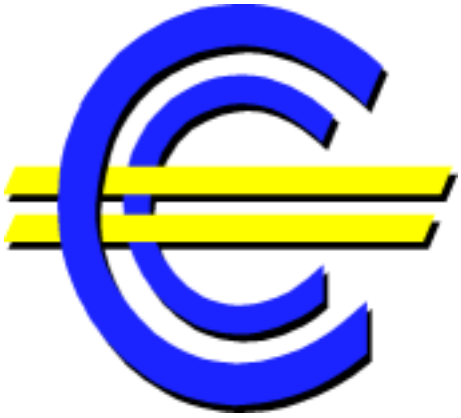
Second ECB
Central Banking Conference
Frankfurt am Main
24 and 25 October 2002



THE TRANSFORMATION OF THE EUROPEAN FINANCIAL SYSTEM

POLICY PANEL INTRODUCTORY PAPER

CENTRAL BANKS AND FINANCIAL STABIILTY: EXPLORING A LAND IN BETWEEN

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Central banks and financial stability: exploring a land in between

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Second ECB Central Banking Conference, "The transformation of the European financial system", 24 and 25 October 2002

Frankfurt am Main, 25 October 2002

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I. INTRODUCTION[1]

1. Over the short span (little more than a third of a century) of the author's service as a central banker, the art of central banking and the position of the institutions practising that art have changed profoundly. A third of a century ago, when currencies were still linked to gold, most central banks' monetary policies were aimed at balancing low inflation and high employment, and they were often ready to sacrifice the former to have more of the latter. Most of them were controlled by the Treasury, which was the *de facto* monetary policy-maker. Most central banks were in charge of banking supervision. Banking crises were virtually non-existent, but that the central bank would provide ample liquidity (and even capital) support was an integral part of what was then thought to be the hallmark of the good and wise central banker. Deposit insurance was rare. Moral hazard was a notion confined to the jargon of private insurers.

In that world, it was taken for granted that financial stability was a major concern and responsibility of the central bank. Indeed, monetary policy, the maintaining of financial stability and supervision of banks formed a single composite, the parts of which were sometimes difficult to disentangle. That world was perhaps not fundamentally different from what central banking had been one or one and a half centuries earlier, i.e. from the time in which central banks had emerged as a fundamental institution of a modern economy based on division of labour and exchange.

Much bigger are perhaps the changes that have intervened subsequently. Currencies were not anymore anchored to gold and their management was left entirely in human hands. Central banks were made independent and assigned the overriding mission of preserving price stability. Economic theory re-established the long-term neutrality of money on a firm basis. More recently, the task of supervising banks was taken away from the central bank in such countries as Denmark, Sweden, the United Kingdom and South Korea.

This development has unbundled the old composite to the point that one may wonder whether financial stability still ranks among the statutory tasks of a contemporary central bank. Indeed, both in academia and in the world of public servants, there are numerous supporters of the view that the central banks should simply not regard financial stability as a good for which it takes any responsibility.

Yet, you need only read the financial chronicles of 2002 to find surprises. The Bank of Japan recently decided to purchase corporate equities held by Japanese banks in order to reduce the market risk within the banking system and to support financial stability. In the United States, as stock prices fell precipitously from the heights reached in 2000, a debate has developed on what the Fed did, or did not do, or should

[1] The author gratefully acknowledges the assistance and support from Reint Gropp and Jukka Vesala in the preparation of this paper. Valuable input particularly in reading through literature and collecting evidence was also provided by Ivan Alves, Inês Cabral, Carsten Detken, Cornelia Holthausen, Cyril Monnet and Simone Manganelli. The paper has greatly benefited from extensive discussions with Vítor Gaspar, Mauro Grande, Philipp Hartmann and Pierre Petit.

have done, to prevent or burst an alleged bubble. In the European Union, a wide debate on how to best organise financial supervision, and on what role central banks should have in it, has occupied officials, academics and the media for years and it is not finished yet.

2. On these grounds, the precise definition of the role of central banks in financial stability is worth exploring further. Indeed, in order to focus on this question, this paper considers the role of a central bank that does not have direct responsibility for prudential supervision. The separation of supervision from central banking is a feature of the Eurosystem[2] – the central bank system of the euro area – and of several other national central banks. The issue of whether or not banking supervision should be inside or outside the central bank and of what is the most suitable supervisory structure at the national level is not addressed in this paper.[3]

Today, the role of central banks in the pursuit of financial stability needs to be viewed in relation to monetary policy and prudential supervision. The difficulty in accurately defining this role in this "land in between" monetary policy and supervision results from the lack of a clearly established analytical and operational framework for financial stability. This paper does not attempt to be prescriptive or to make strong policy recommendations. Rather, its intention is to provide a road map for further debate on these issues.

3. The paper is organised as follows. Section II is devoted to the question of why central banks are involved in financial stability and takes a look at the relevant historical and theoretical underpinnings of this. Section III discusses the recent transformation of the financial system and its implications for the nature of future financial crises, illustrating the point with some recent examples of financial instability. Section IV attempts to clarify the position and tools of the financial stability function of central banks in relation to monetary policy and prudential supervision. Section V discusses the tools available to non-supervisory central banks to foster financial stability in the specific context of the Eurosystem. Section VI concludes the paper.

II. HISTORY AND THEORY

4. The involvement of central banks in financial stability began when they undertook the issuance of money as paper currency (i.e. banknotes), which replaced previous metallic currencies. It further developed when bank deposits grew into a substantial share of the money stock. In Europe, the model of a public central bank

[2] The Eurosystem consists of the European Central Bank (ECB) and the national central banks of the countries that have adopted the single currency.

[3] See Padoa-Schioppa (2002a), and Goodhart and Shoenmaker (1995) for a discussion of these issues.

acting as the sole issuer of legal tender was adopted in the nineteenth century.[4] In the United States it took longer, as the process only reached this conclusion in 1913 with the foundation of the Federal Reserve System. Hence, around the first quarter of the twentieth century the total money supply had become a mixture of largely fungible central bank money and commercial bank money, the former risk-free and the latter potentially risky.

The establishment of a public monopoly for the issuance of legal tender (terms such as "final", "outside", or "high-powered" money were used as the jargon became more varied over time) was essentially related to stability and efficiency needs. The US experience with a system of competing private monies, where hundreds of different banknotes issued by commercial banks circulated throughout the nineteenth century, was particularly instructive in this respect. The notes had different values depending on the creditworthiness of the issuer and, consequently, there were publicly quoted "exchange rates" between them.

The stability issue arose because the issuers of banknotes were profit-maximising commercial banks, who had incentives to print more notes than they could back with holdings of gold or silver, or with deposits of government bonds. This led to "wildcat" banks that heavily engaged in over-issuance.[5] The public's confidence was frequently abused and widespread crises periodically rocked the financial system.

The efficiency issue was due to prohibitive transaction and information costs entailed by the coexistence of many different private monies. There was no single currency that could be used everywhere. Moreover, and perhaps more importantly, the price mechanism was severely impaired, as private agents of different creditworthiness issued competing monies of equal nominal but different real value, resulting in several price-quotations for the same goods. Such a system of multiple prices was very costly and complex for vendors to manage and for consumers to compare.[6]

The subsequent establishment of the Federal Reserve System was also a response to concerns about the anti-competitive nature of private-sector clearing house arrangements that had existed before.[7] Such arrangements were private-sector solutions to some of the shortcomings of the private issuance of banknotes and have been regarded as substitutes for public intervention as they also established *de facto* prudential requirements on participating banks. However, they also tended to support an oligopolistic banking system, reducing competition and restricting entry.[8]

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4 In some countries the function was assigned to a commercial bank (e.g. in the United Kingdom), which was no longer permitted to compete with other banks in exchange for this privilege. In others, it was assigned to originally a private bank (e.g. in Sweden and Denmark) or to a new institution (e.g. in Belgium, France, Germany, Switzerland and Italy). See Capie et. al. (1994), and Goodhart (1991).

5 See e.g. Gorton (1999).

6 See Padoa-Schioppa (1994).

7 See e.g. Gorton (1999), Rolnick et. al. (1998), and Calomiris and Kahn (1996).

8 See e.g. Hirch (1977), and Rolnick et. al. (1998).

5. The view has been put forward recently that efficiency may no longer be a fundamental rationale for a public central bank, since technological developments have lowered the transaction and information costs related to private monies as compared with publicly issued legal tender. For instance, King (1999) argued that owing to developments in computing power and electronic transfers of wealth "*there is no reason* [in a world of competing private payment instruments] … *why final settlement could not be carried out by the private sector without the need for clearing through the central bank*". What I find unconvincing in this argument is its disregard for an, in my view, essential feature of a single currency (and hence of a single ultimate issuer and of a public central bank). This is the superior efficiency of a single unit of account and medium of exchange.

Greater stability – ultimately based on the need to establish "public" confidence in a currency that has no intrinsic value – remains a forceful argument in favour of the central bank solution. The many episodes of financial instability in the free banking era, even in the presence of private clearing house arrangements, have shown the limits of private sector solutions in coping with major liquidity needs in times of stress.[9] Effective liquidity support measures do not seem to be feasible without ultimate access to central bank liquidity. In particular, central bank money has proven to be the most valuable settlement medium in times of crisis, when confidence in the ability of commercial banks to meet their liabilities has faded away.

A radical criticism to the single currency/single central bank approach was advanced by Hayek (1976), who advocated a return to unregulated banking with competing private issuers of banknotes. Hayek argued that, as some historical experiences had shown, central banks did not maintain a stable value of their currencies. The tendency of public central banks to over-issue currency, historically in part motivated by the need to finance government deficits, has in recent years been addressed by increasing the independence of the central bank from treasuries, as well as improving central bank accountability for their performance by setting explicit inflation targets. In addition, Hayek's solution suffers from the same problem related to the lack of a single medium of exchange discussed above. Moreover, as Klein (1974) argued, some inherently liquid and solvent entity would have to guarantee convertibility into some other liquid asset when information about the solvency of the issuing private bank is costly to obtain.[10] A central bank is just such an entity.

6. The combination of the central bank monopoly on issuing "final" money and the participation of commercial banks in the money-creation process resulted in the involvement of central banks in financial stability. This had two main reasons.

First, central banks became the bankers' bank. Central banks facilitated the settlement of interbank payments through rediscounting of commercial bank assets and the collection of reserves (in the form of deposits). Central banks were the

[9] See e.g. Calomiris and Kahn (1996), and Rolnick et. al. (1998).

[10] Recent analysis has confirmed that the core presumption needed to support free banking is perfect and costless information. See Cavalcanti and Wallace (1999), and Williamson (1999).

bankers' banks also in the sense that, to avoid conflicts of interest, they gradually ceased serving non-banks. This configuration emerged spontaneously in Europe, while for the Federal Reserve it was instituted by law, which required it to take up the functions of providing liquidity (discount window) and payment settlement services to commercial banks. On the grounds of prudent management of their banking activities, central banks needed to evaluate the soundness of their counterparties, the commercial banks.

Second, as commercial bank money progressively developed into a large share of the total money stock, the value of money again became dependent on the creditworthiness of commercial banks. In this environment, the concern of central banks for the orderly functioning and stability of the banking system arose from the need to maintain the public goods of a stable means of payment, a unit of account and a store of value which they were asked to provide. This included lending-of-last-resort when commercial banks suffered liquidity strains. By the end of the nineteenth century, most European central banks had acted as lenders-of-last-resort, for example the Banque de France in 1882 following the collapse of Union Generale.[11] After the establishment of the Federal Reserve, the frequency of banking panics substantially decreased, in part due to the provision of occasional liquidity assistance by the new institution.[12]

7. The role of central banks in financial stability was thus part of their genetic code. It was – and, I would be inclined to say, still is – an integral part or an inseparable component of the central bank as a bank, of its monopoly on ultimate liquidity, of its role as the bankers' bank, and of commercial banks as creators of money themselves.

In Europe, central banks were not formally mandated by their charter to conduct prudential supervision.[13] These activities were just an aspect of their role in financial stability and evolved naturally during the nineteenth and early twentieth centuries until they were explicitly recognised in law.[14] In contrast, the Federal Reserve System had from the outset a formal mandate to establish effective banking supervision.

The way central banks developed a concern for the banking sector as a "system" is worthy of some further comment. Indeed, why do we speak about a banking "system" but do not refer to the steel or chemical industries, or even the insurance and securities industries, as "systems"? First, banks are interconnected through the payment system, whose essential feature is currency-specificity. It refers to the circulation of one and the same money, which is completely fungible throughout the system. Fungibility is an essential feature for the acceptance of a currency and one of the key public goods to be preserved in a monetary system. At the same time, the

11 See Capie et. al. (1994), and Goodhart (1991).
12 See Miron (1986).
13 To clarify, the term supervision is used here to cover both rule-making (regulation) and rule implementation and enforcement (supervision narrowly defined). The former consists in establishing the rules which financial institutions are required to follow, while the latter is concerned with enforcing compliance with the regulations and examining the risk exposures and management of institutions.
14 See Revell (1975), and Goodhart (1991).

common payment system links participants in a network that provides a channel for the propagation of risks. Second, banks collectively have the function of channelling liquidity to the rest of the financial sector and into the economy as a whole. In doing so they are entirely dependent on access to central bank liquidity. Third, confidence in the currency and in the central bank influences all participants in a single currency area. The financial market may remain segmented to some extent, but if liquidity needs emerge in a specific segment of the financial services industry, it is always the central bank that bears ultimate responsibility. Hence, all the answers to why the banking system is a "system" have to do with the singleness of the currency and the central bank. This also shows that – with or without formal supervisory functions – the central bank is a key part of the financial system and responsible for its smooth functioning.

8. Banking regulation was considerably tightened after the banking crises suffered in the United States and Europe in the early 1930s to include strict constraints on the composition of banks' assets and liabilities, the rationing of licenses, limits on maturity transformation, separation of commercial and investment banking, and geographical segmentation of activities. Such restrictions were later relaxed throughout the world in the vast process of liberalisation and deregulation that started in the 1970s and progressed thereafter. Administrative restrictions were increasingly replaced by less intrusive, indirect prudential standards, such as capital requirements.

Deposit insurance schemes became a key component of the arrangements put in place to foster financial stability. In the United States deposit insurance was instituted after the Great Depression, while in Europe such systems were mostly established in the 1980s or later.[15] This additional safety net to central banks' lending-of-last-resort was created to support banking sector stability (by removing incentives for depositors to join a bank run), but there was also a social concern to protect "unsophisticated" or "small" depositors.

9. In the last quarter of the last century not only did supervisory tools and practices evolve towards a more market-friendly approach, but the involvement of the central banks in financial stability was also confronted with a number of intellectual and institutional developments that challenged the paradigm shaped by the experiences of the nineteenth century and the first half of the twentieth century. Three issues deserve to be mentioned in this context.

The first issue arose from the heightened academic debate on whether banks are special or, in other words, whether any public intervention in the banking sector is justified on theoretical grounds. This justification has been found to lie in the inherent instability of the banking industry and the consequent threat to the stability of the financial system. The origin of this threat lies in the very nature of banks, and is well understood: the transformation of short-term liabilities into illiquid long-term credits.

[15] In some countries this occurred in conjunction with the implementation of Directive 94/19/EC, which requires the existence of a deposit insurance scheme and harmonises the minimum level of protection (at EUR 20 000).

As originally shown by Diamond and Dybvig (1983), banks provide liquidity insurance to depositors, but the maturity mismatch between deposits and loans makes them vulnerable to runs.[16]

It is important to stress that single bank failures are not necessarily bad. Occasional failures and exits from the industry are, and should be, part of a healthy market mechanism, even in the banking sector.[17] This is increasingly recognised by the supervisory community (e.g. in the Basel Committee's Core Principles on Banking Supervision). However, if bank failures are a result of a purely speculative behaviour by depositors, or they develop into a panic via contagion, affecting several financial institutions simultaneously, they may endanger the essential functions of the banking system, i.e. the provision of liquidity and payment services. There is ample evidence that contagion is a relevant factor and that it has been an important component in the development of financial crises (see Section III).[18]

A second issue arose from the increased concern over the moral hazard consequences of the public safety net (i.e. deposit insurance and lending-of-last-resort by central banks). "Moral hazard" was originally an insurance term, referring to a tendency of the insured to reduce the care they take to avoid insured losses.[19] In banking, the term refers to tendency to take on extra risk (increase leverage or invest in riskier assets) at the expense of the public safety net.

Obviously, completely eliminating moral hazard is not possible in the presence of a safety net. Those who argue against the safety net tend to emphasise its high cost due to moral hazard relative to its benefits. Moral hazard can be limited, however, through specific design features. Deposit insurance should be limited, leaving some creditors uninsured, permitting those creditors to exercise discipline on risk taking by bank managers.[20] In addition, other design features, such as risk-based premia and co-insurance might reduce moral hazard. As regards lending-of-last-resort, central banks have maintained and even strengthened a cautious stance towards it by adopting the policy of case-by-case discretion. They decline to specify in advance which financial institutions would be granted emergency liquidity and under which conditions. This is what Gerry Corrigan has dubbed as "constructive ambiguity". Finally, it is of central importance that deposit insurance and lending-of-last-resort be complemented by effective prudential supervision. In fact, historically, the element of insurance brought about by the lending-of-last-resort function was the major reason for developing the supervisory function in the nineteenth century.

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16 Diamond and Dybvig showed that standard deposit contracts in combination with investment in illiquid assets always create the possibility of bank runs, even if the bank in question is solvent (a "speculative bank run").

17 In the literature this is referred to as "information induced" bank runs. See Postlewaite and Vives (1987), Chari and Jagannathan (1988). Saunders and Wilson (1996) argue that most US bank runs have been of this type.

18 See, for example, Freixas and Parigi (1996) and Allen and Gale (2000a). Humphrey (1986), using data from the private US clearing house CHIPS, found that roughly a third of participants would default after the failure of one major participant. Less dramatic results were found by Angelini et. al. (1996) for an Italian netting system.

19 The pioneering work on moral hazard was carried out by Ross (1973). The first formal paper on this problem was by Mirlees (1974).

20 See Gropp and Vesala (2001).

A third and final issue is the trend towards a separation of prudential supervision from central banks. The following arguments have been advanced in favour of separation: (i) conflicts of interest when combining the two responsibilities; (ii) a concentration of power in a central bank endowed with a highly independent status; and (iii) conglomeration and the blurring of the boundaries between different financial products, calling for close interplay between banking, insurance, and securities supervision. The last two arguments are interrelated as concentration of power in an independent institution would be a particular problem if, in addition to maintaining price stability, it were to be entrusted with the supervision not only of banks but also of non-bank financial institutions.

There is no conclusive theoretical or empirical research to back these arguments in favour of separation, nor any pointing to a single optimal model for supervision.[21] The issue of a possible conflict between price stability and financial stability is further addressed in Section IV. As regards the relevance of power concentration, mechanisms of checks and balances and procedures to ensure accountability are in place for central banks, as for other public bodies. The beneficial operational independence of central banks from political pressure should not be equated to a lack of accountability. In any case, a development in many countries has been the creation of stand-alone supervisory authorities outside of central banks.[22]

10. In the academic debate, and at times in practice, alternative solutions to the safety net arrangements have been considered in order to remove the inherent instability of banking. One consists of introducing new restrictions on banking to eradicate the very source of risk. An early formulation of this idea is the suggestion, put forward by Friedman (1960), of "100% per cent reserve" banking, which has been supported by, for example, Tobin (1985).[23] A more recent formulation, by Merton and Bodie (1993), argues in favour of a "narrow banking" model. The idea is to restrict banks to holding only liquid and safe assets, thus separating the maturity transformation and the liquidity provision functions of banks. As a result, depositors would lose any incentive to start a run even if they had negative information. I rather share the view of those who argue that a renewed restriction of the banking business, one that would force it back to the "narrowness" from which it started, would damage the economy by depriving it of the fundamental benefits obtained from modern banking.[24] A risk would be removed, but at the cost of a substantial efficiency losses. Without cars, the risk of car accidents would fall to zero, but is that what we want?

Another idea, which has received some support, is to suspend the convertibility of bank deposits into cash in periods of crisis. Seen as a solution to the fragility of the banking sector, suspension has been sometimes used by public authorities as a tool to

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21 See Padoa-Schioppa (2002a) for a more detailed discussion.

22 This development has occurred in Denmark, Sweden and Canada and, more recently, in the United Kingdom, Australia, South Korea and Japan.

23 This idea is certainly not new and it can even be traced back to Fisher and Simons' writings in the 1930s.

24 According to Wallace (1996), narrow banking limits the ability of the banking sector to transform savings into investments. Kashyap et. al. (1999) argue that the benefits of a bank intermediation would disappear, since narrow banking would break the synergies between providing liquidity on both sides of the balance sheet.

"buy time" (most recently in Argentina).[25] Here again, however, I would share the views of those who think that suspending convertibility has more drawbacks than advantages. Not only are its legal foundations unclear, but its effectiveness as a real solution has been shown to be limited.[26] Ultimately, confidence is unlikely to be supported by the statutory possibility, and the actual use, of the suspension of such a crucial obligation as the repayment of what is, for good reason, called a demand deposit.

11. Considering the historical development of supervisory structures, including the transfer of supervisory responsibilities to a stand-alone entity, and the academic debate reviewed above, the question arises of whether the special role for central banks in financial stability remains in place.

A factor supporting the role of central banks in financial stability is the inadequacy of deposit insurance when it comes to maintaining financial stability. Deposit insurance prevents "small" depositors from losing faith in their bank, but today the bulk of bank liabilities are held by uninsured creditors, i.e. other banks and financial firms. In the euro area, for example, interbank liabilities account, on average, for around one-third of total bank liabilities, and they consist for the most part (around 70%) of non-collateralised deposits (source: ECB). If a bank defaults on its obligation, its failure could spread to other banks and lead to other defaults. Experience has shown that, among uninsured counterparties, rumours may trigger fear and fear may spread, even in circumstances in which the bank in question is sound and solvent. Panic is not a disease of small depositors only. Thus, as deposit insurance does not provide a safeguard against this disease and its contagion, there is a need for central banks to stabilise the banking system.

In certain circumstances, wholesale markets themselves are susceptible to a liquidity crisis leading to systemic risks. In principle, contrary to retail depositors, banks and other corporate counterparties have the incentive and capability to monitor banks in order to avoid large and risky exposures ("peer monitoring"). This argument has been used to assert that solvent but illiquid institutions would always be able to obtain funding from the market and the central bank should only care about the overall liquidity situation.[27] The latter is, indeed, the foremost aspect of central bank involvement in the prevention of market disruption. However, the need on rare occasions to provide liquidity to individual illiquid institutions cannot be excluded. The possibility of an interbank market failure would justify central bank intervention.[28]

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[25] Wallace (1990) and Diamond and Dybvig (1983) argue that in a bank run situation, a bank should announce a suspension of convertibility. In this way, a solvent bank protects its assets from undesirable runs and ensures that it can fulfil its liabilities later on.

[26] See Engineer (1989) or Qi (1994) for theoretical arguments against the suspension of convertibility.

[27] See, for example, Goodfriend and King (1988).

[28] See Rochet and Tirole (1996) for an analysis showing the possibility of such a market failure. In addition, Flannery (1996) shows that high uncertainty associated with a crisis makes it more difficult for banks to estimate counterparty credit risk, and this may cause them to withdraw from the interbank market altogether.

A form of involvement of central banks which carries fewer moral hazard implications than the provision of liquidity consists of the central bank acting as a co-ordinator to facilitate private sector solutions. Even when a market-based solution is possible on the basis of private sector interest in avoiding a liquidity crisis or a gridlock situation, private parties may not be able to reach a solution because of a lack of information or co-ordination. The recent rescue package co-ordinated by the Federal Reserve Bank of New York to prevent the LTCM hedge fund from collapsing is a telling example of public intervention being used to achieve a private solution.

The rationale for and effectiveness of the role played by central banks also derive from the fact that they have the special expertise, information and tools necessary to perform co-ordination and liquidity support functions. Central banks have been confronted for two centuries with the problem of distinguishing between illiquid and insolvent institutions. Moreover, to avoid destroying incentives for banks to monitor each other and to limit moral hazard, a consensus seems to exist that liquidity assistance should be given only to prevent systemic problems and only to the smallest possible degree.

12. To summarise, there is strong empirical and theoretical evidence that, at times, public intervention may be needed to ensure financial stability. Banking is plagued by inherent instability, which cannot be removed if the economic benefits of banking are to be realised. Moreover, the banking sector functions as a closely inter-linked "system", which is prone to contagion risks though the payment system and interbank markets. The involvement of central banks in financial stability originates from their role as issuers of money. Central banks – like any soundly managed financial institutions – need to monitor the quality of their counterparties. This is in addition to the role of central banks as ultimate providers of a safe settlement medium and liquidity to ensure the orderly functioning of the financial system.[29] Finally, it is important to recognise that these two special reasons why central banks are involved in financial stability are independent of whether or not they have formal supervisory functions.

III. RECENT EXPERIENCES

13. So far, we have established the historical and theoretical origins of the role of central banks in financial stability. Indeed, many central banks were established to serve as bulwarks against chronic episodes of financial instability that were the disease of the previous "free banking era". However, the financial system has not been immune to instability, in particular once the highly restrictive and efficiency-absorbing regulations introduced after the Great Depression were dismantled to improve the capital and risk allocation processes in the economy. Moreover, the

[29] There seems to be evidence that a properly implemented liquidity support function of a central bank, accompanied by sufficiently stringent supervision, has a positive effect on financial stability. See Miron (1986).

nature of potential financial instability may have already taken new forms as a consequence of the ongoing transformation of the financial system. This transformation also has important consequences for the involvement of central banks in financial stability and the policies best suited to preserving it.

Hence, the transformation of the financial system affects the type of financial instabilities we could face. In order to illustrate this point, this Section will examine a number of crises, which have occurred since the liberalisation process, grouping them into "old" and "new" as affected by the changes in the financial system. The use of the labels "old" and "new" is an expositional devise used in order to shed light on relevant developments. My intention is not to say that the more traditional sources of financial instability (such as credit risks related to financial cycles) have become less relevant, but rather that the transformation of the financial system has brought about additional concerns. While the basic trend in the transformation of the financial system can be seen as global, it has occurred in different parts of the world at different speeds. For this reason, a chronological review of the episodes of financial instability is not fully appropriate for the purposes of this paper.

14. In order to appreciate the changes in the financial system and their effect on the potential for financial instability, I shall consider first a stylised description of what could be labelled as the "old" financial system.

The "old" system was characterised by separation in four respects.[30] First, there was separation between financial institutions and financial markets (equity, bond and derivatives markets). The exposure of financial institutions to market volatility was limited, as they largely focussed on the transformation of deposits into illiquid loans. Second, there was strict separation between the three main categories of financial institution (banks, insurance companies and other non-bank financial institutions, such as securities houses), as well as between their products. Non-negotiable bank loans, insurance policies and negotiable securities provided completely distinct ways of allocating savings and risks. Third, the separation between markets and financial institutions, as well as between different types of financial institution, was reflected in the regulatory and supervisory structure. The oversight of markets was conducted by a separate entity from the one supervising financial institutions, and banks faced a different supervisor to insurance companies. Fourth, domestic financial systems tended to be insulated from one another, through restrictions on cross-border competition and capital flows and still relatively weakly developed links between financial systems.

Such a system was susceptible to the type of crisis illustrated by the system-wide crisis in Latin America (early 1980s), the US Savings&Loans crisis (early 1980s), and the three Scandinavian banking crises (early 1990s).[31] These kind of crises also took place in several emerging and developing countries in the 1990s, such as in

[30] See Padoa-Schioppa (2002b).

[31] See, for example, Goodhart et. al. (1998), Drees and Parsabasioglu (1998) (Scandinavian crises), and White (1991) (US S&L crisis).

Brazil 1994, and in South-East Asia in 1997-98 (Thailand, Korea, and the Philippines). In some cases, the crisis was confined to a small number of institutions or to individual institutions (such as in Europe: Banesto in 1993, Credit Lyonnais in 1994 and the banks in southern Italy in the mid to late 1990s).

In Latin America, a banking crisis followed in the wake of the debt crisis of the early 1980s, which resulted from the previous rapid accumulation of debt, significantly on the basis of credit granted by US banks. Argentina, Chile and Mexico had a full-blown crisis in 1980-82. In Argentina 9% of loans were non-performing in 1980 (30% in 1985) and 168 banks were closed. In Chile, 19% of loans were non-performing in 1983 and the authorities intervened in 13 banks. In Mexico, the government had to take over the troubled banking sector in 1982. The US Savings&Loans crisis had its origins in the rapid increase in nominal interest rates resulting from inflation and in the increasing spread between market interest rates and the interest rate ceilings on deposits in S&L institutions. As a result, many institutions lost their net worth during late 1970s and early 1980s and subsequently engaged in excessive risk taking ("gambling for resurrection"). Finally, the Scandinavian banking crises were a consequence of very rapid credit expansion, made possible by the deregulation of foreign capital inflows and restrictions on banks' assets, which dangerously propped-up asset prices and the indebtedness of the domestic non-financial sectors. Credit was often denominated in foreign currencies, which resulted in unhedged foreign exchange risk positions. The level of non-performing loans was highest in Finland, reaching 13% of total loans in 1992.

All in all, these crises followed a fairly consistent (although not necessarily predictable) pattern involving deregulation, lending boom, asset price rises (in particular real estate prices), business cycle and asset price shocks followed by large scale bank failures. Even more importantly, they did not involve financial markets – they affected banks, rather than non-bank financial institutions. Financial instability generally resulted from credit risks and remained national in scope. The risk management and supervisory practices of banks were inadequate to cope with traditional banking risks in the new environment after liberalisation. All these vulnerabilities generally resulted in a crisis following some additional external shock. In the case of Norway and the US S&L crisis, the external shock was the steep decline in oil prices in 1986; in Finland it was the dissolution of the Soviet Union in the late 1980s; and in Sweden it was the ERM crisis of 1992.

The pattern of crisis resolution in different countries was also rather similar, not least in that the role of central banks was relatively limited in comparison with the role of the government and its agencies.[32] While in most cases some initial liquidity support or bridging loans were provided, it was often clear from the outset that the problem was insolvency rather than illiquidity. However, the success of the crisis-resolution varied. For instance, Argentina's crisis in the early 1980s resulted in high

[32] First, governments typically gave a blanket guarantee that all banks would meet their obligations. Second, insolvent banks were either temporarily nationalised or forcibly merged, with "bad loans" being transferred to a state agency. See, for example for Sweden, Englund (1999), and Ingves and Lind (1996).

inflation and disintermediation, whereas Chile's led to a strengthened financial system.

15. While we should be under no illusion that the "old" type of financial distress will not re-occur in the future, one could argue that the "new" financial system brings to prominence new potential sources of financial instability. Such recent changes in the financial system might be summarised by the breakdown in the separations of the "old" system. The first and second separations, between financial institutions and markets and between the three traditional sectors of finance, have been replaced by an increasing integration of markets with banks, and of banks with other financial institutions. This integration has come about through the search for more flexible and effective ways to transform savings into investments. Securitisation and the development of credit risk transfer instruments is one important aspect of this development as it allows the re-allocation of credit risk to the agents best capable of bearing the risk. Such market developments may also be seen partly as a market response to the previous crises in order to allow for better risk diversification. For instance, the Latin American crises acted as a boost to the development of the secondary markets for credit instruments.

These developments also led to corresponding changes in the supervisory structures, breaking down the third separation. Many countries have integrated the supervision of different financial institutions and have switched from strict "command and control" to incentive-based supervision (supporting the development of risk management practices), and increasingly rely on international co-operation. These goals are central, for instance, in the current revision of the capital adequacy rules for banks by the Basel Committee on Banking Supervision.

Fourth, these developments have been accompanied by an increasing internationalisation of the financial system. Capital controls and restrictions on cross-border banking operations have largely been eliminated. National markets can no longer be viewed as isolated entities, but tend to be embedded in a complex system of interlinkages, which calls for close international co-operation. In fact, the Basel Committee was established after the first major international crisis – the Herstatt crisis in 1974.

Four important "new" potential sources of disturbances can be identified that are closely related to this changed environment. First, a rapid increase in banks' financial market-related activities has heightened their exposure to financial markets, suggesting that financial instability may result from market instability. Second, the greater prominence of markets has implied that systemic risk may emanate also from non-bank financial institutions, should the banking system and the liquidity redistribution function be affected though an exposure to these institutions. Third, liquidity conditions and contagion risks may play an increasingly important role. Whereas in tranquil times the liquidity of markets may have increased and institutions' access to liquidity improved, this liquidity has a tendency to dry up rapidly during a crisis. Fourth, large value payments traffic has grown exponentially

and clearing and settlement systems, operating under the principle of net settlement, have emerged outside central banks, which has increased payment system-related risks. The following paragraphs will examine in more detail these changes in the light of the crises we have already witnessed.

16. The origin of the increased exposures of banks to financial market developments is that private capital markets and the associated derivatives markets have substantially deepened over the years, stimulated by many structural factors which have boosted investment in marketable instruments. These factors include increased household wealth, a consequent propensity to invest in securities, and the development of supplementary pension schemes. For example, in the euro area the share of direct or indirect (via collective investment schemes) securities holdings in households' assets is already considerably above the share of deposits. These demand-side developments have opened up opportunities for firms to diversify funding sources, to reduce funding costs by issuing securities, and to finance corporate restructuring from capital markets.[33]

Banks have been able to exploit their extensive retail distribution networks to reach investors, in particular in Europe, offering a full range of mutual funds and brokerage services. Many European banks have also developed strong investment banking services; some major euro area banks now act as global investment banks in competition with, in particular, US investment banks. Banks may also have significant trading activities of their own. This growth in securities-related activities boosted non-interest income (from fees and commissions) and profits euro area banks as the market conditions were very favourable until the middle of 2000.[34] In 2000, i.e. before the stock market fall, consolidated non-interest income already accounted for 57% of the total net income of the 50 largest euro area banks (in 1995 the share was below 30%).

Barings is a good illustration of the risks to banks stemming from financial markets. It also highlights the importance of reaching a decision on the systemic nature of a bank failure in an extremely short period of time.[35] On the afternoon of Friday 24 February 1995, Barings' senior management notified the Bank of England that its securities subsidiary in Singapore had made large losses in Japanese financial markets. Barings requested the Bank of England's support in winding down its activities. The decision on whether or not to support Barings had to be made by the time trading started in Japan on the Monday morning local time, since insolvent institutions are not allowed to trade. The decision not to start a rescue, but instead to invite takeover bids from parties with a potential interest in seeing Barings continue as a going concern, was founded on the assessment that a failure of Barings would not

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33 Between 1995 and 2000, i.e. before the recent market turmoil, capital market transactions by companies in the euro area increased substantially. In this period bond issuance grew at its fastest rate ever, resulting in issue volumes growing by a factor of 10 over the period, and the boom continued through 2001.

34 The ECB (2000a) highlights a longer-term trend towards an increased share of non-interest income for EU banks.

35 See Board of Banking Supervisors (1995).

pose a systemic risk to the UK or global financial system. While no direct support was provided, the Bank of England announced a willingness to provide liquidity to the UK banking system as a whole in order to smooth out the repercussions of the failure.

17. The risks related to non-bank financial institutions are illustrated by the two failures of Japanese securities houses in 1997. The first, the failure of Sanyo, occurred in November 1997. Sanyo was a medium sized securities house with client assets of JPY 2.7 trillion. Initially, the Bank of Japan assessed the failure as having few systemic implications. However, when Sanyo defaulted on its unsecured money market obligations, although the amount was relatively small, there was a substantial negative impact on overall liquidity in the interbank market. The Bank of Japan was eventually forced to inject liquidity into banks via the purchase of eligible bills, repos and bilateral lending against collateral. The second case occurred three weeks later and was similar, albeit more serious. It involved Yamaichi Securities, the fourth largest securities house in Japan with client assets in excess of JPY 22 trillion. No doubt due to the lessons learnt in the Sanyo case, Yamaichi was allowed to continue in operation to settle its existing contracts. The authorities were also faced with the difficult question of whether the Bank of Japan would be permitted to provide direct emergency liquidity to the company, which in the end it did.[36]

Systemic concerns in relation to non-bank financial institutions have been linked with concern about the impact on the banking sector. Another issue is whether the failure of an independent securities firm could by itself be a source of risk to financial stability if banks are not affected. Here my conclusion would be negative. I would maintain the traditional view that financial stability could be at stake only insofar as shocks transmit to the banking sector. A common observation concerning the episodes of turbulence over the past decade or so is that difficulties assumed systemic relevance only when the banking system and the liquidity re-distribution mechanism were hit. When it occurred outside the banking system, turbulence could be managed as long as banks were in a position to support the liquidity needs of other intermediaries.

18. In the two Japanese cases, financial distress spread through money markets. The interbank links were also the source of concern in the United Kingdom's "small bank crisis" in 1991-92.[37] Foreign banks in particular, growing increasingly concerned about the UK property price decline, reduced their exposure to UK banks. The Bank of England used its close ties to financial markets and the large clearing banks to acquire quantitative and qualitative information about the affected banks to assess the likelihood of a systemic impact. At first, some failures were tolerated, but it became apparent that many simultaneous failures of small banks could have a major systemic

[36] See Nakaso (2001) for further details.

[37] While the main business of the affected banks consisted of retail lending, most of the banks were heavily reliant on wholesale funding. Their capital ratios were exceedingly high; the median capital ratio of the banks that would subsequently fail was 26%. Nevertheless, the recession of the early 1990s and declining property prices resulted in high pressure on these banks. See Logan (2001).

impact. When the National Mortgage Bank and some other banks ran into a liquidity crisis in late 1991, the Bank of England decided to provide emergency liquidity assistance.

Continental Illinois (the seventh largest US bank at the time of its failure in 1984) was another early example of a similar liquidity crisis due to an outflow of wholesale deposits.[38] A run by such depositors was caused by rumours that the bank would fail because of its Mexican exposures. Public support operations, involving the central bank and the deposit insurance agency, were initiated due to Continental's size and function as a money centre bank. Like in the "small bank crisis", the underlying problem was illiquidity rather than insolvency.[39]

The failure of the Drexel Burnham Lambert Group and the market for lower-grade bonds in late 1980s, and the market for perpetual floating rate notes in the mid-1980s were early illustrations of the importance of market liquidity outside interbank money markets.[40] Meanwhile, the Russia/LTCM crisis of 1998 demonstrated that it is not just relatively specialised markets with a concentrated structure that are subject to abrupt declines in liquidity, even though perhaps they are more likely to be so. These crises resulted in a substantial decline in liquidity in global corporate and emerging country bond markets. Moreover, the LTCM incidence highlighted the risk that a disorderly failure of a major securities market player could severely depress prices in illiquid markets and lead to contagion via market prices. Prices could fall to a point where other institutions holding important risk concentrations in the same markets would also incur major losses.[41]

All in all, these episodes point to three major conclusions. First, while runs by retail depositors may have become a rare event and are effectively prevented by deposit insurance, runs by wholesale depositors (other banks or firms) may be relatively more important than before. Second, financial market liquidity has gained substantially in importance. The deepening of the markets has improved the ability of banks to access funds in normal times, but liquidity may be more prone to dry up when it is most needed. Third, contagion risk via interbank money markets as well as other financial markets has become a substantial component of the overall risk environment surrounding a bank.

19. Finally, increased payment system risks are mainly related to three factors: the increases in the sheer volume of transactions, structural changes in the systems, and

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[38] One of the triggers of this crisis was the earlier failure of Penn Square in 1982. The authorities had adopted a "pay-out" strategy, which implied that all creditors apart from insured depositors would lose their money. The heightened concerns of depositors resulting from this and Continental's aggressive growth increasingly led to funding problems from wholesale deposits, upon which it relied.

[39] In fact, at the time of its closure, Continental Illinois' net worth was over $2 billion. See FDIC (1998), Wall and Peterson (1990), and Jayanti and Whyte (1996).

[40] As liquidity in the secondary market for low-grade bonds suddenly deteriorated following rumours about a change in regulations which would have greatly reduced the attractiveness of the market, Drexel found it difficult to manage its liquidity through asset sales or collateralised loans. See Allen and Herring (2001).

[41] In the LTCM case, financial stability concerns were perhaps related more to this type of contagion than to traditional credit exposures of banks to LTCM through money market instruments and other lending. This can be inferred from the statements made at the time by Fed Chairman Alan Greenspan and President McDonough.

increased cross-border financial activity. As financial market transactions have skyrocketed, payment volumes have increased dramatically. In 2001, the combined average daily turnover of the two largest US systems, Fedwire and CHIPS, exceeded USD 2.8 billion. The relatively new European system, TARGET, now processes around EUR 1.6 billion per day, three times the amount that all large-value payment systems in the 12 euro area countries processed together in 1990.

In order to cope with the increased payment volumes, private systems for the settlement of payments have emerged, such as CHIPS in the 1970s, a private US clearing house that settles on a multilateral netting basis. In a multilateral netting system, commitments to transfer funds at settlement time usually accumulate during the day and each participant transfers only its multilateral net position vis-à-vis all the other participants at the end of the day. This implies, however, that each participating bank extends intraday credit to the other participants and thus runs settlement risks (with regard to both credit and liquidity risks) vis-à-vis other participant in the payment system (not necessarily only its trading counterparties). The standards developed by central banks (see Section V) for large-value netting systems constitute measures which enable the systems to withstand the failure of the largest participant and to settle on the same day even in such circumstances. In addition, central banks all over the world have put in place gross settlement systems, providing real-time finality of payments, thus eliminating counterparty risk between participants.

Increased cross-border financial activity has led to dramatic growth in foreign exchange trading. The settlement of foreign exchange (FX) transactions typically involves a principal risk because one party might pay out the currency it has sold before receiving the currency it has bought. The settlement of the two legs of FX transactions occurs in two different payment systems, often operating in different time zones. The potential systemic implications of FX settlement risk surfaced for the first time when a German bank, Bankhaus Herstatt, failed in 1974. Herstatt was heavily involved in FX transactions. When the German authorities closed Herstatt, it had very large amounts of outstanding intraday debt, especially vis-à-vis its US counterparties, who because of the time difference had already irrevocably paid Deutsche Mark to Herstatt, but had not yet received the corresponding US dollars. The liquidity losses in the American markets were so large that liquidity assistance became necessary. Ever since, central banks have been concerned about the risks to financial stability coming from the payment system. Nevertheless it took 28 years after the Herstatt event for FX settlement risk to be fundamentally addressed through the new CLS bank, a settlement arrangement that ensures that the final transfer of one currency occurs if and only if the final transfer of the other currency occurs.

The tragic events of 11 September of last year have drawn renewed attention to the vulnerability of the financial system, and of payment and settlement systems, to operational risks. In 1985, pure operational risk (software disruption) at the Bank of New York caused a major payment system problem, which had to be addressed by the Federal Reserve Bank of New York. In September last year, among many factors, the telephone system, a major communications tool in the transfer of payments, was

severely disrupted in the lower Manhattan district. As a consequence, many banks were unable to execute payments to each other via Fedwire, and liquidity became extremely scarce.[42] At the same time, the Bank of New York, a dominant player in the settlement of US government bonds with several offices located in and around the World Trade Centre, was unable to continue operations. Because it was not sending out securities, liquidity accumulated in the accounts of the Bank of New York, causing further disruptions to the payment system. To avoid a major liquidity crisis, the Federal Reserve injected vast amounts of liquidity, first through discount window lending and later through market operations.

20. To summarise, I would argue that the episodes reviewed in this Section clearly point to the important role played by central banks in safeguarding financial stability. This is in particular due to the increased concerns about liquidity, contagion and payment systems. To be more precise, this relates to the more recent history of central banks, while Section II showed that central banks were originally put in place to protect against the fragility and risks to the functioning of the interbank markets and payment systems of the "free banking" era. Recent changes seem to have reinforced, rather than weakened, the original role of central banks as ultimate providers of liquidity to facilitate orderly market conditions and, if needed for financial stability, to neutralise threats of liquidity shortages, which could lead to systemic risk.

IV. BORDERS AND SYNERGIES

21. The preceding two Sections surveyed the role played by central banks in the preservation of financial stability in the past. They showed that this role is rooted in the very origin of central banks, confirmed by their long history and based on solid theoretical arguments. They continued to play this role in the last quarter of the twentieth century through the episodes of financial instability that plagued several countries.

This same recent period, however, has also seen the emergence of an institutional architecture combining three elements that had not previously been present or prominent in the arrangements of most countries. The three elements are: (i) a clear mandate for monetary policy to have price stability as its primary objective, (ii) the statutory independence of the central bank and (iii) the entrustment of banking supervisory tasks to an agency separate from the central bank. The emergence of this architecture has somewhat modified the inherited intellectual and institutional paradigm, although it has not, in my view, overturned the heavy practical and theoretical arguments behind the past record of central bank involvement in financial stability. Indeed, many central banks – including the Eurosystem – have an explicit reference to financial stability inscribed in their statutes. Recent work by BIS shows that even those central banks that do not have an explicit mandate consider the pursuit

[42] See McAndrews and Potter (2002).

of systemic stability and the stability of the payment and settlement systems as one of their key duties.[43]

Today, the role of central banks in the pursuit of financial stability needs to be viewed in relation to "ordinary" monetary policy and "ordinary" prudential supervision. The difficulty in accurately defining this role results from the lack of a clearly established analytical and operational framework for financial stability. This is in contrast to the clear terms of reference available for both monetary policy and prudential supervision. In the case of monetary policy, we can rely on a large body of academic research and a clearly defined framework with measurable objectives and tools. Furthermore, we can rely on established decision-making procedures and communication protocols. For prudential supervision, which had long been neglected by academic research and left to practitioners and legal experts, Section II discussed some of the important contributions, which, during the last two decades, have laid the foundation for a more rigorous understanding of its rationale and tools.

This Section makes an attempt to clarify the position and tools of the financial stability function of central banks in relation to monetary policy and prudential supervision. It shows the boundaries as well as the interrelations between the three areas, although it does not have the ambition to be comprehensive or to give precise policy prescriptions. The Section concentrates on offering some elements to draw a road map for exploring the subject further. After defining financial stability and outlining the tools and actions that are related to it, I will discuss the interplay and overlap of such actions with monetary policy and prudential supervision.

22. It is useful to start with a working definition of financial stability. It is striking that although a number of central banks publish financial stability reports regularly, they tend either to avoid the question of how to define financial stability entirely (e.g. the Bank of England) or to explicitly acknowledge the elusiveness of a consistent definition (e.g. the Austrian National Bank). In general, the concept of financial stability typically refers to the preservation of the core economic functions of the financial system in channelling savings into investments and providing for an efficient and safe payment mechanism. Along these lines, I would suggest defining financial stability as 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. In the jargon of my early years in central banking, this function used to be labelled as maintaining "orderly conditions" in the financial system.

The definition immediately raises the question of the scope of the financial system. In this paper, I define the boundaries of the financial system broadly, encompassing all financial intermediaries and markets, as well as market infrastructures and the regulatory system governing it. This definition permits a broad view of the ways in which savings are channelled towards investment opportunities,

[43] When there is no explicit mandate, the legal basis for central bank responsibility for financial stability is often found in interpretations of central bank law, or sometimes banking law.

as well as the associated mechanisms for risk sharing among economic agents. We are ultimately concerned with the functioning of the financial system as a whole, and with the stability of single financial institutions only insofar as they have implications for the stability of the financial system as a whole. It should be noted that this approach does not deny or disregard the importance of non-financial sector imbalances (corporate and household sector leverage, for instance) and asset prices for the robustness of the financial system. As previous financial tensions and crises amply demonstrate, such imbalances often preceded and indeed caused financial crises, although they did not always do so. A forward-looking assessment of financial stability cannot avoid these issues.

23. In order to clarify the tools available for the pursuit of financial stability, it may help to start from a list of tools that – irrespective of the institution to which they are assigned – may play a role in this regard.[44] Table 1 relates such tools to price stability and financial stability. It further distinguishes the channel through which we aim to achieve financial stability, through measures immediately affecting the stability of the system as a whole or through measures which in the first instance are aimed at ensuring the stability of individual financial institutions, with the ultimate aim of systemic stability. In order to highlight a "pure central bank perspective" of financial stability, a situation is assumed in which the agency in charge of prudential supervision is not the central bank, but note that the analysis of the policy instruments as such is quite independent of the specific institutional arrangements. The table is intended to be descriptive, rather than normative, in the sense that it sets out to illustrate conceivable approaches, rather than to make policy prescriptions.

[44] The term "tool" here refers broadly to the possible actions and procedures available to competent public authorities.

Table 1. Tools for maintaining price and financial stability

	Tool	Price stability	Financial stability	
			System-wide	Individual institutions
1.	Monetary policy strategy	××	×	
2.	Short-term interest rates	××	×	
3.	Market operations	××	×	
4.	Payment systems		××	
5.	Public and private comments	××	⊗	⊗
6.	Emergency liquidity support		××	××
7.	Crisis co-ordination		⊗	⊗⊗
8.	Prudential regulation		O	OO
9.	Prudential supervision		O	OO
10.	Deposit insurance		O	OO

Legend: two symbols (e.g. ××) = primary use of the tool; one symbol (e.g. ×) = additional use of the tool; × = tool of a central bank without supervisory powers; O = tool in the hands of an authority other than the central bank; ⊗ tool available for both.

When composing such a table, one is faced with the problem that it attempts to be precise on an issue in which precision has proven to be quite elusive. Further, it seems quite difficult to avoid putting together diverse and heterogeneous things such as institutions (central bank, supervisory authority), policy tools (interest rates, market operations etc.) and operational arrangements (deposit insurance). Nevertheless, I believe the table will prove this very heterogeneity to be indispensable in providing a comprehensive framework for the definition of the role of central banks in financial stability and in defining the boundaries of this role.

The first three lines on monetary policy (monetary policy strategy, and short-term interest rates or market operations, depending on operational framework), combined with commenting (either to the public at large or, in private, to financial institutions or other authorities) relate to central bank actions aiming at achieving price stability. At the same time, prudential regulation, supervision and deposit insurance, while ultimately concerned with financial stability, influence the behaviour of individual institutions.[45] That leaves four tools in the "land in between": payment systems (operation and standards); the crisis management measures of emergency liquidity support and co-ordination of private sector solutions; and, again, public and private comments. These entries represent the tools available to a central bank without explicit supervisory duties to contribute to financial stability. Thus, these tools facilitate the role of central banks in financial stability fundamentally rooted in the two aspects previously highlighted of being the bankers' bank and ultimate provider of liquidity. In order to clarify my terminology, I use the term emergency liquidity

[45] One has to be quite careful here: the stability of individual banks is not an objective of either central banks or supervisors, if a bank failure has no systemic implications. Nevertheless, the supervision of individual banks clearly serves the objective of the stability of the financial system as a whole, but at the same time, while necessary, is not sufficient to achieve the ultimate goal of overall financial stability.

support here to include the tools of supporting liquidity in the financial system as a whole (through market operations) and emergency liquidity assistance to individual banks.[46] Finally, the table reflects the fact that financial stability considerations are taken into account when designing the monetary policy strategy, the payment system, and the regulatory, supervisory and crisis management frameworks.

A potential conflict between price stability and financial stability is immediately obvious from Table 1. Equally obvious is the need for close co-operation in financial stability activities with bank supervisors, regulators and deposit insurers, irrespective of whether they are inside or outside the central bank. The potential for conflict with price stability arises from the overlap in tools: short-term interest rates and market operations could conceivably be used to accomplish both price stability and financial stability. Similarly, the need for co-ordination with supervisors and deposit insurers arises from the fact that they ultimately pursue financial stability, albeit using different tools.

I will discuss the specific features of the different tools in Section V, which also permits particular references to the euro area context. Here, I would like to focus on further defining the boundaries of the financial stability function in relation to price stability and the functions addressing the stability of individual financial institutions.

24. Consider first the potential conflict between price stability and financial stability. Such a conflict would emerge if there were circumstances in which the monetary policy stance (as reflected in short-term interest rates and market operations) needed to maintain price stability harmed the stability of the financial system. It would also emerge if there were circumstances in which the price stability objective prevented the central bank from dealing appropriately with financial instability.

A very forceful argument supporting the view that such a conflict is unlikely to exist is that the absence of stable prices is a major threat to financial stability. Let me consider inflation first. When price inflation develops, misperceptions among economic agents about the current state of the economy and the level of future returns are likely to spread, and unproductive lending will increase, because inflation makes it a more complex task for lenders to discern the quality of individual borrowers and investment projects. Turning to deflation, financial crises may have been caused, as some observers have suggested, by deflationary pressures not sufficiently combated by central banks through the supply of the necessary liquidity.[47] Indeed, deflation tends to trigger a vicious circle of an increasing real value of debt which leads to further defaults. Overall, there is little doubt that price stability supports sound investment and sustainable growth, which in turn is conducive to financial stability.[48] The suggestion that large price movements can cause financial instability is supported by evidence from major financial crises. Thus, situations in which the conflict could

[46] I.e. injection of tax payers' money by the government is outside the scope of the considerations here.
[47] See e.g. Schwartz (1995), and Bordo and Wheelock (1998).
[48] See Schwartz (1995).

arise are likely to be rare in practice, as the fragility of banks and their counterparties tends to occur in conditions marked by downside risks to price stability.

25. Having said this, it would be too simplistic to close the issue here and to rely, without any further reflection on the reassuring proposition that price and financial stability cannot and do not ever conflict. A few considerations make me unsatisfied with this perfunctory conclusion

First, in point of fact, significant episodes of financial crises – or situations that could have easily led to crises – in the last two or three decades took place in a context in which general price stability was not gravely missing. For example, the Japanese banking problems started to emerge in the early 1990s, resulting from a lending-asset price cycle that took place despite low inflation. Moreover, individual failures (e.g. BCCI, Barings, Credit Lyonnais, Yamaichi), irrespective of whether or not they had systemic repercussions, have occurred in the presence of price stability. The example of Japan might be useful to illustrate this in more detail. Even though it is always easier to comment ex post than making policy on the spot, one could consider that in the late 1980s monetary policy lacked a sufficient degree of forward-looking elements with respect to domestic inflation. In 1988, current inflation in Japan was low, but double-digit money supply growth rates and booming real estate and equity prices helped to fuel the bubble. The short-term inflation forecast might have been very benign, but a more forward-looking strategy would have considered the risks for the variance of inflation stemming from the strong growth in the money supply. A tighter monetary policy, thereby accepting for a short period a lower inflation rate than normally desirable, would (most likely) have been an appropriate response.

Might the last six to seven years of US monetary history eventually turn out to be another example? The final verdict is still outstanding. Should the Fed have raised the federal funds rate more aggressively between early 1999 and May 2000 in order to increase the likelihood of bursting what now appears to have been a bubble?[49] In that case, the Fed would have had to accept a lower inflation rate than originally targeted until the bubble had burst. Would the US economy and thus the world economy be in a better shape today? Honestly, I don't know, but as a central banker I am forced to contemplate the possibility.

Recently, some authors have argued that short-sighted (myopic) expectations are more likely to lead to a deterioration in financial stability in times of low and stable inflation.[50] This is a view I would not share. However, the historical evidence does not support the belief that an environment of stable prices relegates financial instability to such a low order of importance as to be ignored by the central bank. While conducive to financial stability, price stability may not be sufficient in itself to maintain financial stability. Price stability is a necessary but not a sufficient condition for financial stability.

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[49] The Fed increased interest rates by 175 basis points from 4.75% to 6.50% during the period.
[50] See Blinder (1999), Crockett (2000a), and Vinals (2001).

Second, suppose the central bank has a price stability objective and adjusts its policy rate on the basis of an inflation forecast. Since this inflation forecast, like any forecast, is subject to uncertainty, in the short-term the central bank may be above or below its inflation target. This is true regardless of whether the central bank is concerned with financial stability. Consequently, if the central bank assigns a relatively high probability to financial instability and presumes that financial instability is associated with deflationary tendencies, it may need to accept higher inflation in the short-term. However, policy dilemmas lurk in the shadows between the short, the medium and the long-term; not to mention, of course, Keynes aphorism about death before the long-term. A clear mandate and a clear strategy for monetary policy are not sufficient to determine what the central bank should decide when a particular situation arises, and indeed allow for complex discussions, diverse views and disagreements on the best decision to take in any given circumstances. Even less are they sufficient to determine the precise weighting of financial stability considerations against other considerations in the decision whether or not to move rates. Ultimately, the substantive issue is, in the analysis, the relationship between financial and price stability and, in the decision, the weight to be given to financial stability considerations.

Third, there is a widespread belief that a smooth path of interest rates is conducive to financial stability.[51] The argument can be linked to the maturity transformation function of private banks, insofar as they convert variable rate liabilities into fixed rate assets. If the central bank were to interpret its responsibility for financial stability as an objective to smooth interest rates, a trade-off with the objective of price stability might arise. On the other hand, the link between financial stability and a smooth path for interest rates is rather tenuous.

Furthermore, the same argument could be applied to asset prices, as large asset price movements have been a trigger for financial crises.[52] Taking this line of argument to its ultimate conclusion, the implication would be that the price index which measures inflation should include financial asset prices. If this were implemented, however, central banks would directly adjust policy rates to combat asset price inflation. But such a direct reaction may have serious drawbacks.[53] Monetary policy could be dominated and manipulated by financial markets, thus becoming volatile and unpredictable.[54] Moreover, it is likely that financial market participants would increase risk taking in anticipation of the central bank providing a floor for asset prices, possibly resulting in less rather than more financial stability.[55] Not only asset prices, but also the policy tool would strongly depend on market expectations, and the outcome for inflation could become largely arbitrary.[56] Furthermore, making a clear distinction between price increases and price inflation,

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51 See, for example, Cukierman (1990).
52 See, for example, Allen and Gale (2000b), and Kaufman (1998).
53 Cecchetti, for instance, has advocated a different opinion.
54 See, for example, Cukiermann (1990).
55 See, for example, Goodhart and Huang (1999).
56 See Bernanke and Woodford (1997).

which is of crucial importance for any price stability oriented monetary policy, would be exceedingly difficult in the case of assets. Indeed, it does not seem that the major difficulties in estimating the fundamental value of financial assets could be easily overcome, at least at present.[57] In view of these arguments, I would conclude that including asset prices in the policy-relevant price index would most likely lead to problems with the objective of price stability. But as I have tried to make clear, this trade-off can only occur if the central bank reacts mechanically to asset prices. Indeed, most central banks do not include asset prices in the concept of price stability used for their monetary policy decisions.

Fourth, in a context of general price stability there may be sectors or regions of the economy which undergo a price shock, which in turn may cause a financial crisis of sufficient proportions to entail a systemic risk. The overall price index considered by monetary policy may not signal a significant deviation from price stability, but a more circumscribed observation may reveal a situation in which both price and financial stability are seriously threatened. At this local level the positive correlation between price stability and financial stability may not be violated, but it runs in the opposite direction from the one prevailing at the general level. Such asymmetric shocks are, of course, fully contemplated in a properly designed monetary policy framework, but this may not be of very great help when they arise and decisions are needed. The practical relevance of the situation just described has, however, yet to be discovered.

Finally, even if it is true that an environment of stable prices is more propitious to financial stability than either inflation or deflation, the question remains whether conflicts may arise when the economy is moving towards price stability. Particularly in the transition period towards a regime of low inflation, the potentially high real interest rates associated with such a disinflationary process may impose a great burden on financial institutions. Further analysis of this problem is important, especially in the context of the EU accession countries.

Situations might thus arise where the objective of maintaining, or perhaps restoring, price stability over the medium-term demands a policy response which at first sight is not compatible with the short-term dynamics of inflation. Empirically, these occasions appear to be rare (mainly due to the strong link between recessions and financial crises), but do exist and have fairly robust theoretical underpinnings.[58]

26. Although, as we have just seen, asset prices are not, and should not be, part of the price index on which the concept of price stability is based, the issue of how a central bank should position itself with respect to changes in asset prices remains. As the question is indeed currently much debated, partly because of the recent extraordinary vagaries of stock prices in the United States and in other parts of the world, I will briefly discuss the issue here. What should a central bank do in the face of asset price changes?

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57 See, for example, Issing (1998).
58 See Kent and Lowe (1997), and Brousseau and Detken (2001).

The first and foremost part of the answer to this question is straightforward. Given a price stability-oriented and forward-looking monetary policy strategy, a central bank is well advised to evaluate all the implications of large asset price change on future inflation. It should look at such implications both in relation to demand effects and in relation to financial stability considerations. It should adjust the policy rate in order to maintain price stability over the relevant horizon.

There is, however, a more problematic part. This concerns the occurrence of extreme movements in asset prices, combined with the proven ability of central banks to "influence" markets by commenting and analysing current events in the economy. When an asset price – be it the exchange rate, house prices or stock prices – grossly deviates from any plausible "normal" level, should the central bank speak up or keep silent? Should the famous expression "irrational exuberance" (December 1996) never have been used? Should the ECB never have said that "the present level of the euro does not reflect the strong fundamentals of the euro area" (April 2000)? Should subsequent Fed analyses, providing explanations for the extraordinary and unexpectedly prolonged "boom without inflation", not have been made for fear they might encourage a bubble? When does reticence pass the limits of neutrality? On the one hand, of course, the central bank should avoid driving the market as well as taking responsibility for developments it cannot really influence. On the other, however, the central bank is aware that asset markets can sometime lose their sense of direction and that overshooting and undershooting are recurrent and potentially damaging. Undoubtedly, the central bank should be clearly aware of what is the rule and what is the exception, but there are circumstances in which non-interference or neutrality may be impossible and even silence speaks.

27. I would sum up as follows. In the long-term price stability is a powerful facilitator of financial stability, but is, in turn, not sustainable without financial stability. A successful and long-lasting price stability-oriented monetary policy strategy is the most suitable for minimising the risk of a potential conflict between price and financial stability, although it is not by itself sufficient to ensure financial stability.

If the horizon for the price stability objective is appropriately long, and if all relevant information concerning future inflation is taken into account in the process of deriving the appropriate monetary policy stance, then the central bank will be in a favourable position to provide an optimal response for both price stability and financial stability. This is an analytically challenging and very information-demanding exercise in which central bankers cannot avoid the heavy burden of judgement. The information required to reach appropriate policy decisions includes information about the health of the financial sector and about the impact of wealth effects from changes in asset prices obtained though macro-prudential analysis and surveillance and through the analysis of the monetary policy transmission mechanism.

That said, a successful pursuit of price stability over the medium-term might imply accepting, at times, a deviation from the price stability objective in the short-

term for reasons related to financial stability. Since, in general, the synergy between price stability and financial stability is strong, situations of conflict would be rare events.

28. After investigating the relationship between the financial stability function and monetary policy, the other boundary, i.e. with those tools which are, in the first instance, concerned with individual bank stability, remains to be addressed. This boundary is most visible when the central bank does not have explicit supervisory tasks, but often also exists within central banks entrusted with prudential supervision, where it takes the form of interdepartmental co-ordination (or the lack thereof).

The distinction between dealing with individual financial institutions (micro-prudential) and with the financial system as a whole (macro-prudential) is commonly drawn. When this distinction is made, it usually has to do with the focus of the respective activities and the analytical approaches to measuring risks, rather than really questioning their ultimate common objective of financial stability (see Table 1 and Section V). The macro-prudential dimension is usually associated with the central bank, and the micro-prudential one with the supervisory authority.

The macro-prudential dimension focuses on the financial system as a whole. Accordingly, macro-prudential analysis and surveillance encompass assessment and monitoring of potential threats to financial stability arising from macroeconomic or financial market developments (common shocks) and exposures to systemic risk (contagion). Thus a kind of a definition of financial stability which I introduced earlier is followed, as the analysis focuses on evaluating the risk of events of financial distress which would be costly for the economy. The macro-prudential risk measurement approach focuses on the risk of correlated failures. If it looks at individual institutions, paying attention to those characteristics that determine their significance for the financial system as a whole (such as size and links with other institutions).

In this area, the first central analytical issue is to identify how much the financial system is exposed to certain risks (such as a stock market decline) and how robust the system is likely to be in absorbing shocks. The latter depends on the availability of financial buffers (profits, reserves and capital) in financial institutions. The second aspect, where less progress has been made, concerns assessing whether or not financial imbalances have reached an unsustainable level. While authorities cannot expect to predict the incidence of shocks, it is nevertheless important to explore potential downside risks. For instance, unambiguous evidence that an asset price bubble is emerging before it actually bursts remains subject to much controversy. Many indicators are available and can be compared against historical norms,[59] but it is not easy to distinguish between sound earnings expectations and unwarranted and euphoric risk taking.[60] Other types of financial imbalance are also

[59] Such as P/E ratios, equity risk premia and probability distributions derived from options prices.

[60] Fed Chairman Alan Greenspan (2002) recently addressed these issues, also suggesting some future avenues for identifying discrepancies between current asset prices and their fundamental values.

rather difficult to assess definitively. For example, when does lending growth, corporate and household sector leverage or the external debt position of a country reach a level which would be likely to lead to financial instability. Again, specific indicators exist and are actively used, and these can be compared with norms derived from past incidences, although individual circumstances will always have to be analysed.

The micro-prudential dimension focuses on individual institutions and considers the financial condition and risks of each institution, including in comparison with other similar institutions ("peer group analysis").[61] Traditionally, the micro-prudential dimension has regarded developments in macro-economic and financial market conditions as specific to an individual institution. Thus, it has disregarded the feedback effects on overall developments caused by the behaviour of individual institutions. Supervisory authorities nowadays spend considerable resources on assessing the risks run by individual institutions from such a micro-prudential perspective. There is no standardised approach, although a recent review of supervisory risk measurement practices indicated that supervisors tend to emphasise relative or cross-sectoral risk assessment rather than system-wide risk assessment or time (or cyclical) variation in risk.[62] Traditionally, the approaches of supervisory authorities have not been well-suited to measuring risks which are correlated or concentrated in a larger number of institutions or which could lead to system-wide vulnerabilities.

29. While I recognise the neatness of the "macro-micro" distinction, a strict separation of the macro-prudential and micro-prudential dimensions is conceptually inappropriate and it can even be detrimental in practise. These distinctions should be regarded only as "labels", not as hard and fast concepts. If fact, macro and micro-prudential analysis or surveillance are not really two different activities, but are as inseparable as two sides of the same coin. After all, both activities are concerned with the stability of the financial system as a whole, rather than the stability of individual institutions. In fact, an increasing number of supervisory authorities feel quite comfortable with being associated with the task of limiting systemic risk and preserving financial stability, rather than preserving the integrity of individual institutions. The main danger in a strict separation is that when this is the case, the different institutions (i.e. central banks and supervisory authorities) would not be able to perform their functions satisfactorily.[63]

First, confidential supervisory information may play an important role for central banks in the field of payment systems and in checking the "safety" features of other market infrastructures. Prudential supervision is also important for the soundness of the individual counterparties of central banks. Central banks rely on specified criteria that allow safe and prudent institutions to be singled out, and which

61 See Borio et. al. (2001).
62 See Van den Bergh and Sahajwala (2000).
63 Crockett (2000b), and Lamfalussy (2002) recently echoed this view.

usually refer to licensed and supervised banks. When screening the institutions eligible to participate in credit and payment facilities, central banks also have the power to exclude them from the facilities should concerns over the effectiveness of supervisory arrangements or the soundness of banks emerge.

Second, supervisory input is also important for the conduct of macro-prudential analysis and surveillance. Best results are probably achieved by combining different information from supervisory, central bank and market sources. Moreover, macro-prudential analysis may not be very effective if it only focused on aggregated data and average behaviour. Averages will not reveal when and where individual institutions are at risk of going broke. Significant exposures of single major institutions or across institutions can be important sources of financial instability and result in the propagation of risks throughout the financial system.

Third, by contributing to the macro-prudential analysis, central bank research and surveillance of the overall economy and of the banking and financial sectors and information from payment systems and monetary policy operations can indeed be valuable for supervisory tasks. Previous occurrences of system-wide crises (such as the Scandinavian and Japanese crises) forcefully demonstrated the relevance of the macro-prudential dimension for financial stability, and hence the importance of macro-prudential analysis also for supervisory authorities. Indeed, as was pointed out by BIS General Manager Crockett (2000b), the macro-prudential paradigm stresses "*the possibility that actions that may seem desirable or reasonable from the perspective of individual institutions may result in unwelcome system outcomes*". This view is not internalised in the traditional micro-prudential paradigm, which considers financial stability to be ensured as long as individual institutions are sound. For instance, for a single bank it is only natural to relax lending standards in an upturn, but if all banks do the same this could generate an unsustainable lending boom, sowing the seeds of subsequent financial instability. Hence, effective macro-prudential analysis could point to exposures that are relevant for the soundness of individual institutions and could merit further investigation by supervisory authorities.

As regards their key tools, such as capital charges, provisioning policies and risk limits, supervisory authorities still feel much more comfortable with the micro-prudential perspective (i.e. not using these tools to respond to financial system-wide or macro-economic concerns). Whether or not such tools should pay attention to limiting financial and economic cycles is currently an important policy question. A strong counter-argument, which is made by many supervisory authorities, is that the efforts already made and being made to upgrade prudential safeguards will be sufficient.[64] While progress in this respect has certainly been very important and impressive, it remains the case that potential credit and asset price cycles and increased exposure by banks to financial market fluctuations might leave scope for considering more forward-looking supervisory measures. Such measures would strengthen defences during good times by establishing reserves to be drawn upon

[64] See, for example, the strategy formulated in the G10 and the core set of international standards available from the Financial Stability Forum (www.fsforum.org).

during bad times.[65] The implementation of such policies is still fraught with problems (e.g. lack of compatibility with accounting standards).

The issue of increased vulnerability of banks to economic and financial cycles has recently been addressed by many central banks, including the ECB, in the context of the Basel Accord revision.[66] Consensus now seems to exist on, at least, the need to avoid strongly pro-cyclical supervisory requirements. This can be seen, for instance, in the current revision of the new Basel Accord to correct the pro-cyclical features of the first set of proposals.

30. To summarise, this discussion of the important synergies shows the desirability of maintaining close links and information exchange between supervisory authorities and central banks when the two functions are separated. This is similar to the need to also have close interplay on the other front vis-à-vis monetary policy. This Section has also highlighted the fact that, even though still less clearly perceived than monetary policy and prudential supervision, the "land in between" of the financial stability functions and tools of central banks does exist. The tools identified for non-supervisory central banks are significant and can be effective in pursuing financial stability. I did not see a fundamental or likely conflict with preserving price stability when a central bank is concerned with financial stability. The financial stability area cannot – in my view – be ignored by central banks, but should be the focus of further attention and research.

V. TOOLS AND ACTIONS

31. Table 1 listed the policy tools, which may play a role in the pursuit of financial stability, and identified those tools specifically available to central banks not entrusted with supervisory tasks, such as the Eurosystem (as well as several other central banks). This Section will further address the use of these instruments, making particular references to the euro area and the availability of the tools to the Eurosystem.

The Eurosystem represents a special case in this context because of its unique legal and geographical features. First, as a single currency area, it includes a number of national jurisdictions, which have retained supervisory responsibilities. Furthermore, the Eurosystem operates within the regulatory and supervisory framework designed at the EU level. Hence, we have three distinct legal and geographical entities. The national authorities are responsible for the ongoing supervisory function. The ECB (geographically the euro area) is responsible for monetary policy. And the EU (geographically the euro area plus three) is responsible for regulation. This special structure raises a number of important considerations.

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[65] This could include adjusting capital buffers in boom periods (e.g. via stress testing), establishing forward-looking provisions against expected but yet not realised risks ("dynamic provisions") and adopting counter-cyclical collateral valuation and loan-to-value ratios. See, for example, Borio and Lowe (2002) and Crockett (2000b).

[66] See ECB (2001).

First, recalling the arguments of Section II, the euro area is and should be considered a single financial system, rather than the sum of a number of national financial systems. This is irrespective of the empirical evidence suggesting differing degrees of integration in the markets for various financial products traded in this system.[67] The system encompasses a common currency, a central bank at its centre and a payment system linking the participants in a common network. Furthermore, in channelling funds to other parts of the financial sector as well as to the real economy, banks have to rely on a single access to central bank liquidity. Therefore, it can be argued that any system interlinked through a common payment system is defined by its common source of liquidity.[68] This immediately suggests that the stability of the financial system – as well as the micro and macro-prudential functions safeguarding it – has in effect become a euro area-wide concern.

Second, as argued in Section III, one important source of financial instability may arise from the exposure of banks to financial markets and the tendency of market liquidity to dry-up in times of crisis. Due to its size and diversified nature, the euro area has a higher capacity to absorb economic shocks than the financial systems in individual countries.[69] For example, the integrated euro area-wide money market has given banks a source of funding which is wider and deeper (and thus more liquid) than the national markets that existed before stage three of EMU.[70] This high degree of integration, however, may also have increased the risk of cross-border contagion, as major banks operating in the common wholesale system form a fully integrated network. Furthermore, given the "tiered structure" of the interbank market, a significant problem at a large institution acting as a "money centre bank", will potentially be immediately transmitted to other countries. The combined effect of these two features – deeper market and greater cross-border contagion – on euro area financial stability has yet to be ascertained.

Third, while the euro area is conceptually and economically (and not only geographically) distinct from the EU's Single Market, it nevertheless inherited the regulatory and supervisory framework designed for the purposes of the Single Market. Four principles govern this framework: (i) minimum harmonisation of the EU-wide regulation; (ii) mutual recognition of non-harmonised national rules; (iii) national competence for ongoing supervision; and (iv) close co-operation between national authorities.[71] Two forms of co-operation have emerged: bilateral and multilateral. Co-operation also extends to crisis management, despite the absence of clear references to

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67 See Padoa-Schioppa (2001) for more detailed discussion of this issue.

68 This obviously does not preclude the existence of linkages and contagion between financial systems. A "global" financial system would then be considered a network of financial systems.

69 See Duisenberg (2001).

70 See Santillán et. al. (2000) for evidence of this rapid integration and ECB (2002) evaluation of banks' liquidity risk management.

71 The first two principles concerning regulation were adopted in Commmunity legislation in the mid-1980s in order to accelerate the creation of the Single Market, including in financial services. In 1999, as integration has remained incomplete, the European Commission identified a number of areas for action by 2005 (the Financial Services Action Plan). The principle of national supervision maintains that every financial institution operates throughout the Single Market under the authority of the home country who had issued its license. This allows the supervisory authority responsible for each institution to be identified unambiguously.

crisis management in Community legislation. Furthermore, if a crisis should occur at a foreign subsidiary (rather than a branch), the licensing authority of the host country would be expected to resolve the problem.

Since the introduction of the single currency, European policy-makers have repeatedly addressed the appropriateness of the framework for the purposes of the euro area and the Single Market as a whole. The current orientation is to fundamentally stick to the principle of national competence in supervision, while improving the practical functioning of a system composed of several competent authorities. To be effective, supervision must "see" the whole system, which is impossible without close co-operation and information sharing between central banks and supervisory authorities.[72] Hence, to address financial stability concerns from an area-wide perspective, bilateral and especially multilateral co-operation needs to be further enhanced in the EU committee structures. The Banking Supervision Committee of the ESCB provides a platform for EU central banks and banking supervisory authorities which is being used for further deepening of co-operation and information exchange.

Fourth, the Eurosystem relates to this construction in three principal ways: (i) it has the task of contributing "to the smooth conduct of policies pursued by competent authorities relating to the prudential supervision of credit institutions and the stability of the financial system" (Article 105(5)); (ii) the Treaty gives the Eurosystem an advisory role in the rule-making process;[73] and (iii) it has in the Treaty the obligation to "promote the smooth operation of payment systems" (Article 105(2)). The contribution of the Eurosystem in these fields consists of the co-operative efforts of the ECB and the national central banks.

Finally, I should note that, overall, an appropriate supervisory framework should not only be effective in addressing financial stability concerns, but it should also be consistent and minimise the burden of supervision, supporting efficiency in the financial system. For instance, supervisory reporting requirements, risk limits, risk management guidelines and rulebooks on, for example, consumer protection and disclosure rules still differ quite markedly between countries. The recent implementation of the "Lamfalussy procedures", i.e. the approach suggested by the Committee of Wise Men (2001), represents a step forward in securities regulation in the direction of greater consistency and thus also a lower burden for financial groups operating in several countries, as well as towards more flexible rule-making. The application of these procedures also in the banking and insurance sectors is currently being considered.[74]

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[72] The Economic and Financial Committee of the EU (2000) recommended fostering the exchange of information on the major financial institutions and market trends among supervisory authorities and central banks. Another report of the Committee (2001) called for strengthened information exchange and co-ordination of policies across national authorities in crisis situations. The report also notes that central banks need to be involved at an early stage in a crisis.

[73] According to Article 105(4), the ECB must be consulted on any draft Community and national legislation on issues falling within its field of competence. According to Article 25(1) of its Statute, the ECB can provide, on its own initiative, advice on the scope and implementation of the Community legislation in these fields.

[74] The system relies on the establishment of new regulatory ("level 2") and supervisory committees ("level 3"), for the functions of establishing common rules and ensuring their consistent implementation respectively.

32. Embedded in this unique institutional framework, the involvement of the Eurosystem, like that of any central bank without supervisory duties, is directly linked to the instruments available for a central bank such as identified in Table 1. While in Section IV, I discussed the potential for conflict with monetary policy and the need for co-operation with supervisors, I want to focus here mainly on the instruments that exclusively deal with the stability of the financial system as a whole.

This includes the central bank's role in payment systems, public and private commenting in the area of financial stability, emergency liquidity support operations and, finally, crisis co-ordination. In this context, I should like to distinguish between tools aimed at crisis prevention, such as central bank involvement in payment systems and tools aimed at crisis resolution, such as emergency liquidity support and crisis co-ordination. A consistent central bank communication strategy may serve both crisis prevention and crisis containment. To recall, monetary policy tools might also be used to prevent financial instability in a forward-looking fashion (as discussed in Section IV). However, we should also recall the powerful arguments against a mechanical reaction to emerging financial instability. A case-by-case reaction within the framework of a forward-looking monetary policy strategy might be warranted. The latter approach to countering financial instabilities, however, faces several difficulties and unresolved issues. For instance, even if a financial imbalance such as an asset price bubble were to be identified early with sufficient precision, it might be that only a substantial monetary tightening could pre-empt it with the risk of unduly contracting economic growth.[75]

33. One tool which is directly implied by the Treaty is the ability of the Eurosystem to operate payment systems and set payment system standards. These functions are generally aimed at minimising the danger of contagion should a failure or financial market distress occur. Central banks have extensively introduced mechanisms in order to limit risks in payment and settlement systems.

Specifically, central bank responses to settlement risks and contagion risks in large value payment systems have been threefold. First, they have promoted enhanced safety arrangements in net settlement systems.[76] Second, central banks have supported the introduction of real-time gross settlement systems (RTGS), which became technically feasible in the mid-1980s. However, RTGS has only relatively recently became a cost-efficient alternative, due to technological advances that have removed virtually any obstacle to increasing the velocity of money. RTGS ensures the immediate finality of each payment, thereby eliminating intraday counterparty risk positions between banks and thus substantially reducing systemic risk. Third, central banks have developed the payment system oversight function. It aims to ensure the

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75 See Greenspan (2002) for further discussion.

76 In 1990 the G10 "*Report- on Inter-bank Netting Schemes*" (Lamfalussy Report) set minimum safety standards for net settlement systems. Following the report most systems in the world have amended their operational rules and procedures. The follow-up report in 2001, "*Core Principles for Systemically Important Payment Systems*", complemented the standards and extended their applicability globally.

soundness of payment systems from the legal, credit, liquidity and operational risk control and governance viewpoints. Oversight activities range from setting standards to monitoring systems and assessing their compliance with the standards.

In the euro area, a single RTGS system, TARGET, has been established, which links together the national RTGS systems of the EU countries.[77] The system was instrumental in the creation of the integrated euro area money market, which in turn was a pre-requisite for the single monetary policy and more generally resulted in the creation of a single payment area, rather than just a single currency area. While national systems continue to operate in parallel with TARGET, they all meet a level of safety at least equivalent to that required in the "Lamfalussy Report" (see above). Payment systems oversight is a direct Eurosystem competence. The national central banks are responsible for the oversight of the systems located in their respective countries. The Eurosystem is, in turn, responsible for the oversight of systems operating at the euro area level.

In addition, financial stability concerns increasingly also relate to securities clearing and settlement. The tendency towards consolidation in this area, including across borders, although improving efficiency, results in a concentration of transactions in a few systems. The ESCB and the Committee of European Securities Regulators are currently designing safety standards for security settlement systems, including clearing systems.[78] Further risks may arise from the fact that most cross-border transactions are still conducted via custodian banks, rather than through links between national security settlement systems. The growing volume of cross-border transactions has increased the importance of these banks. It is a concern that such entities are currently insufficiently regulated or supervised with respect to their settlement capacity.

34. Continuing on the subject of the tools outlined in Table 1, public and private comments by central banks can be a powerful additional tool to influence market behaviour in a manner which would be conducive to financial stability. Technically, comments are usually disseminated through financial stability reviews, official statistics and public statements.[79] Bilateral and private communication with market players, banks and policy-makers is also quite important. For instance, bilateral consultations with banks could include an element of "moral suasion" when deemed necessary.

In general, I would argue that the judgement of a central bank has an impact even if its communication does not contain new information. The reason is that a central bank does not have a profit-maximising objective and therefore faces different incentives to market participants, giving its views a different – and I would argue – greater weight in the marketplace. In my view, it is in this sense that public

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77 TARGET is an EU-wide system for euro payments. It is a real-time gross settlement (RTGS) system for the euro consisting of fifteen national RTGS systems and the ECB Payment Mechanism.

78 This work also relies on the global standard setting of the CPSS and IOSCO.

79 In the EU, the Austrian, Belgian, Finnish, Swedish and UK central banks issue financial stability reviews at the moment.

"comments" by a central bank may be useful in preventing and containing financial instability. Sometimes public availability of credible information is enough to shift perceptions of investors such that detrimental herds or bubbles are prevented from developing.[80] Furthermore, given that they do it with much less frequency than other market participants, the mere fact that central banks (or other policy-makers) reveal their views may have a stabilising impact on financial markets.[81]

My view is somewhat in contrast to the possibly more prevalent and traditional view that because central banks are unlikely to have an information advantage, efficient markets are perfectly able to deal with irrational expectations on their own. If central banks were able to assess the development of a destabilising "herd" or a "bubble" correctly, other agents would also have this information and such a development would be unlikely in the first place.[82] I do not share this view and some recent academic literature seems to support me.[83] For instance, private market analysts may lack incentives to move against the "herd", since market participants tend to be evaluated against a benchmark of their peers. It is clear that in such a system, risk averse agents prefer the safety of being wrong along with everyone else to the slim chance of being right alone.

Naturally, this tool of public commenting needs to be used prudently (and sparingly) in order to maintain its effectiveness. It is well known that an essential ingredient in effective monetary policy-making is credibility and reputation. Exactly the same considerations apply to the use of communication in financial stability. In particular, comments could be extremely counterproductive if information is released at the wrong time or turns out to be incorrect.[84] Finding the right words at the right time, with respect to monetary policy as well as financial stability, remains at the core of the art of central banking.

In addition to the judgement central banks can bring to the public, summarising information into overall aggregates on risk exposures (e.g. lending levels to particular sectors and countries) and other vulnerabilities might be helpful. For instance, co-operation between central banks and supervisory authorities can be valuable in cases where the view of macro-economic and financial risks can be combined with information on the exposures of individual financial institutions when addressing system-wide vulnerabilities. This was the objective in some of the publications of the

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80 Technically, "herding" is observed if there is a convergence of behaviour, i.e. if agents ignore private information and follow the actions of others. A "bubble" occurs if rational agents know that the price of an asset is too high relative to fundamentals, but they believe that they can unwind their positions at a higher price before the bubble bursts. See Brunnermeier (2001), Bikhchandani et al. (1992), Banerjee (1992), Avery and Zemsky (1998) and Lee (1998).

81 In this spirit Bhattacharya and Weller (1997) argue that a central bank intervention can stabilise foreign exchange markets. In addition, Heinemann and Illing (2002) show that greater transparency on the part of the central bank can reduce the probability of speculative attacks.

82 See, for example, Santos and Woodford (1997) for a recent formulation. However, see Tirole (1985) and Allen and Gale (2000b) for the possibility of bubbles even if all players are rational, but there is nevertheless no room for beneficial announcements by authorities.

83 Alternatively, a public announcement can help bring prices back in line with fundamentals. See Abreu and Brunnermeier (2001).

84 It might also happen that agents overreact to imprecise information from central banks, thereby increasing volatility and decreasing welfare. See, for example, Morris and Shin (2002).

Banking Supervision Committee.[85] Effective communication should therefore, in my view, include exchange of information between central banks and supervisory (and potentially also other) authorities (e.g. as regards emergency liquidity assistance to individual institutions), macro-prudential analysis and surveillance of risks to financial system stability.

The ECB, in co-operation with the national authorities on the Banking Supervision Committee, has established a framework for macro-prudential analysis focusing on the EU banking sector stability. Such an analysis is also needed for the effective use of policy tools in the financial stability area by supervisory authorities (as noted in Section IV). Indeed, the participating national supervisory authorities benefit from common analyses and use them as an input in their supervisory processes. Regular internal macro-prudential reports are produced twice a year,[86] as well as ad hoc reports on relevant issues (e.g. asset prices and banking stability), some of which have been published (five in total so far). As for financial markets, relevant activities are carried out in co-operation with national central banks, and also benefit from contacts with market participants. For instance, regular monitoring of money markets, as well as of other important financial markets and financial infrastructures is undertaken within the ESCB.

35. Furthermore, liquidity injections into the market as a whole (market operations) or into individual institutions (emergency liquidity assistance, ELA) are the most traditional, as well as the ultimate, tools available to central banks to deal with financial instability. While setting payment systems standards or, even more so, timely communication (or monetary policy tools) are devices primarily aimed at preventing crises, liquidity injections take place once a crisis is already in progress. Nevertheless, various recent episodes (see Section III) have demonstrated the capability of well-timed liquidity-enhancing operations to contain crises by stabilising markets and to mitigate the repercussions of shocks.

It is important to recognise that all liquidity injections do not relate to the operations in crisis periods to prevent the spreading of a liquidity problem. Such rare events catch the eye (if disclosed) and usually correspond to the image of a central bank's role in financial stability. Central banks, however, routinely offer the lubricant of adequate liquidity against specified collateral requirements in order to support the orderly functioning of markets.

The academic community has focused its attention on liquidity assistance and public bailouts of banks. Early criticism doubted the capability of the euro area authorities to act (e.g. CEPR 1998) should a liquidity crisis occur. I think these doubts are not warranted.[87] The arrangements concerning ELA have been revised in

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85 See in particular ECB (2000b).

86 The techniques for assessing banking sector stability involve a systematic and regular monitoring of developments on the basis of the interpretation of quantitative macro-prudential indicators (MPIs) together with the qualitative assessment carried out by the authorities with detailed information on the risks of individual banks. In addition, forward-looking information from public (e.g. financial market) sources on bank and non-financial sector health are used to complement the picture.

87 See also Padoa-Schioppa (1999).

conjunction with the launch of the euro in order to adapt to the requirements of EMU. Generalised liquidity operations via market operations are in the Eurosystem's area of competence, while ELA to individual institutions remains, according to an agreement reached in 1999, a national competence and outside the direct scope of Eurosystem policies. Hence, any associated costs and risks are to be incurred by the national central banks concerned.[88] Co-ordinated private sector solutions without the injection of public funds are formally unaffected by EMU, but the potential area-wide nature of the issues can call for cross-border co-operation and the involvement of the Eurosystem (or the Banking Supervision Committee) to facilitate such solutions.

The evidence referred to in Section III suggested that the transformation of the financial system has increased the potential for liquidity shortages in times of crisis. While, in the presence of deposit insurance, bank runs by retail depositors have become less and less likely, losses of liquidity from wholesale markets has become more important. This suggests that market operations aimed at preserving adequate liquidity conditions continue to be central among central bank tools. The ability of the Eurosystem to respond effectively to the implications of the terror attacks in the United States on 11 September 2001 demonstrated its capacity to deal with system-wide liquidity problems. In the days following the attack, many euro area banks hoarded their liquidity and were unwilling to lend to the market, as reflected in high overnight rates and bid-ask spreads. The Eurosystem reacted by injecting additional funds through fine-tuning operations. Although the Federal Reserve System provided ample US dollar liquidity to the markets through its discount window and market operations, euro area banks without a US banking licence were not able to directly access that discount window. In order to channel the necessary US dollar funds to euro area banks, the ECB and the Federal Reserve Bank of New York concluded a USD/EUR swap agreement, followed by corresponding agreements between the ECB and the NCBs and the NCBs and market counterparties.

36. The effectiveness of crisis co-ordination in the euro area can, of course, only be tested in a crisis. Just as a peaceful country should have an effective army even in peacetime, because once an attack comes it is too late, the central bank should prepare itself for crises in times of financial stability. As part of these preparations, the adequate capability of financial institutions to produce relevant information for authorities in a swift manner (contingency plans) has been recently addressed in a number of European and international forums. In particular, the Banking Supervision Committee has been working to ensure adequate co-operation among the EU supervisory authorities and central banks in crisis situations. Obviously, one should not downplay the practical issues in crisis co-ordination, which exist especially in the international context. Cross-border spillovers pose substantial policy challenges. For

[88] Nevertheless, the agreement aims to ensure management of the monetary consequences of the ELA operations to maintain an appropriate monetary policy stance and to ensure adequate information exchange about the potential cross-border effects. For these reasons, for large operations there has to be advance information to and consent from the Governing Council of the ECB. In the case of smaller operations, information exchange after the event has been deemed sufficient. See, for example, the ECB's Annual Report for 1999.

example, differences in opinion may arise when assessing the systemic relevance of a problem or the selection of policy tools to activate. National authorities have a natural tendency to give great weight to domestic considerations and may not take the legitimate rights of foreign stakeholders sufficiently into account.

37. I have just outlined the basic role of central banks in maintaining what used to be referred to as orderly market conditions. However, to conclude this section, let me stress that central banks also have a strong interest in the micro-prudential instruments related to individual institutions, irrespective of whether they are themselves supervisors or not. As I outlined in Section II of this paper, the role of a central bank as the bankers' bank implies a need to be concerned with the soundness of individual counterparties. This is reflected in the statutes of most central banks, including the Eurosystem.

The Eurosystem has a general obligation to operate under the principles of an "open market economy with free competition" (Treaty Article 105(1)), and it has a specific obligation to manage its own exposures prudently; for instance all credit operations of the Eurosystem must be collateralised.[89] Collateralisation is, of course, not a perfect substitute for checking the soundness of the counterparties, since the market value of collateral can suffer in times of crisis. When in the second half of 1998 the decisions on how to select counterparties were taken, it was decided to delegate to some extent the selection to the supervisory agencies. Theoretically, the Eurosystem could have also decided to check counterparties itself. In fact, almost without exception, access to Eurosystem monetary operations and the TARGET system is provided as widely as possible to all credit institutions (i.e. banks as defined by the EU) which meet the requirement of being licensed and supervised by competent national authorities.[90] Such an arrangement can deliver a satisfactory outcome, provided that the regulatory and supervisory arrangements are deemed adequate. Should the eligible institutions encounter or be likely to encounter severe problems, the Eurosystem has not only a legitimate interest but also a duty to assure itself of the soundness of its counterparties. Ultimately, the status of such counterparties may have to be re-considered.

To an extent, the Eurosystem also sets its own standards. Participation in the process of designing regulations, supervisory policies and industry standards provides a tool for non-supervisory central banks such as the Eurosystem to address their concerns. This is best visible in the field of settlement systems (other examples include the Basel Process or consultations on EU regulations). Because of the Treaty's requirement of collateralised credit operations, the Eurosystem has developed standards which must be met by all EU securities settlement systems which

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89 See Article 18(1) of the Statute.

90 See "*The Single Monetary Policy in the Euro Area: General Documentation on Eurosystem Monetary Policy Instruments and Procedures*", ECB, April 2002 (update of the November 2000 edition). See also "*TARGET - Update 2001*", ECB, November 2001.

could be used for Eurosystem credit operations.[91] In particular, the Eurosystem must ensure that central bank refinancing is granted through procedures which will prevent central banks from assuming inappropriate risks in conducting monetary policy and intraday credit operations and which will ensure the same level of safety, regardless of the settlement method. These standards have effectively become supervisory standards and a guide for the industry's development and apply not only to operations related to central bank credit, but to all kinds of operations.

VI. CONCLUSION

38. The key points emerging from this paper can be recapitulated as follows. Central banks are bound to be involved in financial stability: they are banks, they must control the soundness of their counterparties, they are entrusted with the exclusive task of creating ultimate liquidity, and they are driven by a public interest motive. No other public or private institution has been invented which is equally capable of avoiding and mitigating the "indiscriminate public terror" (Bagehot) of a financial crisis. Thus, central banks do play and should play an important role in maintaining financial stability, regardless of the institutional structure for supervision which happens to be adopted in their jurisdiction.

The profound transformation that both the financial system and the central bank have undergone over the last two decades should provide further impetus for carefully re-examining our approach to financial stability and the role central banks play. The transformation has influenced the kind of financial crises we might face. In particular, since the importance of liquidity and contagion risks is increasing, we should expect an increase in the role of central banks in financial stability. Attention should be paid to the risks stemming from non-bank financial activities and financial market price developments. Given the improvements in risk management techniques and procedures, as well as in the conduct of prudential supervision and payment systems oversight, it is tempting to argue that the probability of a crisis has diminished. This conclusion, however, may be premature, as our daily reading of the financial press suggests. At the same time, should a crisis occur, it would probably result in a situation where central bank expertise is in high demand.

39. This paper addressed the definition of central banks' financial stability functions and their place among public policies. I defined these functions as occupying a "land in between" monetary policy and supervision, somewhat independent of both functions. Smooth interplay on both borders is, however, crucial. I did not see a fundamental or likely conflict between preserving price stability and being concerned with financial stability. In special circumstances, however, a central bank could enter a price stability/financial stability trade-off in the short run. Even though synergies between price stability and financial stability should prevail in the longer run, a

[91] See "*Assessment of EU Securities Settlement Systems against the Standards for Their use in ESCB Credit Operations*", ECB, September 1998.

successful monetary policy (successful in keeping prices stable) will not always be sufficient to prevent financial instability. Hence, central banks cannot be indifferent to financial stability; a policy of benign neglect is not an option. The Eurosystem cannot be an exception to this.

While central bank involvement in financial stability is distinct from, and complementary to, supervisory functions, the role of the central bank needs to be embedded in an appropriate overall supervisory regime, whether or not it is entrusted to the central bank. Successful conduct of supervisory and central bank functions requires close co-operation and information exchange, and central banks should continue to provide advice on supervisory rules and policies.

40. There are many unresolved issues on the way to designing successful policies to maintain financial stability. This paper was not intended to be prescriptive or to make strong policy recommendations on each and every issue. Rather, its intention was to provide a road map for discussing the issues.

Central bank activities with respect to financial stability are increasingly preventive. The oversight of payment systems, disseminating information to markets, and setting standards should further increase in importance and lessen the moral hazard that arises from being the lender-of-last-resort to illiquid institutions. Central banks oversee financial stability because they implement monetary policy by managing the liquidity situation in the interbank money market. They also usually run the main wholesale payment systems, either settling in central bank money or developing safety standards for systems operating in commercial bank money. Central banks have shown to be able to swiftly respond to situations of financial distress in a way that mitigates the impact of the event and protects the financial system from systemic risk. The effective reaction of central banks to the events of 11 September last year was a case in point.

The risk of financial cycles becoming stronger, and economic booms and busts more disruptive, could grow in the future. This could endanger financial stability, even though a sound supervisory framework reduces the risk. The way forward is to enhance co-operation among central banks and supervisory authorities in addressing financial instabilities, and to combine more system-wide and counter-cyclical supervisory policies with the willingness of central banks to address financial stability concerns.

41. Finally, and turning to my own house, the Eurosystem, I should say that all the above considerations apply to it as much as to any other central bank. In particular, the Eurosystem has only very limited supervisory duties, but it has the typical tools for financial stability which non-supervisory central banks have at their disposal. The Eurosystem has an obligation to deal only with sound counterparties, and has therefore an interest in strong and far-reaching European supervisory co-operation, as well as in global co-operation under the auspices of the Basel Committee on Banking

Supervision. Unnecessary firewalls should not be created between central banks and supervisory bodies.

As a euro area financial system has been created by the very fact of adopting a single currency, and since the internal integration of this system is proceeding apace, financial stability concerns effectively become a euro area issue. This strengthens the case for a further deepening of the area-wide perspective. The euro area has inherited the supervisory framework established for the needs of the EU Single Market. But the unique challenge faced by the ECB lies in the threefold separation between the regulatory body (the EU), the single currency area (the euro area) and supervisory jurisdictions (each euro area country). This threefold separation requires special forms of co-operation between public bodies.

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