ANALYSIS OF THE CONTRIBUTION OF SHADOW BANKING SYSTEM TO THE ECONOMIC GROWTH OF WAEMU COUNTRIES: THE CASE OF SENEGAL

M. MAMADOU MBAYE

RESEARCHER AT LABORATORY OF RESEARCH ECONOMIC AND MONETARY (LAREM)

FACULTY OF ECONOMICS AND MANAGEMENT (FEAM)

ANTA DIOP SHEIKH UNIVERSITY (ADSU)

DAKAR / SENEGAL

Abstract

The goal of this article is to analyze the contribution of shadow banking system to the economic growth of WAEMU countries. The study focuses on the specific case of Senegal. Shadow banking is a market of multiform capital exchanges and a socialization of investment risks. Its emergence is an indicator of economic maturity which proves the actors care about efficient allotment of financial resources and reflects a widespread change in the perception of the asymmetry linked to funding.

Our theoretical as well as empirical research work enabled us to assess the impact of a virtually distant phenomenon on the growth for our still fragile developing countries. The results of the model show us that shadow banking influences positively economic growth because the elasticity of non-banking public

funding[1] obtained by using a coefficient of λ_2 is positive ($\lambda_2 > 0$). The elasticity reflects the behavior

of the growth following a variation of up to 1% of non-banking public funding. That corroborates the existence of a strong complementary relationship between these two variables. Therefore, shadow banking is a potentiality for financing and even a key instrument for fundraising and therefore promotes economic growth.

Keywords: fundraising, shadow banking, financial system, regulation, economic growth, WAEMU

1. Introduction :

Since the subprime's crisis of 2007 / 2008, a profound change and an accented diversification of the financing canals of the economy have been done worldwide.

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[1] Proxy variable provided by the State Financial Operations Tables of the West African States Central Bank which regroups the financings from speculative markets, non-financial companies and informal finance.

The finance, which is classically duopoly (direct and indirect finance), strongly ill-treated by an excessive regulation very quickly found itself unable to boost up the growth in developed , emergent and underdeveloped countries.

For the economies in construction, the financing of growth becomes then a major preoccupation. Their companies, as development incentives, undergo great difficulties to perform.

The often noticed reason is the obstacle they come across to find enough funds in relationship with their production and development goals.

In fact, long term adequate instruments are practically non-existent in their banking and traditional financial system.

So the fundraising strategy constitutes for these States and for any company, a first-rate difficulty, but also and mainly a bet in the future. The gathering of resources which is about it, is an essential activity as well as during the time of the creation of commercial entity than for the needs of growth of these young States.

The apprehension of the shadow banking system by its impact on growth in the WAEMU area is therefore of an undeniable relevance in the current context of globalization.

No area can develop in financial autarchy in this planetary village with decompartmentalized economic barriers. Besides, the macroeconomic problems of developing countries and even emergent ones have been positioning for more than a decade to the foreground of relative preoccupations of the stability of international economy.

Their weak incomes related to underdevelopment and the specific problems they come across in their titanic efforts to achieve emergence make of them the weak links of the system, in which economic crisis can be badly felt with such a consequence as a political, social and financial instability which can threaten the world macroeconomic balance.

The world is a vast place of financial products exchanges which transcend physical barriers. This dematerialization is expressed in a continuous flow of capitals in a vicious, multi-currency and multi-form financial market characterized by an interdependence of open national economies.

WAEMU is an economically depressed currency board, anchored to a foreign currency which undergoes the European community decisions dictated by the preservation of its interests. It cannot allow itself to go away from the shadow banking system.

The shadow banking system emerges as a real alternative of financial resources gathering and can be defined like a financial intermediation system which gathers external entities to the traditional banking sector, but fulfills partly similar functions (Esther and Plihon, 2010).

The economic literature (theoretical but mainly empirical) very lately got interested in the shadow banking system phenomenon. Despite its importance, it has not been so far about relevant empirical studies which are specific. Nevertheless, a more refined analysis allows us to realize that the topic is of interest for a certain number of writers, some of whom conceive it like the readiest form of financial innovation, whereas for others, it is about a wound that gangrenes the financial system and that is responsible for the recent economic crisis.

The study of the shadow banking negative consequences is undoubtedly the fact of neo-keynesian and pro-minskian writers. Actually, for the Keynesians, a balanced economic growth would not rely on a system totally dependent on a lever effect, because the base of such allotment of resources, essentially composed of speculative and fluctuating products, would do nothing but accentuate the financial instability.

The pro-Minskians, on the same line, describe the mechanism at the origin of the financial instability. They consider that the main pushing elements are :

☞   the rate interest increase and ;

☞   The capital reported debt rate.

As a matter of fact, these two variables as described prevent the optimal coverage from risks making thus projects financed by speculative funds very vulnerable. The breakdowns which would result from this situation will create a brutal drainage of the market capitals, which would oblige the agent holders of assets in cash to get rid of them very quickly

On the other hand, with the studies of financial innovations impact, namely those of the financial system parallel with the economy, the positive effects appear since 1980 in empirical literature with the advent of the endogenous growth theory.

In fact, for Romer (1986), Lucas (1988) and Barro (1990), the economic growth explains itself by the endogenous factors such as the capital, the know-how and the progress contrary to Solow's (1956) exogenous growth model.

Generally, financial system contemporary theoreticians unanimously recognize that shadow banking is a fund provider to the actual economy: necessary resource which the classical system is quite often unable to provide from the fact that among other reasons of an excessive prudential regulation. Blanqué (2015) says that the expression « market based financing » is more indicated than «shadow banking » all the more that it actively contributes to the economy funding and to the lessening of the banking houses statements. Its relevance being then known, it is no longer up-to-date to feel guilty about it but rather organize and supervise it so as to:

☞ rid it from the probable germs of systemic breakdown and ;

☞ reinforce its weak links which can weaken and jam the financial machinery.

Shadow banking is then a necessity and must, as well as the traditional financial system, contribute to the emergence of a real, dynamic, strong and sustainable economy. According to Gruffat (2015), *« Shadow banking contributes to develop the competition in a financial sector dominated by some big banks and that it is at the same time safe and useful for the economy funding to vary and specialize those financing, but what to avoid, as it is the case in China is to leave to the non-banks the need to fund the most exposed and the least capitalized sectors »*.

So as to allow it to really play this lever role, it is urgent to specify and regularize it. Ever since, the post-crisis literature has much focused on the prudential and regular aspects rather than on the existential approach of the shadow banking phenomenon.

For the authors such as Mellios (2015) and Jean J (2015), the danger also lies on an excess of zeal in the regulation which would make possible to a fragmentation of the parallel system enabling to lead to the gestation of micro-shadow beyong any control.

Besides, caution is recommended about this standardization attempt to avoid a structural transformation and a migration of entities which can result in an overregulation.

The relevance and the legitimacy of our study lay on the fact that it is the first of this type in the WAEMU area and that it gives a way to research and analysis on a real phenomenon for which no economy is an exception today, not even the emergent ones.

Our article is not about a relative discussion to the existence of shadow banking in the sub-regional financial environment; this seems quite true, but rather than analyze its contribution to the WAEMU nations economic growth. Our hypothesis stipulates that shadow banking positively and significantly affects the WAEMU countries economic growth more than classical funding.

The rest of the article is organized as follow:

❖ Introduction ;
❖ Model presentation ;
❖ Global interpretation of the model results;
❖ Conclusion.

2. Model presentation :

Our goal is then to turn into econometric model the relationship between the economic growth and shadow banking.

In our analysis, the economic growth represents the explained or dependent variable and shadow banking, an explicative variable.

Since shadow banking is an aggregate variable, we will capture it by a proxy variable that is to say: non-banking public funding system. This proxy variable provided by the State Financial Operations Tables (SFOT) of the Central Bank of West African States regroups the funding from speculative markets, non-financial companies and informal funding.

Since it is about a proxy variable, Cobb Douglas's substitution function seems to us the most indicated to achieve prospective results.

The table below gives us the initial series to launch the model.

Table 1: Funding a non-banking system (CBWAS source-Checked series)

CODE	KKKFP1082A0AP
DESCRIPTION	Non Banking System Funding
UNIT OF MEASURE	FCFA
MAGNITUDE	Milliards Billions
SOURCE	Ministry of Economy and Finance.
SERIES TYPE	Flux Flow

OBSERVATION METHOD	Amount on the Period
2000	17,8
2001	-4,4
2002	-7,4
2003	-2,8
2004	43,6
2005	16,9
2006	29,65
2007	-53,6
2008	85,2
2009	-29,1
2010	29,2
2011	21,1
2012	145
2013	156,1
2014	-69,18

Source : SFOT, CBWAS 2015

The Cobb Douglas's use necessitates the treatment of the series in order to replace the negative values by some potentials which are able to be taken into account through a logarithmic declination of our basic model.

It is firstly about bringing all the negative values to zero and then proceeding to the smoothing of the series by the HP filter (Hodrick – Prescott) so as to obtain the series trend. Since then, we can take back our data with, in place of negative values, underlying values.

Basic model: Cobb Douglas's model

$$Y = A \, K^{\alpha} \, L^{\beta}$$

$$Y = Production$$

$$A_t = Technology$$

$$K_t = Capital$$

$$L_t = Job$$

$$K_t = K_{Priv} + K_{Pub}$$

$$K_{Pub} = BK_1^{\alpha_1} * K_2^{\alpha_2}$$

$$K_1 = K_{Pub\_banking}$$

$$K_2 = K_{Pub\_nonbank}$$

$$Y = A[K_{Priv} + K_{Pub}]^\alpha L^\beta$$

$$LogY = LogA + \alpha Log[K_{Priv} + K_{Pub}] + \beta LogL$$

$$= LogA + \alpha Log\left[K_{Pub}(1 + \frac{K_{Priv}}{K_{Pub}})\right] + \beta LogL$$

$$= LogA + \alpha LogK_{Pub} + \alpha Log\left[1 + \frac{K_{Priv}}{K_{Pub}}\right] + \beta LogL$$

$$or \ K_{Pub} = BK_1^{\alpha_1} * K_2^{\alpha_2}$$

$$LogY = LogA + \alpha Log\left[BK_1^{\alpha_1} * K_2^{\alpha_2}\right] + \alpha Log\left[1 + \frac{K_{Priv}}{K_{Pub}}\right] + \beta LogL$$

$$= LogA + \alpha Log\left(BK_1^{\alpha_1}\right) + \alpha LogK_2^{\alpha_2} + [\dots \dots \dots]$$

$$= LogA + \alpha LogB + \alpha\alpha_1 LogK_1 + \alpha\alpha_2 LogK_2 + [\dots \dots \dots]$$

$$A_1 = [LogA + \alpha LogB]; \lambda_1 = \alpha\alpha_1 ; \lambda_2 = \alpha\alpha_2$$

$$LogY = A_1 + \lambda_1 LogK_1 + \lambda_2 LogK_2 + \alpha Log\left[1 + \frac{K_{Priv}}{K_{Pub}}\right] + \beta LogL$$

$$\begin{cases} \hat{A}_1 = Log\hat{A} + \hat{\alpha}LogB \\ \quad \hat{\lambda}_1 = \alpha.\alpha_1 \\ \quad \hat{\lambda}_2 = \alpha.\alpha_2 \end{cases}$$

$$\begin{cases} \hat{\alpha}_1 = \dfrac{\hat{\lambda}_1}{\alpha} \\ \hat{\alpha}_2 = \dfrac{\hat{\lambda}_2}{\alpha} \end{cases}$$

$$\hat{A}_1 - Log\hat{A} = \hat{\alpha}LogB$$

$$LogB = \frac{1}{\hat{\alpha}}\left[\hat{A}_1 - Log\hat{A}\right]$$

$$B = e^{\frac{1}{\hat{\alpha}}[\hat{A}_1 - Log\hat{A}]}$$

Elucidation of the model variables

The main model variables are:

❖ the public banking funding (K_1) ;

❖ the public non-bank funding (K_2) ;

❖ the private funding (K_{priv}) ;

❖ the rate $\dfrac{K_{priv}}{K_{pub}}$

❖ the work force (L)

In the equation of the model, the economic growth is obtained by (Y) which represents the Gross Domestic Product (GDP). We go from the following theoritical model :

$$LogY = A_1 + \lambda_1 LogK_1 + \lambda_2 LogK_2 + \alpha Log\left[1 + \frac{K_{Priv}}{K_{Pub}}\right] + \beta LogL$$

Model launching:

In this part we unfold the econometric estimations. And, from the obtained results, we will test the research hypotheses and will assess the impact level of shadow banking on the economic growth by means of the proxy variable. After the treatment of initial data, we obtain the below smoothed series which will allow to launch the model. This series is composed of chronological data covering the period from 2000 to 2014.

Table 2 : Underlying values table

Year	GDP	Kpub	Kpriv	Kpub bc	Kpub nbc	ratioplus1	Work force
2000	3331,8	426,2	2533,5	408,4	17,8	6,95	4092071
2001	3575,5	450,7	2790,4	445,6	5,070	7,19	4213183
2002	3717,6	493,2	2973,1	484,2	8,948	7,03	4347798
2003	3986,4	518,3	3063,0	505,2	13,105	6,91	4483596
2004	4242,8	571,0	3290,1	527,4	43,6	6,76	4630827
2005	4592,7	610,6	3565,0	593,7	16,9	6,84	4776363
2006	4893,6	668,1	3871,5	638,5	29,65	6,79	4921476
2007	5408,3	767,1	4270,6	734,4	32,677	6,57	5073814
2008	5994,5	806,4	4890,0	721,2	85,2	7,06	5233032
2009	6033,4	861,0	4857,7	815,9	45,106	6,64	5398218
2010	6401,8	947,4	5024,0	918,2	29,2	6,30	5569017
2011	6782,8	1052,5	5234,7	1031,4	21,1	5,97	5750213
2012	7263,8	1108,2	5562,5	963,2	145	6,02	5935546
2013	7386,7	1133,1	5733,3	977,0	156,1	6,06	6118166
2014	7741,3	1200,3	5993,4	1120,4	79,809	5,99	6316988

Source: Statistician of CREFAT, CBWAS data (smoothing filter HP)

For the worries of the series widening, we have operated a regression by using the bootstrap technique with a 35 observations replication.

These observations will consent to the econometric tests and will attribute certain robustness to the prospective results.

This chronological series will allow us to follow the evolution of the variables during the reserved period. Let's make it clear that all the data are in Billions Francs CFA.

We have recourse to the Ordinary least squares Method (OLS) to eliminate the coefficients of the model. The launching is done in STATA and the levels of 1 percent, 5 percent and 10 percent have been retained for the validation tests.

We want to know, through the model, if the non-banking public funding which translates the shadow banking has a positive impact on the economic growth: it is the principal hypothesis of the model.

Basic equation :

$$LogY = A_1 + \lambda_1 LogK_1 + \lambda_2 LogK_2 + \alpha Log\left[1 + \frac{K_{Priv}}{K_{Pub}}\right] + \beta LogL$$

Formulation of hypotheses

H_1 : $\lambda_2 > 0$: the non-banking public funding has a positive influence on the economic growth.

H_2 : $\lambda_2 < 0$: the non-banking public funding has a negative influence on the economic growth.

In economic literature, the economic growth explicative variables are in the long run: the active economically population growth, the technology growth and the growth of the capital represented in our equation by public funding (banking public funding and non-banking public funding) and the private funding.

The model developed is essentially an instrument of quantitative analysis which will give an idea on the link between the non-banking public funding and the economic growth. It will allow us to bring a contribution to know the impact level of shadow banking on the economic growth.

The Tests used

❖ Validation test of the model

The estimation by the OLS is based on the following hypotheses:

H1: $n > k$. This hypothesis means that the number of observations must be higher than the number of explicative variables.

H2: The matrix rank of the explicative variables is equal to k (X'X is inversible)

H3: $E\ (\varepsilon_t) = 0$. This hypothesis postulates that the mathematic expectation of the risks is nil. The variations are then observed without any errors.

H4: $E\ (\varepsilon_t^2) = \delta^2$. The expectation of the square remainders equals the variance, which means that the appreciator of the OLS is without any error.

H5: $Cov\ (\varepsilon_t, \varepsilon_{t'}) = 0$. This hypothesis shows that the mistakes are not self-correlated.

H6: $\varepsilon\_t \rightarrow N\ (0, \delta^{\wedge}2)$. The chance follows a normal law.

H7: $Cov(\varepsilon_t, X_t) = 0$. The errors of observation and the explicative variable are independent. Validation tests are done before the interpretation of coefficients.

Table 3: results of the estimation by the 'Ordinary least squares' method (OLS)

Linear regression					Number of obs	=	15
					Replications	=	35
					Wald chi2(5)	=	5198.54
					Prob > chi2	=	0.0000
					R-squared	=	0.9984
					Adj R-squared	=	0.9975
					Root MSE	=	0.0142
logpib	Observed Coef.	Bootstrap Std. Err.	z	P>|z|	Normal-based [95% Conf. Interval]		
logkpub_bc	.4601334	.1467034	3.14	0.002	.1726		.7476669
logkpub_nbc	.0299168	.012722	2.35	0.019	.0049822		.0548513
logratioplus1	.4681673	.1597262	2.93	0.003	.1551098		.7812248
logpopactiv	.9912402	.3836653	2.58	0.010	.2392699		1.74321
inf	.0047098	.0049802	0.95	0.344	-.0050513		.0144708
_cons	-10.74621	4.972069	-2.16	0.031	-20.49129		-1.001138

Source: statistician of CREFAT

With these results, we obtain by substitution the following estimated equation:

$$LogY = -10{,}75 + 0{,}46 LogK_1 + 0{,}02 LogK_2 + 0{,}46 Log\left[1 + \frac{K_{Priv}}{K_{Pub}}\right] + 0{,}99 LogL.$$

We have gone through the following tests:

❖ Student's Test

This test allows us to see individual meaningfulness of the model coefficients.

Constancy (c)

$$\begin{cases} Ho: a = 0 & prob > 0{,}05 \\ H1: a \neq 0 & prob < 0{,}05 \end{cases}$$

Prob= 0,031 $<$ 0, 05 so the constant is meaningful

Interpretation: The constant then affects meaningfully the model.

The banking public funding (LogKpub bc)

$$\begin{cases} Ho: c = 0 & prob > 0,05 \\ H1: c \neq 0 & prob < 0,05 \end{cases}$$

Prob=0.002 < 0, 05 so

. Interpretation: the banking public funding has a meaningful influence on the economic growth.

The non-banking public funding (LogKpub nbc)

$$\begin{cases} Ho: c = 0 & prob > 0,05 \\ H1: c \neq 0 & prob < 0,05 \end{cases}$$

Prob= 0.019 $a < 0.05$

Interpretation: the non-banking public funding has a meaningful influence on the model.

Ratio plus1 (Logratioplus1)

$$\begin{cases} Ho: c = 0 & prob > 0,05 \\ H1: c \neq 0 & prob < 0,05 \end{cases}$$

Prob=0.003 < 0.05

Interpretation: the Rate has a meaningful influence on the model

Work force (Logpopactiv)

$$\begin{cases} Ho: c = 0 & prob > 0,05 \\ H1: c \neq 0 & prob < 0,05 \end{cases}$$

Prob= 0.010 < 0.05 so

Interpretation: the active Population variable has a meaningful influence on the model.

❖ FISHER'S TEST

This test gives an idea on the meaningfulness on the model

$$\begin{cases} Ho: bad\ model & prob > 0,05 \\ H1: good\ model & prob < 0,05 \end{cases}$$

Prob (F-Statistic) = $0.000000 < 0, 05$

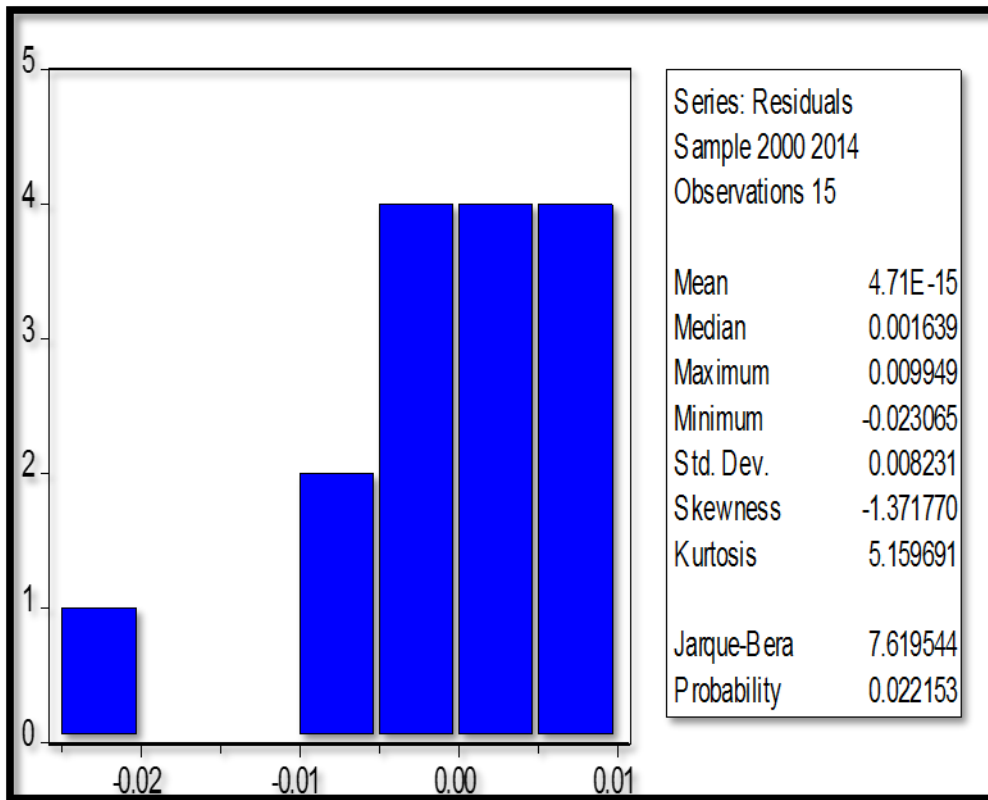Interpretation: the model is good and it is globally meaningful

Figure 1: Normality Test – Jacques Bera's Test

Source: Statistician of CREFAT

$$\begin{cases} Ho: normal\ error \quad prob > 0,05 \\ H1: non\ normal\ error\ prob < 0,05 \end{cases}$$

$$Prob = \ 0,022153 < \ 0,05,$$

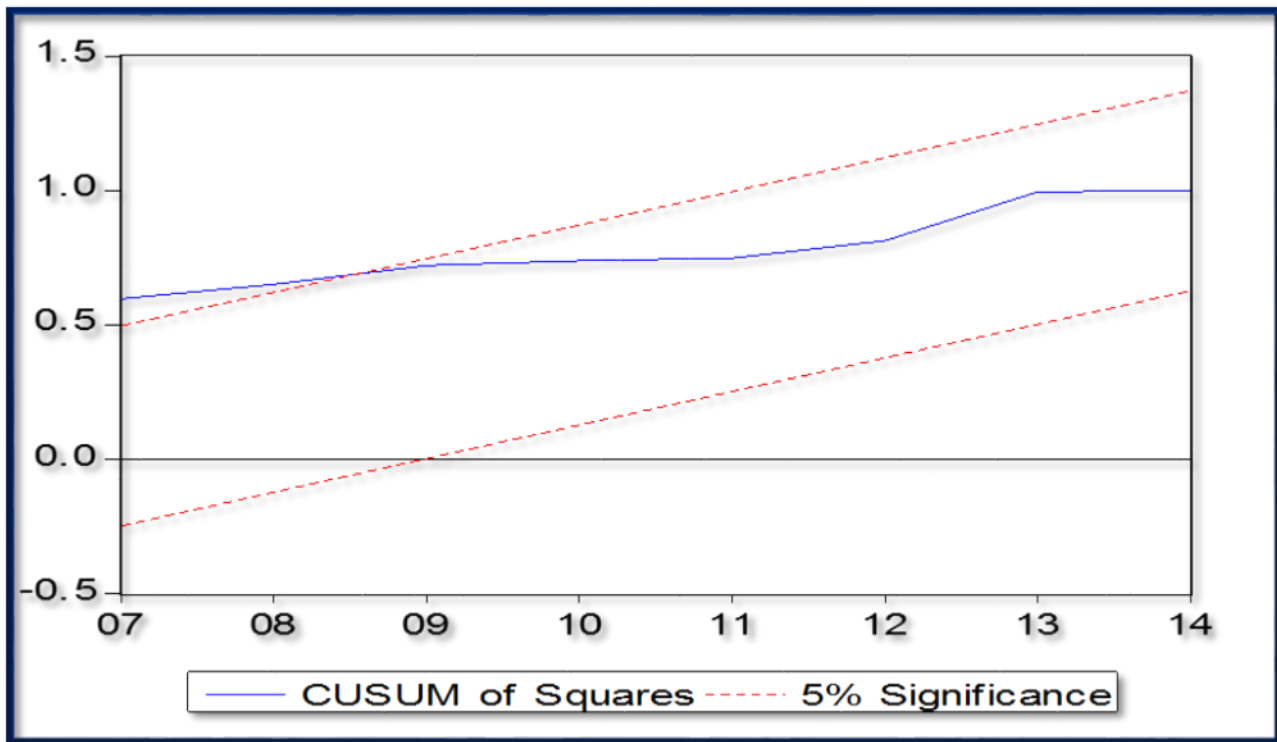Interpretation: we accept _H_1 so the errors of the model do not follow a normal law.

Figure 2: Cusum's Test

Source: statistician of CREFAT

According to CUSUM's test, we notice that the model is unstable on the period 2007-2009

This instability is explained by the sub-primes crisis which resulted in a world crisis influencing negatively the Senegalese economy. This empirically confirms our assertions mentioned in the theoretical analysis.

3. Global interpretation of the model results

The hypothesis according to which shadow banking   obtained by the non-banking public funding would have a negative influence on the economic growth has been invalidated because we have noticed that the

coefficient that affect (λ_2) is positive.

So, shadow banking positively impacts to the economic growth.

The Student's test has shown us that all the variables free from the model including the constant are statistically significant.

Fisher's test has confirmed the global significance of the model.

Jacques Bera's test has revealed that the errors of the model variations do not follow a normal law.

CUSUM's test has detected instability of the model from 2007 to 2009. It is a situation which explains itself by the sub-primes crisis which has become a world financial crisis.

The value of the fixing coefficient (R^2) is up to 0.9984. It is very close to the unit. It shows therefore that 99.84 percent the economic growth variations are explained by the variables free from the model such as the public banking funding, the non-banking public funding, the active population, the public rate /private funding.
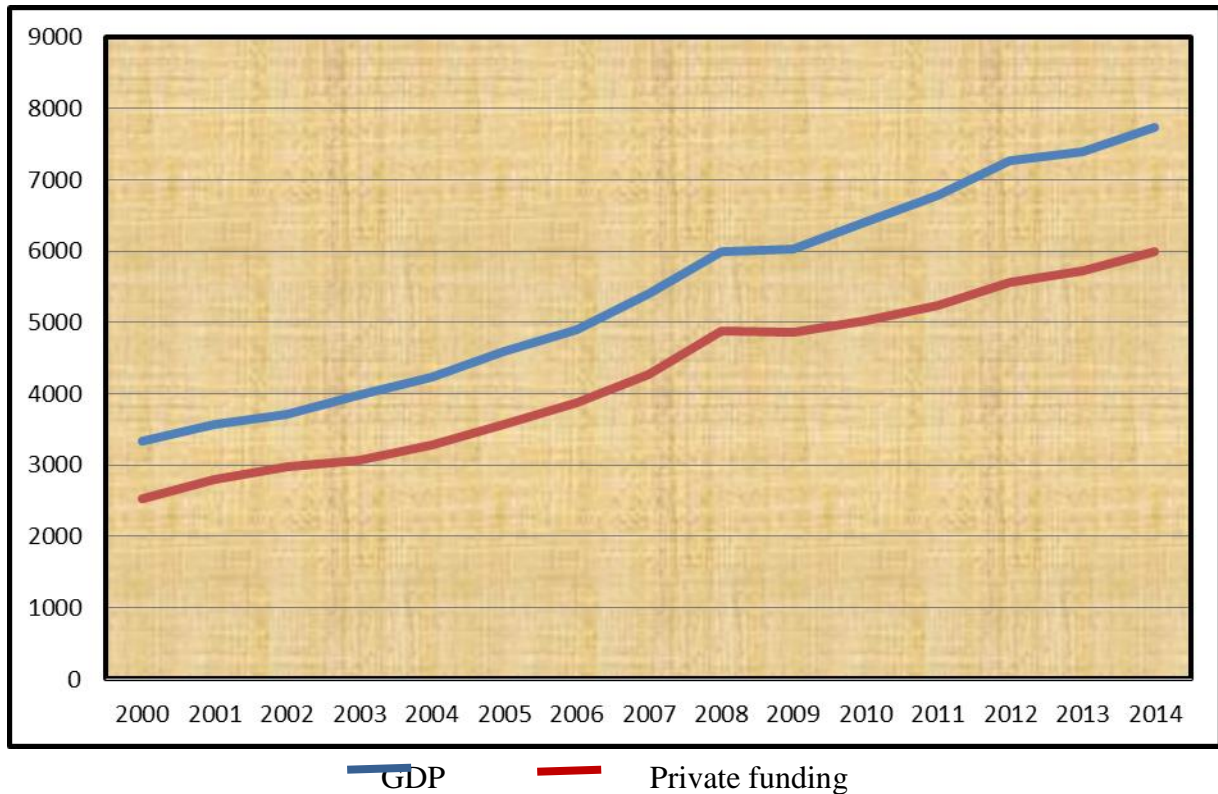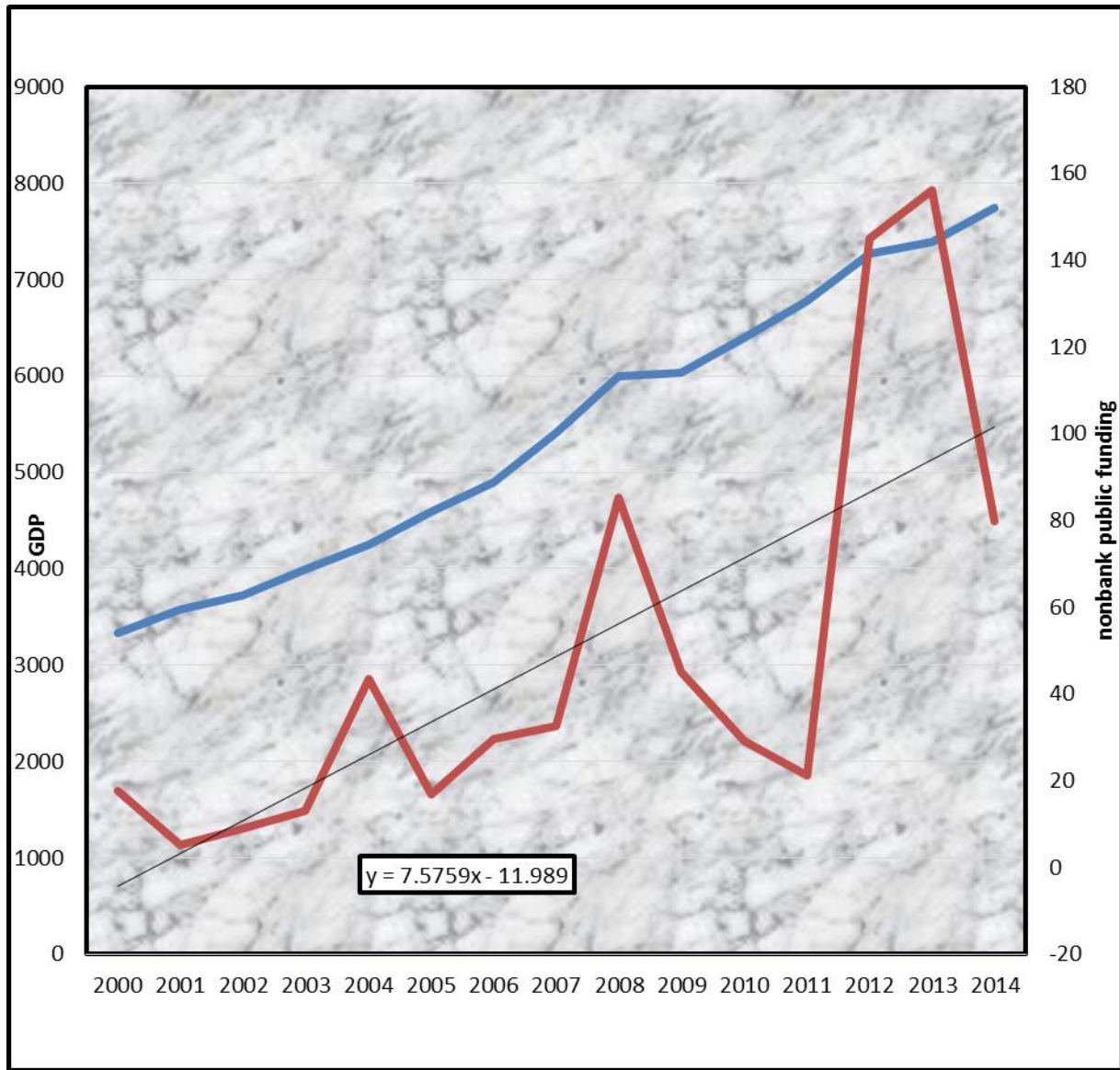
Figure 3: Evolution of explicative variables in relation with the GDP

Source: statistician of CREFAT

Interpretation: We remark that the GDP develops the same as the private funding. It is then a growing function of the private funding.

GDP   Non-bank-public funding ⎯⎯   linear (Non-bank-public funding)

Figure 4: Evolution of the GDP and the non-banking public funding in billions

Source: statistician of CREFAT

Interpretation:

We notice that the curve representing the non-banking public funding has an irregular development because of the negative values in the initial series. After the smoothing of the data, we observe that the GNP follows the same trend as the non-banking public funding.
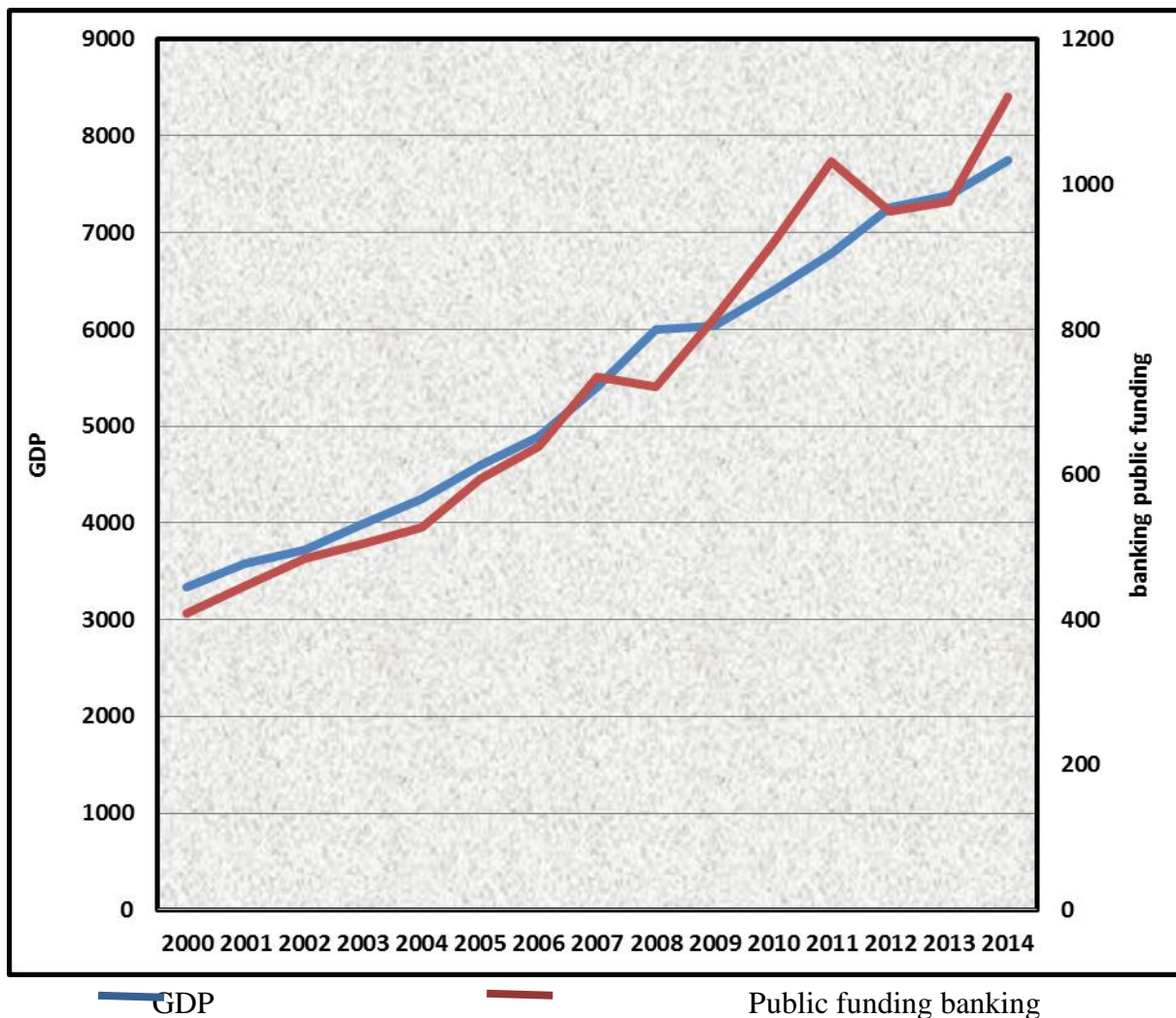
Figure 5: Evolution of the GDP and the public banking funding in billions

Source: statistician of CREFAT

Interpretation

We remark that the GDP does not follow the growing trends of the public banking funding. What confirms the hypothesis to which our banks dislike the risks and do not finance growth. They are more specialized in short –term fundings which are less constraining and easier to recover to the detriment of important investments.

4. Conclusion

The empirical results of our research studies corroborate our hypothesis for which shadow banking system influences in a significant way the Senegalese economic growth.

However, the use of the fundraising instrument of such an importance requires from these states which evolve in an unfinished economic environment, the implementation and the incorporation of an existing regular plan, moderate, realistic and prudential standards.

It is not about a mechanic and systematic importation of directives recommended by the Bâle committee, for, such an approach could lead us to disillusionment. To convince oneself, it is simply about analyzing

the relationship « level of application of prudential norms / level of our countries real economy » in WAEMU zone. We realize that the nations which are very respectful about the prudential standards application such as Guinea Bissau have a real economy which is lagging behind, compared to Ivory Coast which shows a two-digit growth.

The control of shadow banking is without doubt a great challenge for the regulator, because it has in its own some defects which are specific to it but also almost all the risks of the classical system such as the credit risk, liquidity credity, maturity risk and all the panoply of operational risks.

Shadow banking through its interconnections and interpenetrations with other financial systems brings about very quickly systemic crises contrary to the classical finance whose defects can more easily be contained. When the difference shows itself, it is more visible than nature.

In terms of economic politics, our results suggest widening the perimeter of action of West African States Central Bank and integrating in its domains of competences the regulation of parallel finance. This will allow controlling the components of shadow banking as well as for the entities to the activities but also being careful about the heterogeneous products of hybrid transactions between parallel and classical Finance.

Still in the same logic, the application on the fundraising transactions of an important concessional rate of refinancing would permit to avoid the financial dumpers who are not playing right as far as the competition is concerned on the mutually agreed market, in the long run, would be able to threaten the global balance of their young economies.

This measure would turn the products of shadow banking less volatile, less opaque and then less risky.

Some activities such as securitization should be subject to a particular supervision in their immature economies. On the other hand, the toxic products like the resecuritization should be banished from financial practices because, as a reminder, the endorsable, divisible and transmissible speculative titles always have a high degree of involvement in the contemporary systemic crisis.

These recommendations which are able to find their validation in a community level could be about specific adjustments in each state; as far as the asymmetric character of our economies is concerned, yet without going away from the macro prudential orientation of the regulation of the WAEMU zone financial system.

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