



PROPOSED INDICATORS FOR MACRO-PRUDENTIAL SUPERVISION OF THE BANKING SYSTEM IN THE CEMAC ZONE

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Monitoring the banking system

1. The microprudential approach

This approach, which entails the individual assessment (internal control) of each financial establishment, is in line with the recommendations of the Basel Committee on Banking Supervision.

Here, the supervisory authority has to ensure that banks comply with the regulations relating to the management, caution and dissemination of information, in order to protect depositors and guarantee confidence in the banking system.

Several authors (Shen and Hsieh [21], 2004; Cole and Gunther [7], 1998) analyse two micro-prudential monitoring variants either based on a periodic audit of banks or on observing a set of financial stability indicators (FSIs).

The micro-prudential approach has two important shortcomings: firstly slowness in predicting banking system weakness and secondly difficulty in identifying threats to the system.

Monitoring the banking system

2. The Macro-prudential approach

According to Borio [5] (2008), it is not easy to find a universally accepted definition for the term “macro-prudential” because, even if the connotation to which it refers is directly recognizable, its meaning remains largely ambiguous.

According to the BIS, the macro-prudential approach is a (good) complement of the microprudential approach which helps (by taking into account macroeconomic factors) to perfect the banking system monitoring mechanism by taking into account not only the individual exposure of banking institutions but also that of the system as a whole.

Similarly, in their attempt to define macro-prudential indicators, Evans [13] (2000), Hilbers et al [16] (2000) state that these are pointers to the health and stability of the financial system which can be used to assess its vulnerability to shocks.

Monitoring the banking system

2. The Macro-prudential approach

Instead of attaching a lot of importance to each bank as an independent financial institution, the macroprudential approach rather considers the contribution of the bank in terms of risk induced on the system (Crockett, 2000).

Comparing Macro and microprudential approaches		
	Macroprudential approach	Microprudential approach
Operational objective	Reduce the risk of weakness of the entire system	Reduce the risk of bankruptcy
Ultimate objective	Avoid losses (in GDP points) due to a financial crisis	Ensure the protection of investors and creditors
Types of risk	(Partly) Endogenous	Exogenous
Correlation and contagion effects between institutions	Important	Not pertinent
Monitoring method	In terms of overall weakness of the system (top-bottom)	In terms of individual weakness (bottom-top)

Source: Borio [4] (2003)

Methodological Approach

1. Theoretical framework for analysing the banking system

- **Weakness of a bank.**

A bank is said to be weak when it presents the risk of requiring external intervention to ensure its survival.

- **Weakness of a banking system**

The weakness of the banking system can be seen as an aggregation of weaknesses of individual banks coupled with the resulting negative externalities.

- **Deterioration of the banking system**

The deterioration of the banking system is part of the dynamics of weakness. A banking system can thus be said to have deteriorated when it is more fragile at a particular period than at a previous one.

- **The crisis of the banking system**

This marks the outcome of the banking system deterioration process. It therefore becomes necessary for the regulator to intervene in order to reduce the magnitude of the damage caused by the crisis and boost banking activities.

Methodological Approach

2. Formalizing the notion of banking system weakness and deterioration

we present two methods for aggregating the individual weaknesses of banks into a systemic weakness.

To this end, the following variables will be used:

n_{1t} : number of banks ranked as weak under the rating system as of the date t

n_{2t} : number of banks classified as not weak under the rating system as of the date t

E_{1t} : sum of the net commitments of n_{1t} banks classified as weak as of the date t

F_t : intervention funds available in the coffers of the regulator

α_t : level of weaknesses ranging from 0 to 1 as of the date t .

Methodological Approach

2. Formalizing the notion of banking system weakness and deterioration

- **Approach by numbers**

This is a direct approach which entails comparing the number of banks deemed weak by the rating system to the number of banks considered to be financially viable. Thus, by adopting the values above,

The banking system will be said to be weak if $n_{1t} > n_{2t}$

- **Approach by cost of the regulator's intervention**

For the regulator, in order to take on board the weight of banks in the weakness of the banking system, it would be advisable to consider the amount of injections necessary to revive it should its weakness lead to a banking crisis.

Let η_t be the degree of weakness of the banking system as of the date t .

Therefore:

$$\eta_t = \frac{E_{1t}}{F_t}$$

And The banking system is said to be weak if $\eta_t > \alpha_r$

Methodological Approach

3. Formalizing the notion of banking system deterioration

The deterioration of the banking system represents the evolution of its weakness and is thus part of a dynamic process. Therefore, the deterioration of a banking system at a given date is the growth rate of its weakness as of that date.

By considering the approach by numbers, a system can be said to have deteriorated if $n_t > n_{t+1}$.

With the approach by costs, if we let β_t be the deterioration of the banking system as of the date t , using the values above, we have: $\beta_t = \frac{\eta_{t+1} - \eta_t}{\eta_t} = \frac{\Delta\eta_t}{\eta_t}$

The financial system will be said to have deteriorated or not depending on whether β_t is positive or negative. The rate of deterioration will be found using the absolute value of β_t .

Let d_t be the binary variable of deterioration defined by: $d_t = \begin{cases} 0 & \text{if } \beta_t \leq 0 \\ 1 & \text{if } \beta_t > 0 \end{cases}$

Application of the theoretical approach

According to the SYSCO rating, 67 % of the banks surveyed fall under classes 1 and 2. In order to ensure some fluctuation in the weakness variable, we will consider that groups 1 and 2 represent viable banks while the other groups are made up of banks considered to be weak.

1. Construction of a banking system weakness variable

For the construction of this variable, we need to know three elements: the banks considered to be weak during the period under review; the amount of commitments of these banks for each period and the amount of funds the regulator would be ready to inject in order to prevent the system from going bankrupt. Bearing in mind the weakness threshold allowed by the regulator for each period, we can define the binary variable of failure of a banking system.

Thus, for each banking system, the variable “degree of weakness”, was got by establishing a relationship between the monthly commitments of the banks of the system which are considered to be weak and 1% GDP of the corresponding quarter.

Application of the theoretical approach

2. Construction of the banking system deterioration variable

Having an idea of the degree of weakness of a banking system is a key input used by the regulator to make decisions. To develop a forecasting mechanism on the probability of deterioration of the situation of the system we had to assess the system dynamics by comparing successive situations. To this end, we used the weakness variable to build a new quarterly variable that reflects the deterioration of the system, also on a quarterly basis.

Monitoring a banking system should be a permanent activity. With this, one of the qualities required of a good indicator is that it should be available within a relatively short period of time (at most quarterly). This variable will be used in the regression model which will be developed later.

Therefore, the CEMAC banking system will be said to be deteriorating at the date t if the rate of variation of the degree of weakness between t and $t + 1$ is higher than 25%; This means that if $\frac{\Delta\eta_t}{\eta_t} > 25\%$

Therefore, we have
$$d_t = \begin{cases} 1 & \text{if } \beta_t > 25\% \\ 0 & \text{if not} \end{cases}$$

Econometric Analysis and recommendations

3. Presentation of other variables and data used

Below are the variables most used and which we had at our disposal in this study. The explanatory variables of the final model will be chosen from among this set of variables.

- **Aggregate micro-prudential variables**

Apart from the SYSCO rating variable and the owners' equity variable, indicated above, we got all the micro-prudential variables for each bank from BEAC. (Ratio of owners' equity on total assets (*fp-ta*); Ratio of bad debts on owners' equity (*credou-fp*); other micro variables tested)

- **Macro-prudential variables**

The macroeconomic data used is drawn from two sources: the WDI-2007 of the World Bank for GDP variables and foreign debt, on the one hand, and from the IFS database of the IMF for the other variables. (GDP growth rate (*tcpib*); Rate of increase of the Dollar-CFA exchange rate (*tctc*); Foreign Direct Investment-GDP Ratio (*fdi-pib*); Inflation (*inflation*))

- **Variables obtained from the micro-macro combination**

(Ratio of credit to the private sector/GDP of the previous period (*creasp-pib*); The Credit-Export Product (*cre-export*); Other micro-macro variables tested)

Econometric Analysis and recommendations

1. The Econometric Analysis

Most studies carried out on this topic end up by making estimates of the data panel; with the panel being made up of either banks or countries (banking sub-system). Given that our study had to cover a set of 6 (six) banking sub-systems, we therefore had to adopt an approach whose outcome could be an estimate of the data panel. However, to do this (make estimates on the data panel), we needed to clearly specify the model, particularly with regard to uniformity between countries.

“From the econometric point of view, this means testing the equality of the individual coefficients of the model under study. At the economic level, specification tests entail determining if it is right to suppose that the theoretical model under study is perfectly similar for all the countries, or if on the contrary there are peculiarities that are unique to each country.” (Hurlin, 2003).

Since the variable of interest here is binary, we used the econometry of qualitative variables.

Econometric Analysis and recommendations

2. Results and Recommendations

At the end of this analysis, it emerges that the regulator needs to pay particular attention to six variables, coming from all the macroeconomic variables, all the aggregate microprudential variables, and from the combination of these two.

Thus, from a reference situation defined by the average level of model variables and a 29.1% risk of deterioration, a 1% GDP increase in claims over the private sector would lead to a 12.1% increase in the risk of deterioration of the banking system. While a 1% increase in the internal resources of the banking system as a percentage of total assets, would lead to a 14.8% reduction in this risk. These two variables stand out from the rest through the magnitude of their impact on the risk of deterioration of the CEMAC banking system.

Econometric Analysis and recommendations

2. Results and Recommendations

With this study, we were able to identify a set of aggregate micro-prudential variables, macro-prudential variables and other variables drawn from a combination of micro-macro indicators, which can be used to predict a deteriorating situation in the CEMAC banking system.

By determining the marginal effects of each of the variables on the probability of deterioration of the banking system, we were able to establish a hierarchy of variables, with regard to the importance we think the regulator should attach to them.

With repeated use, this forecasting model could easily be automated such that at any one time it can readily give the regulator the probability of deterioration of the banking system.

Econometric Analysis and recommendations

2. Results and Recommendations

The main shortcoming of this study is in the number of variables initially taken into account. The cumulative marginal effect of model variables which have a positive impact on the probability of deterioration is only about 14% while that of variables with a negative impact is about 18%.

Several other macroeconomic variables on which we did not have any data over the period under review, could be included in the analysis, and among them, some could even turn out to be important for predicting the deterioration of the banking system. Moreover, the model does not take into account some characteristics that are specific to the banking system which could be considered as qualitative variables, especially those relating to regulation and structuring of the system.



3rd Financial Risks INTERNATIONAL FORUM

RISK DEPENDENCIES Paris, March 25 & 26, 2010



THANKS

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