

Tunisian Banking System Distress and Fragility: An Empirical Study

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Abstract

The last international financial crisis has shown the primary position occupied by the bank in the financial architecture. Despite good appreciation by notation agencies, this crisis was imputed to an excessive risk taking by banks and to the weakness of the supervision of their activities. Hence, it was necessary to rethink the evaluation of the fragility of banks and break with traditional approaches to calculate the fragility. This paper subscribes to this lineage research on better appreciation of the fragility of Tunisian banks. For this purpose, we used the indices of Fragility Banking System (BSF). In this research, we have conducted an empirical study in order to assess the index of stress and to measure the Tunisian banking system fragility. We have observed that the banking fragility is growing since 2000. The importance of the portfolio of non-performing loans is the main cause of this fragility. The results indicate that the fragility is imputed to traditional factors such as, the financial liberalization, the lack of banking supervision, the international competition and the low levels of profitability.

Keywords: Fragility index, financial fragility, early warning systems.

Classification JEL: G10, G21, G24, E5.

Introduction

The frequency and severity of banking crises over the past two decades, both in emerging and industrial economies, were behind the necessity for the establishment of a more robust prudential device in these countries. Significant efforts have therefore been made in order to build depth indicators of crises, likely to assist policy makers to take more quickly corrective measures and appropriate regulatory mechanism. As we mentioned previously, the prudential regulation of banks may affect the stability of banks by several channels. The predictions provided by the theoretical researches devoted to the issue are strong, while the review of the empirical literature on the topic presented very heterogeneous results.

In the light of all these considerations, it seems interesting to study how the implementation of the prudential standards may influence the fragility and affects the stability of the Tunisian banking system, across from the construction of the index of banking fragility.

In order to achieve this objective, in a first part we will try to present the general framework and the empirical work that have been carried out to detect the fragility of banks, with a presentation of the results of the work carried out in this field. The second part will be devoted to test a fragility index of the Tunisian banking system. We will be outlining the econometric methodology, as well as the results of the estimates and the economic implications.

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1- Banking system distress and weakness, empirical literature

The rise of financial instability is one of the highlights in the year 90. The banking crises are the most spectacular form of this instability. Honohan (1997) reported that two thirds of the IMF countries' members have been hit by serious banking crises, which have resulted in cumulative losses of more than \$250 billions. In addition, almost 130 countries, which represent three-quarters of the member countries of the IMF, have known significant banking dysfunctions, that lead the supervisors to develop a regulatory mechanism to prevent the outbreak of a banking crisis. The principle of prudential control rests on the prevention of behaviors that may result in risks and on the amendments, it aims to avoid the spread of risk and provide a strong financial system able to resist to any fragility of the banking sphere.

a- Empirical evaluation of the banking weakness

Many works deserve to be cited due to their usefulness to assess the vulnerability of financial intermediaries. Although the outbreak of a crisis remains unpredictable, Borio and Lowe (2002) argue that it is possible to detect, with sufficient reliability, the accumulation of fragility revealing of banking difficulties. González-Hermosillo (1999) attests that many empirical studies have not been able to explain the fragility and the occurrence of banking crises. In particular, the probability models give a value of "a" to the periods of crises and "zero" to the periods of quiet characterizing the banking sector. Similarly, this author has concluded that insolvent banks are those who have accumulated bad quality loans and are characterized by a lack of own funds.

González argued that economists devoted to this subject follow two approaches. The first aims to explain the fragility from data relating to the banks affected (the lack of own funds of the banks, the expansion of bank credit, the increase of bank credit, etc.). The second tends to examine the behavior of certain macroeconomic variables such as the exchange rate and the level of international reserves, to assess a certain fragility of the banking system. In this order, Hanschel and Monnin (2003) have used annual data relating to 8 variables to calculate an index of stress for the case of Sweden. Kibritcioglu (2002) includes only 3 variables to estimate the index of fragility of the banking sector by using monthly data for 22 countries.

The role of the bank in the economic activity is very important and indeed essential. Any anomaly which affects the banking system may lead serious consequences on the stability and soundness of the banks, particularly within the developing countries. Generally, the bank may be exposed to several types of risk, namely:

- Liquidity risk: it is linked to the possibility of massive withdrawals of funds from the bank on the part of depositors; its consequence is the decline in bank deposits. More precisely, the risk arises when the bank, in the face of the massive withdrawals of deposits, is unable to get ready the necessary funds.

- Credit risk: the existence of deposit insurance may encourage banks to excessive risk-taking (the problem of moral hazard). As mentioned by Gonzalez-Hermosillo (1999), *"moral hazard can occur when banks take excessive risk in granting loans to conditions which may be very lucrative in the short term, but whose prospects of long-term repayment are reduced, and that they expect that the potential losses are absorbed by a third party, such as the government of the country through the rescue plans or international financial organizations"*. This problem induces a boom of the appropriations; the credit risk involves the failures of borrowers; their inability to repay debt service. Gourinchas et al. (2001) consider that the more part of the banking crises were preceded by lending boom.

- Risk linked to the volatility of real exchange rate: this may be behind the emergence of several problems for the banks that are either directly or indirectly, when the volatility of the exchange rate creates great loss to borrowers of the bank. Kaminsky and Reinhart (1995) argue that the high volatility of the real exchange rate is one of the typical indicators of vulnerability and crises of banks in developing countries. This can be explained by the decline in the profitability of exporters, which may be behind their failure to honor their commitments to the bank.

In order to assess the financial stability in the Mediterranean countries, the study conducted by Cartapanis refers to the evolution of the indicators of the internal and external financial fragility during the period 1999-2006. Mamtez (1999) develops an assessment indicator of the external financial fragility based on the account of the variation of the exchange rate and the foreign exchange reserves. This approach breaks with different operations aiming to calculate the index of banking fragility by reference to the internal financial weakness.

Generally, the literature related to banking crises is committed to identify and describe the crises after their advent. As well, most of the studies use binary indicators giving the value 0 for the quiet periods and 1 for the episodes of banking fragility. This method is analogous to the pressure index on the foreign exchange market in the case of currency crises.

b- An index Banking System Fragility

We proceeded to present the methodology for the construction of the index of monthly fragility of the banking system. An index of fragility is an aggregation of several variables which reflect the symptoms of a banking crisis.

Kibritcioglu (2002) has constructed a monthly index to detect periods of fragility of the banking sector (FSB). The index FSB is a combination of three variables: the bank deposits (DB), the bank credit allowed to the private sector (CBSP) and the external engagement of domestic banks (EEB). The fluctuations that may affect these three variables are supposed to cause changes in the degree of banking fragility.

The index FSB is built based on the following formula:

$$BSF_t = \frac{\left(\frac{CPS_t - \mu_{cps}}{\sigma_{cps}} \right) + \left(\frac{FL_t - \mu_{fl}}{\sigma_{fl}} \right) + \left(\frac{DEP_t - \mu_{dep}}{\sigma_{dep}} \right)}{3}$$

Any decrease in the index of fragility is associated with a growth of the fragility of the banking system; however, this decline is not synonymous with knowledge by the system of a systemic crisis.

The banking system is experiencing an average level of fragility when the value of the index of fragility is between zero and less than zero five. If the index of fragility is less than or equal to less than zero five; then the banking system is highly fragile to a systemic crisis. The evaluation of the internal fragility of Mediterranean countries, has allowed us to realize that these countries have experienced from the late nineties, a growth of the index of fragility coinciding with a decrease of the fragility of their banking system. Some reforms were undertaken by these countries in order to consolidate the strength of their financial institutions. With regard to the evolution of the internal financial fragility in Turkey, we attest that this country has known an alternation of phases of rise and fall of the index of fragility. In fact, Turkey has experienced an increase in the banking vulnerability during the periods 1990-2006 and 2000-2002, when the index of fragility has reached negative values. A systemic crisis has been witnessed in this country during 1994; the index of banking fragility has reached a very negative value around -3,07. By contrast, this country has known, during the period 1996-2000, a decline of the banking vulnerability and an improvement of the performance of these banks. This enhancement is the result of different reforms undertaken in the wake of the crisis.

2- Tunisian banking system: distress and fragility

Our test of empirical investigation falls within the framework of studies seeking to identify the effects of prudential regulation on the stability of the banking system, drawing on work done in this wake by A. Kibritcioglu (2002). In our empirical study, we will try to present an assessment of the current situation of the Tunisian banking sphere, through the construction of an index to measure the banking sector fragility. The data used are collected from the balance sheets, the accounts of the results of the commercial banks, the annual reports of the professional association of banks of Tunisia (APBT) and the reports of Central Bank.

b-Specificities of the variables of the index

Our sample is composed by the main nine listed commercial banks and our period of study extends from 1990 to 2010. In order to achieve the evolution of banking fragility in Tunisia, the index of the weakness of the banking sector, proposed by A. Kibritcioglu (2002) is very suitable to measure and describe the vulnerability of the banking sector. It integrates the three main values of bank's referers (bank deposits, credit to the private sector and commitments on the outside). The formula for the index of fragility of the banking system is the following:

$$BSF_t = \frac{\left(\frac{CPS_t - \mu_{cps}}{\sigma_{cps}} \right) + \left(\frac{DEP_t - \mu_{dep}}{\sigma_{dep}} \right) + \left(\frac{FL_t - \mu_{fl}}{\sigma_{fl}} \right)}{3}$$

- Total deposits of banks "total deposits ": the system becomes fragile when depositors simultaneously demand their funds, the sudden and massive withdrawal deposits reflects the loss of confidence on the part of depositors in the banking system, it may provokethe three following situations:
 1. "Bank run": the bank is forced to liquidate its assets in the short term and this may cause its bankruptcy.
 2. "Fundamental run":massive withdrawals are justified by the deterioration of the quality of the assets of the bank.
 3. "Speculation run ": the fundamentals of the bank are healthy, but the depositors believe that it is insolvent. In this case, every depositor anticipates that the others will withdraw their funds; it results a movement of contagion. This variable represents the liquidity risk.
- Total of credits granted to the domestic private sector or "total credits to domestic private sector ":this variable is responsible for the increase in non-performing loans.However, due to the financial liberalization coupled with deposit insurance, a bank may encourage the excessive risk-taking (moral hazard) which results from the riseof the volume of loans granted to the private sector. The risk of credit is generated by the "lending boom" phenomenon andmay be measured through the growth in credit to the private sector. In the Tunisian banking system, 90 %of the appropriations of the commercial banks are intended for the private sector.
- External commitments in foreign currency or "Foreign liabilities of banks": in absence of control on the movement of capital, a bank may be induced to increase the amount of the funds obtained on the international markets, especially if it does not anticipate the depreciation of its national currency. The more the volume of its commitments denominated in foreign currencies is high in case of devaluation of the domestic currency, the net wealth of the bank will be reduced, and more the bank will be vulnerable.

b- Interpretations of results

Based on the results, we will describe the evolution of the index of fragility of each bank.

-BNA: during the period 1990-1998, itrealized a short phase of high fragility; the value of IFB was less than zero five, it results a high exposure of the bank to a crisis. This trend is due to an amplification of credits distributed in the context of crop season. Besides, and during this whole period, the bad harvests were frequent, the risk of non repayment was accentuated and the situation of the bank was deteriorated in 1998. Throughout 1999-2010, this bank has enhanced its situation by acting on the variables causing this fragility;the non-performing loans. Therefore,liquidity and creditriskwere almost below the average of stress during 1990-1998.However, since 1999, the bad debts rise because of low level of provisions. Besides,the bank weakened due toits ratios of solvability, low liquidity and the importance of the volume of itsdoubtful assets.

-STB: after a phase of average fragility along the decade 1990-1999, this bank has known an accentuation of its fragility during 2000-2010. The main cause of deterioration was the low level of provisioning. The fragility became more pronounced, especially since 1999,dueto the proliferationof bad debts, the lack of liquidity and the investment'sdecline, particularly intourism sector. During the period 2000-2010, the effects of absorption merger, previously achieved, have weakened STB and intensified its fragility.

-The UIB registered a degradation of the level of its fragility;it increased from -1.064 in 1992 to 2.07in 2010. This deterioration is due to the increase of assets classes and the reduction of the rate of provisioning. This fragility is assigned to several factors, including the rise of appropriations and the domination of the financial structure by debts.

-Attijari bank,former South Bank, experienced a critical financial situation which began in 1994. All the efforts in the years that follow have been doomed to failure. This difficult situation was further complicated in 1998, its cumulating point has been reached in 2004 when the bank has known a serious financial crisis, following the publication of its balance sheets and not reliable financial and accounting documents.

This crisis has forced its officials to accelerate the reforms in this bank. This action was belated since the State has been disengaged from this bank and the monetary authorities have reported its privatization to 2006. The majority of the shares were sold to the Moroccan group AttijariWafa bank and to Santander group, first Spanish market capitalization. The index of fragility was around 1.07, it illustrates the high fragility of this bank. However, the situation was enhanced and the bank has known a low level of fragility in 2010 due to an improvement achieved by the new managers.

-BT: since the end of years 90, BT has oriented its activities toward the housing field. This strategy has damaged the financial capacity and weakened the competitiveness and credibility of this bank. The deterioration of fragility of this bank can be also explained by the fact that BT had not vocation to lend to medium and long-terms. The accentuation of fragility during 1999-2008, can also be explained by the crisis of all Tunisian banking system and by the external shocks and intensification of banking risks.

-UBCI has known its worst difficulty in 2002 because of two main factors. The events of 11 September 2001 and the solid relationship with foreign banks, especially BNP Paris Bas, have weakened the UBCI. This weakening was aggravated by the critical financial situation of BATAM society, one of the main customers of the bank. The fragility was high over 2000-2010 after a low weakness during former period. In fact, the fragility was less than its average during the period 1990-1995 because of the introduction of prudential rules. During this period, the volume of own funds was improved, the bad debts were reduced and the level of provisioning has been risen.

-AB: the analysis of the fragility banking allows us to see that the index of banking fragility has experienced a rising trend in 2001. This finding can explain that the AB, as all the banks of deposits, illustrates well this fragility. High level of bad debts and a lack of liquidity constituted the main causes of banking problems.

-ATB: its level of fragility was low during the period 1990-1999. However, this level has risen after due to the increase of the risk of liquidity and the amplification of credits for the private sector.

-BIAT: the evolution of the index indicates that the level of fragility has dropped in 2008. This enhancement is imputed to the establishment of prudential rules and to particular efforts of provisions. Former, BIAT has experienced serious financial difficulties in 1995, 1998 and 2006, due to the critical problems that has known the Societe General in 1995, main shareholder of BIAT. These difficulties can be also attributed to disturbances and float at the level of decisions taken by the leaders of the so-called bank during 1998 and 2006. This situation is mainly explained by problems of governance.

Conclusion

In total, the evolution of the index of banking fragility indicates that the level of fragility of the more part of the Tunisian banks has reached its apogee in the early years four twenty ten. IFB was considerably lower than at least zero five, because of high exposure of banks to huge risks. The improvement of fragility during the period 2000-2008, is attributed to the performance of banking institutions and to the effects of establishment of prudential rules by banks.

Despite the tax benefits they received; the establishment of prudential rules and the development of a sanitation program of the financial situation, banks could not consolidate their solvency and alleviate their fragility. These banks are still suffering from financial difficulties, a low level of provisioning, lack liquidity and a significant compromised portfolio. All these difficulties are considered as a handicap for the Tunisian banks and are evidence of a real banking fragility. Despite this fragility, IMF and the BIRD have reported that the Tunisian banking system was healthy during this period. Certainly, the Tunisian banking system, has not known yet an acute crisis, nevertheless, if this situation will persist, it can cause a systemic financial crisis. After revolution and publication of new report by IMF, the Tunisian authorities have taken seriously the recommendations of international monetary institutions in order to remedy these weaknesses.

References

- Aglietta, M.(2001),«Fragilité financière, crises et enjeux du contrôle prudentiel : quelques leçons de l'expérience récente»,[http://www. Worldbank.org/research/adcd/eu/aglietta](http://www.Worldbank.org/research/adcd/eu/aglietta).
- Artus, P., Betbeze, J. P., de Boissieu, C. et Capelle Blancard, G. (2008), «La crise subprime»,Rapport du CAE n°78, La Documentation Française.
- Bandt, O. et Oung, V. (2004), «Bilan des stress tests menés sur le système bancaire français»,Banque de France,Revue de la Stabilité Financière,N°5,Novembre.
- Ben SlamaZouari, S. (2005),«Evaluation du système bancaire tunisien : construction d'indices de stress», Janvier, [http://www. Researchgate.net/publication/228678563](http://www.Researchgate.net/publication/228678563).
- Bernanke, B. (2009), «Financial Reform to adress systemic Risk»,Speech at the Council on Foreign Relations, Washington D.C, March.
- Bordo, M. and Eichengreen, B. (2002), «Crises now and then: lessons from the last era of financial globalisation», NBER, Working paper n. 8716.
- Borio, C. and Lowe, P. (2002),«Assessing the risk of banking crises», BIS Quarterly Review, December.
- Borio, C. and Tsatsaronis, K., (2005), «Accounting prudential regulation and financial stability: elementsof a synthesis», BIS working papers N°180, Monetary and Economic Department, Bank For International Settlements,September.
- Borio, C., Tarashev N. and Tsatsaronis K.(2009), «The systemic importance of financial institutions»,BISQuartly Review, September, <http://www.bis.org/publ/qtrpdf/r.qt0909h.pdf>.
- Clerc, L.(2008), «A propos des turbulences financières», Banque de France,Débat économique, N°4, Février.
- Demirguc-Kunt, A. and Detragiache, E.(1998),«Financial liberalisation and financial fragility»,IMF, WP98/83, June.
- González-Hermosillo, B. (1999), «Determinants of ex-ante banking system distress-Amacro-micro empirical exploration of some recent episodes», IMF, WP 99/33.
- Honohan, P. (1997),«Banking system failures in developing and transition countries: diagnosis and predictions»,BIS Working Papers 39, Bank for International Settlements.
- Kibritçioğlu, A. (2002), «Excessive risk-taking, banking sector fragility and banking crises»,Office of Research, Working Paper,N° 02-0114.
- Minsky, H. P.(1982), «The financial instability hypothesis:capitalist processes and the behaviour of the economy»,in Kindleberger, C.P. &Laffargne, J. P. (dir), Financial crises: theory, history and policy,CambridgeUniversity Press,PP.13-39.