

DEFINING FINANCIAL STABILITY AND ESTABLISHING A FRAMEWORK TO SAFEGUARD IT

Garry J. Schinasi
International Monetary Fund

The ongoing global financial crisis has been a rude awakening that the current framework for safeguarding financial stability is neither reliable nor effective. The threats to global economic stability caused by the dysfunction of credit and money markets and the weakening of the global banking system also make clear that safeguarding the stability of the financial system is as important a policy objective as maintaining monetary stability if economic growth and stability are to be achieved and sustained.

Despite the global financial industry's importance measured in terms of value added to global production and employment, global finance is not an end in and of itself. It is, instead, a means to enhancing and facilitating the efficiency of economic processes such as resource allocation, risk allocation and pricing, wealth accumulation, and ultimately economic growth and prosperity.

The massive and destructive deleveraging still underway signals that the global financial industry has been missing this point for quite some time—as if finance existed for the benefit of highly paid financiers and outsized rates of return. However, much of the virulence of this crisis could not have occurred without the policy shortcomings and mistakes that inadvertently either encouraged or acquiesced to excessive risk taking and the accumulation of imbalances. Playing key roles in this regard were misaligned private incentives, ineffective regulations and business practices

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(or rules of the game), and inadequate official oversight of financial institutions and markets, not to mention excessively expansionary global monetary and macroeconomic policies.

The financial system policy framework in place prior to the crisis—which has already been transformed significantly in the United States and Europe—failed dramatically. This framework was a patchwork of rules of the game and regulatory and supervisory principles and institutions that emerged in the aftermath of the Great Depression and which has since evolved in response to repeated, but individually unique, experiences of economic cycles of growth and recessions, financial cycles of boom and bust, and dramatic and at times system-transforming financial innovation. In effect, the policy apparatus for safeguarding financial stability did not keep pace with financial innovation, modernization, and globalization and failed to prevent financial imbalances from arising, accumulating, and compounding, to the point of a global systemic financial crisis and quite possibly the worst global economic crisis since the 1930s.

The resulting framework relied too heavily (and naively) on private risk management and market discipline to safeguard financial stability and not enough on appropriate incentives, effective rules of the game, and well designed and rigorously implemented official oversight. The balance of emphasis in policy will likely now swing in the direction of realigning private and public incentives, redesigning new rules of the game appropriate for a modern global financial system, and significantly enhancing the reliance on official oversight through improved supervision of institutions and surveillance of markets. These efforts should also include reforms to enhance financial reporting, disclosure, and market transparency in an effort to improve the effectiveness of market discipline in preventing the build up of catastrophic financial imbalances.

A prerequisite for more effective official oversight is the development and implementation of a more effective framework for assessing the financial system's ability to perform its key economic functions.¹ However, the ultimate objective of promoting efficient finance and of safeguarding financial stability once it is achieved

1. The key functions include matching the needs of savers and investors; providing transactions and payments services; risk pricing, spreading, sharing, and management; and the production, processing, and monitoring of information.

is sustained economic growth, stability, and prosperity. From this perspective, no policy framework can effectively safeguard financial stability if it does not place these core objectives front and center, including in the very definition of financial stability.

With this as background, the purpose of this paper is twofold: first, to establish a definition of financial stability and create a framework for policy analysis that is more closely aligned with economic processes and efficiency; and, second, to examine the implications and challenges for assessing systemic risk and safeguarding financial system stability. The definition links the effectiveness of finance and the financial system to its ability to facilitate the efficiency of economic processes such as wealth accumulation, economic growth, and economic efficiency more generally, as well as risk pricing and management. This means that assessing the stability of the financial system would become a vital step in evaluating the stability of the economy in general and the appropriateness of microeconomic and macroeconomic policies. This perhaps makes assessing financial stability even more challenging than assessing the potential for instability, but this way of framing the intermediate objective of safeguarding financial stability at least offers the possibility of designing policies that proactively promote economic efficiency and health. This more positive and proactive disposition could reap benefits in terms of warding off the accumulation of the kind of financial imbalances that could threaten financial stability.

The paper is organized as follows. The next section of the paper briefly discusses the existing framework of prevention and resolution of financial instability. This framework relied heavily on lines of defense against financial instability, almost as if finance were some kind of disease. All of the existing lines of defense failed to prevent the subprime crisis from occurring and, importantly, from spreading to all other international financial centers. The paper then motivates a definition of financial stability and relates it to economic processes and economic efficiency. This section argues that the concepts of financial efficiency and economic stability cannot be separated as clearly as they are in theoretical micro- and macroeconomic analysis, in part because finance is not an end, but a means to promoting economic efficiency, growth, and stability. If finance is ineffective and prone to repeated systemic booms and busts, it is unlikely to promote intertemporal economic efficiency and may even promote intertemporal inefficiency, as seems to be the

case in the ongoing global crisis. Finally, the paper discusses some of the more important challenges in assessing financial stability in an effort to safeguard the financial system from potential financial imbalances. An implication of the analysis is that intertemporal efficient wealth accumulation and growth can only be safeguarded with a financial stability framework that incorporates and integrates important elements of economics and finance, at both the macro- and microeconomic levels.

1. EXISTING POLICY FRAMEWORK

The existing policy framework for safeguarding financial stability has evolved through time based, in part, on the realizations that finance is subject to market imperfections and that it is a public good. This framework has been portrayed in officialdom as a series of lines of defense against financial imbalances that could arise, and have arisen often enough, from underlying structural market imperfections and unexpected shocks. The lines of defense have been designed to prevent imbalances from becoming systemic and to resolve systemic difficulties should one or more of the defenses be breached. This section briefly summarizes the existing framework within the context of cross-border finance, although the framework presented is also a reasonable characterization of existing national and regional frameworks in advanced countries and the major international financial centers.

1.1 Policy Issues and Concerns

At the global level, the channels through which financial instability can be transmitted from one country to another can usefully be classified into three broad categories: institutions, markets, and infrastructures. This triad—together with legal and monetary arrangements, business practices, and codes of conduct—provides a reasonable definition of what is normally meant by the term financial system, which is discussed more fully later. Cross-border linkages of components of this triad can be seen as constituting the main channels through which problems in one national financial system get transmitted to another. In addition to these financial channels, the global economy is probably the most basic and prevalent cross-border transmitter of economic or financial weaknesses, but this is

the purview of macroeconomists and macroeconomic policymakers and not this paper.

To provide context, table 1 summarizes some public policy issues and concerns around which the existing policy framework has evolved. Roughly speaking, the issues involve one or more market imperfections (or market failures). Three broad global policy issues (specified in the three rows of table 1) arise to varying degrees from three potential channels of systemic concern (the three columns of the table). The policy issues are protecting investors and markets, dealing with safety net issues and moral hazard, and assessing and mitigating cross-border and systemic risk. The three channels are cross-border banks, foreign exchange and other global markets, and unregulated entities, such as hedge funds, structured investment vehicles (SIVs), and other special purpose vehicles.

All three issues are very important for banks generally and cross-border banks in particular. They are all also important for global markets. Investor protection and safety net issues are widely seen as not being relevant for unregulated entities, while the most recent crisis clearly indicates that unregulated entities can pose systemic risk.

Table 1. Public Policy Issues and Concerns

<i>Policy issues and concerns</i>	<i>Policy domain of cross-border systemic concern</i>		
	<i>Cross-border institutions</i>	<i>Global (FX) markets</i>	<i>Unregulated activities</i>
Investor protection and market integrity?	Investor protection	Market integrity	No; possibly for retail investors (of funds of funds)
Moral hazard from safety net?	Yes; also home/host burden-sharing issues	Possibly from G-3 central bank liquidity	No
Cross-border and systemic risks?	Maybe, depending on size, complexity, etc.	Yes, via over-the-counter markets and infrastructure linkages	Yes, via opacity, complexity, and with institutions and markets

Source: Author's assessment.

1.2 Policy Framework

Taking this classification as given, table 2 presents how these risks and public policy concerns are addressed through financial policies. It tries to answer the question: To what extent are the tools of financial policies used to address these concerns?

Table 2. Oversight Regimes

<i>Lines of defense</i>	<i>Policy domain of cross-border systemic concern</i>		
	<i>Cross-border institutions</i>	<i>Global (FX) markets</i>	<i>Unregulated activities</i>
Market discipline	Partially	Primarily	Exclusively
Market and banking regulation	National with cooperation	Not really; over-the-counter transactions	No
Prudential supervision	National and home/host issues	n.a.	No
Market surveillance	Indirect, as participant	Direct, national and international	Indirect, as participant

Source: Author's assessment.

As indicated in the first column of table 2, large cross-border banking groups, including the large internationally active banks, are probably the most closely regulated and supervised organizations on the planet, and for good reasons. These institutions pose financial risks for depositors, investors, markets, and even unrelated financial stakeholders because of their size, scope, complexity, and risk taking. Some of them are intermediaries, investors, brokers, dealers, insurers, reinsurers, or infrastructure owners and participants—and a single complex institution can sometimes play several of these roles. Cross-border institutions are systemically important: all of them nationally, many of them regionally, and about twenty or so of them globally. Protection, safety net, and systemic risks are key public policy challenges. Finally, oversight occurs at the national level, through both market discipline and official involvement, and at the international level, through committees and groups. As a result, banks, generally, and cross-border and global banks are probably the most closely watched financial institutions in the world.

At the other extreme of regulation and supervision are unregulated entities, shown in the right-most column of table 2. They are neither regulated nor supervised. Many of the financial instruments that these unregulated entities strategically and tactically use, such as over-the-counter (OTC) derivatives, are not subject to securities regulation, and the markets in which they transact are by and large the least regulated and supervised. This is part of the investment strategy, and it defines the scope of profit making. Unregulated entities (including hedge funds and certain kinds of SIVs) are forbidden in some national jurisdictions. In jurisdictions where they are partially regulated, this is tantamount to being forbidden, given the global nature and fungibility of the hedge-fund business model. A key characteristic of unregulated entities is that while their market activities are subject to market surveillance just like other institutions, this does not make transparent who is doing what, how they are doing it, and with whom they are doing it. Investor protection is not an issue for most individual unregulated entities, as they restrict their investor base to institutions (such as pension funds, insurance companies, and hedge funds) and wealthy individuals willing to invest in relatively high minimum amounts. It is, however, increasingly an issue for hedge funds, with the advent of funds-of-hedge-funds that allow minimum investments of relatively small amounts less than \$100,000 or even less than \$50,000 in hedge funds. Finally, concerns that hedge funds may represent a potential systemic risk have increased since the Asian and Long-Term Capital Management (LTCM) crises, particularly considering their tremendous growth over the past several years; I return to this theme below.

Global markets fall in between being and not being regulated and supervised. Global markets include the foreign exchange markets and their associated derivatives markets (for both exchange-traded and over-the-counter derivatives) and the fixed-income markets and their associated derivatives markets. Dollar, euro, and yen government bonds are traded more or less in a continuous global market, and the associated derivatives activities are also global.

Global markets are only indirectly regulated. They are subject to surveillance through private international networks and business-cooperation agreements, through information sharing by central banks and supervisory and regulatory authorities, and through official channels, committees, and working groups. Parts of these markets are linked to national clearance, settlement, and

payments infrastructures, so they are also subject to surveillance through these channels. The risks they potentially pose are less of a concern to the extent that the major players in them—namely, the large internationally active banks—are supervised and market disciplined by financial stakeholders. If there is poor oversight of the major institutions, then these global markets are subject to considerable risks, including a greater likelihood of systemic risk. One obvious example would be the global over-the-counter derivatives markets, which are unregulated and have little oversight except through the regulation and supervision of the institutions that engage in the bulk of these markets' activities. Both investor protection and systemic risk are challenging public policy issues for these markets.

Regarding infrastructure, large internationally active institutions typically are major participants in domestic and international clearance, settlement, and payments infrastructures—both public and private—as well as the major trading exchanges. Many of them co-own parts of the national and international infrastructures and have a natural interest in their performance and viability. Incentives are, to some extent, aligned to achieve both private and collective net benefits. Increasingly, however, internationally active banks have been more heavily involved in OTC transactions, which do not pass through these infrastructures. This poses challenges in terms of systemic risk, many of which have surfaced dramatically in the ongoing global financial crisis.

1.3 Lines of Defense against Systemic Risks and Events

As the rows of table 2 make clear, this framework relies on four lines of defense for preventing problems from occurring and becoming systemic and for dealing with them when they do become systemic (nationally, regionally, and globally). These can be roughly categorized as private risk management; market discipline; official oversight; and crisis management and resolution mechanisms.

—Private risk management includes financial-risk management at business-line levels; enterprise risk management at the firm level; management controls at executive and senior-management levels; corporate governance at the board level; and self-regulation via development and promotion of best business practices.

—Market discipline encompasses sound accounting and valuation procedures for properly recording and valuing financial

transactions and statements; the timely reporting and disclosure to allow investors to assess risks; well-functioning markets for price discovery and resource and risk allocation; and legal infrastructure for the enforcement of financial contracts.

—Key features of public sector oversight include transparent and enforceable legal infrastructure; effective market regulation and surveillance; and effective oversight of financial institutions, in which the banks are the most heavily regulated and supervised, investment banks are subject to SEC regulations, insurance and reinsurance are lightly regulated, other institutional investors are lightly regulated, and some activities are unregulated.

—Finally, crisis management and resolution mechanisms involve deposit insurance protection to prevent bank runs; appropriate liquidity provision by the central bank to keep markets functioning smoothly; lender-of-last-resort operations to prevent market dysfunctioning and to keep illiquid but viable financial institutions from failing; and capital injections (preferably private rather than public) to maintain orderly transitions for institutions that are not viable.

The ongoing global crisis triggered by the U.S. subprime crisis occurred because most, if not all, of these lines of defense failed in significant ways. The implementation of this framework, whose aim is to prevent instability, was not successful in preventing the kind of imbalances that created systemic risk and systemic events. Moreover, the central banks and fiscal authorities, and in many cases the legislators, in the advanced countries had to become innovative in creating new tools and finding the financing to support them to prevent further damage to both financial systems and economies. Even more innovative reforms and policy tools may be required to regain economic and financial stability.

1.4 In the Breach: Characteristics of the Current Global Financial Crisis

Although the crisis was triggered by the U.S. subprime mortgage crisis and by housing market booms and bubbles in Europe, many other factors also contributed to the crisis, including excessive credit expansion and leverage, lax lending standards, and ineffective official oversight of key markets and participant institutions. These factors have been vetted in official analyses and widely discussed in the press, so I do not discuss them extensively here.

The main features of the crisis can be briefly summarized as follows. First, markets for liquidity and their supporting derivatives markets became dysfunctional, reflecting an underlying breakdown of trust in systemically important counterparty relationships among the large global active financial institutions. Credit markets and their surrounding derivatives markets were similarly dysfunctional, which created further pressures in markets for liquidity and thus further increased the intensity of underlying creditworthiness issues. Second, the market displayed a growing perception of the increasing risk of a prolonged and possibly deep U.S. and global economic recession. Third, key central banks in the major international financial centers lost control of monetary and financial conditions, which reduced their ability to exercise their policy instruments to safeguard both monetary and financial stability. Fourth, a number of innovative policy changes were implemented, including the use of existing facilities in new ways (extended terms and access) and the extension of facilities to nonbank financial intermediaries. At the international level, central banks in advanced countries coordinated their actions. Finally, the United States and Europe extended official financial support to both bank and nonbank financial institutions, and the U.S. Treasury spearheaded a legislative initiative to remove toxic assets and recapitalize weak systemically important institutions.

The bottom line is that the existing policy framework, which relies on a balance of market discipline and official oversight, failed to prevent the imbalances from arising. Moreover, the existing mechanisms for resolving problems from becoming systemic proved to be inadequate. In effect, all lines of defense failed to prevent a relatively small financial problem from becoming systemic, in part because other lines of defense failed earlier on to prevent the buildup of overwhelming and unsustainable imbalances in credit markets, including massive, opaque, highly-leveraged, and essentially unregulated financial structures and securities.

Policymakers are continuing to innovate to create new mechanisms to contain systemic risk and restore confidence and both economic and financial stability. Ultimately, they will need to create a new policy framework and a more sustainable financial system architecture (which has already begun in the United States) to restore and safeguard financial stability.

2. FINANCIAL STABILITY AS THE OBJECTIVE

An important prerequisite for success in safeguarding financial stability in the future is the development of an intellectual framework that perceives the safeguarding of financial stability as a policy objective on a par with monetary stability, which has been perceived for several decades as a key prerequisite for sustaining durable economic growth and economic stability more generally.² An important component of this intellectual framework will no doubt be the enhanced ability to assess whether the financial system is capable of continuing to perform its main financial and economic functions in the presence of sizable unexpected shocks. Designing a framework for making assessments of this kind must, to some extent, be grounded in a practical conception of what is meant by financial stability and the ability to sustain it. To be useful for assessing the potential for systemic risk and events, the definition and framework must link the performance of the financial system to its ability to facilitate continued economic growth and stability. In short, the framework for assessing financial stability must assess the potential impact of financial vulnerabilities on the real economy. The existing frameworks did this prior to the current crises, but they clearly failed to provide early warnings of the impending financial dysfunctioning and its potential impact on the United States and global economies. The time is ripe for brainstorming and fresh thinking.

One reason why policymakers and academics have relied on concepts of financial instability rather than financial stability is that it is difficult to define what is meant by financial stability. First, stability is a difficult concept to define for an evolving, innovating, organic entity such as a financial system, which is constantly transforming itself. Second, it is difficult to define what is meant by equilibrium in finance, in part because equilibrium prices and resource allocations today depend on expectations of future outcomes, while expectations can be highly volatile if not unstable. Third, the essence of a financial transaction is an IOU or a promissory note involving human trust—the very kind of trust that

2. This section is based on material in Schinasi (2006), Fell and Schinasi (2005), and Houben, Kakes, and Schinasi (2004). I am grateful to my coauthors and to the U.K. National Institute Economic Review for granting permission to use all or part of this material.

policymakers were trying to restore in October 2008. This section tries to motivate and examine a definition of financial stability that has the potential for helping us safeguard financial stability.

2.1 Conceptual Challenges

Public policy typically tries to mitigate the impact of efficiency losses associated with market imperfections. In finance, however, each and every loss of efficiency does not necessarily require intervention. The desirability or necessity of some form of collective intervention is much clearer when a market imperfection in finance leads to an inefficiency that poses a significant threat to financial stability, because of the impact on either financial institutions or markets or both.

Unfortunately, the financial system policy literature rarely makes a clear distinction between sources of market imperfections that threaten stability and those that do not. This is because it is difficult to measure the efficiency losses associated with market imperfections in finance and to assess the risks to financial stability associated with market imperfections. These are some of the challenges in the period ahead, for which an analytical framework for financial stability would be useful for policy purposes.

2.2 Financial Stability Challenge

There are many ways to characterize the challenges to achieving and maintaining financial stability. Moreover, the nature of the challenge will depend on the structure and maturity of the economic system. For mature financial systems, the financial stability challenge can be characterized as maintaining the smooth functioning of the financial system and its ability to facilitate and support the efficient functioning and performance of the economy. To achieve financial stability, it is necessary to have in place mechanisms designed to prevent financial problems from becoming systemic or threatening the stability of the financial and economic systems, while maintaining (or not undermining) the economy's ability to sustain growth and perform its other important functions.

The challenge is not necessarily to prevent all financial problems from arising. First, it is not practical to expect that a dynamic and effective financial system would avoid instances of market volatility and turbulence, or that all financial institutions would be capable of perfectly managing the uncertainties and risks

involved in providing financial services and enhancing financial stakeholder value. Second, it would be undesirable to create and impose mechanisms that are overly protective of market stability or that too tightly constrain the risk taking of financial institutions. Constraints could be so intrusive and inhibiting that they could reduce the extent of risk taking to the point where economic efficiency is inhibited. Moreover, the mechanisms of protection or insurance could, if poorly designed and implemented, create the moral hazard of even greater risk taking.

Maintaining the economy's ability to sustain growth and perform its other important functions is an important aspect of the challenge of financial stability. The achievement and maintenance of financial stability should be balanced against other, perhaps higher-priority objectives such as economic efficiency. This reflects the notion that finance is not an end in itself, but plays a supporting role in improving the economic system's ability to perform its functions.

That the challenge is a balancing act can be seen by considering that the likelihood of systemic problems could be limited in practice by designing a set of rules and regulations that restrict financial activities in such a way that the incidence or likelihood of destabilizing asset price volatility, asset market turbulence, or individual bank failures could be eliminated. This type of stability, however, would be achieved at the great expense of economic and financial efficiency.

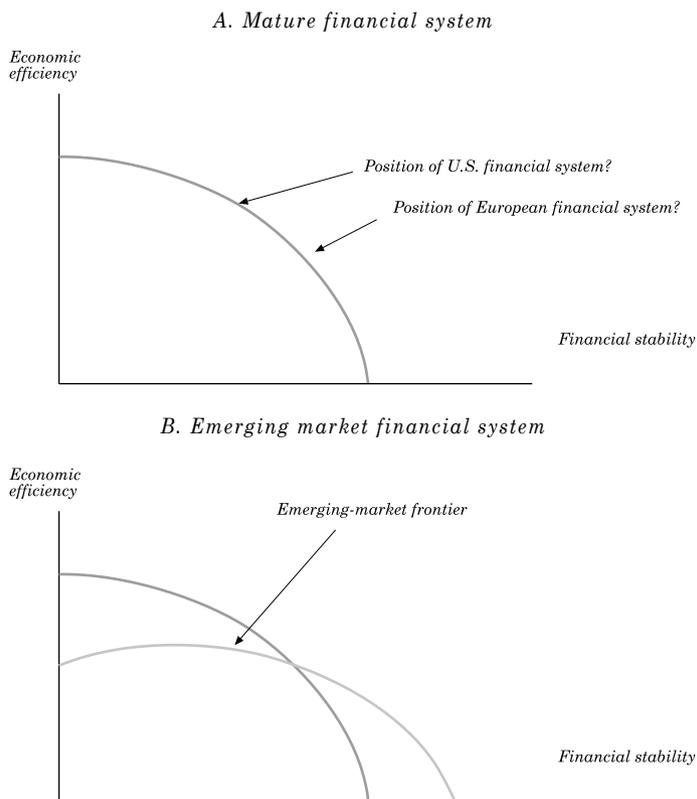
2.3 Stability and Efficiency Are Not Separable

This reasoning leads to the impression, if not conclusion, that there is an *ex ante* trade-off between achieving economic and financial efficiency, on the one hand, and economic and financial stability, on the other. That is, if one is concerned solely with stability, then it may be possible (though not necessarily desirable) to achieve and maintain it by trading off some efficiency.

The possibility of an *ex ante* trade-off can be illustrated by narrowing the definitions of stability and efficiency. Consider a market for a good whose price is sensitive to incoming information, a characteristic of many asset markets. In principle, one could limit the variability of the asset price by imposing restrictions in the market that would inhibit the ability of traders to price in every small piece of information. But from a trader's and investor's perspective, such restrictions could inhibit the efficiency of the market's ability to price and allocate resources in the presence of uncertainty.

On the other hand, it is possible to try to maintain efficiency, and even enhance it, while still allowing the financial system room to innovate, evolve, and better support the economic system. If the cost of doing so is greater asset price volatility or capital flow volatility, it is up to society to choose a point along this continuum of trade-offs (figure 1).

Figure 1. Efficiency and Stability Frontiers



Source: Author's drawing.

Some have characterized the difference between the American financial system and the European financial system as choices of different points along this continuum of trade-offs. The American system is more market oriented in that the financing of both household and corporate activities is accomplished more through markets than

in Europe, where there is much greater reliance on bank funding and less reliance on tradable securities (although this is changing). While one might argue that the American system of finance has led to greater economic productivity and efficiency, this greater efficiency is accompanied by greater asset market volatility and turbulence and a greater observed propensity to financial stress.

From a broader perspective, the challenge of achieving and maintaining financial stability goes well beyond the stability of asset prices, or of prices generally. This is not to say that authorities, and central banks in particular, should not be concerned with asset price volatility, and price volatility more generally, because they determine the value of money. Instead, the challenge of financial stability is broader than, and in fact encompasses, the need to limit the impact of price instability on the functioning of the overall financial system. If the financial system is stable, it will be able to tolerate higher levels of asset price volatility as well as other financial problems, including weaknesses in financial institutions.

At the highest level of generality, the challenge of safeguarding financial stability is to have in place a framework for managing the risk of a systemwide problem. There is as yet no international agreement on what such a framework might be, and policymakers always seem to be trying to prevent the last crisis. In other words, there is much work yet to be done to establish an agreed and flexible framework for safeguarding financial stability against the kind of imbalances that surfaced last summer and that led to the ongoing global systemic crisis.

3. REQUIRED CONCEPTUAL ELEMENTS OF A FRAMEWORK

A financial system performs several key functions that foster and support the effectiveness of the real economy: matching savers with investors; pricing and allocating financial resources and risks; and sustainably facilitating various intertemporal economic processes such as wealth accumulation, economic growth, and social prosperity.

It is difficult to reasonably and practically justify an operationally useful definition of financial stability and a framework for safeguarding it that does not acknowledge and incorporate these key functions as core elements. Nevertheless, the economics and finance professions—both policy oriented and academic—have yet to form a consensus on either a definition or a conceptual framework

for formulating financial system policies. This subsection addresses these and related issues by discussing the important conceptual elements that could usefully help the professions safeguard financial stability. The discussion necessarily entails defining terms and examining their implications.

3.1 Toward a Framework

A framework for financial stability can best be understood as a set of definitions, concepts, and organizing principles that impose discipline on the analysis of the financial system. An important component of a framework for safeguarding financial stability is the early identification of risks and vulnerabilities that might threaten the maintenance of stability.

An effective framework would seem to require three important standards. First, there must be rigorous definitions and understanding of key concepts, such as what is meant by the terms financial system, financial stability and instability, and systemic risk, just to name a few. Second, to be most useful for monitoring and policy, the framework's concepts and definitions ultimately must be either directly measurable or correlated with measures: in other words the concepts and definitions must have useful and policy-relevant empirical counterparts. Third, the set of definitions, concepts, and organizing principles, along with their empirical counterparts, must serve the purpose of ensuring internal consistency in the identification of sources of risks and vulnerabilities and in the design and implementation of policies aimed at resolving difficulties should they emerge.

It is important to define the relevant concepts appropriately, especially financial stability, the financial system, and systemic risk.

3.2 Defining Financial System

Broadly, the financial system can be seen as comprising three separable but closely related components. First, there are financial intermediaries that pool funds and risks and then allocate them to their competing uses. Financial institutions increasingly provide a range of services beyond the traditional banking services of taking deposits and making loans, while institutions such as insurance companies, pension funds, hedge funds, and financial-nonfinancial hybrids (such as General Electric) supply a range of financial

services. Second, there are financial markets that directly match savers and investors, for example, through the issuance and sale of bonds or equities directly to investors. Third, there is the financial infrastructure, which includes both privately and publicly owned and operated institutions (such as clearance, payment, and settlements systems for financial transactions) and monetary, legal, accounting, regulatory, supervisory, and surveillance infrastructures.³

Both private and public persons participate in financial markets and in vital components of the financial infrastructure. Governments borrow in markets, hedge risks, operate through markets to conduct monetary policy and to maintain monetary stability, and own and operate payment and settlement systems. Accordingly, the term financial system encompasses both the monetary system, with its official understandings, agreements, conventions, and institutions, and the processes, institutions, and conventions of private financial activities.⁴ Any analysis of how the financial system works and how well it is performing its key functions requires an understanding of these components.

From this definition, one could reasonably expect that financial stability and monetary stability are related in some meaningful ways. These relationships will become more transparent in what follows.

3.3 Defining Financial Stability

As yet, no consensus has been reached on a useful working definition of financial stability. Some authors define financial instability instead of stability.⁵ Others prefer to define the problem in terms of managing systemic risk rather than as maintaining or safeguarding financial stability.⁶ Consistent with some aspects of these alternative definitions, I propose and analyze a definition of

3. On the role of the legal system, see, for example, Levine (1999), Leahy and others (2001).

4. This particular formulation is an adaptation of the international financial system in Truman (2003).

5. See, for example, the definitions of Central Bank of Norway (2003), Chant (2003), Crockett (1996), Deutsche Bundesbank (2003), Duisenberg (2001), Ferguson (2002), Foot (2003), Large (2003), Mishkin (1999), Padoa-Schioppa (2003), Schwartz (1986), and Wellink (2002), which are surveyed in Schinasi (2004a, 2006). Davis (2002) develops a typology of instability.

6. From a policy perspective, a positive approach focusing on financial stability is more useful than a negative one focusing on financial instability (see Schinasi, 2006, pp. 91–3).

financial stability that has three important characteristics (Schinasi, 2004a, 2004b, 2006). First, the financial system is efficiently and smoothly facilitating the intertemporal allocation of resources from savers to investors and the allocation of economic resources generally. Second, forward-looking financial risks are being assessed and priced reasonably accurately and are also being relatively well managed. Third, the financial system is in such condition that it can comfortably, if not smoothly, absorb financial and real economic surprises and shocks. If any one or a combination of these characteristics is not being maintained, then it is likely that the financial system is moving in the direction of becoming less stable, and at some point it might exhibit instability. For example, inefficiencies in the allocation of capital or shortcomings in the pricing of risk can compromise future financial system stability by laying the foundation for imbalances and vulnerabilities.

All three aspects of this definition entail both endogenous and exogenous elements. For example, surprises that can impinge on financial stability can emanate both from within and from outside the financial system. Moreover, the intertemporal and forward-looking aspects of this particular way of defining financial stability serve to emphasize that threats to financial stability arise not only from shocks or surprises, but also from the possibility of disorderly adjustments of imbalances that have built endogenously over a period of time—because, for example, expectations of future returns were misperceived and therefore mispriced.⁷

Defining financial stability in this way has several important implications. First, judgments about the performance of the financial system entail how well the financial system is facilitating economic resource allocation, the savings and investment process, and ultimately economic growth. There are two-way linkages: the real economy can be positively or negatively affected by the financial system, and the performance of the financial system can be affected by the performance of the real economy. For a framework to be useful for assessing financial stability, it must pay attention to these linkages. Disturbances in financial markets or at individual financial institutions need not be considered threats to financial stability if they are not expected to damage economic activity at large. In fact,

7. That financial stability should not be thought of simply as a static concept of shock absorption capacity is emphasized by Minsky (1982) and Kindleberger (1996), among others.

the incidental closing of a (minor) financial institution, a rise in asset price volatility, and sharp and even turbulent corrections in financial markets may be the result of competitive forces, the efficient incorporation of new information, and the economic system's self-correcting and self-disciplining mechanisms. By implication, in the absence of contagion and a high likelihood of systemic effects, such developments may be viewed as welcome from a financial stability perspective. Just as in Schumpeterian business cycles, where the adoption of new technologies and recessions have both constructive and destructive implications, a certain amount of instability can be tolerated from time to time because it may encourage long-term efficiency in the financial system.⁸

Second, financial stability is a broad concept, encompassing the different aspects of the financial system, including infrastructure, institutions, and markets. Because of the interlinkages between these components, expectations of disturbances in any one component can affect overall stability, requiring a systemic perspective. Consistent with the definition of the financial system, at any given time, stability or instability could be the result of either private institutions and actions or official institutions and actions, or both simultaneously or iteratively.

Third, financial stability implies not only that the financial system adequately fulfills its role in allocating resources, transforming and managing risks, mobilizing savings, and facilitating wealth accumulation and growth, but also that within this system, the flow of payments throughout the economy functions smoothly (across official and private, retail and wholesale, and formal and informal payment mechanisms). This requires that money—both central bank money and its close-substitute, derivative monies (such as demand deposits and other bank accounts)—adequately fulfills its role as a means of payment and unit of account and, when appropriate, as a (short-term) store of value. In other words, financial stability and what is usually regarded as a vital part of monetary stability overlap to a large extent.⁹

Fourth, financial stability requires the absence of financial crises and the ability of the financial system to limit and deal with the emergence of imbalances before they constitute a threat to stability.

8. See Schumpeter (1934).

9. See Padoa-Schioppa (2003) and Schinasi (2003) on the role of central banks in financial stability.

In a well-functioning and stable financial system, this occurs in part through self-corrective, market-disciplining mechanisms that create resilience and that endogenously prevent problems from festering and growing into systemwide risks. In this respect, there may be a policy choice between allowing market mechanisms to work to resolve potential difficulties and intervening quickly and effectively (through liquidity injections via markets, for example) to restore risk taking or stability. Thus, financial stability entails both preventive and remedial dimensions.

Finally, financial stability can be thought of as occurring along a continuum, reflecting different possible combinations of conditions of the financial system's constituent parts. An analogy is the health of an organism, which also occurs along a continuum. A healthy organism can usually reach for a greater level of health and well-being, and the range of what is normal is broad and multi-dimensional. In addition, not all states of unhealth (or illness) are significant, systemic, or life threatening, and some illnesses, even temporarily serious ones, allow the organism to continue to function reasonably productively and return to a state of health without permanent damage. One implication of seeing financial stability in this way is that maintaining financial stability does not necessarily require that each part of the financial system operates persistently at peak performance; it is consistent with the financial system operating on a spare tire from time to time.¹⁰

The concept of a continuum is relevant because finance fundamentally involves uncertainty, is dynamic (meaning it is both intertemporal and innovative), and is composed of many interlinked and evolutionary elements (such as infrastructure, institutions, and markets). Accordingly, financial stability is expectations based, dynamic, and dependent on many parts of the system working reasonably well. What might represent stability at one point in time might be more or less stable at some other time, depending on other aspects of the economic system such as technological, political, and social developments. Moreover, financial stability can be seen as being consistent with various combinations of the conditions of its constituent parts, such as the soundness of financial institutions, financial markets conditions, and effectiveness of the various components of the financial infrastructure.

10. See Greenspan (1999).

3.4 Defining Systemic Financial Risk

According to a report on financial consolidation and risk by the Group of Ten (G-10), “Systemic financial risk is the risk that an event will trigger a loss of economic value or confidence in, and attendant increases in uncertainty about, a substantial portion of the financial system that is serious enough to quite probably have significant adverse effects on the real economy. Systemic risk events can be sudden and unexpected, or the likelihood of their occurrence can build up through time in the absence of appropriate policy responses. The adverse real economic effects from systemic problems are generally seen as arising from disruptions to the payment system, to credit flows, and from the destruction of asset values” (Group of Ten, 2001, p. 126). The G-10 study notes that this definition encompasses much of what is in the literature, but it is stricter in two respects. First, the negative externalities of a systemic event extend into the real economy, rather than being confined to the financial system. Second, this extension into the real economy occurs with relatively high probability. The emphasis on real effects reflects the view that it is the output of real goods and services and the accompanying employment implications that are the primary concern of economic policymakers. “In this definition, a financial disruption that does not have a high probability of causing a significant disruption of real economic activity is not a systemic risk event” (p. 126).

Taken together, a good understanding of what is meant by financial stability and financial instability can serve to define boundaries around the scope of the analysis. The safeguarding of financial stability should not be understood as a zero tolerance of bank failures or as an avoidance of market volatility, but it should seek to prevent financial disruptions that lead to real economic costs.¹¹

4. A FRAMEWORK FOR ASSESSING FINANCIAL STABILITY

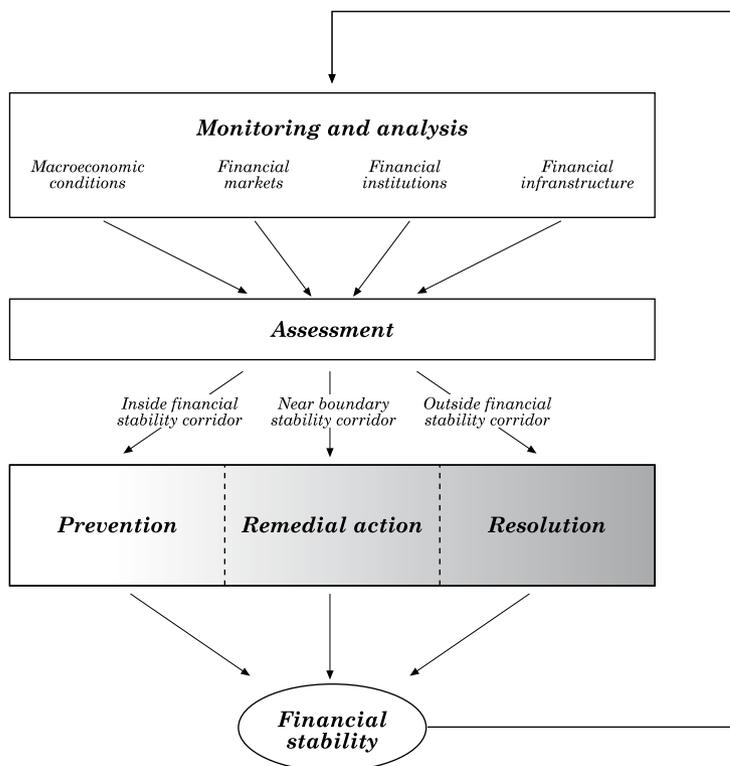
With working definitions of the financial system, financial stability, and systemic risk in hand, it is now possible to discuss the key role of financial stability assessments in safeguarding financial stability. A key to safeguarding financial stability is the early identification of risks to stability and potential sources of vulnerability in the financial system before they lead to unsustainable and potentially

11. Papers that focus on aspects of systemic risk include de Bandt and Hartmann (2000), Hoelscher and Quintyn (2003), and Summer (2003).

damaging imbalances and consequences. For example, weaknesses and vulnerabilities could exist in any of the components of the financial system—namely, institutions, markets, and infrastructure—and could entail all three simultaneously. Along with identifying potential sources of risks and vulnerabilities, it is also desirable to attempt to calibrate their intensity and potential for (or probability of) leading to financial system problems and possible systemic effects. Financial stability assessments are a key part of prevention.

Figure 2 presents a schematic of a reasonable framework for assessing financial stability. Both prevention and resolution of financial imbalances are part of the framework.

Figure 2. Framework for Maintaining Financial System Stability



Sources: Schinasi (2006); Houben, Kakes, and Schinasi (2004).

To prevent financial imbalances from occurring or becoming significant enough to pose a risk to financial stability, the approach taken should entail a continuous process of information gathering, technical analysis, monitoring, and assessment. Because of the linkages between the real economy and the financial system, and also between the various components of the financial system, this continuous process would be most useful if it encompassed both economic and financial dimensions, together with institutional knowledge about institutions, markets, and the financial infrastructure. In effect, the process needs to be comprehensive and analytical (see the top bar in figure 2). Finally, ongoing and fundamental research into the changing structure of the financial system and its changing linkages to the real economy, as well as the further development of measurement techniques for detecting growing imbalances and calibrating risks and vulnerabilities, are vital for keeping this important monitoring phase up to date.

The process entails gathering information about, and monitoring, the macroeconomy (and at times microeconomic aspects, as well) and the various aspects of the financial system through supervisory, regulatory, and surveillance mechanisms. Each of the financial system monitoring components could entail both macro- and microprudential characteristics. For example, when it comes to gathering information about and monitoring individual institutions, the supervisory process could be aided by knowledge about where the economy is along the business and credit cycles and how markets have been performing overall, because the macroeconomy and markets provide the background against which the operational performance of individual institutions should be assessed. Likewise, an assessment of the condition of financial markets must take into account whether the major institutions operating in the markets were well capitalized and profitable. This is another way of observing that there are tradeoffs in safeguarding financial stability, even in the assessment process.

The reason for gathering information, analyzing it, and continuously monitoring the various components of, and influences on, the financial system is to make systematic and periodic assessments of whether the financial system is performing its main functions well enough to be positioned within a corridor of financial stability along the continuum discussed earlier. Such an assessment could lead to three conclusions, which have quite different implications for action (see the middle bar in figure 2, labeled assessment). The assessment might determine that the financial system is within a zone or corridor of

financial stability, approaching a boundary of stability and instability, or outside a zone or corridor of stability. Within the third category, the financial system could further be in a position in which self-corrective processes and mechanisms are likely to move the system back toward the corridor of stability or, alternatively, to need prompt remedial or even emergency measures to reverse the instability.¹²

One could also develop a delineation of financial conditions and potential difficulties according to their intensity, scope, and potential threat to systemic stability. For example, potential financial difficulties can be thought of as falling into one of the following fairly broad categories: difficulties in a single institution or market that are not likely to have systemwide consequences for either the banking or financial system; difficulties that involve several relatively important institutions involved in market activities, with some nontrivial probability of spillovers and contagion to other institutions and markets; and problems that are likely to spread to a significant number and types of financial institutions and across usually unrelated markets for managing liquidity needs, such as forward, interbank, and even equity markets. Problems occurring within these categories would require different diagnostic tools and policy responses, ranging from doing nothing to intensifying supervision or surveillance of a specific institution or market, to liquidity injections into the markets to dissipate strains, to interventions into particular institutions.

4.1 Practical Challenges in Implementing an Assessment Framework

While categories of possible assessments may be easy to discuss in principle, they are difficult to identify in actual practice. How should the boundary of stability be defined and measured, for example? When does an isolated small problem threaten to become a systemic one? There would also seem to be a bias toward being prudent, leading authorities to overreach in identifying both potential sources of risks and vulnerability and to overestimate their likelihood and importance. Thus, it would be useful to establish some ground rules or guidelines for disciplining the continuous process of information gathering, analysis, and monitoring, and identifying sources of

12. As Kindleberger (1996) puts it, “markets work well, on the whole, and can normally be relied upon to decide the allocation of resources and, within limits, the distribution of income, but... occasionally markets will be overwhelmed and need help.”

risk and vulnerability. A check list of disciplining principles for identifying risks and vulnerabilities and for assessing where along the stability spectrum the financial system might be could include the following:¹³

- Is the process systematic?
- Are the risks identified plausible?
- Are the identified risks systemically relevant?
- Can linkages and transmission (or contagion) channels be identified?
- Have risks and linkages been cross-checked?
- Has the identification of risks and the assessment been consistent over time?

In practice, the process of assessing financial stability entails a *systematic* identification and analysis of the sources of risk and vulnerability that could impinge on stability in the circumstances in which the assessment is being made. For example, consider the comprehensive list of sources of risks in table 3. An operationally significant distinction is made between endogenous sources of risk that are present within the financial system and exogenous sources of risk that might emanate from outside the realm of finance.

In keeping with the broad definition of the financial system outlined above, endogenous sources of risk can arise in financial institutions, financial markets, infrastructures, or any combination thereof. For instance, credit, market, or liquidity risks may be present in financial institutions, and, if they materialize, they could hamper the process of reallocating financial resources between savers and investors. Financial markets can be a source of endogenous risk not only because they offer alternative sources of finance to nonfinancial sectors, but also because they entail systemic linkages between financial institutions and, more directly, between savers and investors. Financial infrastructures are also an important endogenous source of risk, in part because they entail linkages between market participants, but also because they provide the institutional framework in which financial institutions and markets operate.

Outside the financial system, the macroeconomic environment can be an exogenous source of risk for financial stability because it directly influences the ability of economic and financial actors (namely, households, companies, and even the government) to honor their financial obligations. Financial stability assessments

13. These ideas and concepts are developed in detail in Fell and Schinasi (2005).

Table 3. Sources of Risk to Financial Stability

<i>Endogenous</i>	<i>Exogenous</i>
<p><i>Institutions-based:</i></p> <ul style="list-style-type: none"> • Financial risks <ul style="list-style-type: none"> ◦ Credit ◦ Market ◦ Liquidity ◦ Interest rate ◦ Currency • Operational risk • Information technology weaknesses • Legal/integrity risk • Reputation risk • Business strategy risk • Concentration risk • Capital adequacy risk <p><i>Market-based:</i></p> <ul style="list-style-type: none"> • Counterparty risk • Asset price misalignment • Run on markets <ul style="list-style-type: none"> ◦ Credit ◦ Liquidity • Contagion <p><i>Infrastructure-based:</i></p> <ul style="list-style-type: none"> • Clearance, payment, and settlement system risk • Infrastructure fragilities <ul style="list-style-type: none"> ◦ Legal ◦ Regulatory ◦ Accounting ◦ Supervisory • Collapse of confidence leading to runs • Domino effects 	<p><i>Macroeconomic disturbances:</i></p> <ul style="list-style-type: none"> • Economic-environment risk • Policy imbalances <p><i>Event risk:</i></p> <ul style="list-style-type: none"> • Natural disaster • Political events • Large business failures

Sources: Schinasi (2006); Houben, Kakes, and Schinasi (2004).

should entail a systematic and periodic process for monitoring each of these sources of risks, both individually and collectively by taking account of cross-sector and cross-border linkages. This process should satisfy the list above.

There are also formidable challenges in assessing the strength and robustness of the measures and models calibrating the plausibility and importance of the various risks, and quantitatively appraising

the potential costs should risks materialize. In actual practice, many shortcuts and qualitative judgments must be made to produce an overall assessment.

For most macroeconomic or monetary policy objectives (such as unemployment, external or budgetary equilibrium, and price inflation), there is a widely accepted measurable indicator (or set of indicators) that defines the objective and measure deviations from it, even if still subject to methodological and analytical debate and even controversy. In the case of both macroeconomics and monetary economics, it took twenty to thirty years of practice, trial and error, measurement and modeling development, and fundamental research to accomplish this. As noted in the introduction, financial stability analysis is still in an infant stage of development. Consequently, there is as yet no widely accepted set of measurable indicators of financial stability that can be monitored and assessed over time. In part, this reflects the multifaceted nature of financial stability, as it relates both to the stability and resilience of financial institutions and to the smooth functioning of financial markets and settlement systems over time.¹⁴ Moreover, these diverse factors need to be weighed in terms of their potential ultimate influence on real economic activity. The lack of indicators also reflects the relatively young age of the discipline of financial stability assessment. Because measurement is not yet highly developed, the current practice of assessing financial stability is more an art form than a rigorous discipline or science.

The challenges in measuring financial system stability reach well beyond the challenges of measuring the degree of stability in each individual subcomponent of the financial system. Financial stability requires that the constituent components of the system—financial institutions, markets, and infrastructures—are jointly stable. Weaknesses and vulnerabilities in one component may or may not compromise the stability of the system as a whole, depending on size and linkages, including the degree and effectiveness of risk sharing between different components. Aggregating information across the system also presents challenges, since different parts of the system perform different tasks. For example, in diversified financial

14. Sets of indicators have been developed, and are widely used, for assessing the soundness of banking institutions. See, for example, core and encouraged sets of soundness indicators in IMF and World Bank (2003) and the IMF's guide on financial soundness indicators (IMF, 2004).

systems, where both financial institutions and markets are important providers of finance, there is no commonly accepted way of aggregating information on the degree of stability in both the banking system and financial markets to form an overall assessment of system stability. If the banking system is functioning well but, at the same time, there are signs of strain in financial markets, the overall assessment of financial system stability is likely to be ambiguous *ex ante*, particularly if the two components account for similar shares of finance provision. The more complex and sophisticated a financial system, the more complex will be the task of precisely measuring overall stability.

Financial stability assessments carry a higher degree of uncertainty than is ordinarily associated with forecasts based on macroeconomic models. This is because there are formidable practical challenges to measuring, modeling, and assessing the consequences of rare events. First, if past crises were prevented or tackled by policy actions, then the assessment of the likely costs of a selected scenario, based on simulations drawn from historical data sets, will likely be biased unless sufficient account is taken of policy reaction functions. It is doubtful that past policy responses to episodes of financial stress could be summarized by a mechanical reaction function, particularly if the authorities were mindful of avoiding the moral hazards that typically follow from predictable behavior. Moreover, even in cases that did not lead to policy responses, the frequency of crises in historical data sets may be too low to facilitate precision in estimating the likely policy-neutral consequences of a stylized scenario.

Second, confidence intervals around the expected output losses associated with the materialization of a specified scenario may not be well defined statistically—or even defined at all. For instance, simulations based on historical episodes tend to be founded on statistical relationships that reflect the central tendency of probability distributions, rather than the tails. Moreover, for hypothetical scenarios, which have not occurred in the past, it may not be possible to compute a confidence interval around the simulation because the events themselves may be subject to Knightian uncertainty or unquantifiable risk.¹⁵

Third, most macroeconomic models used for stress testing tend to be built on the basis of log-linear relationships. For simulations, this means that a doubling of the size of a shock will result in a

15. See Knight (1921).

proportionate change in the effect. In reality, however, unpredictable nonlinearities may surface in situations of financial stress, for instance as a result of threshold effects.

Fourth, as witnessed during the near collapse of Long Term Capital Management in 1998, crises may expose unexpected linkages, such as correlations between financial markets that ordinarily tend to be uncorrelated. Given such uncertainties, the real economic costs associated with a particular scenario could well prove to be larger than those predicted by an empirical model. Such considerations would suggest that the output of any stress tests should only be viewed as indicative of how, or if, the financial system would endure adverse disturbances. To avoid complacency, analysts must exercise a high degree of caution and judgment in forming financial assessments.

If the practice of financial stability assessment is to advance from what is essentially an art to a science, progress is necessary on at least three fronts: data, models, and the understanding of linkages. A priority for data gathering must be microeconomic balance sheet data covering financial institutions, households, and firms. While a picture of the aggregate risks borne within each of these sectors can be useful for financial stability analysis, far more important is an understanding of the way in which the risks are distributed across sectors and whether concentrations or pockets of vulnerabilities can be pinpointed. In mature economies, the availability and comprehensiveness of such data are rather mixed, particularly for the household sector.

Two areas where more and better analytical research on financial stability modeling appears necessary include models for identifying risks and vulnerabilities and models for assessing the consequences of adverse disturbances.¹⁶ Concerning the identification of risks, the literature suggests that models are unlikely to ever be capable of predicting crises, particularly in terms of the precise timing. Nevertheless, this should not stand in the way of developing models for assessing vulnerabilities. Even simple, single-indicator approaches can be useful for gauging risks to financial stability (see Campbell and Shiller, 2001), and current work holds promise for the development of more comprehensive frameworks for pinpointing the

16. See Sahajwala and van den Berg (2000) for an overview of early warning systems used by some G-10 authorities; see Persson and Blåvarg (2003) on the use of financial market indicators.

sets of variables (see IMF, 2004) and the conditions that raise the likelihood of financial stress (for example, see Aspachs and others, 2006). As for the prediction of crises, the intellectual advances made in other disciplines in the modeling of complex and discontinuous processes—such as the prediction of earthquakes—may offer insights for financial stability assessment.

5. CONCLUDING OBSERVATIONS

The ongoing crisis reveals that the framework in place prior to the summer 2007 was inadequate for safeguarding the stability of the global financial system against a systemic threat emanating from both the real and financial economies around the globe. All lines of defense against imbalances growing to systemic proportions were breached, and they collectively failed to work as intended or hoped. This applies to both private and official lines of defense against systemic threats to stability, as outlined earlier in the paper.

Once stability is restored and short-term emergency measures are reversed, an important fundamental remaining challenge is for the international community to agree on a framework for safeguarding financial stability once it is achieved. This requires a deeper understanding of what financial stability requires and how economic stability depends on the presumption of financial stability. This is not yet fully understood in the academic and policy communities.

It would help to have a consensus of what is meant by financial stability and an agreed framework for safeguarding it. As discussed in this paper, such a framework must entail both the prevention of imbalances from becoming systemic and resolution mechanisms for limiting the damage of systemic problems if they surface. Both aspects of the existing frameworks around the world have proven to be inadequate for containing systemic risk in the modern global financial system.

Success in safeguarding stability will require the development of analytical frameworks for understanding the difficult conceptual and policy challenges in preventing the buildup of systemic risk and dealing with it should prevention fail. Likewise, analytical frameworks are needed for practically monitoring and assessing both financial stability and the financial system's ability to eliminate imbalances as they arise through market-based mechanisms—or ex ante market discipline. If the ability to dissipate imbalances is found wanting, then the system could be seen as either in or about

to experience a state of instability for which remedial actions would be required.

One objective of this paper was to propose some steps for developing a conceptual framework for safeguarding financial stability based on a definition of financial stability. The definition proposed explicitly links the concept of financial stability to that of economic efficiency and stability. In practice, such a definition can be thought of as providing a basis for an analytical framework that explicitly links the performance of the financial system to the performance of the economic system. One of the main weaknesses of current practices is that we do not yet sufficiently understand the linkages between the real and financial economies. This gap in knowledge reflects the economics profession's inability to integrate the analysis of macroeconomic and financial system tendencies. Without significant progress in this dimension, it is unlikely that much long-lasting success will be achieved in safeguarding global financial stability. My hope is that some of the ideas put forward in this paper will help others find practical solutions to some of the important remaining challenges.

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