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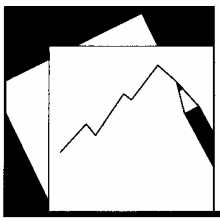

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Toward a Framework for Safeguarding Financial Stability

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Toward a Framework for Safeguarding Financial Stability

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Abstract

This paper examines the emergence of financial stability as a key policy objective. It discusses the underlying trends in the financial system, as well as the role of finance in relation to money, the real economy, and public policy. Financial stability is defined in terms of its ability to help the economic system allocate resources, manage risks, and absorb shocks. Moreover, financial stability is considered a continuum, changeable over time and consistent with multiple combinations of its constituent elements. On the basis of these concepts, a framework is presented that comprises an encompassing analysis and assessment of financial stability, and maps out broad policy implications.

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I. INTRODUCTION

Over the past decade, safeguarding financial stability has become an increasingly dominant objective in economic policymaking. This is illustrated by the periodic Financial Stability Reports that have been launched by more than a dozen central banks and several international financial institutions (including the IMF, the Bank for International Settlements (BIS), and the World Bank), as well as by the more prominent place given to financial stability in many of these institutions' organizational structures and mandates. The greater emphasis on financial stability has reflected the expansion, liberalization, and subsequent globalization of financial systems, raising the possibility of larger adverse consequences of financial instability on economic performance. Although concerns about inflation have receded relative to earlier periods, those about financial instability have been fueled by repeated financial turbulence in mature capital markets, regional financial crises in emerging markets, financial disruptions following the September 2001 terrorist attacks, and contagion risks associated with corporate governance malpractices. Moreover, recent empirical studies have highlighted the rising incidence of banking crises (Bordo and others, 2001; García-Herrero and Del Río, 2003), as well as their considerable costs (Lindgren, Garcia, and Saal, 1996; Hoggarth and Sapporta, 2001). At the same time, central bank concerns with financial stability are as old as central banks themselves, given their ultimate responsibility for confidence in the national currency (Padoa-Schioppa, 2003; Schinasi, 2003). For example, the principal reason for the founding of the U.S. Federal Reserve System in 1913 was to assure stable and smoothly functioning financial and payments systems (Volcker, 1984).

The increased importance of financial sector stability is related to four major trends in the financial economy of the past decades. First, the financial system has expanded at a significantly faster pace than the real economy. In advanced economies, total financial assets now represent a multiple of annual economic production. Second, this process of financial deepening has been accompanied by a changing composition of the financial system, with an increasing share of nonmonetary assets and, by implication, greater leverage of the monetary base. Third, as a result of increasing cross-industry and cross-border integration, financial systems have become more interwoven, both nationally and internationally. Fourth, the financial system has become more complex, in terms of the intricacy of financial instruments, the diversity of activities, and the concomitant mobility of risks. A more detailed discussion and empirical illustration of these trends is provided in Appendix I. Although these trends reflect important advances in finance that have contributed substantively to economic efficiency, they evidently have implications for the nature of financial risks and vulnerabilities and the way these affect the real economy, as well as for the role of policymakers in promoting financial stability. For instance, risk management and diversification techniques have, in principle, bolstered the resilience of the financial system, but the expansion of cross-sector and cross-border linkages implies more scope for contagion. Also, the surge in risk transfers has made it more difficult to track the development of risks. Monitoring efforts therefore need to be more intense, and policy responses generally require coordination among a larger number of authorities from a larger number of countries.

Although the movement toward greater attention for financial stability issues is clear, the point of focus is not. There is no consensus on how to define the concept of financial stability, how to assess developments under this objective, or what role public policy should play. In this light, this paper outlines a basic framework for financial stability analysis and policy. Although most financial systems are still analyzed at the national level, the scope of this framework may be easily extended to international financial stability issues. The paper is organized as follows. Section II discusses the concept of finance in relation to both money and the real economy. This provides a justification for a public sector role in private sector finance. Section III presents a definition of financial stability and discusses its key characteristics. Against this background, Section IV proposes a simple framework for financial stability analysis and policy. Section V concludes.

II. Finance and Financial Stability[2]

A. Finance and Money

For the purposes of designing and managing financial-system policies, finance can be viewed primarily as a means to facilitate functions of, and provide benefits to, the economic system. The benefits of the services provided by modern finance are intimately bound to the existence and services of fiat money. This is not to suggest that private financial relationships would not have arisen without fiat money. Indeed, prior to the introduction of fiat monies in the seventeenth century, trade, exchange, and finance flourished in some parts of the world, but with significantly less breadth, scope, acceptance, and efficiency.

Although fiat money has no intrinsic value, it provides essential services, including that of a means of payment, unit of account and store of value. While the first two services are part of every transaction in a monetary economy, the means-of-payment service is the more unique and defining one, since fiat money provides *finality of payment* with absolute certainty in transactions. Indeed, fiat money provides the ultimate liquidity services, because it embodies universally accepted, instantaneous purchasing power with the lowest risk possible. Given the absence of intrinsic value, this universal acceptance of fiat money hinges on its status as legal tender and thus on the authority of the issuing state (Goodhart, 1989). But in practice, and at a deeper level, fiat money is universally accepted as the means of payment because it is trusted to be accepted by others to be used as such. This universal acceptance distinguishes fiat money from other forms of payment—including commodity monies—used in trade and exchange before the seventeenth century (Kindleberger, 1993). By providing finality of payment and in being universally accepted, fiat money has become the economy's surrogate for trust in exchange (Shubik, 1999).

[2] Many of the issues raised in Section II are fleshed out in Schinasi (2004a).

As a means of payment, fiat money facilitates trade and exchange by eliminating the "double coincidence of wants" (Jevons, 1871), which is the costly requirement of finding someone who possesses the commodity you want to have, who wants to have the commodity you possess and who can agree to a time and place for the exchange. The universal acceptability and practical use of fiat money economizes on the high search and transactions costs in barter economies, and thereby makes trade and exchange more efficient.

The third service that can be provided by fiat money is that of a store of value. But, unlike the first two services, the effectiveness of fiat money in providing a store of value service is not underwritten by the issuing authority. Hence, fiat money's purchasing power in terms of other goods may be considered vulnerable to decline over the course of time. Besides this, the distribution of fiat money in an economy is unlikely to match the exchange needs of individuals at any specific point in time. As a consequence, many individuals are likely to be willing to provide compensation for the use of the means of payment services of fiat money in order to obtain purchasing power that they do not have, but expect to earn in the future.

These considerations imply favorable conditions for an inter-temporal exchange between individuals seeking superior stores of value and those seeking the means-of-payment services of fiat money. In essence, this is finance: a temporary exchange of the means-of-payment services of fiat money in return for the promise of a superior store of value. It is by facilitating inter-temporal and inter-spatial economic processes that finance creates potentially superior stores of value, whether in the form of debt contracts that promise to pay back a fixed amount with a stream of interest payments, or of equity contracts that promise to disburse a share of the firm's profits through dividends, a rise in the value of the share, or both. In this respect, finance enhances and amplifies the benefits of the qualities of fiat money by fostering (through lending activities) the preservation and potential growth of purchasing power through time, and (through borrowing activities) the transfer of future earnings into present purchasing power.

However, unlike final exchanges of fiat money for a good or service, financial transactions are promises between private individuals or organizations, and therefore entail uncertainties about future payments—uncertainties that fiat money eliminates in instantaneous exchange. For example, traditional bank deposits are promissory notes issued by a bank to a depositor: they are close substitutes to fiat money, but they also embody counterparty and other uncertainties not existent in fiat money.

Consequently, there are both potential benefits and costs associated with finance.[3] On the one hand, finance enhances the private and social benefits of fiat money, in part by enlarging the pool of liquidity available for production, consumption, exchange, and other economic processes. On the other hand, finance inherently embodies uncertainty—about fulfilling promises—and thereby changes the nature of the original pool of pure liquidity by

[3] Diamond and Dybvig, 1983, and Diamond and Rajan, 2000, explore this in the context of bank intermediation.

adding instruments of less perfect liquidity and acceptability than fiat money. This intrinsic uncertainty represents a potential instability in financial markets that does not exist in markets in which tangible goods and services are traded. This important aspect distinguishes finance from most other economic activities.

B. Finance and the Real Economy

The benefits of private finance are pervasive and can be seen as originating in the ways in which finance enhances overall economic activity. By amplifying the liquidity services of fiat money, finance improves overall efficiency and makes possible a pace of economic activity far beyond what fiat money alone could support.[4] In modern economies, three important beneficiary roles of finance can be distinguished.

First, finance promotes an efficient allocation of real economic resources between different activities and especially across time. It does so by intermediating between savers interested in postponing their consumption and investors desiring to expand the capital base from which they engage in productive activities. This intermediation benefit will be larger, the greater the economies of scale and asymmetric information in finance.

Second, finance facilitates the transformation of maturities, as the liquidity preferences of lenders and borrowers generally diverge. In particular, while lenders typically strive to preserve their liquidity, borrowers often seek to limit liquidity risks and thus favor loans with a longer-term profile. The financial system serves to bridge mismatches in maturity preferences.

A third role of modern finance—one that has become increasingly important in a globally integrated economy and financial system—is the pricing and management of economic and financial risks. Specifically, finance establishes the risk-free level and term structure of interest rates, as well as relevant risk premia. With these prices, finance provides opportunities for the ownership, unbundling, repackaging and transfer of risks. Thus, risks can be spread and compensated more widely across the economy, and be borne by those most willing and able to manage and carry them.

Achieving the private and social benefits of finance requires that the three main components of a financial system function reasonably well: the financial infrastructure (in particular legal, payment, settlement, and accountancy systems), financial institutions (in particular banks, securities firms, institutional investors, and specialty finance companies) and

[4] Levine (2003) and World Bank (1999) provide overviews of empirical work on the positive contributions between finance and economic development. An important caveat is that the causality between the extent of financial intermediation and the rate of economic growth is difficult to determine empirically, as these variables are inextricably linked and may both be endogenously determined. Theoretical approaches to this issue are developed in Acemoglu and Zilibotti (1997) and Greenwood and Jovanovic (1990).

financial markets (in particular stock, bond, money and derivative markets). When this system is healthy, finance fosters the process of wealth accumulation by individuals, businesses, and governments. This is important because wealth accumulation is a basic requirement for a society to develop and grow, as well as for its ability to weather unanticipated and unavoidable adverse events.

But, in providing these benefits, finance raises the amount of potential claims on pure liquidity well above the available supply of fiat money. As a result, there is the danger of too much finance being built on too little certainty or trust about the future fulfillment of financial contracts. In this way, finance creates the potential for situations in which all legitimate claims on fiat money are not timely honored and transactions in the financial system are not appropriately settled. This intrinsic fragility of the financial system emanates from counterparty risk, market and liquidity risks, payment-system interlinkages and information problems, and creates systemic risk in terms of herd behavior, domino effects, bank runs and other forms of financial contagion. The economic losses related to such systemic failures can be massive (Hutchison and Neuberger, 2002), commensurate with the prosperity gains generated by finance and compounded by the complexities of arriving at a final settlement of outstanding claims and liabilities.

In all, by helping the economic system to allocate resources to their best uses across sectors and through time, and spread risks to those better positioned to bear them, finance supports the processes of production, wealth accumulation and risk sharing. Thus, finance generally fosters the prosperity of societies. However, finance also embodies potential fragility, which in turn can be associated with systemic risk and substantial economic losses. While these potential costs explain why public authorities regulate and supervise (private sector) financial activities, public intervention in private finance can also be justified by the public good features and market imperfections associated with finance.

C. Finance and Public Policy

Modern finance can be seen first and foremost as a dynamic network of a large number of individual private financial contracts. In this perspective, the benefits of finance may be viewed as the aggregate of individual private benefits. Nevertheless, the prospect of actually obtaining these private benefits requires the existence of certain publicly sanctioned arrangements. For instance, private financial contracts are typically written in terms of a legally sanctioned unit of account and measured in terms of legally sanctioned accountancy rules, while settlement and delivery of payment may take place in legal tender (fiat money). In addition, there is the presumption of legal recourse in the absence of contract performance. All of this relies on a solid legal infrastructure. Moreover, other aspects of public policy underpin the effectiveness and efficiency of private finance, including judicious micro- and macro-economic policies. There is ample empirical evidence that these elements of public policy have their worth

in the realm of finance.[5] Indeed, although finance would no doubt exist and bestow benefits without public intervention, it would be less supportive of economic activity, wealth accumulation, growth, and ultimately social prosperity. Put differently, finance may not automatically lead to efficient outcomes if left entirely to market forces.

There are five commonly identified sources of market failures (Barr, 1998; Stiglitz, 2000) that imply divergences from perfectly competitive, economically efficient outcomes: (1) public goods, (2) externalities, (3) incomplete information, (4) incomplete markets, and (5) a lack of competition. In finance, sources of market failure exist in all five of these (partly overlapping) categories (see Box 1 for examples).

Foremost amongst the sources of market imperfection is finance's nature as a public good. This is related to the two defining characteristics of public goods: (1) the benefits received by one person do not affect the benefits received by any other person (non-rivalry in use), and (2) no one can be barred from receiving the benefits of the good once it is produced (non-excludability in supply). On account of these characteristics, public goods are susceptible to free rider problems and, if left to the market's invisible hand, would be under produced. This is because supply can not be limited to paying consumers and social benefits do not enter the production decision. In turn, this suggests a role for public sector involvement to encourage the production of the public good up to the socially desired optimum.

Finance's nature as a public good is rooted in that of fiat money. The unit-of-account and universal acceptability services of fiat money clearly constitute public goods, in much the same way as the maintenance of law and order or the provision of national defense do. To the extent finance builds on fiat money, its sound functioning is important to underpin this unit-of-account function in financial transactions as well as the universal acceptability of settlements through the system. In other words, public sector involvement is justifiable to safeguard a currency's unit-of-account and settlement functions, specifically by fostering the convertibility (at par) of liquid financial assets into fiat money.

However, in finance, market failures also occur on each of the other counts. Closely related to the public good characteristics are the positive externalities provided by finance. In effect, finance generates such externalities by enhancing the public good features of fiat money: it amplifies the universally accepted finality-of-payment services of money, across both time and space. While individual financial transactions are private goods (as they are both rival in

[5] Levine (1999) finds that the legal and regulatory environment of financial intermediaries is positively associated with economic growth. More specifically, Leahy et al. (2001) show that the transparency and enforcement of these legal and regulatory frameworks, in particular in terms of investor protection, accounting and auditing requirements, is broadly linked to innovation and investment in new enterprises. Beck et al. (2003) establish that countries with better developed national institutions and policies governing issues such as property rights, the rule of law and competition are less likely to suffer systemic banking crises.

use and excludable in supply), these broader externalities are clearly public. In fact, these benefits are not only non-rival, they are self-reinforcing: the greater the access to these benefits, the greater the benefits to all. For instance, trust in a currency and in the well-functioning of a financial system will improve the economic environment, by eliciting a generally higher level of financial savings, borrowing and investment. In a nutshell, finance enhances the efficiency of production and wealth accumulation. Conversely, the phenomenon of systemic risk implies the existence of negative externalities, as a financial crisis in one part of the financial system may infect otherwise healthy elements in other parts.

Box 1. Sources of Market Failures in Finance

Public good
- finance provides unit of account services to financial balances (+)
- finance extends universal acceptability benefits of fiat money to financial system (+)

Externalities
- trust in finance enhances efficiency in inter-temporal and inter-spatial allocations (+)
- financial system creates network benefits (+)
- finance subject to contagion and systemic risks (-)

Incomplete information
- incomplete information in finance leads to price misalignments, resource misallocation, and multiple equilibria, including liquidity and credit runs (-)
- asymmetric information between borrowers and lenders leads to adverse selection, moral hazard and credit rationing (-)

Incomplete markets
- uninsurable liquidity risks (lender-of-last resort financing) increases economic uncertainty (-)
- non-price discrimination in provision of finance leads to missed exchange opportunities (-)

Imperfect competition
- single money issuer improves services provided by fiat money and economizes on transaction balances (+)
- monopoly of money supply generates seignorage revenues with incentives for over-issue (-)
- economies of scale and too-big-to-fail considerations lead to insufficient or excessive competition between financial institutions and with new entrants (-)

(+) and (-) indicate a positive respectively negative contribution to market efficiency.

Market imperfections also ensue from the incomplete information available to participants in the financial system, which creates scope for price misalignments, resource misallocation and other financial imbalances. Besides this, asymmetric information between borrowers and lenders may lead to adverse selection before, and moral hazard after, financial agreements are made. In many instances, the costs of gathering and analyzing information on counterparties in the financial system may be prohibitive. This would apply, for example, to any holder of a small claim on a large financial institution. In this circumstance, there are evident economies of scale in public sector supervision of financial institutions.

The markets for finance are also incomplete. For instance, non-price discrimination in the provision of finance (as with redlining practices that exclude certain geographical areas from credit) implies foregone exchange opportunities. Moreover, inherent to the existence of financial market discipline, certain liquidity risks are uninsurable. This missing market may be filled by a lender-of-last-resort.

A final source of market failure in finance stems from imperfect competition. In particular, economies of scale in marketing, information and computer technology and branch networks limit competition within and across classes of financial institutions, as well as with potential new entrants. Beyond this, prudential regulation aimed at protecting depositors and safeguarding financial stability also serves to constrain competition, although expectations of a public sector bailout (especially within institutions that are viewed as too-big-to-fail) may at times actually prompt excessive risk taking. Here the public sector role needs to weigh the prudential concerns with market efficiency. At a more basic level, imperfect competition in finance occurs on account of the evident efficiency advantages of having only one money: a single issuer reduces the need for transaction balances and enhances the unit of account and acceptability services provided by money. However, as the monopoly of money supply brings with it seignorage revenues, there are incentives for over issue. Mandating this supply to a public authority (in particular to an independent, price stability oriented central bank) can counteract these incentives and advance an efficient economic outcome.

In all, while mostly privately beneficial, finance is also associated with market failures and inherently entails the risk of instability and system-wide disturbances. In practical terms, these market failures may lead to the under-production and under-consumption of some economically desirable financial activities, and the over-production and over-consumption of undesirable ones. When private incentives and actions alone do not lead to an efficient pricing and allocation of capital and financial risks, public policy or some combination of private-collective action may encourage a better outcome. Of course, in designing such policies, account needs to be taken of possible future costs associated with private market reactions and adjustments to public policies (e.g., due to moral hazard and regulatory arbitrage).

III. What Is Meant by Financial Stability?

While finance is difficult to delineate, financial stability is even more so. There is, as yet, no general agreement on what financial stability exactly means (Oosterloo and De Haan, 2003). Officials, central banks and academics have proposed a myriad of definitions for financial stability (see Appendix II for an overview). Some define it in terms of what it is not: a situation in which financial *in*stability impairs the real economy (Crockett, 1997 and Davis, 2002), notably when information problems undermine the financial system's ability to allocate funds to productive investment opportunities (Mishkin, 1999). A similar approach is taken by those focusing on systemic risk, specifically in terms of financial problems that stem from linkages between financial institutions or markets and that have a potentially large adverse impact on the real economy (De Bandt and Hartmann, 2000, Group of Ten, 2001, Hoelscher and Quintyn, 2003 and Summer, 2003). Haldane (2004) defines financial stability in terms of a

simple model in which asset prices serve to secure the optimal level of savings and investment. Others take a macro prudential viewpoint and specify financial stability in terms of limiting risks of significant real output losses associated with episodes of financial system-wide distress (Borio, 2003).

This paper takes a positive perspective and defines financial stability as a situation in which the financial system is capable of: (1) allocating resources efficiently between activities and across time; (2) assessing and managing financial risks, and (3) absorbing shocks. A stable financial system is thus one that enhances economic performance and wealth accumulation (on account of the first two aspects), while it is also able to prevent adverse disturbances from having an inordinate disruptive impact (the third aspect). Given that finance is a dynamic concept, involving inter-temporal transactions and innovations, financial stability may be seen as occurring along a continuum, changeable over time and consistent with manifold combinations of its constituent elements (Schinasi, 2004b).

Along this continuum, a multi-dimensional range or corridor of stability may be identified within which the financial system broadly performs its key tasks, as well as observable states outside this range in which aggregate production is substantially below its potential on account of funds not being channeled to profitable activities, risks not being managed and shocks not being absorbed. For a two-dimensional example, in considering the joint stability of financial markets and financial institutions, one may identify combinations of interest-rate-spread volatility (as a potential source of instability) and banking system capital (as a source of absorptive capacity) that are consistent with financial stability—that is, with the financial system facilitating an efficient allocation of economic resources—and other combinations that would not be consistent with stability. The former would constitute the range of stability and the latter would fall outside this range. This methodology could be broadened to a more comprehensive, multi-dimensional and measurable set of factors, that together determine a grid over which a stability continuum may be specified.

Regardless of the precise definition, several key elements of financial stability can be identified. First, that financial stability is a broad concept, encompassing the different dimensions of the financial system—the financial infrastructure, financial institutions and financial markets. Given tight interlinkages, (expectations of) disturbances in any of the individual components can undermine the overall stability, requiring a systemic perspective.

Second, that the concept of financial stability encompasses the (normative) property that the process of finance functions well enough to perform successfully its main facilitative purposes. Thus, financial stability does not require that each part of the financial system is always operating near peak performance and is consistent with the financial system operating on a “spare tire” from time to time (Greenspan, 1999).

Third, that financial stability not only implies that the financial system adequately fulfils its role in allocating resources, transforming maturities, mobilizing savings and diversifying risks, but also that within this system money can adequately fulfill its role as a means for

transactions, a unit of account and a store of value. In other words, financial stability and monetary stability overlap to a large extent.

Fourth, that financial stability relates not only to the absence of actual financial crises, but also to the ability of the financial system to limit and deal with the emergence of imbalances before they constitute a threat to stability. In a 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 system-wide risks. In this regard, there may be a policy choice between allowing market mechanisms to work to resolve potential difficulties and intervening to restore stability. Thus, financial stability entails both preventive and remedial dimensions.

Finally, that financial stability is ultimately couched in terms of the potential consequences for the real economy. Thus, 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, the incidental closing of a (minor) financial institution, heightened volatility or significant corrections in certain financial markets may simply reflect competitive forces and the prompt incorporation of new information. By implication, in the absence of contagion effects, such developments may even be viewed as healthy from a financial stability perspective.

The above definition of financial stability involves several complexities that have practical significance in terms of assessing risks to the functioning of the financial system and the contribution public policy can make to ensuring financial stability.

- *Developments in financial stability can not be summarized in a single quantitative measure.* For most economic policy objectives (price stability, unemployment, external or budgetary equilibrium, etc.) there is a measure which is generally accepted, even if still subject to methodological and analytical controversy. By contrast, there is as yet no unequivocal unit of measurement for financial stability. This reflects the multifaceted nature of financial stability, as it relates to both the stability and resilience of financial institutions, and to the smooth functioning of financial markets and settlement systems over time. Moreover, these diverse factors need to be weighed in terms of their potential ultimate influence on real economic activity. However, even if this may fall short of specifying a multi-dimensional financial stability continuum, there is scope for progress in developing composite indicators or benchmarks for financial stability, especially by considering historical episodes of both stability and instability and by comparing market-determined expectations with actual outcomes. But a further complication is that to the extent policy actions have actually been successful in preserving financial stability, disturbances are not observed and the actual value of any indicator—or for that matter, of relevant policies—is difficult to establish empirically.
- *Developments in financial stability are inherently difficult to forecast.* Assessing the state of financial stability should not only take stock of disturbances as they emerge, but also indicate the vulnerabilities that could lead to such disturbances occurring in the future. A forward-looking approach is therefore needed in order to establish the build-up of imbalances and to take account of the transmission lags in policy instruments. The difficulty here is that

financial crises are inherently hard to predict on account of contagion effects and non-linear relationships. In addition, financial stability risks often reflect the far-reaching consequences of unlikely events. This implies that the focus of the attention is not the mean, median or mode of projections but the entire distribution of outcomes, in particular the 'left tail'. Beyond this, the distribution of possible prospective outcomes may be subject to greater fundamental uncertainty (in the sense of Knight, 1921) than traditional macroeconomic projections, reflecting lack of knowledge regarding the actual shape of the probability distribution governing relevant factors (such as operational, reputation or contagion risk) and making forecasts of financial stability inherently less reliable.

- *Developments in financial stability are only partly controllable.* The policy instruments that can be used to safeguard financial stability generally also have other objectives, such as protecting the interests of deposit holders (in the case of prudential instruments), fostering price stability (in the case of monetary policy) or promoting a swift settlement of financial transactions (in the case of policies governing payment and settlement systems). Besides timing lags, the impact of these policy instruments on financial stability is thus often indirect; in some cases there may even be friction with the instrument's initial objective. Moreover, developments in financial stability are highly susceptible to exogenous shocks—ranging from natural catastrophes to abrupt swings in market sentiment—further limiting their controllability.
- *Policies aimed at financial stability often involve a trade-off between resilience and efficiency.* Measures to enhance financial stability often involve weighing the pursuit of an efficient allocation of financial resources against the ability to exclude or absorb shocks to the financial system. This implies a risk/return judgment that is difficult to arrive at in a fully objective manner. For instance, in the sphere of prudential policies, higher solvency requirements will reduce the risk of a bank not being able to absorb an adverse shock, but will also imply capital costs and foregone lending opportunities. Similarly, exchange restrictions may reduce or exclude certain risks related to international capital flows, but may also limit the efficiency of the domestic financial market.
- *Policy requirements for financial stability may be time inconsistent.* Since the use of some public policy instruments to safeguard financial stability circumvents market forces, the short-term stability gain may come at the cost of a longer-term stability loss. In particular, measures such as the provision of lender-of-last-resort finance or deposit guarantee may undermine market discipline, thereby creating moral hazard or adverse selection. This inter-temporal trade-off is a fundamental issue in financial-system policy making.

IV. A Framework for Financial Stability

A. Introduction

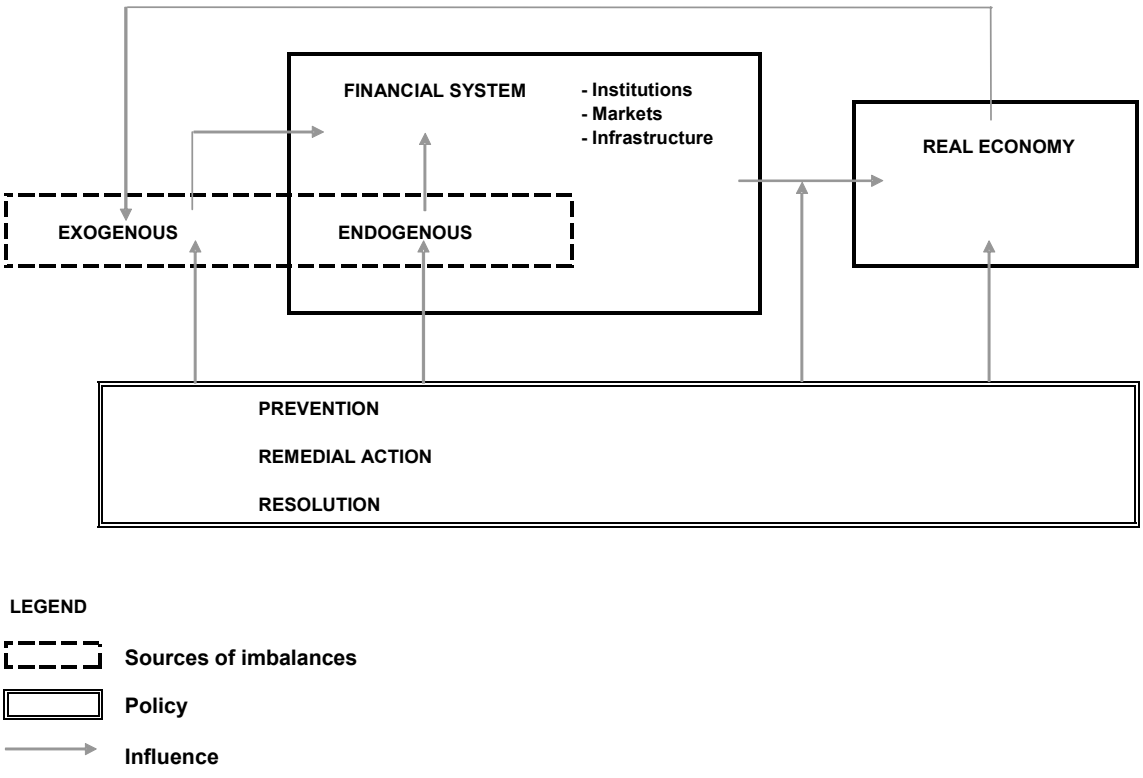
In recent years, various authors and institutions have proposed financial stability frameworks. Some of these are primarily formulated from an academic viewpoint, with only limited attention to policy implications (Mishkin, 1999, and Davis, 2002). An early and extensive survey of the underlying literature is provided in Crockett (1996). Other studies discuss financial stability frameworks from an institutional point of view. These discuss

regulatory regimes for financial stability (Llewellyn, 2001, and Das et al., 2003) and investigate financial stability responsibilities of central banks (Oosterloo and De Haan, 2003). A number of central banks and other policymaking institutions, including notably the IMF, also pay attention to financial stability in regular publications, such as Financial Stability Reviews. Typically, these reviews are published once or twice a year and examine developments in the financial sector and the real economy that indicate potential risks to financial stability. The framework underlying these reviews is generally implicit, although some publications provide a rudimentary discussion of their analytical structure (e.g., Bank of England, 1999; Deutsche Bundesbank, 2003; National Bank of Belgium, 2002; Sveriges Riksbank, 2003). Finally, at the international level, the International Monetary Fund and World Bank have launched the Financial Sector Assessment Program, which examines selected countries' financial soundness and assesses their compliance with financial-system standards and codes (see IMF/World Bank, 2003).

The framework developed in this paper seeks to integrate the analytical and policy elements of financial stability, building on the characteristics of finance and the definition of financial stability. It revolves around an assessment that brings together macroeconomic, monetary, financial market, supervisory and regulatory input. The framework's objectives are to provide a coherent structure for the analysis of financial stability issues in order to: (i) foster an early identification of potential vulnerabilities; (ii) promote preventative and timely remedial policies to avoid financial instability; and (iii) resolve instabilities when preventative and remedial measures fail. This paper tries to go beyond the traditional 'shock-transmission' approach that is the basis of many existing policy-oriented frameworks. Instead, the focus is on identifying and dealing with the build-up of vulnerabilities prior to downward corrections in markets, problems within institutions or failures in financial infrastructure. The assumption implicit in this approach is that the shocks that may eventually trigger such adjustments are usually less relevant by themselves. This also accords with the view that financial stability should be viewed as a continuum, in which imbalances may develop and then either dissipate or accumulate to the point of moving the financial system outside the range of stability.

To illustrate the framework's context, Figure 1 presents a stylized view of factors affecting financial system performance. As indicated in the previous sections, finance helps the economic system allocate resources, manage risks and absorb shocks, while the presence of market failures implies a role for public sector policy. In the Figure, this is indicated by the financial system's linkages with the real economy and policy. An explicit distinction is made between imbalances that arise endogenously within the financial system and those that may originate or be exacerbated by exogenous disturbances from outside the system. This distinction is primarily motivated by differences in policy implications, as explained below. A crucial element of the financial stability framework is the interaction between analysis and policy formulation. The next subsection discusses this interaction by setting out the financial stability framework in operational terms.

Figure 1. Stylized View of Factors Affecting Financial System Performance



B. Operationalizing the Financial Stability Framework

A natural point of departure in operationalizing the framework is the analysis of potential risks and vulnerabilities in the financial system, guided by the definition of financial stability as a continuum. This analysis should be comprehensive and ongoing, examining all factors that influence the workings of the financial system—covering the macroeconomy, financial markets, financial institutions and financial infrastructure—and should be aimed at an early identification of financial vulnerabilities. Subsequently, an assessment is made, indicating to what extent these vulnerabilities pose a threat to financial stability and what policy responses may be appropriate.

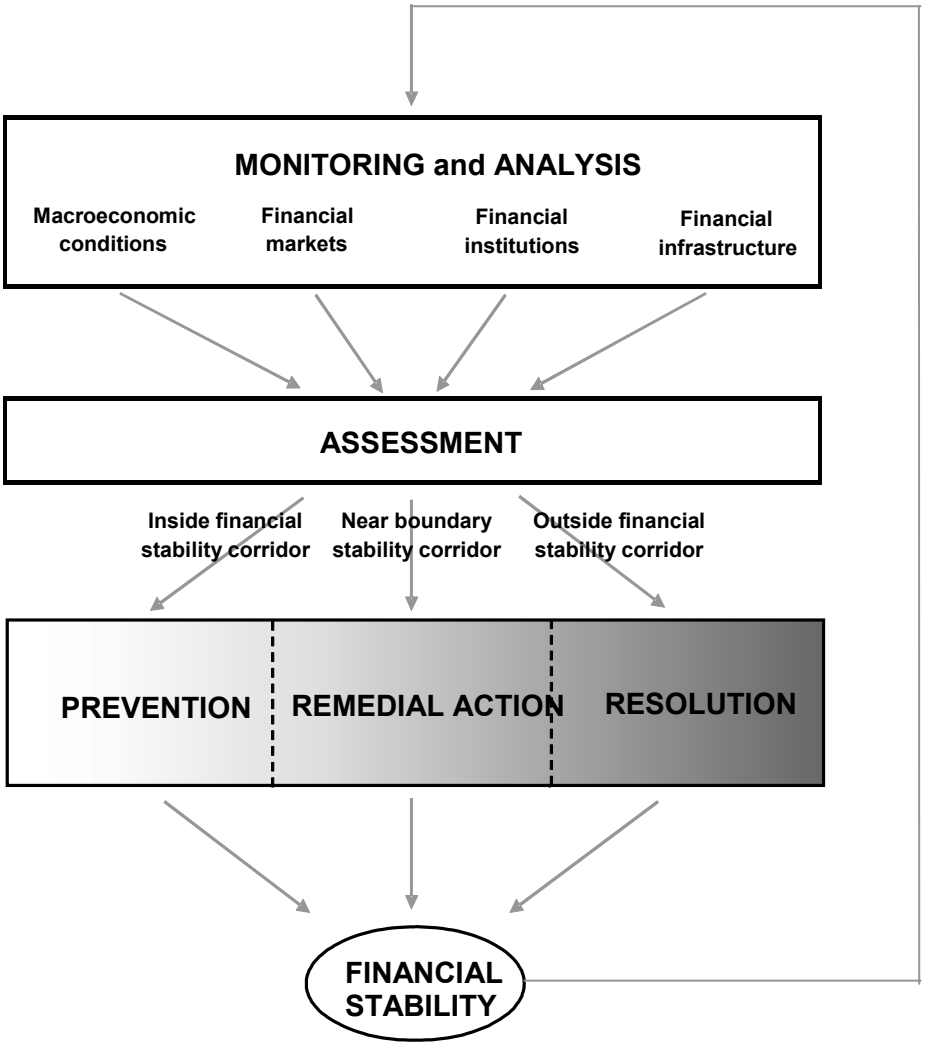
Regarding the financial system's position within the continuum and the implications for policy, three conditions may be distinguished. First, the financial system may be assessed to be broadly in the range of stability and likely to remain so in the near future. In this case, the appropriate policy is mainly preventative, aimed at maintaining stability by relying on both private sector market-disciplining mechanisms and official supervision and surveillance. Second, the financial system may be within a corridor of stability but moving towards its boundary, for instance because imbalances are starting to develop or because of changes outside the financial system. Safeguarding the stability of the system may then call for remedial action, for instance through moral suasion and more intensive supervision. Third, the financial system may be unstable, i.e., outside the corridor of financial stability and therefore unable to perform its functions adequately. In that case, policies should be reactive and aimed at restoring stability, which may include crisis resolution.

The main elements of this financial stability framework – the analysis, assessment and three possible policy stances – are summarized in Figure 2. Obviously, owing to the multifaceted nature of financial stability, the distinction between the policy categories will seldom be clear-cut, as illustrated by the gradual change from light ('passive') to dark ('active'). The analysis and assessment of financial stability as well as the policy implications are further discussed below.

Financial stability analysis and assessment

The analysis of financial stability involves a continuous examination of potential risks and vulnerabilities that may threaten the health of the financial system and economic activity. As indicated in Figure 1, these risks and vulnerabilities may develop endogenously within the financial system, but may also originate in the real economy and be transmitted to the financial system. These different sources of risks tend to have different policy implications. The size and likelihood of endogenous imbalances can typically be influenced by the financial authorities through regulation, supervision or adequate crisis management. By contrast, aside from macroeconomic policies that are subject to long, varying and uncertain lags, external disturbances can hardly be influenced. Rather, the scope for policy is mostly limited to reducing the impact of external disturbances on the financial system, for instance by maintaining the capacity to absorb shocks and back-up systems to protect vital information.

Figure 2. Framework for Maintaining Financial System Stability



In line with the financial system's three main components, endogenous sources can be further split into institutions-based, market-based and infrastructure-based risks. Thus, the endogenous and exogenous sources of risks and vulnerabilities may be summarized as follows (see Table 1):

- First, vulnerabilities may develop in *financial institutions*. For instance, problems may initially arise at a single institution and subsequently spread to other parts of the financial system, or several institutions may be affected simultaneously because of similar exposures. Traditional financial risks are related to credit, market, liquidity, interest rates and foreign currency exposures.[6] But institutions are also prone to operational, legal and reputation risks. Furthermore, business strategy and a concentration of exposures can make financial institutions sensitive to adverse developments in particular areas, while a decline in economic capital reduces institutions' absorption capacity.
- *Markets* are a second source of endogenous risks. Obvious examples are counterparty risk and asset price misalignments. Financial markets can also be vulnerable to runs and contagion. The financial system has become more market-oriented in the past decade, including through an increase in financial institutions' market activities and exposures, as well as through greater participation by non-financial corporations and households in markets. Hence, market-based risks are becoming more relevant for financial stability. At the same time, the role and relative importance of safety nets is also changing. Traditionally, deposit insurance and lender-of-last-resort facilities are designed to address problems arising at individual institutions and to prevent these from spreading through the financial system. Because market-based vulnerabilities immediately affect a substantial part of the financial sector, the appropriate instruments are also becoming more generalized, for instance through liquidity injections in the financial system (White, 2003). A thorough understanding of market vulnerabilities is important for an effective implementation of such instruments.
- *Infrastructure-based vulnerabilities* are a third source of risk. In payment systems, several risks may develop related to clearing and settlement. These often originate in the financial institutions participating in the system, and are in that sense related to institutions-based vulnerabilities. Examples are operational failures, concentration risk and domino effects. Besides this, to the extent that financial infrastructure is itself generally run by a financial institution, infrastructural vulnerabilities may also stem from institution specific financial risks. Other examples of infrastructure-based risks are weaknesses in the legal system and the accounting system. Such vulnerabilities may directly affect a large part of the financial sector.
- Finally, vulnerabilities may be *exogenous*, i.e., originate outside the financial system. For instance, disturbances may arise at the macroeconomic level, such as oil price shocks, technological innovations and policy imbalances. In particular, a balanced monetary and fiscal policy mix may be considered critical for financial stability. Furthermore, microeconomic events, such as a failure of a large company, may undermine market confidence and create imbalances that affect the whole financial system. Other examples of exogenous disturbances

[6] This is a conventional distinction; interest risk and currency risk may also be seen as examples of market risk.

are a sudden introduction or withdrawal of trade restrictions, political events (including terrorist actions and wars) and natural disasters (earthquakes, floods).

Table 1. Sources of Risk to Financial Stability

Endogenous	**Exogenous**

Institutions-based:
• Financial risks
  o Credit
  o Market
  o Liquidity
  o Interest rate
  o Currency
• Operational risk
• Information technology weaknesses
• Legal/integrity risk
• Reputation risk
• Business strategy risk
• Concentration risk
• Capital adequacy risk
 	
Market-based:
• Counterparty risk
• Asset price misalignment
• Run on markets
  o Credit
  o Liquidity
• Contagion
 	
Infrastructure-based :
• Clearance, payment and settlement system risk
• Infrastructure fragilities
  o Legal
  o Regulatory
  o Accounting
  o Supervisory
• Collapse of confidence leading to runs
• Domino effects
	Macroeconomic disturbances:
	• Economic-environment risk
	• Policy imbalances
	Event risk
	• Natural disaster
	• Political events
	• Large business failures

Financial stability analysis covers all of these sources of risks and vulnerabilities, which require systematic monitoring of individual parts of the financial system (financial markets, institutions and infrastructure) and the real economy (households, firms, the public sector). The analysis must also take into account cross-sector and cross-border linkages, because imbalances often arise due to a combination of weaknesses from different sources. For instance, operational failures in payment systems may be caused by problems in financial institutions, and a large

business failure (like Enron) may be linked to weaknesses in the accounting system. The number and importance of cross-linkages is increasing on account of the main trends – financial deepening, integration and complexity – described in Appendix 1. Financial institutions are becoming more exposed to financial markets and other sectors, which increases the scope for contagion and underscores the importance of a comprehensive approach to the financial system as a whole.

Next to the distinction between endogenous and exogenous sources of risk, another policy-relevant issue concerns the initial scope of vulnerabilities and their eventual impact on the financial system as a whole. Two extreme cases can be distinguished. On the one hand, financial stress may initially arise at the micro level and subsequently spread over the financial system. The most obvious example is a bank failure, affecting other parts of the financial system through interbank exposures and confidence effects, or a bankruptcy of a large non-financial company. At the other extreme, developments may immediately affect a major part of the economy, for instance in case of a systemic failure. Investors can often protect themselves against the former type of disturbances, through insurance or diversification of exposures, which also reduces the risk of contagion and systemic crises. For systemic risks, however, insurance either does not exist or tends to be prohibitively expensive, implying that there may be a role for official intervention to reduce their impact.

The liberalization, integration and globalization of financial systems experienced in recent decades may have been associated with changes in the nature of systemic risk. This would mean that a broader, more comprehensive set of indicators is required to assess systemic risk. Specifically, the increasing market orientation of financial systems and the improvement of risk diversification instruments—through activities such as hedging, credit risk transfers and securitization of bank loans—may have lowered risk concentrations and therewith reduced the likelihood of individual bank failures and related traditional domino-effect systemic risks. After all, banking institutions now shed risk more easily into a more complete set of markets and across a more diversified group of non-bank institutional and individual investors. On the other hand, the systemic benefits of this greater sharing of risks may be somewhat offset by a greater vulnerability to system-wide shocks, as the aggregate exposures to financial markets has surged, implying a potentially larger simultaneous influence of extreme adverse events in these markets.

The analysis of financial stability partly corresponds to what is traditionally denoted as macro-prudential analysis (see e.g., Evans et al., 2000). Standard indicators are balance sheet data reflecting sectoral (household and corporate) financial positions, ratios between net debt and income, measures of counterparty risk (such as credit spreads), measures of liquidity and asset quality (such as non-performing loans), open foreign exchange positions and exposures per sector with special attention to measures of concentration. These are mostly micro-prudential indicators, aggregated up to the macro-level. Thus, there is a need to look also at dispersions within these aggregates. In order to cover the entire financial system, a broader set of indicators would also monitor conditions in important markets, including inter-bank money, repo, bond, equity and derivatives markets. Relevant indicators include measures of market liquidity (such as bid-ask spreads), asset price expectations (as embedded in futures, forward and other derivative prices), market uncertainty and risk (as reflected in historical and implied

asset-price volatilities), and asset price sustainability (as indicated by market depth and breadth as well as deviations in asset-pricing models, fundamentals-based models of 'equilibrium' prices, or price-earnings ratios).

A basic compilation of these variables is provided by the Core and Encouraged Set of Financial Soundness Indicators promoted by the IMF (see Appendix III). Complementary indicators may also be derived for the well-functioning of the financial infrastructure, including payment system figures for incidents (failures due to hardware, software or connectivity problems), stop sendings, slowdowns and queuing, as well as non-settlements. Besides this, infrastructural aspects relating to the legal, regulatory, accounting or supervisory field may primarily arise in reaction to situations of financial tension. Finally, macroeconomic variables such as economic growth, investment, inflation, the balance of payments and (non-financial) asset prices may indicate a build-up of imbalances.

Early warning systems can play a role in weighing the importance of different indicators for financial stability and in anticipating financial stress, both within and across classes of financial institutions and within and across the various securities markets.[7] Based on past experience, several variables have proven to be important leading indicators for financial tension. For example, interest rate hikes often anticipate strong adjustments in asset prices. Similarly, various studies have found that the ratio of credit to GDP is an important leading indicator for asset bubbles and financial crises, especially in combination with an investment boom (Borio and Lowe, 2002). In addition, financial market indicators provide important information that captures developments beyond these markets themselves.[8] This is because various (potential) risks in large parts of the economy are immediately reflected in variables like bond spreads and stock prices.

Finally, financial stability analyses need to examine not only potential disturbances, but also the degree to which these can be absorbed by the financial system. In particular, the different factors need to be taken into account that can cushion or contain a shock, such as the size of capital buffers, the reliability of (re)insurance facilities, and the presence and functioning of fire walls, safety nets and back-up systems.

In contrast with other policy fields, such as monetary and fiscal policy, the development of analytical tools for financial stability assessments is still in its infancy. The assessment function thus also involves the continuous improvement of methods for monitoring and assessing the sustainability of developments in financial markets and institutions, and for bringing together separate, partial analyses. Furthermore, as argued in Section III, financial stability assessments are complicated by non-linearities and the need to focus on exceptional but

[7] Sahajwala and Van den Berg (2000) provide an overview of early warning systems used by central banks and supervisors in the G10 countries.

[8] See Persson and Blåvarg (2003) on the use of financial market indicators in financial stability analysis.

nonetheless plausible events. Hence, it is often necessary to consider distributions of variables (especially the 'left tail') and to analyze what happens if risks manifest themselves simultaneously. In this context, stress tests are a useful tool to give an overall picture of the resilience of (parts of) the economy under extreme conditions. Stress tests may be carried out for individual financial institutions, the banking system or the financial system as a whole (Blaschke et al., 2001). However, in this latter context, there is a scarcity of appropriate data and empirical models: the challenge ahead is to develop system-wide stress tests that take account of financial sector interlinkages and of second-round effects that financial institutions have on each other and the real economy.

Policy implications: prevention, remedial action, and resolution

To some extent, the three stages of policy implications presented in Figure 2 are similar to the way a doctor examines a patient. Imagine someone who is in good health with no indications of illness. In terms of the framework, the health of this person would be in the 'prevention' mode, meaning that he or she should try to maintain a healthy condition by continuing to consume balanced meals, doing enough exercise, refraining from smoking, etc. The situation becomes different if there are signs that the patient's condition is deteriorating (as in the case of increasing weight or short breath). This is the 'remedial' stage: even though the patient is not yet ill, pre-emptive action may be needed to ensure that he remains healthy. The doctor will intensify regular check ups, recommend a better diet and exercise, and use moral suasion to improve the patient's life style. If the patient nonetheless falls ill, intervention (intensive care, medicine, surgery) will be needed. Just as a doctor's actions range from pure prevention towards remedial action and, in the ultimate case, serious intervention, the financial authorities' policies will be intensified as the financial system moves towards – or eventually crosses – the boundary of stability.

As with a healthy patient, the financial system is in the preventative mode in the absence of significant indications that it may become unstable in the near future. Existing policies should then be maintained and updated for structural changes in order to prevent future imbalances. In itself, the surveillance of financial markets, institutions and infrastructure constitutes an important element of preventative policy (in the health metaphor, this is similar to regularly checking your weight, blood pressure and pulse, or going to the dentist). Specifically, tight surveillance will stimulate a judicious management of financial risks. Obviously, this is also closely connected to the overall financial stability assessment discussed above. For instance, financial innovation trends such as securitization and the development of derivative markets are changing the way risks are spread over financial market participants, and may therefore require timely adjustments in both how risks and vulnerabilities are analyzed and assessed, and how existing policy instruments are designed and implemented.

In this context, surveillance and other policy instruments, such as supervision, regulation, official communication and macroeconomic policies, are key to sustaining a situation of financial stability (as summarized in the second column of Table 2). By way of illustration, the trend towards greater complexity implies that transparency deserves more attention, while level playing field problems due to cross-sector and cross-border integration

Table 2. Policy Instruments for Financial Stability

Tools	**Prevention** *Implementing existing policies to safeguard financial stability*	**Remedial action** *Implementing pre-emptive measures to reduce emerging risks to financial stability*	**Resolution** *Reactive policy interventions aimed at restoring financial stability*
Market disciplining mechanisms	Maintain, update	Strengthen	Discretionary measures
Self-regulation	Maintain, update	Strengthen	Discretionary measures
Financial safety nets	Maintain, update	Strengthen	LOLR, deposit insurance
Surveillance	Maintain, update	Intensify	Further intensify
Supervision/regulation	Maintain, update	Intensify	Discretionary measures
Official communication	Existing policies	Moral suasion	Restore confidence
Macroeconomic policies	Maintain, update	Reduce imbalances	Discretionary measures
Legal system	Maintain, update	Strengthen	Discretionary measures

Note: LOLR denotes lender of last resort.

may be addressed by international standards and codes (prominent examples being the Basel Accord for banking supervision and the Lamfalussy Standards for payment systems). Furthermore, support may be given to private sector initiatives that enhance financial stability, for example through self-regulation or improvement of the financial infrastructure. A recent example of the latter, with central bank involvement, is the creation of the Continuous Linked Settlement (CLS) bank, which has significantly lowered the risks related to foreign currency transactions (Herstatt risks).

The situation becomes different if the financial system is close to, or at the boundary of the range of stability. For instance, imbalances may be building up because of rapid credit growth in combination with excessive asset price inflation and declining banking system capital; even if immediate risks are absent, problems may become acute if such imbalances continue to expand. Another example is a sudden change in the financial system's domestic or external environment, for instance due to a sovereign default by a neighboring country. Because of such changes, an initially robust financial system may soon be near the boundary of the financial stability corridor.

In such a situation, the appropriate policies are not just preventative, but should also try to influence or 'correct' actual developments (see Table 2, third column). This means that policy instruments, such as surveillance and supervision, need to be intensified in order to get more grip on these developments. Furthermore, in order to avoid risks related to bank and liquidity runs, and to contagion, it may be useful to strengthen instruments like safety nets. Other policy tools such as moral suasion and adjustments in macroeconomic policies may also

be beneficial. In practice, this intermediate stage of remedial policy is probably the most ambiguous one. It is inherently difficult to assess vulnerabilities that have not yet manifested themselves, and perhaps even harder to identify, motivate and implement the appropriate remedial instruments in the absence of financial instability. The buoyant Dutch housing market in the mid-1990s is a good example of the 'remedial action' phase (see Box 2).

Box 2. Remedial Action: Dutch Housing Market Boom in the 1990s

In the second half of the 1990s, both house prices and mortgage lending roughly doubled in the Netherlands. This boom was caused by various factors. In particular, households' borrowing capacity had been augmented by historically low interest rates and strong income growth, in combination with a significant loosening of mortgage lending criteria. Other factors were demographic developments (the number of households increased), greater use of the very generous tax treatment of mortgage interest payments (fully deductible from income tax, leading to low, or even negative real interest rates), and insufficient supply of new dwellings. Furthermore, these factors mutually reinforced each other, as loan-to-value (LTV) ratios typically rose to above 100%, implying that higher house prices were accommodated by higher borrowing capacity and vice versa.

Given the adverse repercussions of the housing market collapse in the early 1980s in the Netherlands as well as in other countries, an important issue was whether this development could become a threat to financial stability. The unbridled credit growth prompted the central bank—which is also the banking supervisor—to investigate the underlying causes and possible risks. In 1999-2000, an intensive survey was carried out among Dutch banks (see DNB, 2000a). The assessment that was made on the basis of this survey, and the policy conclusions that were drawn, fit under the 'remedial' category in Figure 2. While the financial sector's solidity was considered beyond dispute, it was also stressed that the Dutch economy had become more vulnerable and that some developments were leading to further imbalances. Hence, in terms of the framework, the financial system was considered within the range of financial stability, but moving towards its boundary.

A variety of remedial policies were implemented. The surveillance of the housing market and mortgage market was intensified. Banks' regular reporting requirements on mortgages were extended and financial institutions were encouraged to develop stress tests in order to assess more precisely potential risks in their mortgage portfolio. Although not implemented, a maximum LTV limit of 100 percent was proposed in order to break the self-reinforcing spiral of credit growth and higher house prices. In effect, also by publicizing its concerns about the sustainability of housing market developments, the central bank exercised moral suasion. Moreover, the Nederlandsche Bank launched regular surveys among households in order to gain a better insight into their use of mortgage loans and possible risks. Several measures were also taken to get more grip on the dynamics underlying the rapid increase in mortgage lending. In some cases, supervisors gave banks' administrative organization and internal controls extra attention. In addition, the generous fiscal treatment of mortgage payments was put to discussion and some limitations were later implemented. These steps were clearly remedial in the sense that they were aimed at pre-emptively reducing the build-up of imbalances, rather than at directly intervening to resolve a crisis.

The final stage of policy relates to situations of financial instability. In these cases, the financial system cannot adequately perform its functions (in terms of the health metaphor, the patient is seriously ill). In particular, banks may not finance profitable projects, asset prices may be far removed from their intrinsic values, or payments may not – or not timely – be settled. In

extreme cases, financial instability may even spark a run on financial institutions and markets or lead to hyperinflation, a currency crisis or a stock market crash.

In such situations, policies are generally reactive or, in the case of a financial crisis, focused on crisis resolution (see Box 3). This means that surveillance and supervision are further intensified, while more activist policies may be needed to restore the system's capacities and to boost confidence (Table 2, fourth column). These situations typically call for discretionary measures that are difficult to specify a priori, also for strategic reasons (e.g., to avoid moral hazard through constructive ambiguity). Examples are forbearance, the activation of financial safety nets and both institution-targeted or system-wide liquidity injections. In addition, official communication and macroeconomic policies can help prevent excessive financial market turbulence. An illustration of policies in the 'crisis resolution' phase can be provided by the financial authorities' reactions to the September 11, 2001, terrorist attacks (see Box 3).

Box 3. Crisis Resolution: Terrorist Attacks on September 11, 2001

Policy actions taken in response to the terrorist attacks on the Twin Towers are a good example of crisis resolution. Because the attacks hit the world's main financial center, the stability of the international financial system was at stake. Besides the damage in New York itself, the problems could easily spread on account of financial linkages and behavioral reactions in financial markets.

Policymakers immediately needed to assess the situation and the threats to financial stability. While the international payments systems continued to work smoothly, money markets were not operating properly, as reflected in insufficient liquidity. Given the crucial role of these markets, this risked causing serious damage to the financial system as a whole. Hence, in terms of the framework advanced in this paper, the financial system was crossing the boundary of financial stability, implying that intervention was needed to resolve the crisis.

The following corrective measures were taken. First, central banks communicated that, if necessary, almost unlimited liquidity would be made available. Large liquidity injections by the Fed (about USD 80 billion) and the Eurosystem (EUR 70 billion) were sufficient to keep the system afloat. Second, a swap agreement was arranged between the ECB and the Fed—making another USD 50 billion available in the subsequent days—in part to reduce the potential for cross-border contagion. Third, the New York stock exchange was closed for a week. Finally, both the Fed and the Eurosystem decided to cut their main interest rate by 50 basis points, also giving relief to financial markets.

These measures were successful in promptly restoring financial stability. The liquidity injections were only temporarily necessary and were easily reversed afterwards. In many respects, the policy reactions to the terrorist attacks were similar to the official response to earlier financial crises (Neely, 2004). The next step, in line with Figure 2, was the feedback from restored financial stability to the analysis and assessment phase. In this context, several initiatives were launched to strengthen the financial system's robustness to future disturbances, including measures to combat the financing of terrorism.

V. Concluding Remarks

In recent years, financial stability has once again explicitly become a key objective for public policy. To put this shift in emphasis into perspective, this paper first discusses the role of finance versus fiat money, the relationship between finance and the real economy, and the concept of financial stability. It is argued that finance fosters the processes of production, wealth accumulation, and risk diversification but is subject to market failures that justify a public sector role. In this context, financial stability is defined as a situation in which the financial system efficiently allocates resources between activities and across time, assesses and manages financial risks, and absorbs shocks.

In practical terms, finance is shown to have become more important over the past decades, both quantitatively and relative to money. In addition, the financial system has become more interwoven and complex. Driving factors are the deregulation, liberalization, and globalization of financial markets. As a result, financial innovation has surged, as evidenced by the spectacular rise in securitization and derivatives, and financial activities have increasingly taken on cross-sector and cross-border dimensions. These developments have strengthened the linkages between financial institutions and markets, but have also complicated the analysis of financial vulnerabilities.

The analytical framework presented in this paper takes these developments into account. One part of the framework is the assessment of financial stability, which is considered as a continuum of possible states with ambiguous boundaries. This assessment is based on a wide-ranging analysis of the system's different constituent elements (financial institutions, markets, and infrastructure) as well as the interaction among these elements and with their external environment (the macroeconomy). Depending on the assessment's outcome, policy implications are classified into three broad categories (prevention, remedial action, and resolution), each aimed at maintaining the financial system in, or returning it to, the stability corridor. Although most of these elements relate to activities that have always been part and parcel of the work of central banks and supervisory bodies, the framework also emphasizes the importance of undertaking these activities from a system-wide viewpoint.

Indeed, the policymakers' approach to financial stability as an objective in itself is changing. In terms of monitoring, analysis, assessment, and policymaking, this approach is becoming more encompassing, focusing on the financial system as a whole rather than its individual segments. This is necessary, since the system itself is becoming more interwoven and interdependent. It is also reflected in changes to the institutional organization of supervisory tasks, since many countries are integrating supervision into broader, cross-sectoral structures. In addition, considerable emphasis is placed on international cooperation, for instance regarding international codes for the supervision of banks and insurance firms (under the Basle and Solvency Accords) and for payment systems (the Lamfalussy standards). A related initiative is the recent establishment of the Financial Stability Forum, which brings together the relevant national authorities from mature financial markets to identify and discuss weak spots in the international financial system.

Looking forward, the trends of the past two decades are likely to continue. The shift to a larger, more integrated, leveraged, complex, and market-based financial system will continue to change the nature of financial risks. In this respect, this paper's framework should be seen as a flexible tool that can be used to interpret changes and translate these into policy implications. A major challenge is to develop a deeper understanding of how the different dimensions of financial stability interact with each other and the real economy, and how these interactions are influenced by policy actions. More specifically, efforts should be focused on broadening the available data, improving the empirical tools (methodologically and analytically), and developing wide groups of indicators from which some predictive power can be derived while also linking developments in these indicators to specific instruments. This is a heavy agenda. Undoubtedly, practical experiences will also show the way.

APPENDIXES

I. TRENDS IN THE FINANCIAL SYSTEM: AN EMPIRICAL ILLUSTRATION

This appendix presents an overview of the main trends in the financial system over the past decade. The development of key variables shows that: (1) the financial system has expanded more rapidly than the real economy; (2) the composition of the financial system has changed, with non-monetary assets becoming more important; (3) the financial system has become more integrated, both cross-sector and cross-border; and (4) the financial system has become more complex.

Table A.1 illustrates the expansion of the financial system over the years 1970-2000, for a heterogeneous group of developed economies: the United States, Japan, Germany, the United Kingdom, France, Italy, Canada and the Netherlands. The table includes several monetary aggregates, ranging from currency to a broad aggregate, total bank assets, total assets of financial institutions, stock market capitalization and total bonds outstanding. All figures are expressed as a percentage of nominal GDP in the corresponding year. While differences between these countries reflect their more market or bank oriented financial systems, most aggregates have increased, in particular financial institutions' total assets and stock and bond market capitalization. The broad measures of an economy's total financial assets invariably involve some double counting due to claims between financial institutions, but these mutual holdings are relevant for financial stability as they represent links in the financial system.

By contrast, the increase in monetary aggregates, especially the narrower ones, has been limited. The amount of currency relative to GDP has been broadly stable or decreased in all countries except Japan. In the US, even the size of both M1 and M2 has fallen as financial innovation has progressed. For outlier Japan, the increasing importance of narrow money in the 1990s may be attributed to incentives for money holdings, in particular the financial sector's fragile state and the enduring deflationary pressures. The average financial system's expansion is also illustrated by Figure A.1, in which total assets of financial institutions are reflected by the triangle's surface. Between 1970 and 2000, the size of these assets almost tripled relative to GDP. Figure A.2 shows the change in composition over the past decades, by expressing some key financial aggregates as a percentage of their value in 1970 (all deflated by GDP). It is clear that the relative importance of monetary aggregates has decreased, while the non-monetary part has increased rapidly.

The financial system has also become more integrated, both cross-sector and cross-border. Financial institutions now encompass a broader range of activities, as illustrated by the rise in financial conglomerates (see Group of Ten, 2001). In the 1990s, the number of mergers and acquisitions within the financial sector soared (Figure A.3). Part of these transactions involved different industries or countries, especially in Europe where roughly half of the deals in this period were either cross-border, cross-industry or both (Table A.2). In

addition, co-operation between financial institutions intensified through joint ventures and strategic alliances.[9] The greater international orientation of financial systems is also reflected in the increasing size of cross-border transactions in bonds and equity relative to GDP (see Table A.3). On this score, the amount of outstanding international debt securities has surged over the past decades (Table A.4).

The greater complexity of the financial system stems from increases in the intricacy of financial instruments and in the diversity of financial activities. Deregulation and liberalization created scope for financial innovation and enhanced the mobility of risks. In general, this greater complexity and especially the increase in risk transfers have made it more difficult for market participants, supervisors and policy makers alike to track the development of risks within the system and over time. To illustrate the higher mobility of risks, Table A.5 presents the worldwide development of several types of derivatives since the mid-1980s. In nominal terms, total notional amounts outstanding have increased more than forty times, while the number of derivative contracts has increased five-fold.

[9] Van der Zwet (2003) discusses this blurring of distinctions between financial sectors and countries, including by looking at variables such as the share of financial institutions' cross-border and cross-sector revenues.

Table A.1. Development of Key Financial Aggregates

Percentage of GDP

	1970	1980	1990	2000		1970	1980	1990	2000
United States					Germany				
1 Currency	6	5	5	6	1 Currency	5	6	7	6
2 M1	21	15	14	11	2 M1	15	17	22	28
3 M2	60	57	56	50	3 M2	25	29	39	-
4 M3	65	72	72	73	4 M3	42	48	59	68
5 Total bank assets	54	54	53	58	5 Total bank assets	121	160	216	303
6 Total fin. inst. assets	-	111	171	257	6 Total fin. inst. assets	-	182	259	353
7 Equity	34	25	35	132	7 Equity	11	7	17	48
8 Bonds	47	53	108	157	8 Bonds	26	37	67	112
6+7+8	-	189	314	546	6+7+8	-	226	343	513
United Kingdom					Japan				
1 Currency	8	5	3	4	1 Currency	8	9	10	13
2 M4	52	50	86	93	2 M1	29	29	27	48
3 Total bank assets	51	47	108	156	3 M2	74	86	114	127
					4 M3	127	136	180	219
4 Total fin. inst. assets	-	110	242	377	5 Total bank assets	66	77	134	127
5 Equity	41	23	57	167	6 Total fin. inst. assets	122	157	269	260
6 Bonds	52	31	33	74					
					7 Equity	41	25	76	70
4+5+6	-	164	332	618	8 Bonds	23	60	78	124
					6+7+8	186	242	423	454

Table A.1. (concluded). Development of Key Financial Aggregates
(Percentage of GDP)

France					Italy				
1 Currency	10	5	4	3	1 Currency	10	7	6	7
2 M1	29	24	25	23 *	2 M1	44	42	35	18
3 M2	44	51	44	44 *	3 M2	76	79	67	-
4 M3	62	69	74	65 *	4 M3	76	89	88	-
5 Total bank assets	-	-	-	-	5 Total bank assets				
6 Total fin. inst. assets	-	-	-	-	6 Total fin. inst. assets	-	-	-	-
7 Equity	6	4	14	84	7 Equity	7	3	10	57
8 Bonds	14	19	42	55	8 Bonds	-	39	65	108
6+7+8	-	-	-	-	6+7+8	-	-	-	-
Canada					**Netherlands**				
1 Currency	4	3	3	3	1 Currency	8	6	7	5
2 M1	11	9	7	11	2 M1	23	21	25	35
3 M2	38	47	56	48	3 M2	-	-	-	-
4 M3	46	63	64	65	4 M3	53	60	77	92
5 Total bank assets					5 Total bank assets	71	129	184	254
6 Total fin. inst. assets	-	-	-	-	6 Total fin. inst. assets	116	191	285	431
7 Equity	9	18	26	87	7 Equity	41	16	38	185
8 Bonds	33	52	68	76	8 Bonds	11	25	73	85
6+7+8	-	-	-	-	6+7+8	168	232	396	701

Sources: Thomson Financial, IMF, BIS, Merill Lynch, Salomon Smith Barney, and various national sources.

Notes: Currency is coins and bank notes in circulation, M1-M3 and M4 are national definitions. Total assets of financial institutions consists of total bank assets and (depending on data availability) assets of insurers, pension funds and mutual funds. Equity is total stock market capitalisation; bonds are total debt securities outstanding (government and corporate).

Table A.2. Financial Sector Mergers and Acquisitions, 1991-99
Distribution (percentages)

	North America	Europe	Japan/Australia
Within border/within industry	80	53	64
Within border/cross industry	12	19	16
Cross border/within industry	6	21	14
Cross border/cross industry	2	8	5
Total	100	100	100

Source: Group of Ten (2001).

Table A.3. Cross-Border Transactions in Bonds and Equities[1]
Percentages of GDP

	1975-79	1980-84	1985-89	1990-94	1995-99	2000	2001	2002
United States								
Bonds	4,0	9,4	63,6	94,0	138,8	120,1	161,7	208,1
Equities	1,9	3,6	9,9	14,7	45,0	108,4	87,6	84,1
Japan								
Bonds	2,1	9,6	114,3	72,6	63,4	55,5	73,5	73,4
Equities	1,1	4,3	14,7	9,6	17,2	40,8	36,6	33,0
Germany								
Bonds	5,3	9,9	40,2	87,3	208,7	278,1	377,2	350,3
Equities	1,6	3,0	11,5	15,2	48,6	168,7	133,6	114,0
France								
Bonds	-	6,8	21,9	108,6	233,5	226,9	290,2	286,4
Equities	-	2,4	12,1	16,9	56,1	171,0	140,6	143,2
Canada								
Bonds	1,2	3,9	29,3	104,5	216,6	130,8	137,5	158,2
Equities	3,3	6,5	14,8	19,2	52,9	110,1	107,7	153,0
Italy[2]	0,9	1,4	9,4	114,6	518,7	782,4	820,7	-

Sources: Bank for International Settlements; national balance of payments data.
[1]Gross purchases and sales of securities between residents and nonresidents.
[2]No breakdown in bonds and equities is available.

Table A.4. Outstanding International Debt Securities, by Nationality of Issuer
(Percentages of GDP)

	1970	1980	1990	2000	2003-Q2
United States	0.1	0.7	3.0	17.1	25.8
Japan[1]	0.0	1.5	10.5	5.8	5.6
Germany[2]	0.1	0.4	4.2	40.9	65.7
France[1]	0.1	2.1	7.3	22.4	34.1
Italy	0.1	0.5	4.1	18.3	28.8
United Kingdom[1]	0.2	2.3	13.5	34.9	47.5
Canada	0.2	13.4	18.5	27.9	29.2
Netherlands	0.6	2.4	10.5	69.9	88.5
Sweden[1]	0.3	7.5	17.2	37.0	47.7
Switzerland[2]	0.5	1.7	7.3	43.2	44.9
Belgium	0.4	2.1	14.6	49.9	67.2

Source: Bank for International Settlements.

[1]For 1970 data refer to 1971.

[2]For 1970 data refer to 1972.

Table A.5. Exchange-Traded Derivative Financial Instruments
(Notional principal amounts outstanding and annual turnover)

	1986	1990	1995	2000	2001	2002	2003 Q1	2003 Q2
Notional principal amounts outstanding				*(In billions of U.S. dollars)*				
Interest rate futures	370.0	1,454.8	5,876.2	7,907.8	9,265.3	9,950.7	11,033.7	13,444.4
Interest rate options	144.0	595.4	2,741.8	4,734.2	12,492.8	11,759.5	17,622.1	22,024.6
Currency futures	10.2	17.0	33.8	74.4	65.6	47.0	65.9	71.5
Currency options	39.2	56.5	120.4	21.4	27.4	27.4	29.4	33.2
Stock market index futures	14.5	69.1	172.2	377.3	341.7	334.2	378.1	421.7
Stock market index options	37.8	93.6	337.7	1,162.9	1,605.2	1,754.7	1,894.0	2,307.4
Total	615.7	2,286.4	9,282.0	14,278.0	23,798.0	23,873.5	31,023.1	38,302.7
North America	515.6	1,264.4	4,852.4	8,167.9	16,198.9	13,688.9	16,895.8	21,639.9
Europe	13.1	461.4	2,241.3	4,217.7	6,179.5	8,863.6	12,857.8	15,179.9
Asia-Pacific	87.0	560.5	1,990.2	1,606.2	1,308.4	1,191.7	1,122.5	1,308.7
Other	0.0	0.1	198.1	286.2	111.2	129.3	147.0	174.2
Annual turnover				*(In millions of contracts traded)*				
Interest rate futures	91.0	219.1	121.5	179.0	290.8	273.6	368.1	421.3
Interest rate options	22.2	52.0	51.1	26.2	62.8	62.9	75.5	87.2
Currency futures	19.9	29.7	23.8	11.3	14.9	10.2	13.3	15.9
Currency options	13.0	18.9	7.2	1.8	3.1	3.4	3.5	3.3
Stock market index futures	28.4	39.4	27.6	63.3	98.2	160.0	174.1	171.7
Stock market index options	140.0	90.4	25.7	15.5	15.5	20.2	20.5	20.3
Total	314.9	478.2	275.2	431.1	906.0	1,231.3	1,385.8	1,509.3
North America	288.7	312.3	97.9	115.1	189.8	238.5	286.6	347.9
Europe	10.3	83.0	86.3	164.9	257.4	276.7	351.7	340.1
Asia-Pacific	14.3	79.1	23.5	113.2	391.4	682.5	712.6	778.8
Other	1.6	3.8	67.5	37.9	67.4	33.6	34.9	42.5

Source: Bank for International Settlements.

Figure A.1. Composition of Key Financial Aggregates in 1970 and 2000

(Percentage of GDP, average of the United States, Japan, Germany, the United Kingdom, France, Italy, Canada and the Netherlands)

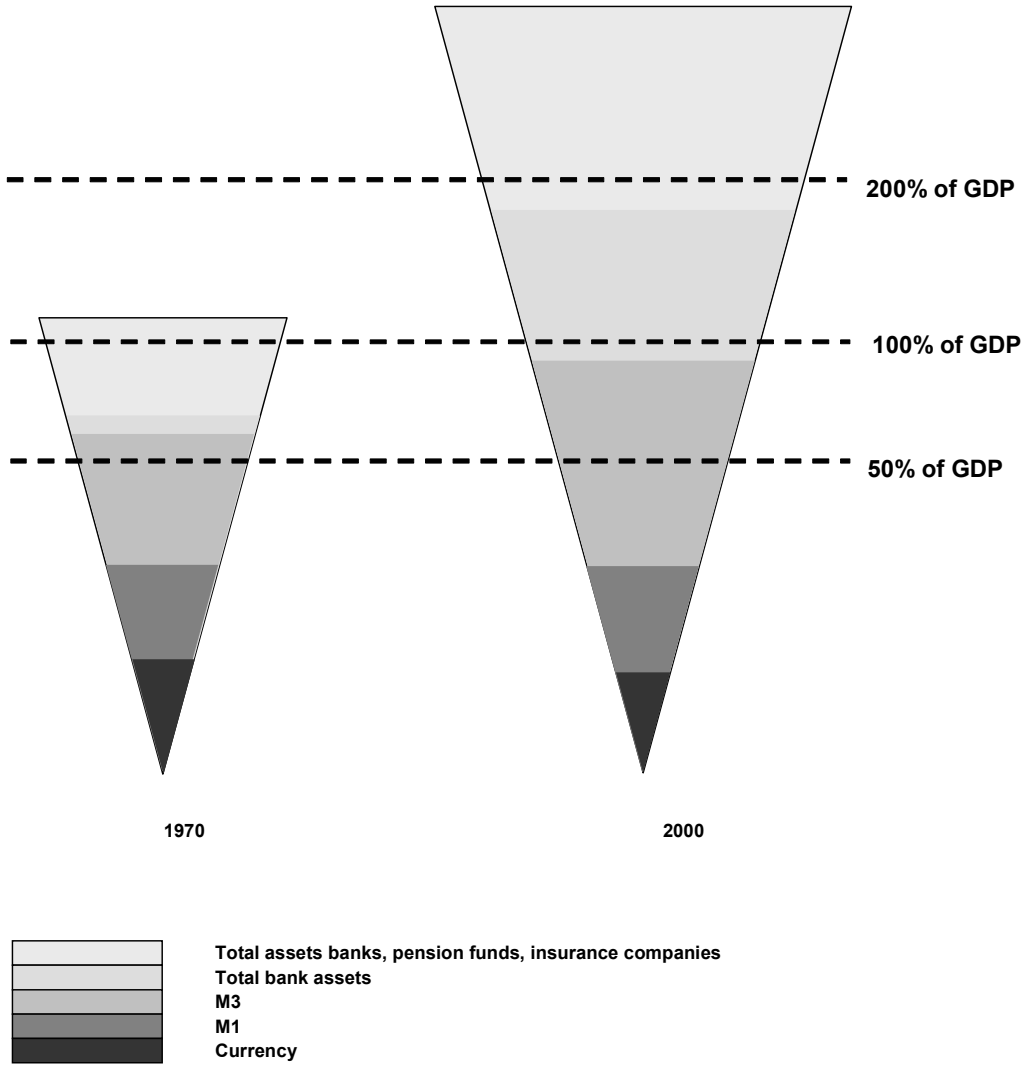
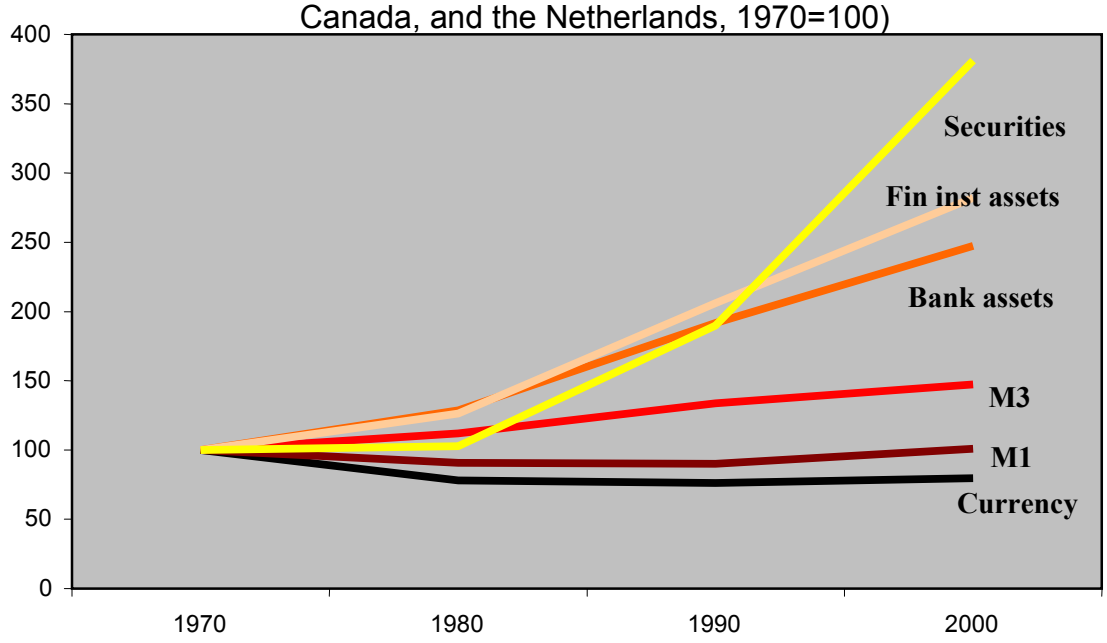


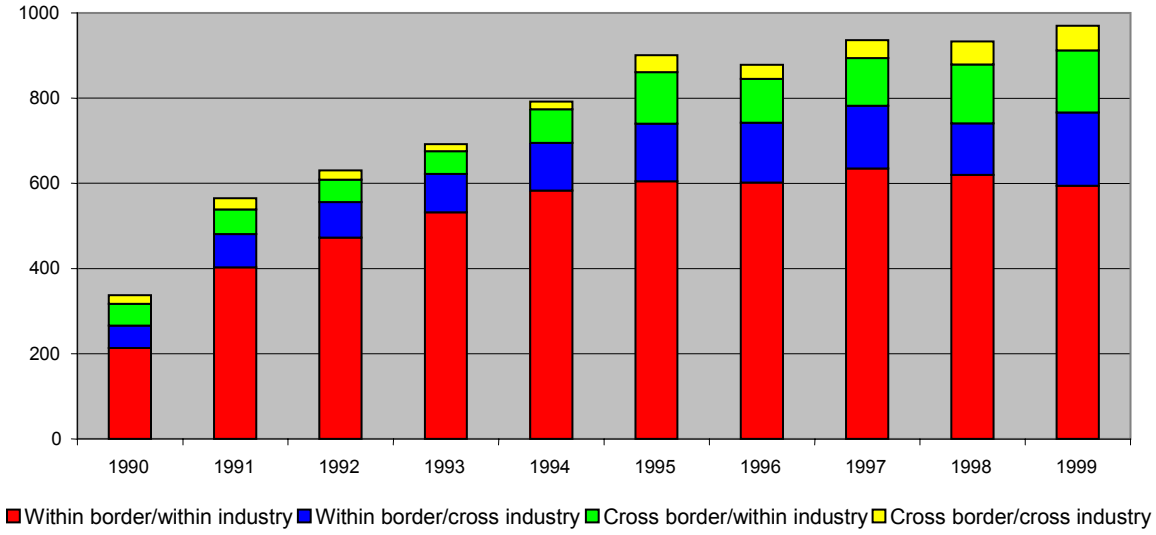
Figure A.2. Development of Key Financial Aggregates, 1970–2000

(Average for the United States, Japan, Germany, the United Kingdom, France, Italy, Canada, and the Netherlands, 1970=100)



Source: Table A.1

Figure A.3. Financial Sector Mergers and Acquisitions, 1990–99
(Number of M&As in G-10 countries)



Source: Group of Ten (2001).
Note: "M&As" denotes mergers and acquisitions.

II. ALTERNATIVE DEFINITIONS OF FINANCIAL STABILITY

This appendix provides an overview of definitions or descriptions of financial stability by a selected group of officials, central banks and academics.[10]

John Chant (Bank of Canada)[11]

> "Financial instability refers to conditions in financial markets that harm, or threaten to harm, an economy's performance through their impact on the working of the financial system. ..... Such instability harms the working of the economy in various ways. It can impair the financial condition of non-financial units such as households, enterprises, and governments to the degree that the flow of finance to them becomes restricted. It can also disrupt the operations of particular financial institutions and markets so that they are less able to continue financing the rest of the economy. ... It differs from time to time and from place to place according to its initiating impulse, the parts of the financial system affected, and its consequences. Threats to financial stability have come from such diverse sources as the default on the bonds of a distant government; the insolvency of a small, specialized, foreign exchange bank; computer breakdown at a major bank; and the lending activities of a little- known bank in the U.S. Midwest. (pp. 3-4.)

Andrew Crockett (Bank for International Settlements and Financial Stability Forum)[12]

> "...define financial stability as an absence of instability....a situation in which economic performance is potentially impaired by fluctuations in the price of financial assets or by an inability of financial institutions to meet their contractual obligations. I would like to focus on four aspects of this definition.
>
> Firstly, there should be real economic costs.... Secondly, it is the potential for damage rather than actual damage which matters.... Thirdly, my definition refers .... not just to banks but to non-banks, and to markets as well as to institutions... Fourth, my definition allows me to address the question of whether banks are special.....all institutions that have large exposures - all institutions that are largely interconnected whether or not they are themselves directly involved in the payments system - have the capacity, if they fail, to cause much widespread damage in the system."

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[10] Some authors choose not to define financial stability and instead use the concept of systemic risk. See Oosterloo and Haan (2003) for a discussion of this concept.

[11] See Chant (2003).

[12] See Crockett (1997).

Deutsche Bundesbank[13]

"The term financial stability broadly describes a steady state in which the financial system efficiently performs its key economic functions, such as allocating resources and spreading risk as well as settling payments, and is able to do so even in the event of shocks, stress situations and periods of profound structural change."

Wim Duisenberg (European Central Bank)[14]

"...monetary stability is defined as stability in the general level of prices, or as an absence of inflation or deflation. Financial stability does not have as easy or universally accepted a definition. Nevertheless, there seems to be a broad consensus that financial stability refers to the smooth functioning of the key elements that make up the financial system."

Roger Ferguson (Board of Governors of the U.S. Federal Reserve System)[15]

"It seems useful....to define financial stability....by defining its opposite, financial instability. In my view, the most useful concept of financial instability for central banks and other authorities involves some notion of market failure or externalities that can potentially impinge on real economic activity.

Thus, for the purposes of this paper, I'll define financial instability as a situation characterized by these three basic criteria: (1) some important set of financial asset prices seem to have diverged sharply from fundamentals; and/or (2) market functioning and credit availability, domestically and perhaps internationally, have been significantly distorted; with the result that (3) aggregate spending deviates (or is likely to deviate)significantly, either above or below, from the economy's ability to produce.

Michael Foot (U.K. Financial Services Authority)[16]

"...we have financial stability where there is: a) monetary stability; b) employment levels close to the economy's natural rate; c) confidence in the operation of the generality of key financial institutions and markets in the economy; and d) where there are no relative price movements of either real or financial assets within the economy that will undermine (a) or (b)."

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[13] Deutsche Bundesbank (2003).

[14] See Duisenberg (2001).

[15] See Ferguson (2003).

[16] See Foot (2003).

> "The first three elements of this definition are, I hope, non-contentious. In respect of (a) and (b), it seems implausible to define financial stability as occurring in a period of rapid inflation, or in a mid-1930s style period of low inflation but high unemployment.
>
> Similarly in respect of (c), it would be strange to argue that there was financial stability in a period when banks were failing, or when normal conduits for long-term savings and borrowing in either the personal or corporate sectors were seriously malfunctioning. Such circumstances would mean the participants had lost confidence in financial intermediaries. It would mean, almost certainly, that economic growth was being damaged by the unavailability or relatively high cost of financial intermediation.
>
> This leaves us with (d).....I would say that there are four main channels by which changes in asset prices might affect the real economy: by changing household wealth and thereby consumption….; by a change in equity prices….; by their impact on firms' balance sheets which can then affect corporate spending….; by their impact on capital flows, with for example inflows of capital – as during the dot.com boom in the US - strengthening the domestic currency."

Andrew Large[17]

> "In a broad sense.....think of financial stability in terms of maintaining confidence in the financial system. Threats to that stability can come from shocks of one sort or another. These can spread through contagion, so that liquidity or the honoring of contracts becomes questioned. And symptoms of financial instability can include volatile and unpredictable changes in prices. Preventing this from happening is the real challenge."

Frederick Mishkin (Columbia University)[18]

> ….financial instability "occurs when shocks to the financial system interfere with information flow so that the financial system can no longer do its job of channeling funds to those with productive investment opportunities"

[17] See Large (2003).

[18] See Mishkin (1999).

Norges Bank[19]

> "Financial Stability is often defined as the absence of crises in the financial system. This means that the financial sector is robust in the face of shocks to financial institutions or financial markets."

Tommaso Padoa-Schioppa (European Central Bank)[20]

> "...[financial stability is] a condition where the financial system is able to withstand shocks without giving way to cumulative processes which impairs the allocation of savings to investment opportunities and the processing of payments in the economy.
>
> The definition immediately raises the related question of defining the financial system. ...[which] consists of all financial intermediaries, organized and informal markets, payments and settlement circuits, technical infrastructures supporting financial activity, legal and regulatory provisions, and supervisory agencies. This definition permits a complete view of the ways in which savings are channeled towards investment opportunities, information is disseminated and processed, risk is shared among economic agents, and payments are facilitated across the economy."

Anna Schwartz (National Bureau of Economic Research)[21]

> "A financial crisis is fueled by fears that the means of payment will be unobtainable at any price and, in a fractional reserve banking system leads to a scramble for high-powered money. It is precipitated by actions of the public that suddenly squeeze the reserves of the banking system ... The essence of a financial crisis is that it is short-lived, ending with a slackening of the public's demand for additional currency."

Nout Wellink (De Nederlandsche Bank)[22]

> "According to our own definition at the Nederlandsche Bank, a stable financial system is capable of efficiently allocating resources and absorbing shocks, preventing these from having a disruptive effect on the real economy or on other financial systems. Also, the system itself should not be a source of shocks. Our definition thus implies that money can properly carry out its functions as a means of payment and as a unit of

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[19] See Norwegian Central Bank (2003).

[20] See Padoa-Schioppa (2003).

[21] Schwartz (1986).

[22] See Wellink (2002).

account, while the financial system as a whole can adequately perform its role of mobilizing savings, diversifying risks and allocating resources. Financial stability is a vital condition for economic growth, as most transactions in the real economy are settled through the financial system. The importance of financial stability is perhaps most visible in situations of financial instability. For example, banks may be reluctant to finance profitable projects, asset prices may deviate excessively from their underlying intrinsic values, or payments may not be settled in time. In extreme cases, financial instability may even lead to bank runs, hyperinflation, or a stock market crash."

III. IMF SOUNDNESS INDICATORS: CORE AND ENCOURAGED SETS

Core Set	
Deposit-taking institutions	
Capital adequacy	Regulatory capital to risk-weighted assets
	Regulatory Tier I capital to risk-weighted assets
Asset quality	Nonperforming loans to total gross loans
	Nonperforming loans net of provisions to capital
	Sectoral distribution of loans to total loans
Earnings and profitablity	Return on assets
	Return on equity
	Interest margin to gross income
	Noninterest expenses to gross income
Liquidity	Liquid assets to total assets (liquid asset ratio)
	Liquid assets to short-term liabilities
Sensitivity to market risk	Net open position in foreign exchange to capital
Encouraged Set	
Deposit-taking institutions	Capital to assets
	Large exposures to capital
	Geographical distribution of loans to total loans
	Gross asset positions in financial derivatives to capital
	Gross liability position in financial derivatives to capital
	Trading income to total income
	Personnel expenses to noninterest expenses
	Spread between reference lending and deposit rates
	Spread between highest and lowest interbank rate
	Customer deposits to total (non-interbank) loans
	Foreign currency-denominated loans to total loans
	Foreign currency-denominated liabilities to total liabilities
	Net open position in equities to capital
Other financial corporations	Assets to total financial system assets
	Assets to GDP
Nonfinancial corporate sector	Total debt to equity
	Return on equity
	Earnings to interest and principal expenses
	Net foreign exchange exposures to equity
	Number of applications for protection from creditors
Households	Household debt to GDP
	Household debt service and principal payments to income
Market liquidity[23]	Average bid-ask spread in the securities market [1]
	Average daily turnover ratio in the securities market [1]
Real estate markets	Real estate prices
	Residential real estate loans to total loans
	Commercial real estate loans to total loans

[23] Or in other markets that are most relevant to bank liquidity, such as foreign exchange markets.

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