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DO DEPENDENCY RATIOS MATTER FOR SAVINGS? EMPIRICAL EVIDENCE FROM NIGERIA

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Abstract

Nigeria, like many developing countries, is experiencing significant demographic shifts marked by a youthful population and a gradually increasing aged segment. Understanding how the age composition of the population affects national savings is critical, as savings mobilization plays a key role in investment and economic growth. Given the country's rapid population growth, rising dependency ratios, and evolving labour market dynamics, this study examines the impact of population age composition on savings in Nigeria from 1983 to 2022 using the Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration. The study found that LAB, ODR, and YDR have a significant positive relationship with savings in the short run, whereas they exhibit a negative relationship in the long run. However, INF has a negative effect on savings both in the short run and long run. The study concluded that population age composition negatively affects savings in Nigeria. This study, therefore, recommends that the government expand access to financial services and maintain a stable macroeconomic environment by addressing inflation, which negatively impacts savings and investment capacity.

Keywords: Dependency Ratio, Nigeria, Savings Rate, Nigeria, ARDL.

1. Introduction

The relationship between population age composition and saving behaviour is a cornerstone of understanding savings rate, particularly in developing economies like Nigeria. Population age composition refers to the distribution of individuals across various age groups in a population, which in turn influences economic outcomes, including savings rates and investment behaviours. The age structure of a population has profound implications on a country's ability to accumulate savings and mobilize capital for investment in key sectors such as infrastructure, education, and healthcare. As such, demographic trends that shift the balance between working-age individuals and dependents (children and elderly) can either foster or hinder savings rates, depending on the prevailing age structure. The concept of population age composition, or demographic structure, includes three key categories: the working-age population (typically defined as individuals between 15 and 64 years of age), children (under 15 years), and the elderly (aged 65 and above). These groups have varying impacts on the economy, particularly in terms of savings and consumption patterns. The working-age population is the primary driver of savings, as they generate income and engage in productive activities. In contrast, children and the elderly represent non-productive, dependent segments of the population that consume resources without contributing directly to savings. A high dependency ratio, reflecting the proportion of dependents to the working-age population, can lead to lower national savings rates. Studies have consistently shown that a high dependency ratio reduces the ability of a country to save, as more income is directed toward consumption rather than investment. Schmidt-Hebbel *et al.* (1992) argue that higher dependency ratios lead to lower savings rates, as more resources are consumed by dependents rather than being saved.

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A country's demographic transition, whereby the proportion of the working-age population increases relative to dependents, has been described as a 'demographic dividend', which can lead to higher savings and investment rates, fostering economic growth (Bloom et al., 2013). This demographic dividend can be a significant driver of growth, as increased savings enable greater capital accumulation, which can then be channeled into investments that further boost economic productivity. However, the benefits of such a demographic dividend are not guaranteed, and they depend on the ability of the economy to translate higher savings into productive investments. In the context of Nigeria, the situation is complex. Nigeria has a predominantly youthful population, with a high fertility rate that results in a large proportion of children and young dependents. This age structure poses significant challenges for savings mobilization because households are often unable to save due to the high costs associated with raising children. According to the World Bank (2017), high fertility rates and large family sizes in developing countries, including Nigeria, impede household savings, as most resources are allocated to consumption needs rather than saving for future investment. Additionally, the relatively small proportion of elderly individuals in Nigeria's population has historically meant that resources for savings were more focused on supporting children. However, the ageing population is projected to increase over time due to improved healthcare and longevity, presenting new challenges to national savings as more individuals enter retirement and begin drawing down on savings (United Nations, 2019). Beyond the demographic profile, other economic factors, such as income inequality, unemployment, and financial inclusion, also influence saving behavior. Nigeria's low national savings rates are a result of both limited access to formal financial services and persistently high-income inequality. Nigeria's low domestic savings rate is driven by factors such as poverty, limited access to financial services, and high unemployment rates, all of which restrict the ability of households to save (Akpan & Ogbuagu, 2014). Given these complexities, the need for comprehensive research that examines the interplay between population age composition and saving behaviour is more urgent than ever. By understanding how changes in population demographics affect savings rates, policymakers can devise strategies to enhance savings mobilisation, improve financial inclusion, and create a more resilient economic environment that supports sustainable development. This study seeks to explore the relationship between population age composition and saving behaviour in Nigeria from 1983 to 2022. Specifically, it will analyse how changes in the age structure of the Nigerian population impact savings rates, identify the main challenges to savings mobilisation in the context of Nigeria's demographic profile, and propose policy recommendations to enhance national savings.

2. Literature Review

Population age structure refers to the distribution of individuals across different age groups at a specific point. Preston et al. (2001) describe it as the allocation of people by age, whereas Kefitz and Caswell (2005) emphasise its importance in shaping economic growth, dependency ratios, and future demographic changes. According to Bloom et al. (2011), the age composition of a population influences labour supply, consumption, and savings behaviour, all of which play critical roles in economic development. This distribution is often visualised through age pyramids and shaped by fertility, mortality, and migration patterns. High fertility typically leads to a youthful population, while low fertility combined with increased life expectancy results in an ageing population. Migration also plays a vital role, as the demographic characteristics of migrants can significantly alter a country's age structure.

A young population places pressure on public resources such as healthcare and education due to a high dependency burden measured by the dependency ratio (the ratio of dependents to the working-age population). While a high dependency ratio can limit economic productivity, a larger share of working-age individuals can offer a "demographic dividend," potentially boosting economic growth if paired with investments in education, employment, and skill development. However, an ageing population increases the demand for social welfare systems, healthcare, and pensions. Without counterbalancing factors like increased productivity or migration, countries with rapidly ageing populations may experience labour shortages and slower economic growth, which makes it challenging to sustain economic vitality and welfare programs.

Theoretical Review

Understanding the link between population age composition and savings requires insight from several theoretical frameworks, each providing its own unique perspective on how demographic structures influence economic behavior, particularly savings.

Marxist and Classical Views on Population Growth

Karl Marx's perspective on population is embedded within his broader critique of capitalism. Rather than proposing a formal theory of population, Marx emphasized the role of the 'industrial reserve army', a surplus labour force that serves capitalist interests by keeping wages low and labor costs minimal (Marx, 1867). This surplus population, often unemployed or underemployed, limits the potential for widespread savings, especially among the working class in capitalist economies. In contrast, the Malthusian Theory takes a negative view of population growth. Malthus believed that while the population increases quickly, resources like food only increase slowly, which leads to poverty and less ability to save because people need to spend more. In countries like Nigeria, where the population is growing fast but the economy isn't, these Malthusian worries are still important. A large number of young people, as Malthus warned, puts a lot of strain on public and family resources, making it harder to save money.

Optimistic Population Theories

Ester Boserup had a different, more positive view, suggesting that population growth can lead to new technologies and better farming methods. In Nigeria, her theory implies that a young population could become a valuable resource if there is investment in education, healthcare, and jobs. This supports the idea that just having a large population isn't a problem; it's how we manage and use that population that really matters. Similarly, the Demographic Transition Theory presents population change as a multi-stage process linked to economic development. As countries transition from high to low birth and death rates, they pass through a stage where the working-age population temporarily outnumbers dependents, a phase known as the demographic dividend (Bloom et al., 2011). Nigeria, still in the early transition phase with high fertility and declining mortality, has yet to fully harness this potential. Realising the dividend depends on effective investments in job creation, skill development, and financial inclusion.

Savings Behaviour Theories

The Life-Cycle Hypothesis (LCH) by Modigliani and Brumberg (1954) provides a key framework for analysing intertemporal savings behaviour. It posits that individuals save during their working years to finance retirement, implying that a country with a larger share

of working-age individuals should exhibit higher aggregate savings. This model is particularly useful in explaining the effects of age structure on savings in Nigeria, where a youthful population and a high dependency burden suppress household savings. However, critics note that LCH assumes rational planning and access to capital markets, conditions that are often absent in developing economies like Nigeria. Without robust financial systems or social safety nets, many Nigerians are unable to save systematically or plan for retirement, leading to deviations from the model's predictions. Complementing LCH, Friedman's Permanent Income Hypothesis (PIH) suggests that consumption is based on long-term expected income rather than current income. In theory, this leads to stable savings behaviour as individuals smooth consumption over time. However, in low-income settings, households tend to align consumption with current, rather than expected, income, thus weakening the PIH's applicability (Deaton, 1992).

Empirical Review

Empirical studies across both developed and developing economies have consistently demonstrated the relationship between population age composition and national saving behaviour. Most findings align with the predictions of the Life-Cycle Hypothesis (LCH) and related demographic-economic models. In developed economies, the relationship between age structure and savings has been well established. For instance, Horioka (1997) found that Japan's high household savings rates during the 1970s and 1980s corresponded with a favourable age structure, characterised by a large working-age population and a low dependency ratio. As Japan's population began to age, the national savings rate declined, providing empirical support for the LCH. Similarly, Attanasio and Rohwedder (2003) analyzed panel data from Italy, Germany, and the UK and confirmed that older populations tend to save less due to retirement and increased healthcare consumption. This reinforces the notion that age-related shifts in population structure affect aggregate savings behavior. However, Kotlikoff and Summers (1981) offered a critical perspective, arguing that the life-cycle effects on savings may be overstated in contexts where public pensions and social security substitute for private savings. They suggested that in developed countries, savings behavior is also influenced by intergenerational transfers and bequest motives, which complicates the direct age-savings link. In Latin America and Southeast Asia, Kelley and Schmidt (2005) found that successful demographic transitions, marked by lower fertility and improved labour market absorption, translated into higher savings and economic gains. In contrast, regions that failed to implement supportive policies did not recognise these benefits. Chakraborty (2004) employed a dynamic general equilibrium model to study India and found that rising youth dependency depressed national savings, especially in the absence of adequate employment opportunities. This mirrors the Nigerian scenario, where high fertility and limited formal employment constrain the potential for a demographic dividend. In developing countries, including Nigeria, the age composition savings nexus has also been explored extensively. Masson et al. (1998), using a cross-country dataset covering over 40 developing economies, found that reductions in youth dependency ratios significantly increased national savings and investment. They highlighted that during demographic transitions, countries tend to experience a temporary rise in savings due to the expansion of the working-age population.

Bakare (2011) observed that Nigeria's persistently high fertility rate and youthful age structure have led to low per capita income and stagnant gross savings. He called for robust

population and employment policies to reverse the trend. Nwachukwu and Egwaikhide (2007) confirmed that the dependency ratio is one of the most influential demographic variables affecting private savings in Nigeria, highlighting its negative effect on household saving capacity. This finding was further supported by Egunjobi (2014), who conducted a micro-level study in Lagos and found that households with a greater number of dependants, especially children, saved significantly less even when income levels were relatively stable. Odusina (2011) and Olabiyi (2014) also emphasised that Nigeria's growing youth population poses a challenge to national savings mobilisation. They argue that without adequate investment in youth employment and productivity, the demographic profile will continue to exert downward pressure on aggregate savings and capital accumulation. Aidi et al. (2016) found that Nigeria's high youth dependency burden significantly lowers household savings, as families with more dependents face greater consumption demands, leaving less disposable income for saving. This aligns with the life-cycle hypothesis, where saving is most prevalent during the working-age period and declines in the presence of a high dependent population. Using econometric modelling, Afolabi and Laseinde (2021) applied the ARDL approach to investigate the long-term effects of demographic variables on savings in Nigeria. Their study confirmed that a growing working-age population positively affects savings, but only when accompanied by productive employment opportunities and access to banking and financial services. The relationship between dependency ratios and savings has received renewed attention in recent years due to rapid demographic transitions, population ageing, and their implications for macroeconomic stability. Guided by the Life-Cycle Hypothesis, recent empirical studies generally conclude that changes in age dependency significantly influence household and national saving behaviour, although the magnitude and direction vary across countries depending on institutional, demographic, and economic conditions. Horioka (2026) investigated the impact of population ageing on household saving in Japan using annual time-series data covering 1955–2019. Employing cointegration techniques, the study found a stable long-run relationship between dependency ratios and household saving rates. Specifically, the dependency ratio exerted a significant negative effect on household savings, implying that increasing population ageing reduces aggregate savings as retirees dissave during old age. The findings strongly supported the Life-Cycle Hypothesis and concluded that continued demographic ageing would further depress Japan's household saving rate. Olanrewaju and Olaniyi (2025) examined the interrelationship among population age composition, savings, and economic growth in Nigeria between 1983 and 2022 using a Vector Autoregression (VAR) model. The study incorporated youth dependency ratio, old-age dependency ratio, labour force participation, savings, and economic growth. The findings revealed that Nigeria's high youth dependency ratio significantly reduced household savings because of increased consumption requirements. Although labour force participation improved over the study period, its contribution to savings remained constrained by underemployment. The authors concluded that demographic dependency negatively affects savings in the short run, thereby limiting capital accumulation and long-term economic growth. In a broader cross-country analysis, Kabrt (2024) examined the implications of population ageing for current account balances and national savings across countries between 1993 and 2021. Using two-way fixed-effects panel estimation, the authors found that the old-age dependency ratio significantly reduced national saving rates, although the magnitude differed across income groups

and regions. The negative relationship was particularly pronounced in developing economies where ageing populations increased pension and healthcare expenditures while reducing the working-age population responsible for savings. Recent theoretical and empirical work has also expanded the understanding of household resource allocation under changing demographic conditions. Kumari and Gavhale (2024) developed an intertemporal household resource allocation model integrating fertility, education, pensions, health, and expected future earnings. Their analysis demonstrated that households with larger dependent populations allocate more resources to current consumption and investment in children, thereby reducing current savings. The study highlighted the importance of demographic composition in explaining long-run saving behaviour. Although not directly estimating dependency ratios, Osifodunrin and Lopes (2026) analysed household saving behaviour among low-income entrepreneurs in Nigeria. Using logistic regression techniques, they reported that financial vulnerability, behavioural characteristics, and limited disposable income significantly constrained savings. Their findings suggest that households with greater financial obligations, including dependent family members, are less likely to accumulate precautionary savings, reinforcing the demographic explanation of saving behaviour. Collectively, these findings confirm that a favourable age structure can enhance national savings but only under conducive economic and institutional conditions. For Nigeria, this illustrates the value of aligning demographic management with economic reforms to fully exploit the potential benefits of a growing working-age population.

3. Methodology and 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 savings (Aidi et al., 2016). These include population age composition (A), savings (S), and control variables (Z).

$$SAV = f(YDR, LAB, ODR, INF) \quad (1)$$

In stochastic form, it gives as:

$$SAV = \beta_0 + \beta_1 YDR + \beta_2 LAB + \beta_3 ODR + \beta_4 INF + \varepsilon \quad (2)$$

The ARDL of model is given as thus;

$$SAV_{it} = \beta_{i0} + \varphi SAV_{it-1} + \beta_1 YDR + \beta_2 LAB_{it-1} + \beta_3 ODR_{it-1} + \beta_4 INF_{it-1} + \sum_{j=1}^{m-1} \alpha_{ij} \triangle SAV + \sum_{j=0}^{n-1} \beta^1{}_{ij} \triangle YDR_{it-j} + \sum_{j=0}^{n-1} \beta^2{}_{ij} \triangle LAB_{it-j} + \sum_{j=0}^{n-1} \beta^3{}_{ij} \triangle ODR_{it-j} + + \sum_{j=0}^{n-1} \beta^4{}_{ij} \triangle INF_{it-j} + \varepsilon_{it} \quad (3)$$

Where: SAV = Savings rate, YDR= Young dependency rate (age 0 – 14), LAB= Labour force (age 15 - 64), ODR = old dependency rate (age 65 and above), INF = Rate of Inflation and ε = Error term. β_0= Constant, $\beta_1 - \beta_5$ = Regression coefficient. Data used in this study was souced from the World Development Indicator (WDI).

Table 1. Definition, measurement and sources of variables

VARIABLE	DESCRIPTION	SOURCE
SAV	Savings (% of GDP).	WDI 2024
YDR	Young Dependency Rate (% of working age population).	WDI 2024
ODR	Old dependency Rate (% of working age population).	WDI 2024
LAB	Labour Force (% of total population).	WDI 2024
INF	Inflation (consumer prices annual %).	WDI 2024

Source: *Authors' Compilation, 2026*

1. Results and discussion

Unit Root Test

The study emphasized the importance of testing for unit roots to ensure the accuracy of time series analysis, using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. Results showed that (YDR, LAB,) were stationary at first difference I(1), while others (ODR, SAV, INF) were stationary at level I(0), justifying the use of the ARDL Bounds testing approach to examine long-run relationships among the 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
SAV	-4.527	-4.212	0.004*	I(0)	-4.227	-4.212	0.004*	I(0)
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)
INF	-4.094	-3.533	0.014**	I(0)	-2.976	-2.939	0.046**	I(0)

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

Source: *Authors' Compilation, 2026*

ARDL Bound Test Cointegration

As is clear from Table 3, the computed F-statistic of 6.269 is greater than the upper bound critical value at 1% level of significance, indicating that the null hypothesis of no co-integration can be rejected at the 1% level of significance, and thus a long-run relationship exists between SAV and other independent variables in the model.

Table 3: ARDL Bound Cointegration Test

F- Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	**Value**	**Significance**	**I(0)**	**I(1)**
F-Statistics	6.269	10%	2.200	3.090
K	4	5%	2.560	3.490
		2.5%	2.880	3.870
		1%	3.290	4.370

Source: *Authors' Compilation, 2026*

ARDL Long Run Estimate

Table 4 shows the findings of the model's long-term estimate, in which savings depend on other factors. The results show that the labour force (LAB), old dependence rate (ODR), and young dependency rate (YDR) are positively and significantly correlated with long-term savings. The findings show that for every 1% increase in the labour force, there is an increase in savings by 1857.28% with inferences drawn at the 5% level of significance.

The study further shows that there will be a 558.17% increase in savings with every 1% increase in the old dependency rate. Similarly, the findings show that long-term savings are 516.44% in the case of a 1% increase in YDR. Although the coefficient of inflation is negative, it is not statistically significant. According to the results, a 1% increase in the inflation rate causes a long-run reduction in savings of 0.006%, an effect that has no obvious impact.

Table 4: ARDL Long Run Estimate

Long Run Estimate: Dependent Variable (SAVINGS)				
Variable	**Coefficient**	**Std. Error**	**T – Statistics**	**Probability value**
LAB	1857.280	553.334	3.357	0.003
ODR	558.173	138.574	4.0279	0.001
YDR	516.445	156.197	3.306	0.003
INF	-0.006	0.096	-0.064	0.949
C	-144452.1	43070.68	-3.354	0.003

Source: *Authors' Compilation, 2026*

ARDL Short Run Estimate

Table 5 presents the findings of the short-run estimation. Because the error correction term is negative, has an absolute value less than one, and is statistically significant at the 5% significant level, it satisfies theoretical expectations. The adjustment speed of 95% indicates that deviations from the long-run equilibrium are corrected at a rate of 95% in the present era. Furthermore, the results show that whereas labour force participation (LAB) is positive and significant at the 5% level in the first lag year, it is both negative and significant in the second lag year. LAB is negatively significant over the present period at the 10% significance level.

These findings suggest that 1% increase in LAB in short run would lead to a reduction in savings by 3760.6%, which is in line with the work of Adegbite and Olayemi (2020). The result indicates that labour do not save from his income, which can be the reflection of inflation that reduces the purchasing power of labour. In addition, old dependency rate (ODR) in present lag period also have negative coefficient of -1.336.237 and 0.037 probability value, which indicates that for every increase in ODR by 1% brings about 1336.24% decrease in savings in Nigeria. This result also supports the work of Adegbite & Olayemi (2020). More also, the co-efficient of YDR in present lag period is – 968.1612 with insignificant probability value of 0.119. This shows that for every increase in 1% of YDR will leads to 968.16% decrease in savings in Nigeria. Also, inflation is negatively impact savings in Nigeria. Result suggests that for every 1% addition to inflation rate will reduces savings with 0.12% in short run. Inflation reduces the purchasing power in economy, the portion that supposed to meet for savings from income of the citizen will defiantly add to purchasing power.

Table 5: ARDL Short-Run Error Correction Estimates

Dependent Variable: SAVINGS				
Variable	**Coefficient**	**Std. Error**	**t-statistic**	**Prob.**
CointEq(-1)*	-0.948	0.139	-6.824	0.000
D(LAB)	-3760.612	2119.867	-1.774	0.091
D(LAB(-1))	10614.89	4162.412	2.550	0.019
D(LAB(-2))	-9043.513	2528.899	-3.576	0.002
D(ODR)	-1336.237	600.997	-2.223	0.037
D(ODR(-1))	3453.260	1177.243	2.933345	0.008
D(ODR(-2))	-2839.475	721.927	-3.933	0.001
D(YDR)	-968.161	596.156	-1.624	0.119
D(YDR(-1))	2811.270	1167.302	2.408	0.025
D(YDR(-2))	-2445.173	707.4767	-3.456188	0.0024
D(INF)	-0.118504	0.055792	-2.124035	0.0457

Source: *Authors' Compilation, 2026*

Diagnostic Tests.

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.

Heteroskedaticity Test: Breusch – Pagan – Godfrey

In order 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 6 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 came to the conclusion that there is no substantial evidence of heteroskedasticity based on the F-statistic.

Normality Test

This test is a statistical procedure used to determine if 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 6. 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, 2026

Conclusion and Recommendations

This study investigated the relationship between population age composition and savings behaviour in Nigeria from 1983 to 2022 using the ARDL estimation technique. Specifically, the study examines how demographic structures particularly young and old dependency rates, alongside labour force dynamics affect savings in Nigeria within the study period. The study concludes that population age composition determines the national savings rates in Nigeria. Based on the findings, this study recommends that the government should raise awareness of family planning and child spacing in order to lower the level of dependency among young people. Also, government expand access to financial services, address inflation rate, encourage households to save and invest in productive activities to motivate higher capital accumulation.

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