

Financial Stability: Definitions, Theoretical Foundations and Roles of the Central Banks

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Abstract

Financial stability is a complex concept whose definition remains discussed. A first family of approaches defines stability in opposition to the concept of financial instability while referring to the lesson of the various episodes of last crises. A second approach introduced primarily by the central banks tries to define this concept starting from the various properties of a stable financial system. However, the formulation of an operational definition remains conditioned by the installation of an analytical framework which must delimit the field of intervention of the responsible authorities, define the instruments and the transmission channels of the adopted decisions and specify the indicator of measurement making it possible to evaluate this function. The traditional functions of the central banks such as the management of the liquidity, the banking supervision and the control of the monetary policy confer to them a central role in the maintenance of financial stability. In the same way, their interventions successful at the time of financial crises enabled them to acquire an expertise on the matter. Thus, one attends an increased role of the central banks in this field, according to various methods and within devices associating generally various actors (Government and regulation and supervision authority).

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JEL Classification Codes: G21, G29, G12, E49.

Introduction

The economic and social costs of financial crises are generally very high. As a result, the entire central banks in OECD countries, following a growing number of institutions in developing countries have registered, although in different forms, financial stability, in addition to price stability, the heart of their concerns.

For this purpose, these institutions have developed a number of analytical approaches and tools to assess the exposure of financial systems to actual or potential risks. We are witnessing the rapid spread of relatively recent practices such as monitoring of micro and macro prudential indicators, in-depth evaluation of conditions in all segments of financial markets, the production and dissemination of resistance test and the publication of Financial Stability Reports.

The purpose of this paper is to clarify certain aspects of the concept of financial stability, and the role of the central bank in its preservation. It has five sections. The first shows the difficulties of precise definition and consensus of the concept of financial stability and provides definitions advanced in the academic literature and by a few large institutions. The second section discusses the various sources identified in the many theoretical approaches, the phenomena of financial instability. The third section develops a detailed description of instruments and tools available to authorities to ensure effective macro-prudential regulation. The next section discusses the analytical framework for macro prudential approach. The final section discusses the role of central banks in maintaining financial stability, while specifying the device to which they should have close monitoring of developments in the financial system.

1. Financial Stability: Definition Test

The abstracted character, the complexity and the dynamic property of financial stability constitute as many constraints as for the possibility of emitting a complete definition of this concept. However, the need to incorporate financial stability in the devices of the regulatory authorities and supervision imposed the use of definitions for the adoption of an operational framework to preserve the economic system of the negative externalities of the financial system. The definitions are issued so far, nevertheless, incomplete and the tools to fight against episodes of instability or possible financial crises are not unanimous.

1.1. Difficulties Related to the Definition of the Concept

The great financial crises reinforced the public dimension of financial stability, since their economic costs and social are very high and affect the whole of the economic agents. The various authorities of regulation meet complexities in the formulation of an operational definition of this concept because of the difficulty in delimiting the field of intervention of the responsible authority, defining the instruments, the transmission channels of the adopted decisions and installing an indicator of measure to a context marked by a financial system in permanent change.

The problems of the authority responsible for financial stability emanate from the multidimensional character of the financial system. The taking into account of the whole of the financial and economic actors makes difficult the design of a regulation suitable. In addition to the assimilated banks and organizations, financial stability also covers the insurances, the financial markets, non-financial companies, the government and the households. These various components of the system are of nature heterogeneous, but the supervening of a financial crisis can affect them via the contagion phenomena caused by the various interconnections which bind them.

The existence of several authorities of regulations makes difficult the analysis and the evaluation of financial stability according to a single vision. In practice, the degree of implication of the central banks as regards financial stability is growing; as the publication testifies some to the Financial Stability Reports (see work of S. Oosterloo and al (2007)). However, in the light of the international experiments, it proves that no entity of regulation to the capacity to control the financial system as a whole. In fact, this exceeds even their fields of intervention (some decisions concern the authority of the Government or the Parliament).

In addition to the multidimensional character of stability, its dynamic property involves difficulties as for the possibility of controlling it. Indeed, the various phenomena of financial innovation (in terms of product or processes) feed the financial system by novel methods of risk management which are suitable for affect financial dynamics and the design even of the regulation.

The evolutionary character of the financial system requires a specific regulation and dynamics which takes account of the various financial innovations.

Another difficulty related to the concept of financial stability is its abstract character. Indeed, the price stability is measurable and observable while, financial stability, considering its multidimensional character, cannot be reduced to a single indicator which summarizes the whole of the evolutions in the financial sphere. Nevertheless, to overcome this difficulty, several international financial institutions propose indicators which describe the situation of the financial system (such as the FSI¹ proposed by the IMF). Moreover, some empirical work² suggests using indicators of vulnerability which make it possible to apprehend the state of the financial system as a whole.

In spite of the constraints which limit the possibility of emitting an operational definition with financial stability and thus the instruments to be adopted, the central banks and the international agencies (FMI, BIS and World Bank) were constrained to formulate definitions their allowing his follow-up and his maintenance.

1.2. Definitions

Taking into account many dimensions of the concept of financial stability, certain authors considered to be more convenient to consider, rather, the concept of financial instability. The recourse to this concept to define the stability of the system is explained by the facility to describe the various last financial crises. Indeed, of the episodes of tensions (speculative bubbles, problems of liquidity, over-indebtedness, risks of bankruptcies.) are directly observable and thus allow to describe the situations being able to generate a potential instability of the system.

Financial instability according to F. Mishkin (1992) occurs when shocks affecting the financial system stop the information flow, so that this last cannot carry out any more its objective of optimal allowance of the saving towards the investment. According to the idea of Mishkin, the problems of financial crises and their relationships to the economic contractions are overall related to attributions of the financial intermediaries. Indeed, the banks find their sources of existence in the informational advantage which they get for the economic agents. In this direction, the banking system makes it possible to reduce the selective risk and the moral hazard³. When the unfavorable circumstances question this key function, the financial system often fits in a sequence of banking panics and rationing of credit which deform the function of investment and consumption, thus leading to an economic crisis.

A. Crockett (1997) defines financial instability as a situation in which the economic performance is potentially deteriorated by fluctuations in the prices of the financial credits or by incapacity of the financial institutions to honor their contractual engagements.

R. Ferguson (2002) considers that there is a situation of financial instability, when negative externalities of the market emerge and affect negatively the real economy. The negative externalities are decisions taken by the financial and economic agents negatively impacting the activities of the other agents. It estimates that financial instability is a situation characterized by three principal criteria: the prices of a significant whole of financial credits abruptly seem to have diverged compared to the fundamental ones (speculative bubble), and/or; the operation of the financial markets as well as the availability of the credit (interior or external) having been significantly disturbed, with for consequence a significant deviation of the total expenditure, which is established on levels higher (or inferiors) than production capacities of the economy.

These definitions of financial stability, by reference to financial instability, however present a disadvantage inherent in their retrospective character. Indeed, the adoption of these definitions does not

¹ Financial soundness indicators

² For details (Illing, Liu, Gonzalez, Hanshel, Monnin, Kaminsky and Reinhart).

³ Adverse selection is a phenomenon which is reflected by the development of a contract (ex ante). Indeed, before signing a contract the selection of candidates or counterparties is marred by problems of limited information, which leads to some incompleteness in the final choice. Moral hazard occurs after the conclusion of the contract. It occurs when the person tries to benefit from incompleteness in the original contract (see Akerlof GA (1970), Williamson O. (1975)).

make it possible to envisage policies other than those aiming at avoiding the phenomena of instability observed during the episodes of last crises. This encouraged a certain number of institutions to formulate definitions making it possible to describe the characteristics of a stable financial system.

Bundesbank (2003) defines financial stability as being a state of balance in which the financial system is in measurement: to achieve its principal economic functions effectively, such as the allowance of the resources, the minimization of the risks and the maintenance of the operation of the systems of payment; and to provide its functions in the event of shocks, of stress situations, like during the periods of important structural changes.

For the bank of Norway (2003), financial stability implies that the financial system is robust with the disturbances of the economy, in terms of financial intermediation, operation of the payment systems and adequate redistribution of the risks.

In a working paper published by the IMF, Schinasi (2004) considers that a financial system is in a situation of stability when it is able to support the performance of an economy (and not to block it), and to absorb financial imbalances of origin endogenous or resulting from unfavorable and not anticipated events.

Consequently, a stable financial system is a system which guarantees an economic activity healthy and effective and which with the capacity to deaden the shocks (economic and financial) and not to amplify them. This requires a solidity of the financial institutions, an efficiency of capital market and a control of the payment systems. This definition, of general order, remains in spite of very difficult to put into practice because of the problems related to the responsible authority, of the index of measurement and the tools available to fight against the phenomena of instability before their transformations into financial crisis. With the international level, a reflection is already started to lead to an adequate institutional framework and with capable operational tools to evaluate and to maintain financial stability. Nevertheless, this reflection is far from being completed.

The evaluation of financial stability thus amounts identifying the various shocks and disturbances which threaten the stability of the system. This exercise remains difficult because of the unforeseeable character of the future vulnerabilities (the financial crises during the two last decades attest some) and of the complexity of the mechanisms of contagion.

2. Sources of Financial Instability: Theoretical Approach

Theoretical approaches of the causes and propagation mechanisms of various phenomena at the origin of financial crises have been the theoretical point of view of two approaches. The first referred to as macro focuses on the origin of cyclical instability⁴ phenomena. The second family of approach that is based mainly on microeconomic foundations uses the advanced firm and decision theories.

2.1. Macroeconomic Approach

The macroeconomic approaches consider, overall, that the financial crises result from the reversal of the business cycle, generated by excesses of price of credits, and thus postulate a direct link between financial fragility and the real economy.

Fisher (1933) considers that the phenomena of financial instability are caused by two factors, the over-indebtedness of the economy and the extreme movements of the prices (deflation). Before arriving at a crisis situation, the cycle of the businesses records a growth stimulated by an exogenous event⁵ (technological effect or emergence of a particular sector) which improves, in certain sectors, rates of profit, the level of the fixed assets and which leads to a rise in the prices of the transferable securities. These investments financed mainly by the bank credits generate an increase in the money

⁴ Said another current macroeconomic financial instability, by using the money supply. This school was initiated by the monetarists and especially Friedman and Schwartz (1963).

⁵ This was repeated for several phases of history in the creation of the railways in the 1800s and the launch of technology companies in the U.S. during the 90s (see the study of kindleberger). Fisher was mainly inspired by the thought of J. Schumpeter that considers economic growth is closely linked to innovation.

supply, an increase in the prices and an increase the speed of circulation of the currency. The increase in prices is associated with a fall in the level in the real debt and as long as the credit charges remain lower than anticipations of profits, the debt of the economic agents increases until bringing back them to a situation of Ponzi finances⁶ (over-indebtedness). Consequently, a process of degearing is undertaken leading to a fall of the assets prices and a rise of real interest rates making appreciate the actual value of the initial debt. In front of the incapacity to recover their funds completely, the financial institutions will be encouraged to liquidate the less liquid credits thus leading to a fall, more exacerbated even, assets prices (deflation). The confidence loss, in the quality of the banking credits leads to massive withdrawals of the funds deposited which generate a banking panic, a strong deceleration of the loans and thus a financial crisis marked by a fall of the economic activity (contraction of the investments) and a rise of unemployment.

While being based on work of J.M. Keynes, Minsky (1977) worked out a theory of the financial instability (Financial Instability Hypothesis), centered on the relation between the financial development and the economic growth. The capitalist economies stimulate the growth via the financial channels (banks and financial markets) which allow an inter-temporal allowance of the resources based on the prospects for profitability. The cycle, according to this theory, is stimulated by a big number of technical innovations and financial, which is accompanied by an exceptional increase in rates of saving and investment. The role of intermediation entrusted to the financial system makes it possible to drain this saving with the economy and to consolidate the level of the profitability rates. Nevertheless, to answer positively at the requests of loans and in front of the obligation to guarantee the durability of this process, the financial firms often tend to widen their passive, via strategies of innovation, thus leading to an increase the speed of currency circulation and general prices level. During the first phases of the business cycle the investors generate the strong financial profitability's stimulated by important action leverages. The allowance for risk imposed by the banks is weak and the economic agents maintain their levels of saving to the rise and anticipations of future prices support the value of the collateral ones. The acceleration of the process of innovation and debt creates a change in the capitalizations of the economic agents. Indeed, they pass from a capitalization dominated by entities of cover to speculative entities and of Ponzi finances. At the end of the cycle, the situation of over-indebtedness supports the liquidation of the debts and consequently a contraction of the assets prices, leading to an economic crisis and financial.

Kindleberger (1978) considers that even if the phenomena of financial instability do not have the same amplitudes and the same ex-post effects, they are characterized by a similar sequence of stages. Indeed, the financial crises are preceded by five phases: a first stage consists of the one period exit of recession to a phase of growth supplied with a credit boom. The latter combined with optimistic anticipations of the economic agents; generate a rise in the assets prices in a second phase. This excess of optimism results in a fall of consumption present and thus a deformation of the consumption curve. The third phase begins as soon as the assessments of the agents start to post high rates of debt and is characterized by an inversion of confidence in the markets and a change in the risk perception. Thus, of the falls start to be recorded on the level of the assets prices involving a review with the fall of the guarantees held by the financial firms. The rational answer of the agents is to seek more liquidity by precipitating the sales transactions while accepting important losses leading to the emergence of the fourth phase of instability. This situation involves a deflation which increases the level of the real debts of the agents which generates in its turn a general panic likely to generate a financial crisis with economic dimension.

2.2. Microeconomic Approach

The macroeconomic theories make it possible to explain the relation between the business cycle and financial instability, however, they provide only explanations partial of the behaviors of the economic agents during the various phases of a cycle. The development of the decision theories contributed to

⁶ When interest payments are more important than the profits or expected, we are in a situation of Ponzi finance.

the comprehension of certain mechanisms explaining the phenomena of financial instability. In particular, the introduction of informational asymmetries and the irrational behaviors of the agents gave more relevance to the analyzes concerning these phenomena. Thus, the new projections of the microeconomic theories made it possible to formulate relevant explanations of the events which support the emergence of a financial crisis. The characteristic of the microeconomic theories is that they make it possible to analyze the sources of instability starting from the study of the components of the financial system. This section will be devoted to the presentation of the microeconomic bases of financial instability starting from the financial institutions, the payment systems and the financial markets.

Financial instability and financial institutions. The causes of the instability of the financial institutions emanate from the nature even of their activity. Works of Williamson (1970) Akerlof (1970) and of Mishkin (1991), affirms that the increase in informational asymmetries encourages the agents to resort to the financial institutions in order to reduce the unfavorable selection and the moral hazard. The organization of the financing activities by the means of a financial institution thus makes it possible to generate a higher level of information which leads to a situation of balance between the applicants and the suppliers of funds. However, the maintenance of this state requires the safeguarding of confidence in the financial institution to avoid the problems of banking panic. Indeed, the activity of the banks is mainly assured via the deposits the economic agents whose cash withdrawals generally follow the law of the great numbers. The occurrence of an event which weakens confidence in the system accelerates the rate of withdrawal of the depositors and obliges the financial intermediary to liquidate its positions on other credits by accepting great losses of capital. This sale chains some generally results in a fall in the assets prices and a strong deterioration of the image of the financial intermediaries. In answer, the depositors, in lack of confidence, will continue to withdraw their funds thus involving a banking panic in the financial system. The paper of Diamond and Dybvig⁷ (1983) confirmed that even the depositors which maintain their confidence may find it beneficial to withdraw their funds. Thus, the financial intermediary deals with two requirements, that to maintain the liquidity with the depositors and that to be able to liquidate its credits at the good moment and handsome price. It thus runs often a risk of transformation which returns this system of intermediation vulnerable to banking panics.

The change of the behaviors of the depositors is often due to the supervening of information on the banking credits. In other words, the loss of confidence is explained by the deterioration of the quality of banking employment which is caused either by exogenous phenomena at the financial institutions, or by systemic problems involved in the irrational behaviors of the economic agents. Indeed, the microeconomic theory advances five reasons of continuous exposure of the financial institutions at these risks: **disaster myopia, mimicry, and agency problems, negative externalities and the structure of banking industry.**

Disaster myopia is related to the evaluation of the risk by the various economic agents and financial. Impossibility of envisaging the disaster by the financial intermediary places it in situation of ignorance as for the durability of the solvency of the economic agents. Indeed, the financial intermediary can quantify and measure impure uncertainty (risk), but remains unable to carry out the same exercise with regard to pure uncertainty (Knight 1921). The risk is always approximated by objective probabilities, while, pure uncertainty can be evaluated only by subjective probabilities, which are by definition no measurable, which returns the financial institution in a situation of myopia which can lead to a unpredictable disaster.

The mimicry is the synonym of the mimetic behavior. The interventions of the regulatory authorities in the management of the banking problems which are identical for all the banks (lender in last resort), encourage the financial institutions to follow similar strategies. Thus, the intermediaries can lead excessive strategies of taking risk, simultaneously, which confer on the problems deterioration of the quality of the loans a public character in the event of supervening of crisis related to this

⁷ See the work of two authors concerning the optimal contracts between financial institutions and depositors.

phenomenon. This imitation is sometimes compared to an irrational behavior, though other authors regard it as rational when the informational incompletes dominate the markets (Orleans 2003).

The problem of agency emerges when there exists an information asymmetry between the main thing (shareholder) and the agent (manager). In general, agent has privileged access with information compared to the main thing, which encourages it to make decisions which go in the direction of its own interests, with the detriment of the main thing. While engaging, for example, in risked investments, it guarantees to the main thing more important outputs, but exposes the institution at the high risks. By this strategy, it is able to achieve its goal of output and to reinforce its position in the institution. The relation between the depositors, the financial institutions and the applicants of funds is a relation of agency. On the one hand, the holders of projects which have relevant information on the quality of their investments (risk-profitability) cannot divide them with the financial institution and thus expose it to an undervaluation of the risk. In addition, the depositors are unaware of the manner with which the bank manages their funds and expose them to a default risk. These two situations encourage the agent having relevant information to make of it use for its own interests while trying to achieve the goals of its mandate. This situation encourages the financial institutions to take more risk to achieve the goals (rate of profitability) required by the various backers (depositor and shareholders). Moreover, the holders of investment plans (customers), by knowing the intentions of the financial institutions, finance by their equities the less risky investments and share with them the riskiest projects. That guarantees a short-term output and puts in danger the activities of the long-term institutions.

The negative externalities occur when a decision taken by one or more institutions impacts their external environment negatively. Thus, the engagement of the financial institutions in situations of risk involves this type of externality. For example, a problem of liquidity which affects a particular institution will encourage it to resort massively to the interbank market and the central bank. This type of attitude will have negative effects on the other institutions, since they will be forced to assume the failure of the first.

The competing structure of financial industry can be a factor of excessive taking risk by the financial institutions. A competing industry guarantees effective prices and costs, while the existence of a monopolistic structure supports the increase in the risks on the level of a giant institution (too big to fail). Therefore, more one banking industry is competing plus the probability of having phenomena of instability is lower⁸. In the same way, the changes which affect the structure of banking industry (bankruptcy of a bank, creation of a bank, fusion, scission...), according to Bernanke (1983), can have effects on the real costs applied by the financial institutions and can involve a rationing of credit leading⁹ thus with a reduction of the investments and confidence in the financial system.

The phenomenon of instability of the financial institutions tends to worsen more under the effect of contagion which is explained by two reasons: on the one hand because of the existence of financial relation between the institutions on the interbank market and on the level of the systems of payment, and the incomplete of information available on the institutions on the other hand. Indeed, the depositors and the creditors of the financial institutions generally trust at only one institution in their judgment relating to the health of the other establishments since they generally have structures of similar activities, and run consequently the same risks.

Financial instability and payment system. The contagion really appears at the time of the operations of payment and payment between the various speakers. The financial institutions which carry out transactions within the money market aim placing their liquidities or at getting some near other institutions. While maintaining the relations of liquidity through the payment system, the financial institutions are daily exposed to the risk of counterpart, liquidity and market. If for example a financial institution has doubts concerning the liquidity and the solvency of a counterpart or another

⁸ The relationship between industrial structure and financial stability remains controversial. Some works suggest that a competitive structure can promote financial instability.

⁹ Credit rationing is a situation in which financial institutions reduce their lending rates, began to select severely investment to be funded.

institution, it can choose to cancel or delay the agreed transactions. This situation can lead to events similar to banking panics, since the loss of confidence as for the solvency of an institution can slow down the activities within the money markets incentive the depositors to withdraw their funds quickly.

In addition, the data-processing networks of the systems of payment can be prone to interruptions causing of the delays of payments between the financial institutions¹⁰. This can cause difficulties for the whole of the actors and lead to systemic problems of liquidity. The more the institutions are inter-connected between them, the more they are exposed to the potential problems affecting the systems of payment.

The instability which can generate the systems of payment does not limit to the national context. Indeed, the foreign banks via their subsidiary companies in host countries have the capacity to carry out transactions with the local institutions. The systems of payment are thus increasingly interdependent and a disturbance in one of them can be easily transmitted to the other. They represent an important channel by which the risk of contagion appears, from where need for guaranteeing its fluidity even at the time of panic. This configuration confers on the system of payment an international dimension.

Financial instability and financial markets. The instability of the financial markets is often comparable with an excessive volatility of the assets prices of which the effect is direct on the firm's investment strategies, on the consumption and the financial health of the various agents. The reasons which explain instability in the financial institutions (see paragraph above) are the same ones as those which nourish the instability of the assets prices. The informational imperfection largely explains the volatility of the assets prices. The uncertainty which characterizes the future rates of profitability, in this context, makes difficult the exact evaluation of the assets prices. Indeed, rational anticipations of the prices refer to objective probabilities as long as it is there an informational efficiency and a complete market. On the other hand, in the event of informational imperfection, only cognitive rationality¹¹ guides decision making. This type of rationality is often associated with subjective probabilities which depend more the self fulfilling expectation¹². Major explanations of the instability of the markets can be formulated through a market research of exchange and stock market. However, of the problems of instability can relate to the market of the raw materials and the market of the real estate.

Instability on the exchange market depends on the mode adopted by the public authorities. In a mode of exchange fixes where the control of the monetary authorities is outstanding, instability could appear when a discrete and extreme change of the value external of the local currency is operated. In a mode of floating exchange, instability results in a deviation of the local currency of fundamental macroeconomic. Generally, a crisis of exchange appears when the speakers on the exchange market stop believing in the sustainability of the local currency. As an answer to this situation they try to liquidate their positions on this currency (similar to banking panics). This causes a reduction of the price of the currency leading thus to a loss of credibility and an accelerated depreciation. The impact of the fall of foreign exchange rate on the real economy results in a revaluation with the rise of interest rates in order to stabilize the investments, but, this situation can lead to a deterioration of the assessments of the companies and banks.

Since the crisis of the Thirties until the crisis of 2007, the stock markets contributed largely to the birth of the financial crises. Indeed, the fall of the assets prices in the stock markets and the draining of the liquidity can lead to a failure of the companies with dimensions and financial institutions who's financing is closely related to the markets of the credits. Their integrations and their interconnections accentuated their vulnerability with the exogenous shocks. Several reasons explain the

¹⁰ The U.S. payment system was a source of instability during the financial crises of 1987, 1989 and 2001.

¹¹ see Boudon R. (2009), "Rationality".

¹² The theory of Kahneman and Tversky (1979), individuals tend to make decisions with reference to the chef of distributions and not to the expectations. Indeed, it tends to give more weight to low probabilities in the decision-making in financial markets.

origin of the instability of the stock markets, among which irrational behaviors and the instability of the macroeconomic framework.

The rationality of the agents is the basic postulate of the existence of the stock markets. This rationality implies an evaluation of the assets prices starting from a fundamental value which integrates objective anticipations of outputs. Informational efficiency contributes to the maintenance of balance on the various stock markets. However, the existence of a resale market calls into question the validity of the assumption of efficiency of the markets. Indeed, the stock markets were created to convey the saving towards the investment; however, to guarantee the liquidity of the titles, it was necessary to set up resale markets. This new configuration which supports the speculation led to a disconnection of the assets prices of their fundamental values and causes an excessive volatility of the credits. Generally, this deformation of the prices is due to mimetic movements which lead to a “rational irrationality”. This phenomenon continues until the advent of a shock which reverses the curve of the assets prices, which is reflected negatively on the value of the firms with dimensions and the financial firms¹³, bringing back the prices to their intrinsic values and worsening the aversion with the risk. The instability of the financial markets can be reduced to the existence of a speculative bubble which obeys an endogenous formation of the values far from the fundamental macro-economic¹⁴.

Another source of instability in the stock markets lies in the not anticipated macroeconomic fluctuations. Indeed, the assets prices are future projections of the economic outputs of the firms. Each change affecting the outputs has an impact on the valorization of the financial titles. A deterioration of the macroeconomic or political situation (price of the raw materials, taxation or political instability) led to an inversion of the conditional hopes of the economic outputs in the stock markets. This fall of the assets prices involves the deterioration of the assessments of the financial institutions. In the same way, of the favorable macroeconomic conditions, such as the emergence of a sector (real for example), can influence anticipations of the agents and lead to an overvaluation of the values of the financial credits which can constitute the genesis of an episode of financial instability.

Thus, each component of the financial system is a potential source of financial instability. The regulatory agencies must thus carry out a rigorous follow-up and give a special attention to the various endogenous and exogenous shocks suitable for affect these various components.

3. Financial Stability and Macro Prudential Approach: New Logical of Regulation

Financial stability makes it possible to maintain the functions of the two systems, financier and economic, while allowing the economic agents to profit from the positive externalities of the intermediation activities. The disturbances affecting these two systems can generate important economic and social costs.

The installation of a financial stability policy requires a marriage between the micro and macro framework of the financial regulation. However, the maintenance of financial stability is not only question of one regulation; other economic policies of stabilization must be taken into account. Thus, in addition to the prudential orientations of prevention, the monetary policy, the fiscal policy and the exchange rate policy are necessary tools in order to guarantee effectiveness and a rigor in the fight against the episodes of instability and financial crises.

Table 1: Tools to maintain and evaluate financial stability

Tools	Objectives	Instruments
Micro prudential regulation	To guarantee the solidity of the individual firms	Test of solvency, action leverage and liquidity

¹³ Generally, negative movements in stock markets are interpreted the same way by all agents at a rapid rate, while positive events are interpreted differently and with a normal speed.

¹⁴ For more details see Walter et al. (2008) "critical of the fundamental value" and Orlean A. (1999), "The power of finance."

Table 1: Tools to maintain and evaluate financial stability - continued

Macro prudential regulation	To guarantee the stability of the financial system	To reduce the pro-cyclicality of the capital
Monetary policy	Price stability and management of the liquidity	Interest rate, obligatory reserve and operations of pensions
Fiscal policy	Management of the total request	Taxes, investments and others
Exchange rate policy	Management of foreign exchange rate	To limit the open positions of exchange and the exposure to certain types of currencies

Source: Hannon (2010)

The micro-prudential and macro-prudential policies are intended to reinforce the preventive devices against situations of instability by adopting a more restrictive financial regulation. In parallel, the monetary, budgetary and of exchange rate policies guarantee the stability of the macroeconomic framework which contributes to avoid situations of financial instability. Although the expansionist policies support the growth and improve optimistic anticipations of the economic agents, they can make emerge risky behaviors which often result in situations of instability.

These various tools have certainly different objectives and heterogeneous instruments (table 1), but the adoption of a device which gathers them makes it possible to actively fulfill the requirements of a policy aiming at preserving the impact strength of the financial system. However, it is it should be noted that arbitration between the various decisions (interest rate, public expenditure, etc.) is necessary to contain economic agent's anticipations, to avoid the emergence of the financial risks and to maintain macro-economic equilibrium.

The macro prudential approach is today essential tools for the regulation authorities. The financial crisis of 2007-2008-2009 put forward the interconnections between the real sphere and the financial system. Thus, the current reflections on financial stability insist on the utility of a regulation which incorporates the macro prudential approach.

3.1. Definition and Principles of the Macro Prudential Approach

The definition of the macro prudential approach is generally done by the recourse to the micro prudential approach which takes care that a financial institution respects the national and international lawful requirements in terms of capital, liquidity and communication. These two approaches are complementary, however, three great characteristics distinguish them with knowing; the objective, the finality and vision compared to the concept of risk (Borio 2009).

The objective or the goal of the macro prudential approach is to limit the systemic risks and the supervening of the financial crises. In this direction, this approach has a dimension more total than that of the micro prudential approach, which aims at combating a default risk of an entity. Thus, the macro prudential approach makes it possible to ensure the durability of the confidence of the depositors as well as the introduction of a climate aiming at the continuity of the activities of intermediation on the whole of the compartments of the financial markets¹⁵.

The finality of the macro prudential approach is the financial system in entirety and thus the reduction of the economic and social costs of the financial crises, while, the micro prudential regulation is intended to preserve the interests of the borrower; depositors or shareholders. The example given by Borio (2009) as for the differences between the two approaches is interesting. Indeed, we can bring closer specificities to these approaches by the portfolio theory, where the micro prudential approach is the part which is interested in the evolution of a component of the basket in terms of profitability and risk, while, the macro prudential approach is similar to the analysis of the

¹⁵ Caruana (2010) considers that the objective of macro prudential approach is to limit the risks and costs of systemic crises. In other words, it seeks to avoid psychological distress whose costs are significant. Its aim is to reduce systemic risk by identifying the interrelationships and common exposures among different institutions and the pro-cyclicality of the financial system.

portfolio by integrating the whole of the involved titles. Consequently, we integrate several dimensions of the risk, their correlations and the feed-back effects (systemic risk).

In a macro prudential approach one wonders primarily about the risk in an endogenous way to the system. What wants to say that the financial institutions are supposed to have an influence on the dynamics of the economic and financial systems, since a class action suit, their shares, can induce extreme situations on the level those financial markets (see the theories of instability). However, the micro prudential approach considers that the risk is exogenous in the sense that an institution cannot significantly affect the prices and the macroeconomic framework equilibrium. However, the border between the two approaches remains difficult to establish. Indeed, the shocks which affect an institution can gain a systemic and endogenous character in the presence of the phenomenon of contagion (see table 2).

Table 2: Approach Macro vs. Micro prudential approach's

	Macro prudential	Microphone prudential
Intermediate target	Limited the situations of instability of the system	To limit the insolvency of an individual institution
Final target	Macroeconomic cost related to financial instability	Consumer protection
Characterization of the risks	Endogenous (depends on the collective behaviors)	Exogenous (independent of the individual behavior of the agents)
Common exposures	Important	Less significant
Prudential control	Signal down	Bottom up

Source: Borio (2003)

The innovation made by the macro prudential approach lies in its capacity to integrate the effects of return ticket between the economic system and financier. It supports the recourse to relative data with the whole of the system (economic and financial) and makes it possible to collect the dynamic behaviors of the various actors and the interactions likely to submerge; it thus gives more weight to the systemic events. On the other hand, the micro prudential regulation is carried out within the various institutions to control and supervise their individual practices (Bottom up).

The macro prudential approach thus integrates various dimensions of the systemic risk within the financial system namely: temporal and transverse dimension. The first consists to evaluate and analyze the relation between the duration of the business cycle and the level of pro-cyclicality of the financial system. The second studies the distribution and the diversification of the risks in the financial system and economic.

3.2. Macro Prudential Instruments

The debate on the macro prudential instruments at the disposal of the regulatory authorities is recent since the whole of measurements were proposed, by the central banks, the authorities of supervision and the governments, in answer for the purposes of the financial crisis of 2007-2008.

The work carried out within the BIS made it possible to count eight instruments able to conclude this new policy (see table 3). These instruments meet aims in relation to dimensions temporal and transverse.

The first instruments correspond to the methods which must be used to integrate the relations between the financial risks and the business cycle. These methods must be jointly elaborate by the banks and the authorities of supervision. In this direction, the regulatory agencies must assign notations to the banks and work out analytical tools in order to measure the systemic risks.

Then, an effort of financial communication is important to sensitize and inform on the state of the financial system. Also, of regulatory measurements must be employed to reduce the pro-cyclicality of the financial capital. Indeed, the economic and financial literature recent highlighted several measurements aiming at achieving this goal. The first suggests re-examining the adequacy between the

banking guarantees and the value of the loans (Loan-to-Been worth ratio). The second approach consists in reducing the pro-cyclic character of the provisioning of the credits in suffering. Indeed, the fiscal policies and managerial often encourage the banks to lead policies of provisioning aiming at amplifying the financial cycle. Other tools must be set up to reduce the pro-cyclicality of the banking financing in the short run and to take into account the transverse dimension of the systemic risk. For example, several authors underlined the interest to use a ratio of capacity of impact resistance which is the relationship between the very liquid credits and the exits of cash over a 30 days period (Patrick (2010)).

Lastly, the macro prudential instruments also include devices aiming at a reduction of the risks of concentration, a rationalization of the policy of distribution of the dividends and benefit. They integrate in more the mechanisms of resolution and management of the financial crises and the bankruptcies of institutions.

Table 3: Examples of macro-prudential instruments

Methodology to measure the risks	International practices
<ul style="list-style-type: none"> • <i>By the banks</i> • <i>By the supervisors</i> 	To measure the risks and their relationships to the business cycle. Notation of the institutions, development of systemic measurements and communication as for the level of vulnerability of the system (macro stress test for example).
Financial communication	
<ul style="list-style-type: none"> • <i>Accountant</i> • <i>Prudential filtering</i> • <i>To reveal</i> 	The banking logic of provisioning and methods of accounting To reduce the pro-cyclist of the capital through the smoothing of the results and an effective policy of provisioning. To inform on the various risks and also on their importance through the financial reporting of the financial institutions and the Reports/ratios of Financial stability.
Lawful capital	
<ul style="list-style-type: none"> • <i>Pillar 1</i> • <i>Pillar 2</i> <p>Liquidity of refinancing</p> <p>Collateral</p> <p>To limit the risk of concentration</p> <p>Restriction on the profits</p> <p>Management and resolution of default</p>	To reduce the sensitivity of the capital to the variations of the business cycle with the respect of the level of the risks. To increase the lawful capital for specific risks. The revisions of the supervisors must take into account the evolution of the business cycle. To limit the concentration of the refinancing of the loans in currencies and the mismatches of currencies. To require a maximum of the ratio titles compared to the loans. To limit the exposures to a source of risk or a particular customer. To rationalize the policy of distribution of the dividends and the benefit. To intervene during time of boom and not during time of stress (monetary policy and budgetary). Moreover, to set up a restrictive regulation as for the management of the systemic institutions (Too big and/or Too interconnected to fail).

Source: (BIS 2008)

4. Analytical Framework of the Macro-Prudential Approach

In the light of the reflections carried out in this paper, it proves that financial stability is a description of a state of the financial system and an evaluation of its capacity to reabsorb the various economic and financial shocks.

The evaluation of financial stability is generally carried out in two stages. The first relative one to a description of the current location is often based on the analysis of the financial soundness indicators and the tools making it possible to judge state of the financial system at a given moment.

Five types of agents are analyzed, through several ratios and sizes economic namely: households, financial institutions, non-financial companies, financial markets and the real estate market¹⁶.

The second stage of evaluation of financial stability aims, on the other hand, at measuring the robustness and the impact strength of the financial system through its setting under shocks, endogenous or exogenous, extreme and plausible. Generally, in this stage of the tools such as the macroeconomic tests of resistance are frequently used. It should be noted that the stresses test worked out by the banks individually belong to this device¹⁷. The authorities with load of financial stability must combine the two methods (Top down and Bottom up) to be able to formulate suitable conclusions.

The interest carried to the approach of macroeconomic stress test begin with the recent orientations from the IMF and the World Bank in the publications from the FSAP including one great part was dedicated to the evaluation of the systemic risks and the interconnections between financial system and economic.

Thus, several techniques can be used: early alarm systems, the macro stress test based on small-scale models (time series and given of panel for example) as well as the macroeconomic models with financial frictions¹⁸ which today are more recommended considering their capacity to introduce the interactions between the economic sphere and the financial sphere and to integrate feed-back effects (feedback effect) which guarantee a relevant evaluation of financial stability to them.

The early warning systems were conceived to envisage situations of instability or financial crises. The empirical literature on the matter is abundant. Initially, work related to the banking crises and of exchange and the developments pioneers were those of Demirguç-kunt and Detragiache (2005), Davis and al (2008) and others. This technique consists of the use of a relation binding of the explanatory variables with a binary financial variable indicating situation of stress. These models are able to reproduce the episodes of crises and to envisage the probability of supervening. However, they make it possible neither to measure the costs of the financial crises nor to evaluate the feed-back effects.

The macros stress tests recently developed by international organization and some central banks highlighted the mechanisms of propagation of a shock of nature endogenous and exogenous within the financial system and economic. According to figure 1, which synthesizes methodology on which rests the macroeconomic tests of resistances, the disturbances which affect the system can occur either of the real sector or of the financial sector. These shocks can be idiosyncratic or systemic nature (De Bandt and al (2000 and 2009)). An idiosyncratic disturbance is defined as being an individual shock¹⁹ (for example the fall of a bank or the failure of a counterpart or a sector). As for the systemic shocks in fact disturbances simultaneously affect the whole of the components of the system. The systemic or idiosyncratic nature, these disturbances, can assign several components or sectors to knowing: households, companies, banks, the public sector, non-banking financial institutions and the markets structure. Once affected, the latter contribute to increase the risks incurred by the system (the credit risk, of liquidity, contagion and others) and generate significant losses in terms of capital.

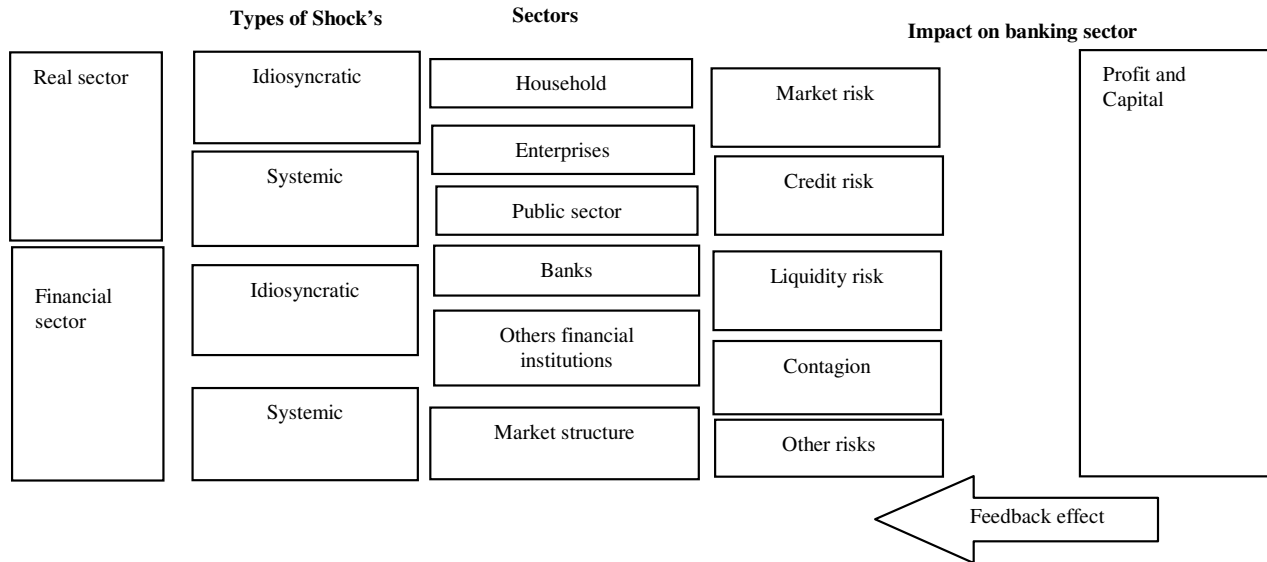
¹⁶ IMF (Financial soundness indicators 2006)

¹⁷ The stress tests developed by banks and suggested by the supervisory authorities are, in turn, closely linked to a micro prudential approach, which aims to achieve a fight against episodes of bank failure. While recent developments are the growing advantage of the macro approach in supervising the financial system.

¹⁸ Goodhart et al.(2010).

¹⁹ The idiosyncratic shock can take a systemic because of contagion in relation to the interconnections between the various components of real and financial sectors.

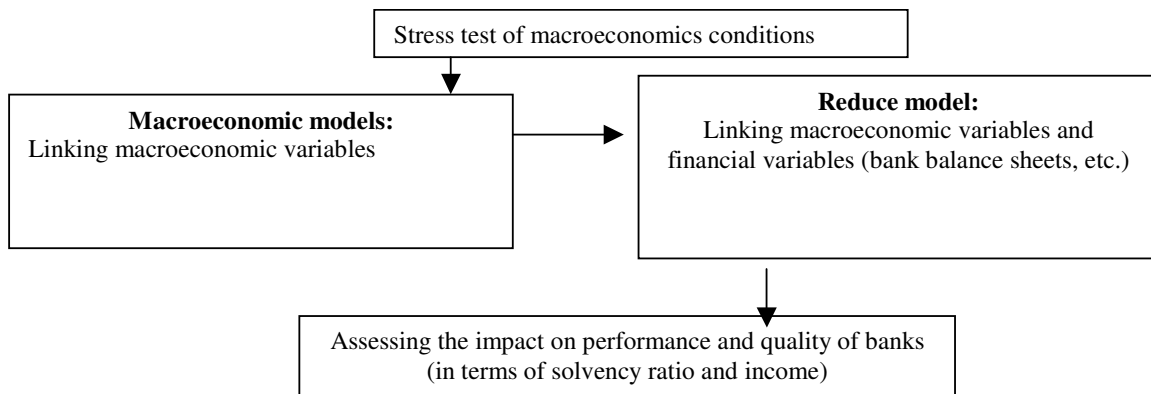
Figure 1: Methodology of the macroeconomic tests of resistance



Source: Quagliariello (2008)

In practice, the exercise of macro stress test is articulated around two great stages. In a first phase a macroeconomic model is elaborate in order to conceive scenario, making it possible to describe the behaviors and the fluctuations of the macroeconomic framework in normal situations and extremes (shocks). In one second phase, small-scale models connecting the macroeconomic evolutions with the fluctuations of the financial variables of interest (according to the type of risk to be evaluated) are used. Thus, the shocks generated by the first model are useful like inputs for the second and make it possible “to stress” the financial variables in order to identify the vulnerabilities of the financial system, and thus to evaluate its stability and its capacity to reabsorb these shocks (see figure 2).

Figure 2: Process of macro stress testing



Source: Foglia (2008) and Sorge and al (2008)

The models can to generate the shocks are often classified in two families: structural and nonstructural models. The first are based on relations economically founded between macroeconomic variables. However, the majority of the models put in production today by the regulatory agencies do not include the financial system, which limits their relevance and justifies the recourse to nonstructural models like the VAR model.

The small-scale models which describe the relations between the financial and macroeconomic variables are generally models in time series and/or panel data models. Though, by construction, they

are unaware of the feed-back effects on the macroeconomic variables, they profit from several advantages in particular their increased flexibility and their facility of implementation.

The installation of a device including the whole of these models contributes to the evaluation of the impact strength of the financial system as for the various shocks, makes it possible to reinforce the macro prudential regulation and to guarantee consequently the best followed financial system.

5. Roles of the Central Banks

The majority of the central banks are elected to preserve the price stability. However, the supervening of the financial crises their allotted the mission of contributing to the maintenance and the safeguarding of financial stability. The experiments of financial crises showed that the central banks have the tools and the instruments to evaluate the stability of the system and to manage the financial crisis situations successfully.

The studies of Thornton, Volker and Schinasi affirms that the central banks are responsible partly for financial stability, because they guarantee the availability continues liquidities, ensure the good performance of the payment system and take care of the transmission of the monetary policy of the various economic actors. In practice, the majorities of the central banks contribute to the maintenance of financial stability and often carry out this mission through an effective supervision and a regulation (see table 4). However, the operational missions, objectives that they continue, the range of the tools of which they lay out and the true nature of the responsibilities which fall to them on the matter are variable according to the geographical areas, and the historical circumstances of the mandates which were entrusted to them.

Table 4: Central banks and financial stability

	The law clarifies that financial stability is an objective or a task (1)	Central banks and function of financial stability (2)		Financial Stability Report
		Regulation	Supervision	
Argentina	*	*	*	*
Australia				*
Brazil	*	*	*	*
Canada	*			*
China	*		#	*
ECB	*			*
France	*	*	*	*
Germany	*	#	#	*
India		*	*	*
Indonesia	*	*	*	*
Italy	*	*	*	
Japan	*		⊠	*
Korea			⊠	*
Mexico	*			*
Russia	*	*	*	*
Arabia Saudi	*	*	*	
South Africa	*	*	*	*
Turkey	*			*
England	*			*
The USA	*	#	#	

(1): * indicates that financial stability is explicitly stated as an objective in the legislation. In some cases it may be a memorandum of understanding.

(2): * indicates that the central bank is responsible, while # indicates that it shares this feature with other bodies. ⊠ indicates that the central bank has no responsibility but is involved in this function Source: Viñals (IMF 2010)

In spite of these variable configurations, the central banks generally have a completely particular role, and of foreground, in devices of financial stability often associating the governmental authorities and the various bodies of regulation. This role is justified by a series of elements.

Initially the responsibility of the central banks as regards supply of liquidity constitutes a reason for which it is paramount to integrate financial stability in its specifications. Indeed, at the time of the financial crises, the central banks must manage to maintain the liquidity of the markets and to guarantee its availability for the unit of the agents to arrive to a resumption of confidence and to preserve the system liquidity and disturbances affecting the payment system.

In the same way, being often in charge of the banking supervision the central banks have a thorough knowledge of realities of the sector, including the nature and the evolutions of the various stations of the assessments, the real or potential exposure to various types of shocks, and the characteristics of the internal devices of risk management. This supervision partly guarantees the robustness of the banking system which facilitates the transmission of the monetary policy.

Lastly, it should be noted that the monetary policy and financial stability are closely dependent. The control of the monetary policy cannot be done independently of the objective of financial stability. An aiming policy of low interest rates, for example, could support an excessive taking risk and the emergence of a situation of financial instability.

The central banks with a clear mandate which entrusts to them a paramount role in the safeguard of financial stability must be equipped with tools and the instruments necessary to its safeguarding. In the literature there exist two types of measurements: **reactive and precautionary measures**.

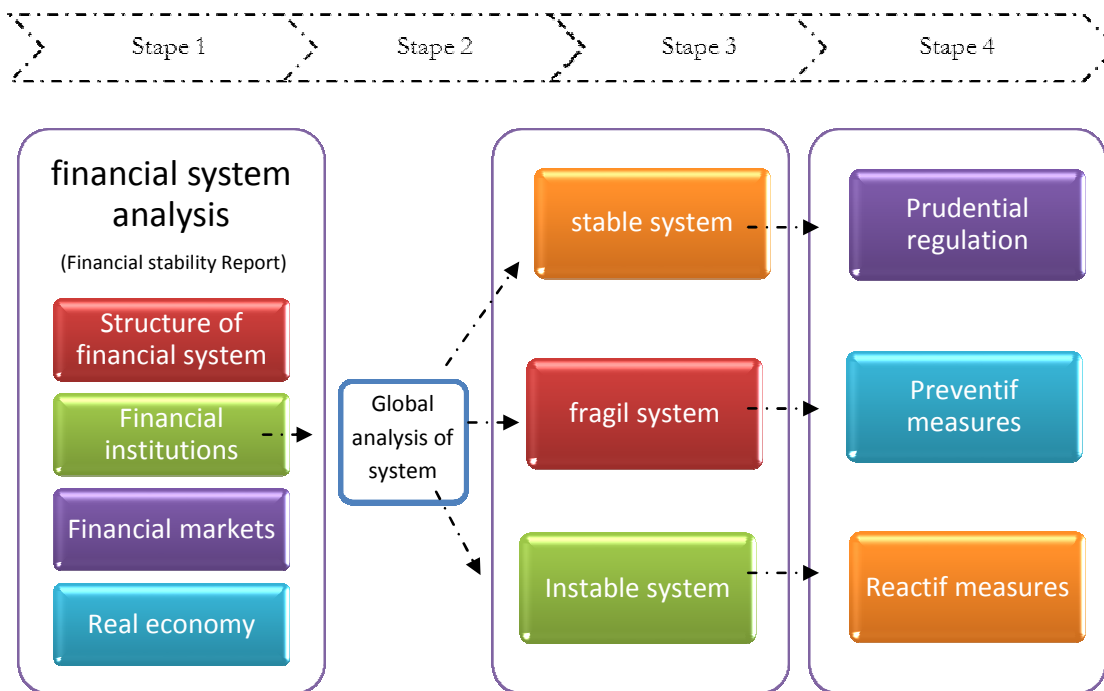
The first measurements include an effective banking supervision, an active monitoring of the markets as well as a macro prudential approach. The banking supervision consists of the observance of the banking regulation and the alignment of the whole of the banks to the international standards (IFRS and Basle I, II and III). The purpose of this measurement is to reinforce the practices of risk management, to support the healthy financial policies and to preserve the target level of the lawful capital while reducing their pro-cyclicality. As for the supervision and the regulation of the markets, the monetary authorities must take care that the markets remain efficient, deep and narrow.

The central banks must be able to analyze the interactions between the macroeconomic environment and the financial system. Generally, the evolutions of the business cycle affect the activities of the financial institutions and the markets of capital. Thus, the tools such as the macro-stress-test, the financial soundness indicators (IFS) and the early warning system must be worked out to evaluate the stability of the financial system. Lastly, the central banks must be equipped instruments making it possible to manage temporal and transverse dimensions of systemic risk.

In addition to the precautionary measures, the central banks generally have reactive measures intended to overcome the effects of significant turbulences or financial crises. The first fundamental mechanism is that of the lender in last resort. Thus, the draining of the liquidities following a generalized loss of confidence can be stopped through massive and/or targeted injections liquidities. However, the central banks must distinguish the banks which face problems of liquidity of those which have problems, more complicated, of solvency. In practice, and in times of crisis, such a distinction proves often delicate and is based primarily on the quality of collateral at disposal of the institutions.

In the event of insolvency of an institution, the mechanisms envisaged depend on the respective roles of the central banks and the governments. The absence of consensus on the true nature of measurements to be engaged in the event of insolvency (recapitalization, fusion, bankruptcy.) is partly explained by the implications that a frequent recourse to procedures of rescue would have. In fact, although these procedures have in particular the advantages of limiting the negative externalities on the real economy, of containing the effects of contagion, like protecting the creditors from the institution in difficulty, they require injections of public funds and thus an increase in the moral risk.

The diagram below provides an overall picture of the articulation of these two measurements:

Figure 3: Steps for the conduct of the mission of financial stability

Sources: Schinasi (2009), Schinasi (2006) and Houben and al. (2004) and others

In the facts, the central banks will be held to work out a regular follow-up of the situation of the various components of the financial system and evolutions of the national and international economic conjuncture. This is considered through the development of the Financial Stability Report (RSF). The latter will aim to evaluate the situation of the financial system and to identify the endogenous and exogenous vulnerabilities and to judge the level of stability of it through the various already evoked macro-prudential tools. A stable condition requires only the adoption of a micro-prudential approach based on the respect of the lawful and financial requirements. The identification of a vulnerable state requires the use of the macro-prudential instruments to reduce the pro-cyclicality of the financial system and to limit risk exposures of financial and economics systems. In addition, the emergence of a crisis or instability requires the application, in urgency, of reactive measurements aiming at bringing back the system to its stable situation to guarantee a durable growth and a confidence as for the economic outlooks.

Conclusion

The difficulties surrounding the definition of financial stability result in impossibility of having a broad consensus relating to the objectives and the instruments to be used. The sources of instability are uncountable and the evolutionary character of the financial system complicates the mission of the various regulators. Consequently, the subject remains of topicality, and as well the public authorities as the great international financial institutions continue the reflections which aim at supplementing the existing devices of evaluation and intervention.

So one attends widening, according to variable methods, field of the missions assigned at the central banks. This movement is accompanied by the reinforcement of the information exchanges and expertise between the various functions of these institutions, as between the central banks and the other regulation authorities of the financial system. This movement is concretized in particular by the publication of a Financial Stability Report which can constitute in itself an instrument of reduction of the risks of instability. Indeed, it supports the emergence of a framework of co-operation between the

various agents and actors and increases the transparency on the various components of the financial system.

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