong correlation between savings and economic growth. Wako's study in Ethiopia revealed a negative correlation between population growth and income per capita, while labour force expansion positively influenced income levels. Age structure also plays a key role, as Brunow and Hirte (2006) found that regions with a larger workforce under 45 experienced stronger economic growth, whereas older populations benefited from accumulated experience. Similarly, Bloom et al. (2010) observed that a higher proportion of working-age individuals positively correlated with GDP growth in OECD countries.

However, aging populations pose economic challenges. Maestas et al. (2016) found that a 10% increase in the population aged 60 and above led to a 5.5% decline in GDP per capita growth. Lee, Mason, and Cotlear (2013) showed that aging reduces national savings rates, while Horioka & Terada (2012) observed declining household savings in Japan due to rising dependency ratios. Goodhart & Pradhan (2020) and Cooley & Henriksen (2018) linked aging to lower capital accumulation, reduced productivity, and constrained investment.

Researchers have suggested various policy measures to mitigate these effects. Börsch-Supan (2013) proposed pension reforms to encourage extended workforce participation, while Scandinavian countries have promoted labour market policies that facilitate older individuals' re-entry into the workforce (Lindh & Malmberg, 2007). Razin and Sadka (2019) highlighted the role of controlled immigration policies in maintaining labour supply and sustaining economic growth. Ultimately, demographic shifts necessitate strategic policy interventions to balance labour force participation, savings, and economic stability in aging economies.

The literature on population growth, savings, and economic development in developing countries provides significant insights into their interactions and implications for policy formulation. Klasen and Lawson (2007) analyzed Uganda's population dynamics, revealing that rapid population growth poses a threat to per capita economic development. They identified structural poverty as a major impediment to economic progress. Similarly, Rutger and Jeroen (2011) investigated age distribution's impact on economic expansion in emerging nations, finding that labour force growth positively affects GDP growth. Their findings emphasized the need for an investment-driven employment generation.

Dao (2012) examined population and economic growth relationships across 45 African economies, finding a negative linear relationship, suggesting that high fertility rates hinder economic growth while an aging population may enhance per capita GDP growth. Kotani and Kotani (2012) explored net migration's impact on Indonesia's economic growth and concluded that population increase negatively affects economic growth, while net migration is a crucial determinant of economic outcomes.

Akintunde et al. (2013) examined population dynamics and economic growth in Sub-Saharan Africa (1975–2005) using pooled OLS and dynamic panel methods. They found that high fertility rates impede economic development, whereas life expectancy positively correlates with economic growth. Anoruo and

Ahmad (2011) applied the Granger causality test across several African nations (2010–2017), revealing a long-term relationship between savings and economic growth, except in Nigeria. Their study suggested that economic growth influences savings accumulation.

Hamza (2015) reported a negative correlation between demographic variables and economic growth in developing economies. In the same way, Odhiambo (2018) looked at how savings affect growth in Kenya and found that the relationship is two-way, which is different from most previous studies that only found one direction. Verma and Wilson (2015) studied savings, investment, and foreign inflows in India (1950–2011), concluding that while these factors significantly impact long-term GDP, their short-term effects are minimal.

Nigeria-specific studies reinforce the broader findings. Onwuka (2006) found a negative relationship between population and economic growth from 1980–2003, while Onwuka and Adewole (2012) observed a positive correlation from 1981–2007, suggesting context-specific variations. Bloom et al. (2010) emphasized the potential of Nigeria's demographic dividend in boosting economic growth if labour productivity, health, and education investments are prioritized.

Nwakeze and Omoju (2011) highlighted that population growth negatively impacts Nigeria's savings; they advocated policies to enhance income and manage population growth for sustainable economic development. Studies by Odusina (2011) and Nwosu et al. (2014) found a long-term relationship between population growth and economic expansion. However, Aidi et al. (2016) reported no causality between the two variables. Osundina and Osundina (2015) examined capital accumulation and savings in Nigeria, finding a strong positive relationship between GDP and savings. Okwori et al. (2016) analyzed Nigeria's economic recovery post-global financial crisis, estimating a multiplier effect of 0.68, reinforcing the role of government spending in economic growth.

Temidayo and Taiwo (2011) recommended policies linking savings and investment for sustainable growth. Soyibo and Adekanye's financial liberalization study suggested weak support for the McKinnon-Shaw model in Nigeria. Okere and Ngbudu (2015) demonstrated a positive correlation between macroeconomic variables and domestic savings, advocating monetary and fiscal coordination.

Job and Eugene (2019) examined savings, remittances, and economic growth in Nigeria (1980–2017), finding that economic growth influences savings. Obi and Adedoyin (2020) emphasized human capital investments for economic expansion. Eze (2018) identified juvenile dependency ratios as a constraint on per capita income growth. Adedoyin (2021) employed multiple econometric techniques to confirm a unidirectional causality from population growth to economic growth in Nigeria. These findings align with broader research, highlighting the complex interplay between demographic trends, savings behavior, and economic development in Nigeria and other developing economies.

3. METHODOLOGY

3.1. THEORETICAL FRAMEWORK

This study utilized the neoclassical growth model, which has also been highly applauded for the holistic and detailed approach to analysis the impact of population and income on growth within the economy, as also highlighted by Akintunde et al. (2013) and explained in detail by Aidi et al. (2016), though with some differences. Neoclassical theorists posit that growth in population is an indication of better technology and prosperity within the economy. According to the neoclassical model of growth, productivity or growth in output in general can be stimulated by increased savings or reduces in the population growth rate.

The conventional neoclassical growth theory, aggregate production function is stated as follows:

$$Y = Af\ (L, K) \tag{3.1}$$

Where:
Y represents output or gross domestic product (GDP), L denotes labour, K refers to capital stock, and A stands for the productivity factor (i.e., the exogenously determined level of technology).

3.2. MODEL SPECIFICATION

The study engaged an augmented neoclassical growth model i.e. equation, incorporating vectors of variables that influence population dynamics and savings, as well as other variables affecting economic growth. These include population age composition (A), savings (S), and control variables (Z).

From the equation 1 above, we have.

$$RGPD = f(A, S\ Z) \tag{3.2}$$

A, S and Z are thus defined as equation 3, 4 and 5.

$$A\ = f(YDR,\ LAB\ ,\ ODR) \tag{3.3}$$

$$S = f(SAV) \tag{3.4}$$

$$Z = f(INF, SSE) \tag{3.5}$$

The interrelationship between population age structure i.e. (LAB, ODR, and YDR), savings and economic growth is represented in a VAR econometric form as below.

$$\begin{pmatrix} \mathrm{GDP}_t \\ \mathrm{LAB}_t \\ \mathrm{ODR}_t \\ \mathrm{YDR}_t \\ \mathrm{SAV}_t \\ \mathrm{INF}_t \\ \mathrm{SSE}_t \end{pmatrix} = \beta 1 \begin{pmatrix} \mathrm{GDP}_{t-1} \\ \mathrm{LAB}_{t-1} \\ \mathrm{ODR}_{t-1} \\ \mathrm{YDR}_{t-1} \\ \mathrm{SAV}_{t-1} \\ \mathrm{INF}_{t-1} \\ \mathrm{SSE}_{t-1} \end{pmatrix} + \beta 2 \begin{pmatrix} \mathrm{GDP}_{t-2} \\ \mathrm{LAB}_{t-2} \\ \mathrm{ODR}_{t-2} \\ \mathrm{YDR}_{t-2} \\ \mathrm{SAV}_{t-2} \\ \mathrm{INF}_{t-2} \\ \mathrm{SSE}_{t-2} \end{pmatrix} + \beta 3 \begin{pmatrix} \mathrm{GDP}_{t-3} \\ \mathrm{LAB}_{t-3} \\ \mathrm{ODR}_{t-3} \\ \mathrm{YDR}_{t-3} \\ \mathrm{SAV}_{t-3} \\ \mathrm{INF}_{t-3} \\ \mathrm{SSE}_{t-3} \end{pmatrix} + \varepsilon t \tag{3.6}$$

Where: GDP is Gross Domestic Product (proxy for economic growth), YDR is Young dependency rate (age 0 – 14), LAB is Labour force (age 15 - 64), ODR is old dependency rate (age 65 and above), SAV is Savings rate, INF is the Rate of Inflation , SSE is the Secondary School Enrolment (proxy for technology), β_0 is Constant $\beta_1 - \beta_5$ is the Regression coefficient and ε is the Error term.

Table 1. *Definition, measurement and sources of variables*

VARIABLE	DESCRIPTION	SOURCES
GDP	Gross Domestic Product.	WDI
YDR	Young Dependency Rate (% of working age population).	WDI
ODR	Old dependency Rate (% of working age population).	WDI
LAB	Labour Force (% of total population).	WDI
SAVINGS	Savings (% of GDP).	WDI
SSE	Secondary School Enrolment (% of gross).	WDI
INF	Inflation (consumer prices annual %).	WDI

Source: Authors Compilation, 2025

4. RESULT AND DISCUSSIONS

4.1. UNIT ROOT TEST

Examining the time series features of any macroeconomic variable involved is crucial for time series analysis to yield conclusions that may be regarded as accurate. This study used the Phillips-Perron (PP) and Augmented Dickey-Fuller (ADF) unit root tests to establish the order of integration for the macroeconomic variables that were studied. ADF and PP test results show that GDP, YDR, LAB, and SSE are all stationary at I (1). ODR, SAV, and INF, however, are stationary at level I (0). In this instance, the variables exhibit both I (0) and I (1) characteristics, suggesting that they are integrated with varying ordering based on the results. For this study, the researcher used the ARDL Bounds testing strategy, which is the best method for looking at the long-term relationships between these variables.

Table 2: *Unit Root Test*

	AUGMENTED DICKEY FULLER (ADF)				PHILLIPS PERRON (PP)			
Variable	**T-Statistics**	**Critical Value**	**P-Value**	**Order**	**T-Statistics**	**Critical Value**	**P-Value**	Order
GDP	- 4.413	-3.616	0.001*	I (1)	- 4.492	- 3.616	0.009*	I (1)
YDR	- 3.165	- 2.954	0.032**	I (1)	- 1.971	- 1.950	0.048**	I (1)
LAB	-3.983	- 3.553	0.019**	I (1)	-1.983	-1.950	0.047**	I (1)
ODR	-5.456	-4.297	0.000*	I (0)	-2.846	-2.626	0.006*	I (0)
SAV	-4.527	-4.212	0.004*	I (0)	-4.227	-4.212	0.004*	I (0)
INF	-4.094	-3.533	0.014**	I (0)	-2.976	-2.939	0.046**	I (0)
SSE	-8.717	-3.616	0.000*	I (1)	-8.717	-2.941	0.000*	I (1)

Where *, **, ***, indicates 1%, 5% and 10% significant level respectively

Source: Authors Compilation, 2025

4.2. LAG ORDER SELECTION CRITERIA

The lag order is calculated using the Final Prediction Error (FPE), which assesses the accuracy of the model's predictions, in conjunction with metrics such as the Hannan-Quinn Information Criterion (HQ), Akaike Information Criterion (AIC), and Schwarz Information Criterion (SC), the proof shown below in Table 4.9. Despite the study, the maximum latency of three was used.

Table 3: *VAR Lag Order Selection Criteria*

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-198.291	NA	0.000	11.097	11.402	11.204
1	80.489	437.006	6.59e-10	-1.324	1.114	-0.464
2	255.776	208.460	9.62e-13	-8.1501	-3.579	-6.538
3	380.281	100.950*	4.06e-14*	-12.231*	-5.526*	-9.868*

Source: Authors Compilation, 2025

4.3. IMPULSE RESPONSE FUNCTIONS ANALYSIS

4.3.1. RESPONSE OF GDP TO ODR, YDR, SAVINGS AND LABOUR FORCE

The response of GDP (Gross Domestic Product) over 10 periods to key economic indicators, namely ODR (old dependency rate), YDR (young dependency rate), SAV (Savings Rate), and LAB (labour Force).

The results show GDP's sensitivity to the respective economic variables across 10 periods. Positive coefficients indicate a stimulating effect on GDP, while negative coefficients suggest a detrimental effect. Over the 10 periods, ODR and YDR generally had positive effects on GDP, with increasing contributions in later periods, indicating strong relationships between output growth, yield rates, and GDP. SAV had a minimal but consistent positive effect. On the other hand, LAB (labour force) consistently had a negative impact, worsening over time and significantly dragging down GDP, especially in the later periods.

4.3.2. RESPONSE OF OLD DEPENDENCY RATE (ODR) TO OTHER VARIABLES

In period one, ODR increased by 0.008, while GDP and other indicators had no significant movement. This suggests that the old dependency rate increased independently of the other variables. In the second period, ODR grew to 0.013, with GDP contributing positively (0.003). YDR (0.001), SAV (0.001), and LAB (0.001) all contributed positively, suggesting that improving economic conditions, savings, and labour helped increase the ODR. Also in period five, ODR declined to 0.007, alongside a larger reduction in GDP (-0.004). Despite YDR and SAV being positive, the negative impact on GDP and labour force dragged down the ODR. Furthermore, ODR increased again to 0.008, indicating some recovery. GDP and LAB continued their negative trends, but improvements in YDR (0.006) and SAV (0.003) helped stabilize ODR in period six. Also, Period seven ODR continued to rise to 0.009, even

as GDP remained negative (-0.004), while YDR (0.005) and SAV (0.003) helped support this growth, while LAB had a minimal positive contribution. Period eight indicates that ODR decreased slightly to 0.008, with GDP (-0.004) continuing to decline. YDR and SAV remained stable, while LAB had a small positive effect (0.002), slightly mitigating the negative overall impact. In Period nine, ODR further dropped to 0.006, with GDP staying negative (-0.004). YDR (0.003) and LAB (0.003) contributed positively, but the negative GDP held down further growth in ODR.

4.3.3. RESPONSE OF YOUNG DEPENDENCY RATE (YDR) TO OTHER VARIABLES

Period 1 shows that YDR starts at 0.036, with no initial contribution from SAV or LAB, while both GDP and ODR have positive impacts, with ODR showing a more significant effect (0.023), indicating that an increasing old dependency rate correlates with a rise in young dependency. In second period, YDR increases to 0.081, driven by a larger rise in ODR (0.053), also, GDP decreases further (-0.007), suggesting that economic output is negatively impacted as the young dependency rate increases, while savings has a small positive contribution (0.010), and labour force declines slightly (-0.014), implying that as the young dependency rate grows, labour force participation decreases. In period three, YDR increases further to 0.129, with a continued rise in ODR (0.102) and GDP declines more sharply (-0.011), indicating the growing young dependency rate puts pressure on economic output while SAV contributes positively (0.026), also LAB drops further (-0.038), showing a trend of declining labour force participation as the dependency ratio increases till period six.

More also, in period seven, YDR reaches 0.288702, and ODR climbs to 0.289, showing a parallel rise in both young and old dependency. GDP shows further decline (-0.016), while LAB continues to drop significantly up to -0.172, but savings contribute positively (0.067), helping to maintain economic balance as dependency rates increase. Period eight shows that YDR rises to 0.322299, with ODR increasing to 0.330, GDP drops further (-0.023), and LAB declines steeply (-0.222), indicating worsening labour market conditions, meanwhile savings remain stable (0.068), continuing to support the economy despite rising dependency ratios. Period nine indicates that YDR reaches 0.355, with ODR climbing to 0.376.GDP declines to -0.028, and LAB falls significantly (-0.278), reflecting the growing pressure on the economy as the dependency rates increase, savings stays relatively stable (0.069), mitigating some of the negative effects of rising dependency. Finally, in the last period, YDR reaches its peak at 0.387, while ODR continues rising to 0.422, GDP drops to -0.032, and LAB experiences a sharp decline (0.339) and savings continue to make a positive contribution (0.068), but it is insufficient to counteract the growing dependency burden on the economy.

4.3.4. RESPONSE OF LABOUR FORCE (LAB) TO OTHER VARIABLES

Through a ten-period analysis, the labour force's (LAB) response in the figure below offers important insights into the connection between labor force participation and macroeconomic variables including GDP, the Old Dependency Rate (ODR), the Young Dependency Rate (YDR), and savings (SAV).

In the first period, the labour force shows a minimal positive response (0.0002) while GDP, ODR, YDR, and SAV are all near-zero. This suggests that in the initial period, the labour force response is almost neutral, reflecting early-stage dynamics with limited external influence. Second period, the labour force response increases to 0.004, coinciding with slight decreases in ODR (-0.019) and YDR (-0.023), indicating a marginal improvement in labour force participation as dependency rates decline. However, savings fall sharply (-0.003), which could be attributed to reduced income from an aging or dependent population. In the third period, the labour force grew more significantly (0.011), even though ODR and YDR continue to decline. The rise in labour force participation may be driven by stronger GDP growth (0.003) in this period, which can stimulate job creation and employment. Starting from the fourth period up to the seventh period, the labour force increases significantly up to 0.052, reflecting robust growth as GDP continues to increase. The decrease in dependency rates (ODR and YDR) could be enabling more efficient utilization of human resources in productive sectors, as the declining dependency ratios free up more workforce capacity. Also in period eight, the labour force response reaches 0.067, even as YDR and ODR remain negative. This sustained growth suggests that external factors, such as investments in skill development and education, may be driving labour force improvements despite demographic pressures.

The labour force response continues to strengthen in period nine, reaching 0.083, reflecting a growing workforce. Although dependency ratios are worsening (YDR: -0.105, ODR: -0.113), the labour force remains resilient, possibly due to reforms or demographic shifts, such as delayed retirement or increased female labour force participation. In the last period, the labour force peaks at 0.100, showing strong and sustained growth despite the persistent negative effects of ODR and YDR. This might be indicative of effective long-term strategies to mitigate the economic impacts of an aging population, such as incentivizing longer workforce engagement or increasing labour productivity.

4.3.5. RESPONSE OF SAVINGS (SAV) TO OTHER VARIABLES

Figure 1 depicts the response of savings (SAV) to changes in GDP, Old Dependency Rate (ODR), Young Dependency Rate (YDR), and the labour force (LAB) over a ten-period analysis as; thus, The first period, Savings (SAV) sharply increases by 5.242 units despite a large negative GDP response of -1.696. This suggests that the savings rate was high, potentially indicating precautionary saving behavior, while Old dependency rate (ODR) and young dependency rate (YDR) show minimal changes in this period. Furthermore, in the second period, the response of savings declines sharply to 0.486, showing a decrease in savings as GDP and ODR

recover slightly and YDR experiences a strong negative response (-1.849), which may explain the fall in savings, as households with more dependents tend to save less.

Also, the third period indicates that savings turn negative (-0.378), corresponding to significant negative changes in YDR (-1.840), while GDP and ODR experience positive changes. This period shows that as YDR continues to negatively affect savings, labour force contribution to GDP rises significantly (1.960). Savings worsened in period 4, reaching -1.328 despite the improving GDP response. The declines in both YDR (-2.18) and ODR (-1.799) lead to the negative impact of high dependency on the savings rate. In period five, savings experiences some improvement, although still negative (-0.351), as YDR's negative effect moderates compared to the previous period. And the labour force continues to show a positive impact, potentially contributing to the reduced strain on savings.

Moreover, savings slightly improve, becoming positive (0.025) as YDR's negative response intensifies (-2.072) in period six, as the old dependency rate falls significantly (-2.479), which likely offsets some potential for increased savings. In period seven, savings remain positive (0.206), coinciding with the continued positive response of the labour force (3.080). However, the increase in YDR and ODR continues to suppress significant savings growth. In period eight, savings turn negative again (-0.128) as the young dependency rate peaks at -3.783 and ODR also increases significantly. The pressure on savings from rising dependency is evident in this period. Moreover, Savings decline further to -0.390, as YDR and ODR reach their highest negative values (-4.698 and -4.897, respectively) in period nine. The labour force's positive response continues to counterbalance some of these effects, but savings remain under pressure. Finally, the response to savings in the tenth period reaches its lowest point (-0.563) as dependency rates reach their peak values (-6.166 for ODR and -5.763 for YDR). Despite the continued positive impact of the labour force (6.430), the high dependency rates heavily strain household savings capacity.

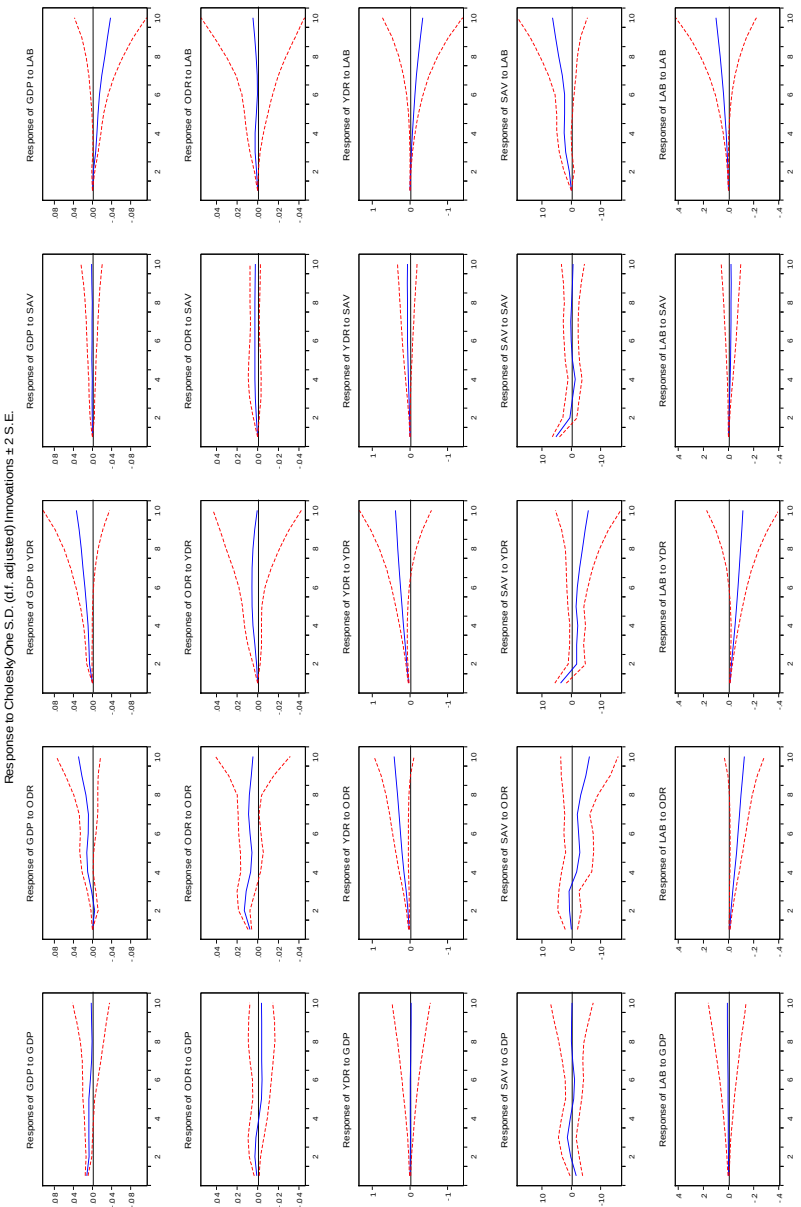

Figure 1: *Impulse Response Functions Analysis*

Source: Authors Compilation, 2025

4.4. DIAGNOSTIC TESTS.

4.4.1. BREUSCH – GODFREY SERIAL CORRELATION LM TEST RESULTS

The Breusch-Godfrey Serial Correlation LM Test is commonly used to assess whether autocorrelation is present in the residuals of a regression model. For this analysis, a p-value of 0.095 and an F-statistic of 5.607 are found. The null hypothesis that there is no serial connection cannot be refuted because the p-value is higher than the typical significance level of 0.05. Consequently, there is no discernible autocorrelation in the model. Consequently, the regression results remain unchanged, ensuring the validity and reliability of the analysis's findings.

4.4.2. HETEROSKEDATICITY TEST: BREUSCH – PAGAN – GODFREY

To identify heteroskedasticity which happens when the variance of the errors in a regression model is not constant the Breusch-Pagan-Godfrey Test was also used. Table 4.16 below shows the results, which show that the p-value is 0.288 and the F-statistic is 1.395. The null hypothesis of homoskedasticity cannot be rejected since the p-value above the 0.05 significance level. The study concluded that there is no substantial evidence of heteroskedasticity based on F-statistic.

4.4.3. NORMALITY TEST

This test is a statistical procedure used to determine whether a data set or the residuals of a model distributed anomaly. The standard distribution is a bell-shaped curve that is symmetrical about the mean, with most of the observations clustered around the center. It is a key assumption in many statistical analyses, especially in regression models, time series models like ARDL, and hypothesis testing. Based on the figure below, the normality test results indicate that the residuals are close to normal distribution, as evidenced by the p-value from the Jarque-Bera test and the near-zero mean. Though there is a slight skew and moderate kurtosis, these are not significant enough to raise concerns. The model's residuals meet the normality assumption, which strengthens the reliability of the ARDL model's estimates and statistical inferences.

Table 4. *Diagnostic tests*

Test	**Null Hypothesis**	**Value**	***P*-Value**
Jaque-Bera	Residuals are normally distributed	3.3832	0.1842
Breusch-Godfrey LM	Absence of serial correlation	5.607	0.095
Breusch–Pagan-Godfrey	Homoscedasticity	1.395	0.288
Ramsey RESET	Model is correctly specified	1.0175	0.3556

Source: Authors' Compilation, 2025

4.4.4. STABILITY TEST RESULT (CUSUM TEST AND CUSUM OF SQUARE TEST)

The model's robustness and the lack of structural breaks or significant changes in the interactions among variables are demonstrated by the CUSUM test results, which show that the estimated coefficients in the model stay constant across the examined time. The stability of the model's variance was further evaluated using the CUSUM of Squares test. According to the results, there is no indication of any notable structural changes, and the variance is stable at the 5% significance level. These outcomes provide more proof of the model's robustness and dependability.

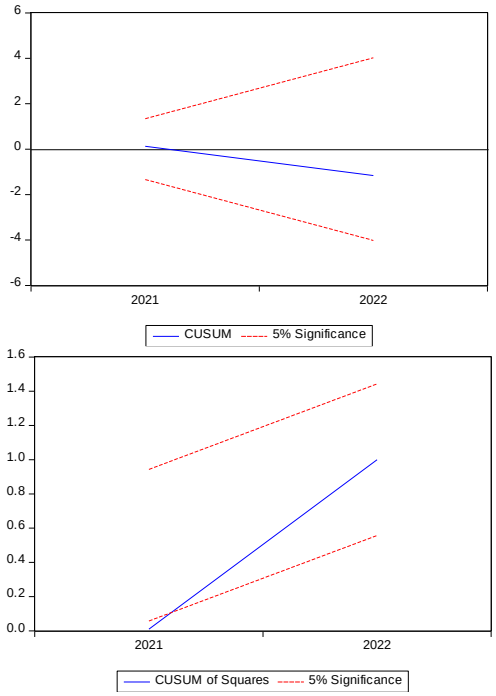

***Figure 2**. CUSUM Test AND CUSUM of Square Test*

5. CONCLUSION AND RECOMMENDATIONS

This study utilized the VAR econometrics model to investigate the interrelationship among population age composition, savings patterns, and economic growth in Nigeria from 1983 to 2022. Economic growth was proxy with GDP While population age composition was grouped into dependency (young dependency and old dependency) and active labour force. The study concluded that youthful dependency constitutes more than 80% of the labour force, while the labour force increases but remains underutilized. This is consistent with the work of Bloom et al. (2010), who identified the potential for Nigeria to harness its demographic dividend if the youthful population is productively engaged. Results also concluded both dependency rate decreases household savings in the short run as resources are

diverted to immediate consumption. The study corroborates with the finds of Aidi et al. (2016), who noted that high dependency reduces disposable income and savings.

Based on the findings, the study therefore recommends that the government should take advantage of the growing number of people of working age by funding programs for job creation, education, and vocational training. This will help integrate the labour force effectively into the economy and maximize productivity. Also, they should develop integrated policies that link population management strategies with economic development goals to ensure sustainable growth. Furthermore, government should expand access to financial services, particularly in undeveloped areas, encourage households to save and invest in productive activities and introduce fiscal policies and incentives, such as tax benefits on savings and investments, to motivate higher capital accumulation. Furthermore, maintain a stable macroeconomic environment by addressing inflation, which negatively impacts savings and investment capacity.

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