

Market discipline of Tunisian uninsured big depositors

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Abstract: *This article focuses on market discipline of Tunisian uninsured big depositors. The theoretical framework of market discipline is composed of two phases: the first one is made by the depositor recognition and control of bank risk and the second one is formed by the influence of depositor control on the bank conditions. The results of the regression of uninsured deposit variation on banking accounting information show depositor control based on efficiency and assets quality. However the results of the regression of bank characteristics on estimated deposit variation of a lagged period reject the reaction of the bank to depositor control. These findings support only the first phase of market discipline of uninsured big depositors: recognition and control.*

Key Words: *Bank risk, market discipline, uninsured big depositors*

INTRODUCTION

Facing the considerable costs of a bank crisis, government regulators decided to relinquish part of their bank monitoring to market players. Monitoring and sanctions imposed by the market players and the ensuing reaction of the banks constitute the market discipline. There are several market players, notably shareholders, subordinate debtors and uninsured big depositors. The latter are in a better position to impose market discipline because deposits constitute a continuous source of financing. They monitor their banks by transferring uninsured deposits to a better bank or requiring a higher deposit interest rate whenever the performance of their bank is not longer satisfactory. The bank reacts to this control by improving its financial conditions. The depositor control and the bank reaction constitute market discipline.

The authors in this field have only focused on the first phase of market discipline and have proved the uninsured big depositors control. In Tunisia, there hasn't been a research dealing with uninsured big depositor market discipline. The aim of this paper is to examine the two phases of market discipline of big uninsured depositors.

Through my research, I attempt to establish whether uninsured big depositors control their bank which reacts by improving its financial conditions. For this purpose, I first regress deposits variations of uninsured big depositors on bank fundamentals. I suppose that deposits variation depends significantly on bank fundamentals. Second, I regress bank fundamentals on estimated deposit variation of a lagged period. I suppose that bank fundamentals are significantly influenced by deposit variation of a lagged period.

I expect my results to be of great interest to academics involved in guiding and researching progress with international prudential regulation and to the Tunisian regulatory and supervisory authorities (Financial Market Council and the Central Bank of Tunisia) since the study provides insight into the existence of market discipline. Moreover, market discipline is one of the three pillars of Basel II. It is assumed in this new regulation that supervisory control must be reinforced by market discipline, which lead to a mixed control by regulatory authorities and market players. Therefore, my results could help to diagnose and promote this pillar and thus improve the adequacy of Tunisian prudential rules with international prudential rules.

The remainder of this paper proceeds as follows. The first section describes the Tunisian banking system. The second section presents the related literature. The third section deals with literature related to my research as well as hypothesis development. The fourth section describes the data collection process and the methodology. The fifth section discusses the findings of my research.

II. DESCRIPTION OF THE TUNISIAN BANKING SYSTEM

The Tunisian banking system is composed of fourteen commercial banks, eight banks of investment and eight offshore banks. However, there are only ten banks listed on the Tunisian Stock Exchange. There were important reforms of the banking system since 1987 such as deregulation, disintermediation and promotion of financial activity.

There is no deposit insurance system, but depositors have confidence in the intervention of the central bank in case of default. The central bank also has the authority to ask the bank's main shareholders to reorganize a failed bank

All bank activities are controlled by the Central Bank, the Superior Council of Credit and the Professional Association of Banks. The central bank established an important reform in 1991 bringing prudential regulation relating to financial balance, risks division, and non performing commitments and loans. Banks have to prepare for to the Central Bank periodic financial bank statements in addition to the yearly financial statements. In 1996, banks also took part in a program of improvement for Tunisian companies. However, before 1998, there wasn't an accounting framework for the banks' financial statement preparation. Instead, banks referred to notes and circular of the central bank. In 1999, the legislature has adopted bank accounting standards inspired from the IFRS.

III. THEORETICAL FRAMEWORK OF MARKET DISCIPLINE

According to Flannery(2002), effective market discipline includes tow components : control and influence. Control is the premise that market players can evaluate the bank conditions and reflect this evaluation in corrective actions. Influence is the bank reaction to this evaluation by improving its financial characteristics. In the same way, P.Hamalainen, M.Hall et B.Howcroft (2005) devides market discipline into tow phases: recognition and control. The recognition phase is composed of tow sub-phases. The first sub-phase is the recognition by market players that they face risk in case of default and must control bank risk. The second sub-phase is the capability of market players to recognise change in bank conditions. The control phase is also divided into to sub-phases. The first sub-phase is made by the corrective actions taken by market players. The second sub-phase is the reaction of the bank to these actions. Besides, Regulatory authorities react to market signals, which constitute indirect market discipline.

Lane (1993) identifies four conditions to effective market discipline : efficient markets, availability of relevant and reliable information on bank risk, market players don't believe that the regulator will save bank in case of bankruptcy and the bank react to market signals.

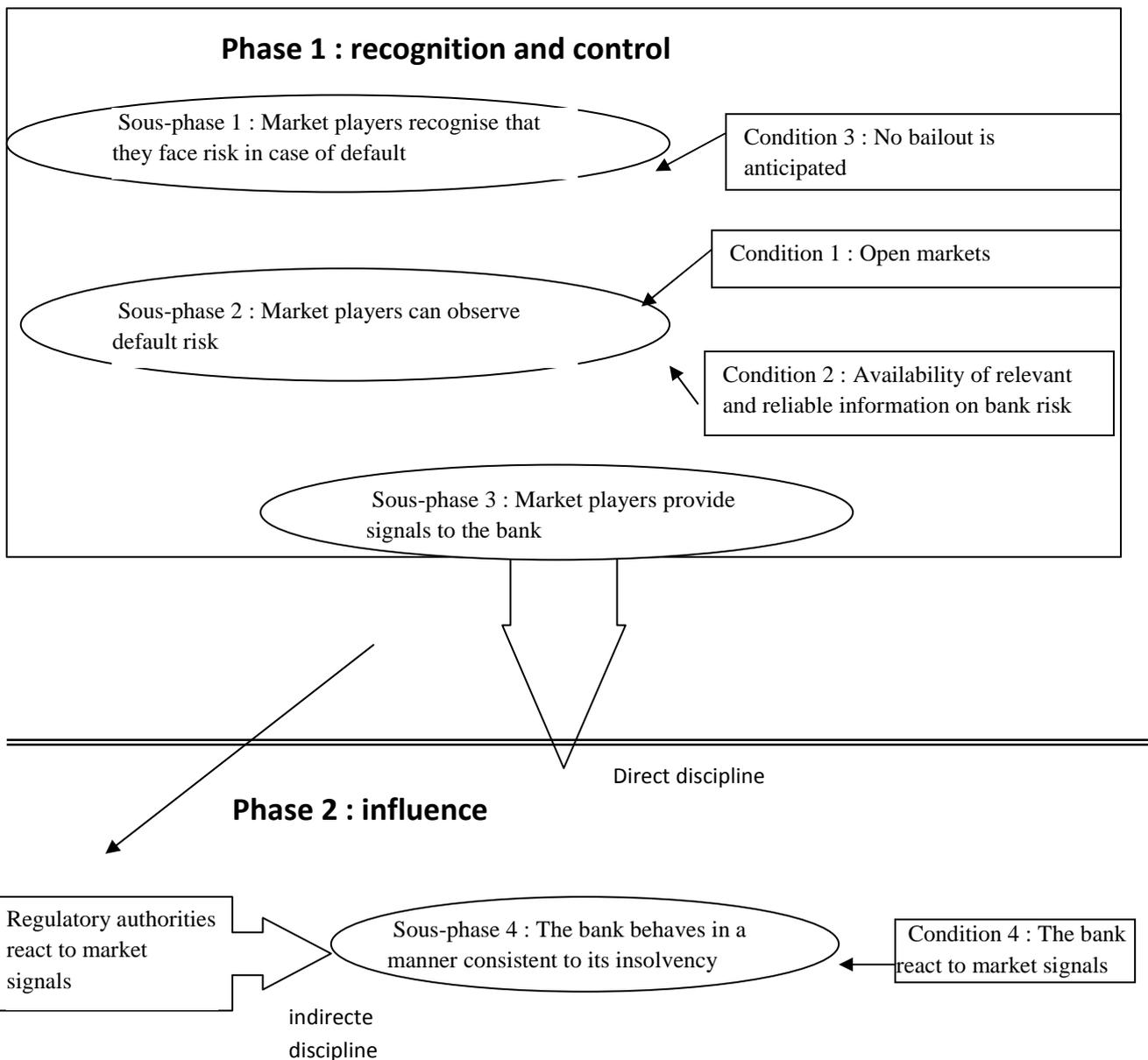
Inspired of these works, I present the following framework :

Phase 1 : recognition and control.: This phase is composed of three sub-phases. The first sub-phase is the recognition by market players that they face risk in case of default and must control bank risk. The second sub-phase is the capability of market players to recognise change in bank conditions. The third sub-phase is made by the corrective actions taken by market players. There are three conditions to this phase : efficient markets, availability of relevant and reliable information on bank risk and the market players don't believe that the regulator will save bank in case of default.

Phase 2 :Influence. This phase is formed by the fourth sub-phase; the bank behaves in a manner consistent to its insolvency as a reaction to the market's corrective actions. This phase is conditioned by the response of bank to market signals.

This framework is presented in the following figure.

Figure 1 : Framework of market discipline



Source: figure made by the author

IV. RELATED LITERATURE AND HYPOTHESIS DEVELOPMENT

Research on uninsured depositor market discipline has examined the influence of bank fundamentals on uninsured depositor decision-making. The uninsured depositors monitor their banks by transferring uninsured deposits to a better bank or requiring a higher deposit interest rate whenever the performance of their bank is not longer satisfactory. Thus, the authors regress the uninsured deposit variation and the deposit interest rate on bank accounting information.

Park and Peristiani (1998) find that uninsured depositors ask the American saving banks for compensation for the risk associated with bank fundamentals. Concerning Colombian depositors, Barjas and Steiner (2000) conclude that they control the bank risk through deposit

reduction. Also, deposit variation and deposit interest rate in Argentina, Chile and Mexico depend significantly on bank risk (Périas and Schmukler, 2001). However, A.El-Shazly (2001) finds little evidence of Egyptian big depositor discipline. On the other hand, Swiss depositors present a certain degree of market control in their reaction to bank risk (Birchler and Maechler, 2002). In the USA, Maechler and McDill_(2006) find that five bank fundamentals influence the decision making of American uninsured depositors. In India, Gosh and Das (2004) show that bank risk influence the amount of deposits of Indian uninsured depositors. Dreu and Loannido (2006) find that four fundamentals variables among six influenced market discipline of Bolivian uninsured depositors. Omet et al (2007) show Jordanian big depositors control and little evidence of Koweitian, Omani and Saudi big depositor discipline.

However, except Barjas and Steiner (2000), all these authors prove the first phase of market discipline: the depositor control. Thus, they don't examine if the bank reacts to this control and revises its financial conditions. As far as I know, studies focusing on Tunisian market discipline haven't been conducted. So, I seek in this paper to examine Tunisian big depositor discipline. I examine depositor control and bank reaction to this control. So, my hypotheses are:

H1: The uninsured deposit variation depends significantly on bank fundamentals.

H2: The bank reacts to the depositor control in a manner consistent with its insolvency.

V. SAMPLE AND METHODOLOGY

Sample and data

The sample includes the ten listed Tunisian commercial banks shown in table 1. I observe financial data of these banks during the period 1999-2004 in order to take into account the impact of the bank accounting reform of 1998. I also use data on deposits to term that are generally uninsured deposits of big Tunisian depositors which are available in the Central Bank.

[Insert table 1 here]

Variables

The dependent variable is the deposits to term variation that are generally uninsured deposits of big Tunisian depositors. It is measured by the first difference of deposits to term of the bank i at the time t .

The independent variables are variables reflecting bank risk. The most used variables reflecting bank risk in bank risk literature are the CAMEL variables. Several researchers (Sinkeys 1975, Demigüç-kunts and Detragiaches, 1998, Borios and Lowes 2002...) show that these variables accurately identified and predicted banks at risk. These variables are related to capital adequacy, asset quality, management, earnings, and liquidity. They are computed from bank financial statements.

Capital adequacy

Perias and Schmukler(2001), Birchler and Maechler (2001), Barjas and Steiner (2000), Maechler and MacDill (2006), Gosh and Das (2004) and Ioanidou and De Dreu (2006) measured this variable by the ratio of equity to assets. I use this same measure. I expect a positive effect of this variable on the variation of deposits to term.

Assets quality

Perias and Schmukler(2001) use the ratio of non performing loans to assets and the ratio of loan concentration. Birchler and Maechler (2002) include four measures: the ratio of other deposits than saving deposits to all the deposits, the ratio of deposits to mortgage lending, the ratio of mortgage lending to all the credits, and the ratio of inter-banking lending to all the loans. Barjas and Steiner (2000) use the ratio of non performing loans to all the loans, the ratio of non performing loans to total assets, the ratio loan loss provisions to total assets, and the ratio of the sum of the capital, non performing loans and loan loss provisions to total assets. Maechler and MacDill (2003) measure this variable by the part of credits in all the assets and the mortgage lending part in all the lending as well as the part of classified loans in all the loans. Gosh and Das (2004) use the part of classified loans in all the loans. Ioanidou and De Dreu (2006) add the ratio of loan loss provisions to total assets.

My measures of this variable are the loan growth, loans divided by total assets, inter-banking lending divided by total assets, the ratio of guarantees received to total loans, the ratio of commitments given to assets, the ratio of commitments given to commitments received the commitments received / loans ratio and the potential liabilities / Assets ratio. I use also the ratio of debtor accounts to loans, the ratio of non performing loans to total loans and the one of non performing loans to total assets as well as the loan loss provisions / equities ratio and the loan loss provisions/ total assets ratio. I suppose a positive effect of this variable on deposits to term.

Earnings

Peria and Schmukler (2001), Gosh and Das (2004) and Ioanidou and De Dreu (2006) measure this variable by the return on assets. Birchler and Maechler (2001) include four measures : the ratio of the net income to total liabilities, the ratio of the income commissions to total the liabilities, the ratio of interest rate incomes to total liabilities and the liability growth. Bongini and al (2001) use the ratio of net income to whole middle assets and the ratio of interest income to whole incomes whereas Barjas and Steiner (2000) use the return on equity.

My measures of this variable are the return on assets, the return on equity, the ratio of interests received to liabilities, the ratio of received commissions to liabilities and the ratio of operating income to revenues. I suppose a positive effect of this variable on deposits to term.

Management or efficiency

Peria and Schmukler (2001), Birchler and Maechler (2001) and Gosh and Das (2004) measure this variable by the ratio of expense other than interests to whole assets. Ioanidou and De Dreu (2006) measure this variable by the ratio of general expenses to total assets.

I include general expenses divided by the banking net earnings and operation expenses paid divided by cashed operation products. I also add the ratio of paid banking operation expenses to received banking operation products. An increase of these expenses would have a negative effect on deposits to term.

Liquidity

Peria and Schmukler (2001), Birchler and Maechler (2001), Gosh and Das (2004) measure this variable by the ratio of liquid assets to total assets. Bongini and al (2001) use the ratio of loans to liabilities. Barjas and Steiner (2000) use the ratio of reserves to total assets.

I measure this variable using the ratio of reserves to total assets, the ratio of customer loans to total debts and the ratio of liquid assets to total assets. I also the loans and advances net of repayment / client deposits net of withdrawing ratio, the dividend/net income ratio and operating cashflow growth. I expect that the most liquid banks encounter less deposit reduction.

Control Variables

Park and Peristiani(1998) adopt as control variables the population density, the population growth, wages paid by the bank, the acquirement of another bank and the bank size. Barjas and Steiner(2000) use as control of output, the direct financial output as expressed by the interest rate and the indirect output as indicated by the level of transaction services or offered number of branches. They insert other specific variables like the public criterion, the foreign criterion as well as the size expressed by total assets. The control variables chosen by Birchlers and Maechler(2001) and Gosh and Das (2004) are the GDP growth, the monetary market rate of and the consumer index price. Ioanidou and De Dreu (2006) add the inflation rate.

I include several control variables like the GDP growth, the population growth, the population density, the consumption index price, the monetary market rate, the saving rate and the bank size.

The independent variables and the control variables are shown in table 2.

[Insert table 2 here]

Models and statistical tools

The depositors control is tested by the same regression model used by Peria and Schmukler (2001), Birchler and Maechler (2001), Barjas and Steiner(2000), Gosh and Das (2004) and others:

$$\Delta \text{Dépôts } i,t = \alpha + \beta' \text{ Camel Variables of the bank } i,t-1 + \beta'' \text{ Control Variables } t + \epsilon_{i,t}$$

$\Delta \text{Dépôts } i,t$ represent the first difference of deposits to term of the bank i at the time t . The vector of accounting characteristics of the bank, the Camel Variables of the bank $i,t-1$,

presents a delay of one year to control the fact that the information of the financial statements is available to the public with a certain delay.

The response of the bank to depositor control is tested by the same model used by Barjas and Steiner(2000)

$$\text{CAMEL}_{it} = a_i + b_1 (\text{DEPVAR})_{it-1} + e_i$$

CAMEL_{it} represent bank fundamentals of a period t

(DEPVAR)_{it-1} is obtained by the regression of uninsured deposit variation on bank fundamentals of a lagged period.

$$(\text{DEPVAR})_{it-1} = \sum b_i (\text{CAMEL})_{it-2}$$

To multiply the number of observations, we observe a panel of banks. There are two models of the panel: the fixed effects model and the random effects model. The Hausman test allows to decide between the two models. The regressions and the Hausman test are performed by the software TSP.

RESULTS

The results of the regression of uninsured deposit variation on different combinations of CAMEL measures are presented in table 3.

[Insert table 3 here]

According to the table, the coefficients of the Debtor accounts / Loans ratio and the Loan loss provisions /Equities ratio measuring the variable Asset quality are significant to 95% in all the combinations of measures. In the same way, the coefficient of the General Expenses / Net banking earnings ratio measuring the variable Efficiency is significant. So, two fundamental variables are significant: Efficiency and Assets quality. These results are consistent with those of Park and Peristiani (1998), Barjas and Steiner (2000), Péria and Schmukler(2001), Birchler and Maechler (2001), Maechler and McDill (2006) and Ungan, Caner et Özyıldırım (2007).

My first hypothesis is thus supported; there is some depositor control based on Efficiency and Assets quality.

To study the influence of public/private criterion of the bank in depositor control, I introduce a Dummy which takes the value 1 if the bank is public and the value 0 if the bank is private. The results of the regression of uninsured deposits variation on bank fundamentals and the dummy are in table 4.

[Insert table 4 here]

The results show that the Assets quality measured by the Debtor accounts / Loans presents a significant coefficient. Besides the coefficient of the General Expenses / Banking net earnings ratio measuring Efficiency is significant. However the dummy measuring the public/private

criterion is not significant. Therefore, the public or private criterion does not influence deposit variation. Thus, depositors behave in the same way regarding either public or private banks. For the two types of banks, they take into consideration Efficiency and Assets quality to control their banks. So, the public/private criterion does not influence depositor control.

To test my second hypothesis and examine bank response to depositor control by improving its fundamentals, I regress bank fundamentals on estimated deposit variation of a lagged period.

The results of this estimation figure in table 5.

[Insert table 5 here]

As shown in the table, the coefficients of the variables measuring bank response to depositor control are not significant. However, it is possible that the bank reacts in an asymmetric way, which means that a deposits increase following good fundamentals doesn't generate any improvement of bank characteristics. The bank reacts only to a deposits decrease due to bad fundamentals. This reaction of less performant banks is identified by a dummy which take the value 1 if the deposit variation is less than the mean of the sample and the value 0 if it is superior to the mean of the sample. The results of this test are in table 6

[Insert table 6 here]

I note that there is not a significant coefficient. Therefore, even in the case of deposits fall less than the mean of the sample, the bank doesn't react to depositor control by improving its fundamentals. It is possible that the bank react by a rise of deposit remuneration rate. But this latter is unobservable variable. It is also possible that depositor control is not strong enough to be perceived by the bank as a threat to its funding.

Thus, my second hypothesis is rejected; the bank doesn't react to market signals in a manner consistent with its insolvency. This result is contrary to that of Barjas et Steiner (2000). They find that the bank reacts to depositor control by an improvement of capital adequacy and assets quality. Indeed, the bank rise the loan loss provisions.

VI.CONCLUSION

In this study, I deal with market discipline of uninsured Tunisian big depositors, which is made by two phases : depositor recognition and control of bank risk and the ensuing bank reaction. Concerning the first phase, my results show that uninsured deposit variation depends on two fundamentals: Efficiency and Assets quality. However, the second phase is not verified; the bank fundamentals are not influenced by deposit variation of a lagged period.

Like the findings of Park and Peristiani (1998), Barjas and Steiner (2000), Péria and Schmukler(2001) , Birchler and Maechler (2001), Maechler and McDill (2006) and Ugan, Caner et Özyıldırım (2007), my results provide evidence supporting depositor control. Moreover, I deal with the bank response to depositor control. Unlike Barjas and Steiner

(2000), my results indicate that the bank doesn't react to depositor control by improving its financial conditions.

So, to establish effective market discipline, it is first necessary to reinforce depositor control. Regulatory authorities must make efforts to make them more aware of bank risk and their role in improving financial systems. Therefore, banks will be afraid of losing their funds and will improve their financial conditions to satisfy market players.

My research significantly contributes to national research because it is one of the rare studies that deal with market discipline. Thus, this study can help promotion of market discipline, which constitutes the third pillar of Basle II and improve the adequacy of Tunisian prudential regulation to international prudential regulation. My research also significantly contributes to international accounting research because it is one of the rare studies focusing on the bank reaction to depositor control. Therefore this research can contribute to the promotion of market discipline, and thus the stability of financial systems.

Table 1: sample of banks

Amen Bank (AB)

Arab Tunisian Bank (ATB)
International Arab Tunisian Bank (BIAT)
Tunisian Society of Banks (STB)
International union of Banks (UIB)
Union of Banks for the Trade and the industry (UBCI)
Bank of the habitat (BH)
Agricultural National bank (BNA)
Bank of South (BS)
Bank of Tunisia (BT)

Tableau 2 : independent variables

INDEPENDENT VARIABLES	MEASURES
Capital Adequacy	Equity /Assets
Assets Quality	<ul style="list-style-type: none"> -- Inter-banking lending /Total loans -- Loan growth -- Loans /Assets (distribution of loans) --Guarantees received/Loans --Non performing Loans /Assets (available variable after normalization) -- Non performing Loans / Loans (available after normalization) -- Loan loss provisions / Equity (available variable after normalization) -- Loan loss provisions/Assets (available variable after normalization) --Commitments given/Commitments received --Commitments given/Assets -- potential liabilities / Assets
Management or efficiency	<ul style="list-style-type: none"> -- Operation expenses paid / cashed operation products --General Expenses / Banking net earnings -- Paid banking operation expenses / Received banking operation products
Liquidity	<ul style="list-style-type: none"> -- Liquid assets/Total assest --Loans/Debts --Reserve/Assets -- Loans and advances net of repayment / client deposits net of withdrawing -- Dividend/net income -- Operating cashflow growth
Earnings	<ul style="list-style-type: none"> -- Net income / Equity -- Net income / Assets -- Interests received / liabilities -- Received commissions / liabilities -- Operating income /Revenues
Control Variable	<ul style="list-style-type: none"> -- Population Density; -- Population Growth, -- Consumption index price -- Monetary market Rate -- Saving Rate --Bank Size; --GDP Growth

Table 3: regression results under the adapted IFRS (new measures)

Variables	Measures	COMB 1	COMB 2	COMB. 3	COMB. 4	COMB. 5
Capital adequacy	Equity /assets	0.6609 [0.514]	5.85269 [0.273]	0.844977 [0.860]	5.71440 [0.304]	3.57118 [0.530]
Assets quality	Debtor accounts / Loans	-2.0738 [0.048]*	-11.3666 [0.003]**	-7.44368 [0.017]	-9.16365 [0.014]	-7.32073 [0.045]
	Loans / assets	-1.1114 [0.276]		-0.890650 [0.662]		0.0579 [0.735]
	Loan loss provision / Equities	2.1766 [0.038]*	.984739 [.036] *		1.06660 [.032] *	
	Potential liabilities / Assets		1.28152 [0.372]			
	Commitments Given / Commitments Received			-.019372 [0.929]		
earnings	Operating income /Revenues	0.1725 [0.864]	1.08656 [0.143]	0.721923 [0.370]	1.02313 [0.183]	0.633351 [0.478]
efficiency	General Expenses / Banking net earnings	-2.274 [0.031]*	-1.85708 [0.008]**	-1.70820 [0.022] *	-1.57240 [0.031] *	-1.92825 [0.022]*
liquidity	Dividend / Net income					-0.016 [0.367]
	Operating cash flow growth				0.016238 [0.327]	0.058 [0.735]
	Reserves / Assets	1.1604 [0.256]	0.755313 [0.291]	0.981528 [0.216]	0.870 [0.142]	1.04129 [.182]
	GDP Growth	0.652 [0.520]	-2.98238 [0.391]	-0.542821 [0.872]	-3.47269 [0.336]	0.310229 [0.936]
Control variables	Monetary market rate	0.5839 [0.564]	-.160003 [0.367]	-.074343 [0.675]	-.088897 [0.490]	-.122953 [0.553]
		0.4464	0.582397	0.455893	0.599725	0.549599
R2		0.0774	0.206555	0.053726	0.220518	0.122903
R2 ajs		0.5732 [0.785]	1.2206 [0.3368]	1.4452 [0.2312]	1.0435 [0.4435]	1.6917 [0.1601]
F	Probability		[0.304]	[0.2516]	[0.4117]	[0.2568]
Test of Hausmann						

** Significant at the level of confidence 99% * Significant at the level of confidence 95%

Tableau 4 Results of the influence of the public/private criterion

VARDEP (deposit variation) = ai+ b1 LLPE +b2 RA + b3 GEB + b4 DAL + b5 Dummy+ ei

Variable	Mesure	t-Statistic
Assets quality	Loan loss provision / Equities (LLPE)	1.9138 [0.067]
	Debtor accounts / Loans (DAL)	2.7974 [0.010]*
Liquidity	Reserves / Assets (RA)	1.08777 [0.287]
Efficiency	General Expenses / Banking net earnings (GEB)	-2.9473 [0.007]**
Control Variables	Dummy (1 if the bank is public 0 if the bank is private)	1.5907 [0.124]
R2		0.4842
R2adjusted		0.216
F		1.8052

* Significant at 95% ** Significant at 99%

Table 5 Results of the bank response to depositor control

$$\text{CAMEL}_{it} = a_i + b_1 (\text{DEPVAR})_{it-1} + e_i$$

	Capital adequacy	Liquidity	Assets quality	
CAMEL	Equity /assets	Reserves / Assets	Loan loss provision / Equities	Loans / assets
	0.2438			
	[0.809]			
		-1.5456		
		[0.133]		
			-0.1743	
			[0.863]	
				-0.1919
				[0.849]
Hausman test	P = [0.747]	P = [0.428]	P = [0.100]	P = [0.693]
R2	0.8873	0.9945	0.9210	0.3472
R2 ajusté	0.8485	0.9926	0.8881	0.3300

DEPVAR: Deposit variation ;

Tableau 6 Results of the response of less performant banks to depositor control

$$\text{CAMELit}_i = a_i + b_1 \text{DEPVARit}_i - 1 * \text{Dummy} + e_i$$

	Capital adequacy	Liquidity	Assets quality	
CAMEL	Equity /assets	Reserves / Assets	Loan loss provision / Equities	Loans / assets
	0.3918			
	[0.698]			
		-0.0012		
		[0.821]		
			-0.3832 [0.705]	
				1.387 [0.177]
Probabilité du test de Hausman	P = [0.739]	P = [0.325]	P = [0.153]	P = [0.145]

VARDEP : Deposit variation

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