

Original Research Article

Does Demographic Structure Matter for Savings in ECOWAS

Abstract

Countries in ECOWAS had recorded low savings rate in the last three decades. Savings rate as a percentage of GDP in Mali and Sierra Leone were negative in the period considered in this study. Previous studies mainly focused on the determinants of savings in ECOWAS with little attention on the role of demographic structure. This paper examined the determinants of savings in ECOWAS and the importance of demographic structure in savings rate. Data on gross savings rate, per capita income, interest rate, inflation and population age structure were collected for six ECOWAS countries namely, Cote d' Ivoire, Ghana, Mali, Niger, Nigeria and Sierra Leone. The data spans from 1981 to 2014. The fixed effect least square dummy variable was used to analyze the data. Per capita income was found to have statistically significant effect on savings rate. However, real interest rate and inflation rate were not statistically significant. Young age dependency rate and working population rate showed negative effect on savings rate. Although the results of the demographic variables were contrary to theory they provided important policy lessons. Economic policies should be directed towards increasing income of the working population age group to increase the saving rate in the region.

Keywords: Demographic factors, Savings, Per Capita Income, Least Square Dummy Variable

JEL Classification: D91, E21, E29, J10

1 Introduction

Savings¹ rate have been generally low across Africa region in the past decades. Regional differences abound in savings rate. For instance, Loayza, Schmidt-Hebal and Serven, (2000) noted that over the past three decades, savings in East Asia have doubled while that of sub-Saharan Africa and the Caribbean had stagnated. The low rate of savings in sub-Saharan Africa, ECOWAS² inclusive, has reduced the level of capital accumulation for investment. This is one of the main factors that have caused slow growth in the region.

Available statistics indicated that gross domestic savings in 2005 was 17.6% of GDP for sub-Saharan Africa, 24% in Latin America, 26% in South Asia while it represented 42.9% in East Asia and Pacific countries World bank (2007). A study conducted by Global Development Horizons (2013) indicated that in less than a generation, savings and investment across the globe will be dominated by the developing countries of the world with clear and distinct domination by Asia and the Middle East. This

¹ Savings generally reflects the residual income used for the acquisition of financial and non financial assets

² Economic Community of West African States

37 same report also projected steady growth investment for sub-Saharan Africa envisaged from the
38 growth from her robust labour force.

39 Although some studies had examined the determinants of savings in ECOWAS, little attention has
40 been given to the effect of demographic structure on national savings. The demographic structure of
41 the population could have a strong implication on the national savings rate. Countries with greater
42 proportion of population between the ages of 15 and 64 (working population) are expected to have
43 higher savings than those with of their populace in the dependency range. Also, higher income
44 countries rate of savings tends to be higher compare to the middle income and low income countries.

45 Economic progress is a reflective of a nation's saving rate. Thus, achieving sustainable development
46 in ECOWAS depends on the level investment which in turn, significant boost in the region's savings
47 rate. A clear understanding of the main factors that determine savings in ECOWAS and the role of
48 demographic structures on savings rate is important for designing effective policies that can
49 accelerate savings rate in the region.

50 The effect of savings in stimulating investment and the promotion of economic growth and
51 development through capital formation and capital accumulation have been recognized over decades
52 (Romer 1986, Lucas 1988, Solow 1956). At the macroeconomic level, savings is an inducement for
53 growth for the attainment of macroeconomic stability at both developing and developed countries.
54 However, at the micro level, it is a crucial factor in breaking down the vicious cycle of poverty which is
55 a major issue in ECOWAS region.

56 Despite importance of savings in promoting growth, countries in ECOWAS have not achieved an
57 accelerated savings rate. Domestic savings and investment rates in the region in the 1990s dropped
58 below the rates recorded in the 1980s, while in the 2000s, the record were lower than in the 1990s,
59 (UNCTAD, 2010). The rationale behind this low rate of savings were found by Elbadawi and Mwega,
60 (2000) to be due to; low income per capita, high young-age dependency ratio, and high dependence
61 on foreign aid. Abu, Karim and Aziz (2015) also identified the role played by corruption in the
62 ECOWAS region which has led to the slow pace of savings in the region.

63 Unrealistic government budget and Inflation which distort stability has also contributed to this slow
64 pace. The gap between savings and investment has widened, making the sub-region even more
65 dependent on external financing for its development. It is in this light, that this paper seeks to
66 determine the trends in savings and investigate the factors responsible for low savings in ECOWAS
67 region with focus on achieving economic prospect for ECOWAS using selected countries from the
68 region. Six ECOWAS countries were selected, namely, Nigeria, Ghana Niger, Sierra Leone, Cote d
69 Ivoire and Mali; based on data availability. The coverage of the study is from 1981 to 2014.

70 The rest of this paper is organized as follows. Section two discusses the trend and development in
71 savings in ECOWAS. Literature review is documented in section three. Further, section 4 presents the

theoretical framework and methodology for the study. In sector four, the data collected for the study are analysed and discussed. This follows by conclusion and policy implication of findings in section 6.

2. Overview of National Savings and Demographic Structure in ECOWAS

2.1 Trends in savings Rate in ECOWAS

Table 2.1 presents gross national savings as percentage of GDP in ECOWAS. West Africa countries had experienced persistent fluctuation in their savings rate since 1980s. Also, considerable variations abound in savings rate of ECOWAS countries during the period under study. On average, between 1981 and 1985, percentage of gross savings to GDP was -3.02% in Mali. This negative savings rate is a reflection of low income in the country. However, in the reference period, Nigeria's savings rate was high (20.84%) relatively to other ECOWAS countries. One of the plausible reasons for the high savings rate in Nigeria was due to the crude oil price boom that occurred in the late 1970s to early 1980s.

Following the Structural Adjustment Programme (SAP) adopted by ECOWAS countries in 1985, savings rate increased in Ghana, Mali, Niger and Sierra Leone. Nevertheless, Cote d'Ivoire gross national savings as a share of GDP decline to 1.15% between 1986 and 1990 (see table 2.1). Between 1991 and 1995, Ghana and Mali witnessed remarkable increase in savings rate. In the reference period, averaged savings rate as a share of GDP in the countries were 13.67% and 11.53%, respectively. Average gross savings rate as a share of GDP in Sierra Leone was at its lowest in the period under study between 1996 and 2000. Ghana's gross savings as a percentage of GDP increased to 14.23%. Also, between 2001 and 2005, Ghana's gross savings as a percentage of GDP was high compare to other counties in the ECOWAS region. During the period, gross savings as a percentage of GDP lagged considerably behind in Sierra Leone and Cote d' Ivoire. Subsequently, remarkable improvements in the savings rate were recorded in Mali, Nigeria and Sierra Leone between 2006 and 2010 (see table 2.1). Mali and Nigeria continue to maintain a relatively high savings rate up till 2014.

Table 2.1: Gross Savings Rate (% of GDP) in Selected ECOWAS Countries

S/N	ECOWAS Countries	GROSS SAVINGS RATE. % OF GDP						
		1981-1985	1986-1990	1991-1995	1996-2000	2001-2005	2006-2010	2011-2014
1	Cote d' Ivoire	9.74	1.15	3.86	10.71	5.96	13.99	15.06
2	Ghana	6.06	9.28	13.67	14.23	20.62	13.55	17.40
3	Mali	-3.02	9.66	11.53	12.80	15.29	20.44	25.37
4	Niger	7.29	7.37	3.92	4.20	8.03	15.64	19.63
5	Nigeria	20.87	19.63	15.98	12.96	10.58	24.19	25.27
6	Sierra Leone	6.41	9.21	1.14	-1.55	2.40	10.57	11.63

Source: Authors compilation from World Bank's World Development Indicator

2.2 Trends in Demographic Structure of ECOWAS Countries

Table 2.2 shows the demographic structure of ECOWAS countries using the population age structure. Accordingly, the population age structure that falls between 0 and 14 as well as 65 above depend on the working population category. The demographic structure of the region tends to follow a similar

trend across member countries. In 1985, Sierra Leone has the highest share of population that falls between 15 and 64.

The dependency ratio of all countries in the region was high. For instance, in Cote d' Ivoire, population between the ages of 0 and 14, ranges from 42.7% to 45.2%. Niger and Nigeria recorded 47.7 and 44.9, respectively. Population within the ages of 14 and 64 for all countries in the region is marginally higher than 50% of the population except Niger with 47% in 2014. Although, these figure showcase availability of labour force in the region, the lack of innovation and presence of high unemployment have detrimental effects on their productivity.

In most of the sampled countries, the proportions of population above 65 are low. These can be attributed to poor living conditions associated with poor sanitation, poor health facilities and care for the aged. All these had resulted to low life expectancy in the region.

Table 2.2: Population Age Structure of Selected ECOWAS Countries

S/N	Countries		1985	1990	1995	2000	2005	2010	2014
1	Cote d'Ivoire	age 65+	2.5	2.7	2.8	2.8	2.8	2.9	3
		age 15-64	52.1	52.5	53.5	53.7	53.1	53.3	54.2
		age 0-14	45.2	44.7	43.7	43.4	44.1	43.6	42.7
2	Ghana	age 65+	2.6	2.7	2.9	3	3.3	3.5	3.4
		age 15-64	52.4	53.4	54.3	55.5	56.4	57.3	57.6
		age 0-14	44.8	43.8	42.7	41.4	40.2	39.1	38.9
3	Mali	age 65+	3.5	3.8	3.6	3.2	2.9	2.7	2.5
		age 15-64	51.2	49.5	49.8	50.2	50.4	50.1	49.9
		age 0-14	45.1	46.6	46.5	46.5	46.6	47	47.5
4	Niger	age 65+	2.1	2.3	2.4	2.4	2.4	2.5	2.5
		age 15-64	50.1	49.9	50.1	49.5	48.4	47.5	47
		age 0-14	47.7	47.6	47.4	47.9	49	49.9	50.4
5	Nigeria	age 65+	2.8	2.8	2.8	2.8	2.7	2.7	2.7
		age 15-64	52.2	52.2	53	53.6	53.6	53.3	53.1
		age 0-14	44.9	44.8	44.1	43.5	43.5	43.9	44
6	Sierra Leone	age 65+	3.2	3	2.7	2.4	2.5	2.5	2.6
		age 15-64	53.4	52.6	52.8	53.2	53.6	53.9	54.6
		age 0-14	43.3	44.2	44.4	44.2	43.8	43.4	42.6

Source: Authors compilation from World Bank's World Development Indicator

3. Review of Related Literature

3.1 Theoretical Literature

There are several theories in economic literature on the effect of savings on economic performance both at micro and macro levels. Most of the theories on this theme were on determinants of savings and the relationships between savings and aggregate output. Notably, theories of consumption form a starting point in the analysis of the relationship between savings and its determinants.

Differences in savings among people can be explained in the life cycle model of savings. According to the life cycle model of savings, people save when they are young to finance their consumption in

retirement. This implies that private savings increase with a higher percentage of working population and falls with a higher percentage of the young and aging population. The basic life-cycle model of savings was modified by Bloom, Canning and Graham (2003) to include longevity. The theoretical model assumes that agents maximize their utility over their lifetimes, choosing how much to work and how much to consume and how changing in life expectancy influence their decisions. A major shortcoming of the model is that it assumes that longevity is fixed exogenously, ignoring the fact that it depends on consumption and access to healthcare.

In an enquiry on the dynamics of savings, Ashlok (1989) modified the life cycle-overlapping generation model of agents who live for two-periods, working during the first and retirement in the second. The model is based on the assumption of constant returns to scale, Cobb-Douglas utility function, population growth and no bequest. The general argument is that savings depend on income and changes in income over time. Similarly, Hippolyte (2007) developed an overlapping generation model based on the neoclassical assumptions to how demographic structure changes induced by an exogenous shift in birth rate affect the level of capital accumulation. This model emphasized the effect on age dependant in capital accumulation.

Braun, Ikeda and Jones (2009) modelled demographic structure and Total Factor Productivity (TFP) in a discrete time household utility function. The production function of the firm follows the Cobb-Douglas process. Each factor earns its real rate of return. The households have an endogenous supply decision. These assumptions allow household to smooth his/her consumption and hence affect the households' savings decision. This model is an improvement of the traditional over-lapping generation model. Tobing (2012) extended the conventional life-cycle theory to four periods lived agents, a representative firm producing single good and government. The model show that savings rate of the young and middle-aged agents are decreasing in fertility and increasing in survival rates.

3.2 Empirical Literature

Elbadawi and Mwega (2000) focused on the sub-Sahara Africa region using data spanning from 1970-1995 to analyze the factors that determines private saving. Their study found out that savings in the region was low in comparison with other regions of the world (especially the high performing Asian economies). With the use of granger causality test, the study found out that savings granger cause investment. The study therefore concludes that the low investment in the region is a causal factor of low savings which emanates from the regions low per capita income, high dependence on aid and the presence of high young –age dependency ratio.

Adewuyi, Bankole and Aramowo (2010) examined the determinants of gross domestic saving in ECOWAS using savings model derived from the standard life-cycle theory. The study used panel data for aggregate ECOWAS covering the period 1980- 2006. Mixed result was observed from the fixed and random effects models. The result signifies that among ECOWAS countries, a positive but insignificant effect of gdp growth rate on gross domestic savings while gdp per capita showcase a

significant negative impact on gross domestic savings. The study reported significant negative impact of inflation, high budget deficit and terms of trade on gross saving in ECOWAS.

The study conducted by Yasin (2008) on Middle East and North Africa (MENA) countries revealed a significant positive relationship between national savings ratio and the percentage of working population groups. Similarly, Gani and Yasin (2010) found that age structure is a prime determinant of national savings in Pacific Island countries. The results showed a statistically significant and positive relationship between national savings ratio of GDP and the percentage of working population groups. Also, a statistically significant and negative relationship between national savings and percentage of retired population was obtained.

Abu, Karim and Aziz (2015) identified the role of corruption on low savings rate in ECOWAS region using OLS and TLS-instrumental variable techniques which incorporate random effects in investigating the effect corruption has on savings. Using data spanning from 1996-2012, their result revealed that lower corruption is in relation with higher savings while high income level reduces the effect of corruption on savings. The study concludes that to raise savings, government in ECOWAS should operate policies that will reduce corruption and also increases incomes for combating the negative effect of corruption on savings.

The findings of Tobings (2012) showed that demographic factors, namely, fertility rate and longevity explained about 68% of cross-country dispersion in savings rate. Fertility rate was found to have greater impact on cross-country savings rate than longevity. The paper provided an insightful explanation of the large gap in savings rate between high and low income countries.

Ogbor (2014) employed co-integration and error correction mechanisms to establish the determinants of savings in Namibia using data from 1991 to 2012. The study found long run relationship between savings and the study explanatory variables such as inflation, income, population growth. Population growth was found to have a negative relationship with savings while income and inflation exhibit positive relationships with savings. The result analysis also revealed that financial deepening and deposit arte have no significant effects on savings rate.

The study conducted by Keho (2012) established that age dependency exert a negative effect on domestic savings on 16 African countries using bound test analysis of cointegration of persaran et al and the modified granger causality test (Yoda and Yamamoto 1995). The study found that there is evidence of cointegration for eleven countries while the result of causality test revealed that low savings was caused by dependency ratio in nine countries while two countries showcase a positive relationship between dependency ratio and savings.

4. Theoretical Framework and Methodology

4.1 Theoretical Framework

The key idea of Life Cycle hypothesis developed by Modigliani and Brumberg (1954) and Friedman (1957) is that individual's consumption in a given period of time depends not only on the current income but income over his or her life time. The difference between current and permanent income is transitory income. Further analysis in economic literature shows that time path of income is important for savings.

The Modigliani and Brumberg model shows that individual maximizes his utility subject to the resources available. These resources are the sum of current and discounted future earnings over his life time. Suppose that the total consumption of an individual of age A is a function of total resources available to such individual over his entire life time. This can be given as:

$$C_t = \lambda^A W^A \quad (1)$$

In the equation (1) λ^A is a proportional factor that depends on the rate of return on assets, demographic factors (Age) and type of utility function. The wealth of an individual at age A, that is W is the sum of the initial capital³ K_0 and the present value of individual earnings over his entire life time.

$$W_t = K_0 + y_t + \sum_{v=A+1}^N \frac{y^\alpha}{(1+r_t)^{v-A}} \quad (2)$$

The current income is denoted by y_t . Income earn by the individual up till the end of his life time is represented by y^α . N is the period an individual earn income and r_t is the rate of return on assets. Accordingly, the average annual expected income y_t^A of an individual can be expressed as follows:

$$y_t^A = \frac{1}{N-A} \sum_{v=A+1}^N \frac{y^\alpha}{(1+r_t)^{v-A}} \quad (3)$$

Assuming the value of λ is identical for all age groups; hence consumption for the age groups can be rewritten as follows:

$$C_t^A = \lambda^A y_t^A + \lambda^A (N-A) y_t^A + \lambda K_0 \quad (4)$$

Savings for the age groups can be expressed as follows:

$$S_t^A = y_t^A - C_t^A \quad (5)$$

³ This is the bequest bestow on individual household

$$S_t^A = \left[\frac{1}{N-A} \sum_{v=A+1}^N \frac{y^A}{(1+r_t)^{v-A}} \right] - [\lambda^A y_t^A + \lambda^A (N-A) y_t^A + \lambda K] \quad (6)$$

The expression in equation (6) shows that savings is the difference between the income an individual is expected to earn over his life time and aggregate consumption.

4.2 Methodology

First is to conduct unit root test for all the variables to be used in the analysis. This study adopts the IM Peseran and Shin panel unit root test procedure. The fixed effect least square dummy variable technique is adopted to estimate the effect of demographic factors and other determinants of saving rate, such as, income, interest rate and inflation on national savings of ECOWAS countries. The dummy variable coefficients are the country specific intercepts.

The empirical model deals with the effect of demographic structure and other determinants of savings on national savings. Drawing from the theoretical framework and some of the empirical studies, the determinants of savings considered in this study include income per capita, interest rate, inflation, budget deficits and population growth. In our quest to determine the relevance of demographic structure, age structure are categorized into three, namely, 0-14, 15-64 and 65+. Further the age dependency ratios of ECOWAS countries are included in the analysis. The model specification can be expressed as:

$$NS_{it} = f(Y_{it}, INT_{it}, INF_{it}, A_{it}^{0-14}, A_{it}^{15-64}, A_{it}^{65+}) \quad (7)$$

The system generalized method of moment equations to be analysed are specified as follows:

$$NS_{it} = \beta_{11} D_{1i} + \beta_{12} D_{2i} + \beta_{13} D_{3i} + \beta_{14} D_{4i} + \beta_{15} D_{5i} + \beta_{16} D_{6i} + \beta_1 Y_{it} + \beta_2 INT_{it} + \beta_3 INF_{it} + \beta_4 A_{it}^{0-14} + \beta_5 A_{it}^{15-64} + \beta_6 A_{it}^{65+} + U_{it} \quad (8)$$

Where;

$D_{1i} - D_{6i}$ = Dummy variables

$\beta_{1i} - \beta_{16}$ = Country intercepts

NS_{it} = National savings as a percentage of GDP

PCI_{it} = Per capita income

INT_{it} = Interest rate

INF_{it} = Inflationary rate

A_{it}^{0-14} = Percentage of population between the ages of 0 and 14 (young age dependency rate)

245 A_{it}^{15-64} = Percentage of population between the ages of 15 and 64 (working population)

246 A_{it}^{65+} = Percentage of population over 65 years of age (old age dependency rate)

247 4.4 Data Sources and Measurement

248 Data for this study were gathered from various institutions' publications. In particular, data of national
 249 savings, real GDP per capita and demographic structure were collected from World Bank's World
 250 Development Indicator. Data on interest rate and inflationary rate were obtained from International
 251 Monetary Fund's International Financial Statistics. Here, the deposit rate was used to capture interest
 252 rate and end of the period headline inflation for each country were collected for countries' inflationary
 253 rate. The data are from 1981 to 2014.

254 5. Empirical Results and Discussion

255 The results of the I M Pesaran and Shin panel unit root test are presented in table 5.1. Stationarity
 256 test were conducted on all variables used in the study. It can be inferred here that the null hypothesis
 257 of all panels contain unit root cannot be rejected for most of the variables. Essentially, national
 258 savings rate and inflation rate are stationary at level. Other variables, namely, per capita income,
 259 interest rate, percentage of population between the ages of 0 and 14, Percentage of population
 260 between the ages of 15 and 64 as well as percentage of population over 65 years of age are
 261 stationary at first difference.

262
 263 **Table 5.1 I M Pesaran and Shin Panel Unit Root Test**

S/N	Variables	Statistics at Level	P-Values	Statistics at 1 st Difference	P-Value	Order of Integration
1	NS	-2.6938	0.0035	-8.9704	0.0000	I(0)
2	PCI	6.2702	1.0000	-6.7692	0.0000	I(1)
3	INF	-5.4999	0.0000	-9.0866	0.0000	I(0)
4	INT	-0.2704	0.3934	-6.9626	0.0000	I(1)
5	A^{0-14}	1.9454	0.9741	-1.7024	0.0443	I(1)
6	A^{15-64}	4.6835	1.0000	-2.7310	0.0032	I(1)
7	A^{65+}	1.0057	0.8427	-2.3162	0.0103	I(1)

264

265 Table 5.2 shows the result of the Least Square Dummy Variable (LSDV) model. The coefficient of per
 266 capita income is statistically significant at 1%. This implies that a 10% increase in per capita income
 267 leads to 0.09% increase in savings. Here, it is evident that per capita income is a major determinant of
 268 national savings rate in ECOWAS region. Additionally, the results of the LSDV show that real interest
 269 rate and inflation are not statistically significant at the conventional levels. To a large extent in
 270 ECOWAS, market interest rate has not promoted savings rate. Similarly, the statistical insignificant

value of the coefficient of inflation could be as a result of price-wage adjustment mechanism which is slow in the ECOWAS region.

Consequently, demographic structure variables, notably, the percentages of population between ages 0-14 (young age dependency rate) and percentages of population between ages 15-64 (working population) are statistically significant at 1%. Although the sign of the coefficient of the percentage of population between the ages of the young age dependency rate conforms to theory, the coefficient of the working population deviates from the *a priori* expectation. Further, the coefficient of the old age dependency rate is not statistically significant in the estimation. This is due to the fact that this group has no significant contribution to the nation savings in ECOWAS.

The coefficient of population of young age dependency rate is negative because this population group depends on the working population; hence, they are expected to reduce the amount of the gross savings. It implies that a percentage increase in the population of the young age dependency rate will lead to 4.2% decrease in national savings. Contrary to expectation, the coefficient of the working population has negative effect on national savings. Some plausible explanation can be provided for these findings. First, unemployment rate has been very high in the past two decades across the sampled countries; this has led to low savings rate of the population. Second, real income has fallen across ECOWAS countries due to high rate of inflation with low real wage. All these could result to the negative effect of the working population on national savings.

Further, differences across countries were tested in the LSDV model in table 5.2. The statistically significant of the dummies show that country specific characteristics have influence on national savings. The R^2 value shows that 46% of the variation in national savings is accounted for its determinants and demographic structure in ECOWAS. Overall, the F-statistics confirms the appropriateness of the model.

Table 5.2: Fixed Effect Estimate (Least Square Dummy Variable)

	Coef.	Std. Err.	t-stat	p-value
Pci	0.00938	0.0029212	3.21	0.002
dr	0.04901	0.0814692	0.60	0.548
inf	0.0156928	0.0239744	0.65	0.514
aa	-4.229427	1.567497	-2.70	0.008
ab	-4.428531	1.772636	-2.50	0.014
ac	0.0168541	2.370592	0.01	0.994
-lcountry2	-5.193589	2.020118	-2.57	0.011
-lcountry3	-5.972583	2.800052	-2.13	0.035
-lcountry4	-11.80338	1.822163	-6.48	0.000
-lcountry5	-234.6311	88.83615	-2.64	0.009
-lcountry6	-209.7764	84.5233	-2.48	0.014
-cons	433.4222	160.5892	2.70	0.008

Number of Observation = 163, Root MSE = 6.0687

F(11, 151) = 11.53, Prob>F = 0.0000

$R^2 = 0.46$, Adj. $R^2 = 0.4169$

Source: Author's computation using STATA 13

Conclusion

A key argument in the economic literature on savings is the importance of demographic structure on savings rate. This study examined some important determinants of gross savings and investigates whether demographic structure has any role to play in ECOWAS. The Least Square Dummy Variable (fixed effect) model was used to analyze the determinants of national savings.

Per capita income has a statistically significant effect on savings rate in ECOWAS. However, real interest rate and inflation were found to be insignificant. The young age dependency ratio and the working population ratio negatively affected savings rate. The negative effect of working population on national saving could be as a result of the high rate of unemployment in the region and low real wage. Government policies should be directed towards improving per capita income and low inflation rate in ECOWAS countries.

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