

## Analysis of the Determinants of Domestic Savings in the WAEMU

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Received: April 28, 2021

Accepted: June 20, 2021

Online Published: August 3, 2021

doi:10.5539/ijbm.v16n9p71

URL: <https://doi.org/10.5539/ijbm.v16n9p71>

### Abstract

This article analyses the determinants of domestic savings in the West African Economic and Monetary Union (WAEMU), except for Guinea-Bissau. Members of the WAEMU are Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo. WAEMU member countries are working toward greater regional integration with unified external tariffs. The economic dynamism sought by each country could be beneficial to the mobilization of savings. Research into the determinants of savings is therefore of crucial importance for countries with a financing gap. The study covers the period from 1982 to 2017. The data used for this study come mainly from the World Bank (WDI). Using Dynamic Least Squares (DOLS), the study finds that domestic saving behavior is positively influenced by gross domestic product per capita, investment, life expectancy at birth, and the lending rate. On the other hand, primary school enrolment, trade openness, and inflation negatively affect domestic savings.

**Keywords:** domestic savings, panel data, dynamic least square

### 1. Introduction

The founding works of growth analysis, carried out in particular at the theoretical level by Solow (1956) and, at the empirical level, by Denison (1967), allow an initial diagnosis of the causes of growth or lag in an economy. Capital accumulation, the working population, and technical progress are the essential sources of economic growth. Capital accumulation, especially low savings rates, is considered one of the causes of the development lag of African countries. According to World Bank data (1995), China, the Republic of Korea, Indonesia, Malaysia, Singapore, and Thailand had very high savings and investment rates, which reached 30% to 40% of GDP, in the 1990s. The economic performance of emerging countries is partly explained by the availability of savings. On average, these countries have managed to invest massively without running recurrent external deficits, i.e. without structurally relying on foreign savings to finance their investments. Indeed, in a world where capital mobility is imperfect, or at least where potential investors avoid economies with serious macroeconomic risks, the availability of abundant national savings is certainly the best guarantee of investment dynamism. The situation of WAEMU countries is worrying insofar as all eight countries in the Union, since 1995, remain low-income countries with an average growth rate of 3.7% for the zone over the period 1995 - 2010 (WDI, 2017).

To make up for the growth lag between WAEMU countries and emerging countries, the emphasis has been placed on mobilizing domestic resources and foreign direct investment. Thus, efforts have been made to attract more foreign capital and facilitate foreign direct investment (FDI). Similarly, concrete steps have been taken to ensure that donors make good use of development assistance funds. Indeed, many initiatives have been taken at the international level to increase the volume of official development assistance (ODA) to poor countries. What has not changed much, however, is the lack of attention that African policymakers pay to mobilizing domestic savings. The heavy reliance on foreign aid to finance development needs has certainly played a role in this attitude. Aid was originally intended to complement domestic financial resources to stimulate development efforts and help countries emerge from underdevelopment. Unfortunately, it has instead ended up stifling domestic savings and creating a high dependency of African economies. In the UEMOA zone, external financing

policies have increased the level of external debt of developing countries, which has ultimately penalized their growth. A new approach focusing on the promotion of domestic capital markets is being promoted.

In Africa, the policy of financial liberalization (McKinnon, 1973), under the impetus of the major international organizations, has found favor with the authorities. Applied in the context of structural adjustment programs, the policy of financial liberalization favored the development of financial systems in general and capital markets in particular, but without any major impact on the financing of economic activity. African countries continue to suffer from a lack of development finance. Financial liberalization theory has placed a strong emphasis on the need to mobilize and harness the available domestic resources of these countries. By tapping into domestic financial resources, the available resource gap could be reduced and the process of economic development accelerated. For Azanleko (2012), domestic savings remain a privileged source of financing for investment and allow the vulnerability of the economy to fluctuations in the international economy to be minimized.

In recent years, empirical work has focused on the determinants of savings in both developed and developing countries. This renewed interest in the determinants of savings is motivated by the dramatic fall in savings rates in most OECD countries and the widening gap between savings and investment in developing countries (Athukorala & Sen, 2004). For the WAEMU economies, the investment rate averaged 18.7% of GDP between 1995 and 2017. Domestic savings are no exception, since, during the same period, the average rate was only 9.22% of GDP (BCEAO, 2017). Given these ratios, the challenge of this study is to find ways and means of financing the economy of the WAEMU zone.

The challenge is to promote domestic savings in the UEMOA zone to increase the investment rate and achieve higher growth rates. Thus, knowledge of the main determinants of domestic savings is of paramount importance in the formulation of economic policies that can promote economic growth. It is, therefore, necessary to ask what are the main factors that guide savings behavior in WAEMU countries?

Based on this central question, the main objective of this article is to analyse the main factors that guide savings behavior in WAEMU countries. More specifically, it aims to :

- Determine the macroeconomic variables that affect domestic savings in the WAEMU,
- Identify the socio-economic factors that influence the savings performance of WAEMU countries,

Concerning our specific objectives, we can postulate the following hypotheses:

Hypothesis 1: Macroeconomic variables such as GDP per capita and the lending rate positively affect domestic savings in the WAEMU region.

Hypothesis 2: Socio-economic factors such as life expectancy at birth and the level of primary school enrolment negatively affect domestic savings in the WAEMU.

This study is of particular interest to the economies of the WAEMU region. Indeed, developing economies in general and WAEMU economies in particular, need to find the necessary financial resources for their development. Because of the constraints linked to external financing, the mobilization of domestic savings seems to be the most appropriate way to finance their economies. This study is a major contribution in that it provides insight into the determinants of domestic savings in the WAEMU.

Methodologically, the study uses the dynamic least squares method. This method is suitable for our study, as it takes into account the endogeneity between income and savings. The rest of the paper is organized as follows. Section 2 deals with the literature review on the determinants of domestic savings. Section 3 is dedicated to the methodology of the study. Section 4 is devoted to the presentation of the results. Section 5 concludes the study.

## **2. Literature Review on the Determinants of Domestic Savings**

This section reviews the theoretical and empirical literature on the determinants of domestic savings. This is an important step to make a judicious choice of explanatory variables for our model.

### *2.1 The Determinants of Household Savings: A Review of the Theoretical Literature*

According to the classics (Smith, 1776), the objective of saving households is to obtain greater consumption tomorrow by foregoing consumption today. This objective is automatically achieved if today's savings are effectively invested in the development of new production capacities. The increase in the capital stock thus enables the production of more goods and services in the future. The income received by households allows them to consume more in the future. The balance between savings and investment is, according to the classics, obtained through the variation of interest rates. An increase in interest rates increases savings, which is a prerequisite for any investment.

In the framework of neoclassical theory, the economic agent seeks to maximize his utility and when he has to make a trade-off between consumption and saving, he will consider what he will get from saving, in other words, he will consider the interest rate. If the interest rate is high, the agent will be encouraged to save since saving will ensure a large income in the future. Conversely, when the interest rate is low, the economic agent tends to save little, as saving will bring him little income in the future. McKinnon (1973), the standard-bearer of neoclassical economists with his theory of financial liberalization, also supports the idea that a rise in interest rates attracts household savings, allowing banks to lend to businesses for investment.

In contrast to classical and neoclassical authors, Keynesians believe that the higher the income, the greater the savings. A consequence of Keynes' psychological law is that the higher the household income, the higher the savings. The relationship between disposable income and saving is therefore positive and increasing.

Following the Keynesian theory, Modigliani (1963) considers that income is cyclical, varying over the life course, and that households will transfer part of their income from the 'good' years to consumption in the 'bad' years. The objective of these income transfers is to have a relatively stable consumption structure throughout life. The main reason for income fluctuations is the existence of a period of activity with relatively high income and a period of inactivity (retirement) with relatively low or no income. In this case, the role of savings is to respond to households' desire not to see their consumption fall substantially during the retirement period. Therefore, an increase in per capita income would lead to an increase in the overall savings rate because it increases the earnings and savings of the younger (working) age group relative to the older group (Athukorala & Sen, 2004). Thus, countries with higher per capita income growth rates should have higher savings ratios than countries with lower growth rates.

For his part, Friedman (1957) admits that there is a strict proportionality between consumption and income, provided that we consider the values of consumption and income foreseen by the economic subject. This income is now permanent because it is the sum that a consumer can spend by keeping the value of his capital constant. Therefore, when a household saves, it adds to its wealth and thus increases its permanent income. Since individuals essentially consume the permanent component of their current income, it follows that transitory income is systematically allocated to savings (Muradoglu & Taskin, 1996).

Recent theoretical and empirical developments have revealed that precautionary saving is determined by the degree of uncertainty, by the persistence of labor income, as well as by the level of wealth (Leland (1968); Hall, 1978). For Deaton (1991), it is the liquidity constraints faced by households that limit their ability to borrow, forcing them to save. Thus, the only real option available to them if they want to ensure that they have the necessary funds for a rainy day, is to save when times are better.

In addition to these determinants, institutional and psychological factors have been cited as influencing domestic savings. In terms of institutional factors, the work of Beverly and Sherraden (1999) identifies four institutional factors that have an impact on savings. The first is the existence of institutionalized savings mechanisms, such as private and public pension schemes. The second is the financial education of households, which can influence their willingness to save. Indeed, information seminars on retirement increased the savings of those who attended them. A third institutional factor raised by the authors is that of incentives to save (preferential tax treatment of interest income, tax deduction for contributions to retirement savings schemes, etc.). The fourth concerns the importance of contractual savings mechanisms as factors affecting the level of savings.

On the level of psychological factors, Chudzian et al. (2015) shows the importance of the individual's relative income in determining his or her level of saving. Duesenberry (1949) already emphasized that households compare their income with that of their peers and with their past income. Other psychological factors have been raised by different authors. Carroll (1997) explains why the rich save more than the need to finance their future consumption or that of their close descendants would suggest. Saving is seen as giving social status and power to those who can do so. For the rich, wealth accumulation is seen as an end in itself.

Moreover, during the 1990s, some authors have raised the importance of preventive saving for households. Avery et al (1988) report that 43% of consumers participating in the Federal Reserve's 1983 Survey of Consumer Finances identified preparation for possible emergencies as their main reason for preventive saving. In contrast, only 15% of consumers identified preparation for retirement as their primary motive for saving, which is the foundation of life-cycle theory.

## *2.2 The Determinants of Household Savings: A Brief Review of Empirical Studies*

To organize these empirical studies, we first present those concerning countries outside the African continent and then those concerning African countries.

The studies concerning countries outside the African continent have shown that certain macroeconomic variables positively or negatively influence the level of savings according to its use.

In the case of OECD countries, Callen and Thirmann (1997) sought to analyze the effect of taxes and social security systems on household savings over the period 1975-1995. The results indicate that the structure of the tax system and the financing of the social security and welfare system have a positive effect on household savings. On the other hand, Modigliani and Cao (2004) conducted a study on the determinants of the household saving rate in China over the period 1953-2000. They find that the long-term growth rate, the labor force, and inflation have positive and significant effects on the household saving rate in China.

In the case of Jordan, Halleq (2003) examined the determinants of private savings in this country between 1976 and 2000. The main results reveal that the dependency ratio has a significantly negative effect on private savings. However, the growth rate of GDP per capita has a significantly positive effect on private savings. Besides, the development of the credit market, the social security ratio, and social assistance spending positively affect private savings. Finally, real interest rate, inflation rate and terms of trade have insignificant effects on the level of private savings in Jordan. The study by Athukorala and Sen (2004) on India, over the period 1954 and 1998, concludes that real interest rates, growth in per capita income, deepening of the financial system and the inflation rate have a positive effect on domestic savings. Also, the terms of trade and capital outflows hurt saving behavior in India. The study also indicates that moderate inflation would positively affect private savings.

Regarding studies on African countries, Muhleisen et al (1995) analyzed the determinants of domestic savings in 39 sub-Saharan African countries. The results indicate that income variables such as GDP, capital per capita or the growth rate of real GDP have a positive influence on the level of savings. Similarly, macroeconomic stability is an important factor in stimulating savings, as a low inflation rate combined with a low fiscal deficit ratio promotes increased savings. In the case of Egypt, Touny (2008) analysed the determinants of domestic savings in this country from 1975 to 2006. He found that GDP per capita has a significant and positive effect on domestic savings especially in the long run. Also, financial development measured by M2/GDP ratio, interest rate and inflation rate has a positive and significant effect on domestic savings in Egypt, while the current account deficit has a negative and significant effect in the short and long run.

In Nigeria, Olayemi and Michael (2013) report that real interest rates have a positive effect on savings. Also in Nigeria, Ehikioya and Mohammed (2014) find that per capita income, inflation rate, terms of trade and financial deepening are important determinants of private savings in Nigeria.

At the level of the WAEMU zone, the study by Azanleko (2012) indicates that the variable that has a greater positive effect on domestic savings is real GDP per capita. The other variables that have a positive effect on domestic savings in WAEMU countries are: domestic bank credit, the urbanization rate and the political rights index. On the other hand, constraints on private sector borrowing harm domestic savings. Next, Timite (2007) analysed the determinants of domestic savings in Côte d'Ivoire and found that in the long run, the behavior of domestic savings is positively influenced by the current balance of economic relations with the outside world, disposable income, per capita income, fluctuations in international cocoa prices, government revenues and inflation. On the other hand, the interest rate and public expenditure hurt the domestic savings rate.

### 3. Econometric Model and Data

In this section, we present the specification of the model, the methodology of the study and the data sources.

#### 3.1 Model Specification

The objective of this work is to analyze the determinants of domestic savings. Based on the empirical literature, the econometric model is built upon the following equation:

$$Sav_{i,t} = \theta_{i,t} + \theta_{1i}GDPC_{i,t} + \theta_{2i}INVEST_{i,t} + \theta_{3i}INF_{i,t} + \theta_{4i}LIFE_{i,t} + \theta_{5i}OPEN_{i,t} + \theta_{6i}SCHOOL_{i,t} + \theta_{7i}DEBR_{i,t} + \mu_{i,t} \quad (1)$$

Where  $Sav_{i,t}$  denotes the domestic savings of country  $i$  at date  $t$ . We choose this variable because it is a key investment financing variable for economies that are subject to external financial constraints. The variable  $GDPC_{i,t}$  represents the GDP per capita of country  $i$  at date  $t$ . According to Touny (2008), GDP per capita has a positive effect on domestic savings, especially in the long run. In addition, the variables  $INVEST_{i,t}$  and  $INF_{i,t}$  indicate respectively the investment and the inflation rate of country  $i$  at date  $t$ . For Timite (2007), the behaviour of domestic savings is positively influenced by inflation in the long run. The variable  $LIFE_{i,t}$  indicates the life expectancy at birth of country  $i$  at date  $t$ , expressed as the average number of years that a newborn child can expect to live, if the mortality conditions that prevailed during the period under study remain unchanged throughout its life. According to Horioka and Wan (2007), variables relating to the age structure of the population influence the household savings rate in the short term. The variable  $OPEN_{i,t}$  is the openness rate of the economy

of country  $i$  at date  $t$ . It is obtained by summing exports and imports divided by twice the GDP. Its effect on domestic savings is ambiguous because it depends on the component that dominates between exports and imports. The variable  $SCHOOL_{i,t}$  measures the number of years of primary school education in country  $i$  at date  $t$ . It is assumed to positively influence domestic savings. Finally, the variable  $DEBR_{i,t}$  denotes the lending rate of banks in country  $i$  at date  $t$ . Its effect on domestic savings is expected to be negative.

### 3.2 Econometric Methodology

The estimator commonly used in econometrics is the ordinary least squares (OLS) estimator. Although the OLS estimator is the most efficient in the family of linear estimators, its distribution is asymptotically biased, and depends on nuisance parameters associated with the presence of serial correlations in the data. Such a problem is posed for panel data. Indeed, the estimation of a cointegration relation requires the use of an efficient estimation method. Two techniques exist, namely the FMOLS (Fully Modified Ordinary Least Squares) method proposed by Phillips and Hansen (1990) and extended by Pedroni (1996) and the DOLS (Dynamic Ordinary Least Squares) method of Saikkonen (1991) and Stock and Watson (1993). For this study, we propose an econometric approach in dynamic panel data using the dynamic least squares estimator (DOLS). Indeed, the DOLS estimator takes into account the endogeneity and the correlation between the variables. This model is therefore suitable for our study since there could be endogeneity between income and savings.

### 3.3 Data Sources and Descriptive Statistics

The empirical study is based on a panel of seven (7) WAEMU countries except for Guinea-Bissau over the period from 1982 to 2017. The data used in this study comes mainly from the World Bank (2017). These data allow us to make a brief descriptive statistic of the variables of the study, as recorded in Table 1. Domestic savings (Sav) in WAEMU countries averaged 10.95% of GDP over our study period. Its minimum value is -12.86% and corresponds to domestic savings in Mali in 1985 while its maximum value of 32.88% of GDP corresponds to the savings rate of Côte d'Ivoire in 2016. With a standard deviation of 7.55, the variability of domestic savings is high from one country to another for the seven WAEMU countries from 1982 to 2017. The average lending rate of WAEMU countries is 11.24% over the period 1982 to 2017. Its minimum value is 0.85% and its maximum value is 18.77%. It has a standard deviation of 2.83 indicating average variability across the seven WAEMU countries over the entire study period. Life expectancy at birth for UEMOA countries averages 53 years, corresponding to life expectancy at birth in Togo in 1981 over the period 1982 to 2017. Its minimum value is 39 years, which corresponds to the life expectancy at birth in Côte d'Ivoire in 1963. Its maximum value is 67 years which corresponds to the life expectancy at birth in Senegal in 2016. Its standard deviation of 5.4 indicates that life expectancy varies greatly from one country to another within the WAEMU countries. The openness rate of the WAEMU countries' economy, on average, is 30.7% over the period 1982 to 2017. Its minimum value is 14.18% and its maximum value is 62.5%. It has a standard deviation of 9.5 indicating a high variability between WAEMU countries over the study period, certainly due to the extraversion of the zone's economies.

Table 1. Descriptive analysis of variables

Variables	Obs	Mean	Std.Dev.	Min	Max
SAV	245	10.9504	7.552017	-12.85879	32.88164
GDPC	245	0.5301005	4.151193	-19.18247	18.16374
INVEST	245	18.47782	6.572016	3.148003	39.95157
INF	245	3.878152	6.898701	-9.823833	46.38607
LIFE	245	53.1147	5.400471	39.927	67.146
OPEN	245	30.77506	9.506288	14.18701	62.51672
SCHOOL	245	1.298446	0.2185473	1.017272	1.810349
DEPR	245	11.24996	2.83856	0.85	18.779

Source: Author's estimates, based on WDI data (2017).

In terms of the correlation between the variables, the summary is shown in Table 2. It indicates a low correlation between the explanatory variables. According to Table 2, very low correlations are observed between (INVEST, SAV); (INVEST, GDPC); (LIFE, SAV); (LIFE, GDPC); (LIFE, INVEST); (OPEN, LIFE); (DEBR, INVEST); (DEBR, INF); (DEBR, LIFE) all of which are below 0.6. Only (SCHOOL, OPEN) correlates higher than 0.6, but still reflects a partial correlation, as  $(SCHOOL, OPEN) = 0.74 < 0.8$ . Therefore, there is no strong correlation

between the variables. Thus, there would be no multicollinearity problem that could cause biased estimates of the model's coefficients and risk overestimating the values of their calculated variances.

Table 2. Correlation Matrix

	SAV	GDPC	INVEST	INF	LIFE	OPEN	SCHOOL	DEBR
SAV	1.0000							
GDPC	0.0327	1.0000						
INVEST	0.2114*	0.3234*	1.0000					
INF	0.0788	-0.0848	-0.0108	1.0000				
LIFE	0.2053*	0.1412*	0.4930*	-0.0772	1.0000			
OPEN	0.6336*	-0.0183	0.0396	0.0677	0.3523*	1.0000		
SCHOOL	0.5503*	0.0469	0.0580	-0.0213	0.5342*	0.7438*	1.0000	
DEBR	0.1024	-0.0852	-0.1706*	0.1306*	-0.1360*	-0.0057	-0.0502	1.0000

Source: Author's estimates, based on WDI data (2017).

#### 4. Empirical Results

We start the empirical analysis by examining the statistical properties of our variables. After this step, we will present the results of the cointegration tests. Once these precautions have been taken, we will present the results of the estimations.

##### 4.1 Unit Root and Cointegration Test Results

The order of integration of variables is tested according to the tests of Im, Pesaran and Shin (2003) and Levin, Lin and Chu (2002). The first test corrects for shortcomings related to the heterogeneity of the individuals in the panel, i.e. the individual-specific constants. This characterizes our data well with the different savings policies practiced in each country. As for the second test, its choice lies in the fact that it tests the stationarity of the variables which present constant terms and which contain zero values. The results of the stationarity tests are shown in Table 3.

Table 3. Stationarity Test Results

Variables	LLC (Levin Lin et Chu)				IPS (Im Pesaran et Shin)			
	At Level		In first Difference		At Level		In first Difference	
	Statistics (p-value)	Decision	Statistics (p-value)	Decision	Statistics (p-value)	Decision	Statistics (p-value)	Decision
SAV	-0.412 (0.339)	Non stationary stationnaire	-5.825*** (0.000)	stationary	-3.4491*** (0.0003)	stationary	-9.9124*** (0.0000)	stationary
GDPC	-5.305*** (0.000)	stationary	-10.440*** (0.000)	stationary	-9.4092*** (0.0000)	stationary	-11.6561*** (0.0000)	stationary
INVEST	-1.6732** (0.0471)	stationary	-7.3536*** (0.0000)	stationary	-5.0095*** (0.0000)	stationary	-10.0832*** (0.0000)	stationary
INF	-5.7446*** (0.0000)	stationary	-10.1385*** (0.0000)	stationary	-7.6168*** (0.0000)	stationary	-10.7330*** (0.0000)	stationary
LIFE	-37.1495*** (0.0000)	stationary	-21.2006*** (0.0000)	stationary	2.7071 (0.4966)	Non stationary	1.0712*** (0.0000)	stationary
OPEN	-1.8321** (0.0335)	stationary	-5.269*** (0.0000)	stationary	-2.5565*** (0.0053)	stationary	-9.0122*** (0.0000)	stationary
SCHOOL	0.3101 (0.4218)	stationary	-0.4818* (0.0850)	stationary	6.0285 (1.0000)	Non stationary	-1.3059* (0.0958)	stationary
DEBR	-0.3304 (0.3705)	stationary	-10.0827*** (0.0000)	stationary	-3.8771*** (0.0001)	stationary	-10.2192*** (0.0000)	stationary

Note. (\*), (\*\*), (\*\*\*) refers to the significance of the parameters at the (10%), 5% and 1% threshold.

Source: Author's estimates, based on WDI data (2017).

Based on the LLC test, the results indicate that the variables (GDPC); (LIFE) and (INF) are stationary at level at the 1% threshold. Also, the variables (INVEST) and (OPEN) are stationary at level at the 5% threshold while the variables (DEBR) and (SCHOOL) are not stationary at level, but are stationary in the first difference for the variable (DEBR) at the 1% threshold and at the 10% threshold for the variable (SCHOOL). As for the endogenous variable (SAV), it is stationary in the first difference at the 1% threshold.

With the IPS test, the endogenous variable (SAV) is stationary at the 1% level. Concerning the exogenous variables, the variables (GDPC); (INVEST); (DEBR); (OPEN) and (INF) are stationary at the 1% level and the variable (SCHOOL) is stationary at the 10% level. As for the variable (LIFE), it is stationary in the first difference at the 1% threshold. It follows that all the variables are stationary in first difference according to the two tests of IPS (2003) and LLC (2002).

In conclusion, we find that in the first difference, the unit root hypothesis is rejected by the two tests for all the analysis variables. Thus, we can say that all the variables in the panel are integrated of order 1 as attested by the statistics of Levin Lin and Chu (2002) and Im Pesaran and Shin (2003).

At this stage of the study, there is a presumption of cointegration between the I(1) variables. To do this, we will carry out cointegration tests to verifying whether there is a long-term relationship between the variables. In our case study, the Pedroni (1999, 2004) and Kao (1999) tests are used to verify the long term relationship between the variables. The results are reported in Tables 4 and 5.

Table 4. Results of the Pedroni tests

Alternative hypothesis: common AR coefs. (within-dimension)				
	Statistic	Prob.	Statistic	Prob.
Panel v-Statistic	-1.650092	0.9505	-4.27988	1.0000
Panel rho-Statistic	0.393123	0.6529	0.74571	0.7721
Panel PP-Statistic	-2.987033	0.0014	-1.55785	0.0596
Panel ADF-Statistic	-2.306732	0.0105	2.29357	0.9891
Alternative hypothesis: individual AR coefs. (between-dimension)				
	Statistic	Prob.		
Group rho-Statistic	1.471726	0.00295		
Group PP-Statistic	-2.644531	0.0041		
Group ADF-Statistic	-1.158759	0.1233		

Source: Author's estimates, based on WDI data (2017).

According to the Pedroni tests based on the within-individual dimension, we have Prob (Panel PP-Statistic) = 0.0014 < 5% and Prob (Panel ADF-Statistic) = 0.0105 < 5%. According to these results, the hypothesis of absence of cointegration is only refuted by two tests at the 5% threshold, which are respectively the parametric tests of the Phillips-Perron t-statistic (panel t-statistic) and the parametric test of the Augmented Dickey-Fuller t-statistic. Furthermore, the same Pedroni tests based on the inter-individual dimension, indicate that Prob (Group PP-Statistic) = 0.0041 < 5%. According to this result, the hypothesis of absence of cointegration is refuted at the 5% threshold by the non-parametric test of the Phillips-Perron t-statistic (group t-statistic).

Finally, we observe that 4 out of 7 tests verify the existence of long-term relationships between the variables of the model. Consequently, there is ambiguity as to the conclusion to be drawn. Thus, the Kao test (1999) will allow us to confirm with certainty the existence or not of a long-term relationship between the variables. The Kao test shows that the Prob (ADF) = 0.0008 < 5%, which means that the hypothesis of the absence of cointegration is refuted at the 5% threshold.

Table 5. Results of the Kao tests

	t-Statistic	Prob.
ADF	-3.140496	
Residual variance	12.21952	0.0008
HAC variance	5.732374	

Source: Author's estimates, based on WDI data (2017).

Finally, we can say that according to the tests of Pedroni (1999, 2004) and Kao (1999), there is a long term relationship between the variables of the model. We can now present the results of the estimation of our dynamic model.

#### 4.2 Econometric Findings

The econometric results are obtained from the estimation method (DOLS) performed on equation (1). The results are reported in Table 6.

Table 6. Results of the estimation (DOLS)

Pays	DOLS						
	GDPC	INVEST	INF	LIFE	OPEN	SCHOOL	DEBR
Bénin	0.83 (8.29)***	0.44 (7.05)***	-0.61 (-10.81)***	-1.24 (-4.02)***	-0.27 (-2.70)***	21.18 (3.10)***	1.16 (9.86)***
Burkina Faso	-0.44 (-4.33)***	1.37 (18.46)***	0.24 (3.97)***	-1.92 (-5.48)***	-0.39 (-3.63)***	148.85 (5.87)***	0.26 (1.98)***
Côte d'Ivoire	1.19 (7.46)***	-0.36 (-2.69)***	0.56 (14.36)***	3.53 (5.51)***	-0.32 (-3.74)***	-11.80 (-3.79)***	0.88 (5.25)***
Mali	-0.72 (-3.61)***	2.59 (7.02)***	-0.36 (-4.38)***	3.22 (-2.94)***	1.34 (3.70)***	177.23 (2.66)***	-0.19 (0.57)**
Niger	-0.69 (-11.73)***	0.99 (7.52)***	0.09 (2.65)***	9.31 (6.45)***	-1.90 (-12.08)***	-1083.67 (-7.09)***	0.41 (4.19)***
Sénégal	0.87 (22.93)***	-0.53 (-10.51)***	-0.14 (-10.89)***	5.25 (10.14)***	0.45 (10.69)***	-174.00 (-10.92)***	0.01 (-0.12)**
Togo	-0.001 (-4.09)***	1.00 (8.3e+13)***	0,001 (6.30)***	0.002 (1.80)**	0.001 (2.69)***	0.002 (5.96)***	0.003 (1.66)**
Panel group(UEMOA)	0.15 (5.64)***	0.78 (3.1e+13)***	-0.03 (0.45)**	1.67 (4.06)***	-0.16 (-1.92)**	-134.74 (-1.59)**	0.36 (8.40)***

Note. (\*), (\*\*), (\*\*\*) refers to the significance of the parameters at the (10%), 5% and 1% threshold.

Source. Author's estimates, based on WDI data (2017).

The economic interpretations will be made for each variable of the model and concern the long term.

The coefficient of the variable (GDPC) is significant at the 1% level and positively influences domestic savings. This result can be interpreted using Keynesian theory. According to the latter, savings increase with income. The level of savings depends on the level of income of the economic agent. Thus, when the income of individuals increases, consumption does not vary as much, so savings increase. Similarly, the coefficient of the variable (INVEST) is significant at the 1% threshold and has a positive impact on domestic savings. This result can be explained by the post-Keynesian monetary theory. Indeed, according to the endogenous money supply approach, the supply of credit authorizes investment. The latter allows the generation of income, part of which will constitute savings. This is an articulation in line with the theory of the circuit. Investment and the standard of living, therefore, influence the level of domestic savings in the WAEMU zone.

The coefficient of the variable (LIFE) is significant at the 1% level and positively influences home savings. This result can be explained by Modigliani's life cycle theory. The longer individuals live, the more they will want to save to smooth their consumption. Indeed, individuals are assumed to be net savers during their working life and dissavers during their retirement. In our case of study, the majority of the active population being composed of young people, an increase in life expectancy leads them to save more for their old age.

As for the coefficient of the variable (DEBR), it is significant at the 1% level and has a positive influence on domestic savings. An increase in lending rates is favorable to savings. In the UEMOA zone, activity is mainly financed by banks, as the financial markets are young. As a result, an increase in bank lending rates forces individuals to save to finance their activities. Faced with high lending rates, economic agents have no choice but to save to finance their expenditure.

The coefficient of the variable (OPEN) is significant at the 5% level and negatively influences domestic savings. Greater economic openness is unfavorable to savings in the WAEMU zone. This result can be explained by the state of the trade balance of these countries. Indeed, the majority of WAEMU countries have trade deficits, which



is equivalent to a capital outflow. A deficit trade balance means more imports and therefore a reduction in savings to meet external purchases. Moreover, with the primary specialisation of the countries in the zone, the deterioration of the terms of trade does not allow these countries to have sufficient income to save.

The coefficient of the variable (INF) is significant at the 5% level and has a negative influence on domestic savings. Inflation is therefore unfavourable to domestic savings. This result could be explained by Pigou's (1947) theory of real balances, taken up by Patinkin (1965). Indeed, when the inflation rate increases, the purchasing power of the economic agent decreases. To maintain the previous level of consumption, economic agents will draw on their savings, which will cause the domestic savings rate to fall.

Finally, the coefficient of the variable (SCHOOL) is significant at the 5% level and has a negative influence on domestic savings. This result could be explained by the low level of education observed in the WAEMU zone. The number of years of primary schooling is not beneficial to domestic savings. It will undoubtedly be necessary to increase the level of education of the population so that they understand the merits of saving. Indeed, in emerging countries where savings levels are high, the level of education also remains high. The culture of saving can only be acquired when the level of education is high.

### 5. Concluding Remarks

The purpose of this study was to analyze the determinants of domestic savings in the WAEMU. This empirical study focused on a panel of seven (7) WAEMU countries except for Guinea-Bissau over the period from 1982 to 2017. Our analysis aimed at highlighting both macroeconomic and socioeconomic factors of domestic savings using the dynamic least squares (DOLS) method.

In total, this study allowed us to provide answers to the various questions raised in the problem, whose central question is: what are the main factors that guide savings behavior in WAEMU countries?

Finally, we can say that this study has allowed us to highlight some favorable factors of domestic savings, which are: GDP per capita, investment, life expectancy and bank lending rates. Economic openness, the inflation rate and the number of years of primary schooling have a negative influence on domestic savings. From these results, some important lessons can be drawn. Firstly, a policy to promote economic growth is necessary to increase the standard of living of the population. Indeed, this study has highlighted the Keynesian channel of saving which involves an increase in income. Secondly, countries must redouble their efforts in terms of investment. Indeed, investment leads to economic growth, which ultimately increases the standard of living of the population. Thirdly, WAEMU member states must make an effort in the area of health to increase the life expectancy of their inhabitants. Fourth, monetary authorities must maintain their efforts in monetary management to keep inflation low.

In terms of perspective, it should be noted that the factors identified are common to all seven WAEMU countries covered by our study. As the model was estimated using panel data, each country has its own specificities that need to be considered. These specificities reside in the omitted variables whose inclusion could modify certain results of the study. Thus, a subsequent study could incorporate other qualitative or quantitative variables through a survey of different household behaviours. The social background and beliefs of households could be taken into account.

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