

Introductory remarks

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Introduction

This conference is, as you all know, the third in a series devoted to the same theme. The previous two were held at the Federal Reserve Board in 1995 and at the Bank of Japan in 1998.

In his remarks at the first joint conference in 1995, Alan Greenspan referred to *risk measurement and systemic risk* as parts of a newly evolving area of research in finance and economics. He foresaw that such research would influence the way business would be done in both the private and public sectors. Research on risk measurement-related issues indeed strongly influenced the character of regulatory and policy initiatives as well as of industry practice during recent years.

Making good policy depends on having a clear awareness of the limitations of our knowledge. We do not have all the answers, so we need more research into what we do not fully understand. The focus, of course, is on the practical implications, for both financial regulators and market practitioners, of such research.

Research on risk measurement has enabled private sector institutions to put in place practical risk measurement and management tools to manage their portfolios more efficiently. Market participants have become more able to differentiate among sectoral and country-related risks, and to take pre-emptive precautionary measures. This may help explain the resilience of the global financial system in the face of the economic slowdown, and the apparent absence of contagious effects in the immediate aftermath of the Argentine debt default.

Official sector monitoring of potential risks has also been improved. There is now a much greater awareness of the need for coordination between various policymaking institutions and interests. The establishment of the Financial Stability Forum (FSF) is both a cause and a consequence of this greater awareness. The FSF brings together a wide cross section of representatives of institutions involved in financial stability-related issues. In doing so, it has helped raise awareness of the interrelationships of various aspects of financial stability and to promote the exchange of information and identification of gaps. Taken together, all this should improve our ability to reduce the incidence of financial crises, and to deal with those that nevertheless occur.

We in the BIS are particularly happy to host this conference in Basel, because its subject matter is so close to the heart of the activities of the BIS and the broader central bank community. The CGFS, in particular, has always had as its mission to understand and help shape the structural characteristics of financial markets.

I should say, finally, that now is a particularly appropriate time to address issues of risk measurement. It is true that the global financial system has, overall, shown a remarkable degree of resilience in the face of a confluence of economic shocks. However, recent developments have also exposed concentrations of systemically relevant financial risk exposures. In addition, much of what has been done by the official and private sector to anticipate and manage financial sector risk is now being seriously tested for the first time.

Market developments in response to the crisis in Argentina and the bankruptcy of Enron can be seen as both evidence of the substantial advances in risk management practices and a reminder that there is, and always will be, substantial room for improvement with regard to the way risks are being treated. Issues such as the nature of systemic banking crises, the sources of market liquidity, and how to further refine risk measurement methods, therefore, remain firmly on the policy and research agendas.

So much for the history and purpose of this series of conferences. Let me now consider some of the issues. I will first try to elaborate on what I will call the “**endogeneity of risk**” in the financial system. In my view, this concept is key to understanding the concept of financial instability. I will take the term financial instability to encompass two closely related phenomena: the potential for large destabilising

movements in asset prices and the possibility of financial institutions' distress or failure. Of course, periods of stress in financial markets can result from the knock-on effects of singular events involving individual market participants. More normally, however, generalised financial distress arises when groups of market participants are exposed to common risk factors. These factors, in turn, may be exogenous to financial decision-making processes. But, not infrequently, they are the consequences of endogenous forces within the financial system that tend to amplify the impact of exogenous developments or may even generate crisis situations themselves.

In what follows, I will argue that a more comprehensive approach to risk measurement is key to understanding these issues. Against this background, I will have a few words to say about some of the more specific topics addressed in the papers to be presented over the next two days, namely **banking stability and contagion**, **market liquidity**, **exposures to extreme events**, and **monitoring of systemic risks**.

The endogeneity of risk

Until recently, risks were essentially compartmentalised, with various categories of market and credit risk each being modelled and managed separately. In addition, under what might be called the "old view", sources of risk were seen as largely exogenous. Risk measurement and management systems were essentially based on the assumptions of atomistic markets: markets are made up of a very large number of independent agents, each of them too small to matter. The consequence of this implicit assumption was that risks were seen as independent of market participants' own actions.

Increasingly, however, risk is now seen as multidimensional. Advances in modern finance theory and information technology have identified and defined a multitude of risks, including - as well as market and credit risk - liquidity, operational, legal and reputational risk. Previously combined categories of risk, such as market risk, have been broken down into component categories. And correlations among risk factors have been realised to be of critical importance in the actual measurement of a portfolio's overall risk profile. Consequently, formal statistical models have been generated for the measurement and appropriate management of these risks. This development towards model-based, statistical risk measurement and management has greatly improved financial decision-making, by enabling market participants to more thoroughly understand their exposures. As a result, it can be argued that risk-taking decisions by market participants now conform more closely to their actual risk-bearing capabilities. This should have improved market efficiency, in terms of both pricing and resource allocation, as well as financial stability. However, risk management techniques are constantly evolving as conditions change. Each "crisis" brings to light new weak spots that need to be addressed.

Furthermore, as I said earlier, risk is now seen as endogenous. The environment is not given, but is the product of the actions of individual agents. As a result, systemic stability is critically determined by the collective behaviour of individual market players. Under this "new view", strategies of market participants, including policymakers and regulators, need to take account of any feedback of their collective actions on the conditions under which individual market participants operate. These insights have flowed from the game-theoretic contributions of recent years.

Decision-making processes, therefore, have to take account of the possibility that actions and policies that are reasonable or desirable from an individual perspective may result in unwelcome consequences at the system level. Financial firms need to manage risk with an eye on how their own behaviours are likely to influence those of other market participants. And supervisors need to analyse the interaction between individual incentives and systemic outcomes.

For example, it would be natural for market participants to cut exposures as market prices fall to match their "value-at-risk" to their diminished capital position. Such behaviour, especially by players whose positions are large relative to the overall market, would tend to deepen the decline in prices. This, in turn, might feed into other players' decision-making, potentially triggering further sales and a vicious circle that could end in a drying-up of market liquidity and a spreading of financial stress.

How serious in practice this phenomenon of endogeneity is depends on a number of factors, including the number of players and the diversity of their behaviour. It has been argued, for example, that the now widespread use of a relatively small number of similar risk management systems may induce significant numbers of market participants to respond to market developments in similar ways. This is not to say that the move towards more sophisticated, statistical risk management models should be

abandoned. By no means. These approaches have, for good reason, been widely adopted throughout the financial community - a development, by the way, which has been much supported by Basel-based bodies. Still, the fact that similar models are being used is a fact that is relevant, both to the optimal course of action for individual firms, and to the incentives embodied in supervisory guidance.

Let me repeat a point made earlier: there is always room for improvement in terms of understanding the limitations of what we know and of how this knowledge is being applied. It is for this reason that issues such as the appropriate treatment of operational and liquidity risks or the formal integration of market and counterparty credit risk have attracted growing interest. For the same reason, we still have to more fully understand the nature of systemic banking crises, the dynamics of market liquidity, and contagious effects across markets and countries.

There is a lively debate on these and related issues in academic as well as central bank and practitioners' circles, which I am sure will be taken further during this conference, in the light of the interesting papers that will be presented on these topics.

Specific issues

Let me turn now to some of these specific issues to be addressed in the conference:

Banking stability and contagion

Thinking about the nature, causes and transmission of crises has developed a great deal in recent years, building on the original Diamond and Dybvig model and other studies on banking crises and contagion. However, the nature and causes of systemic crises and of contagion across markets and countries are still only partially understood. Theoretical as well as empirical work on contagion is, therefore, still necessary, particularly as contagion continues to mean different things to different people. Some of the papers to be discussed today explore these issues. The models presented in these papers examine how financial turmoil might "travel" from one country or market to another. For example, sequential trading in the presence of asymmetric information may trigger contagious asset price movements. Movements in asset prices are important in determining the probability of bank runs. The way in which bank mergers take place can affect bank balance sheets and, in turn, system stability. Finally, the degree of development of bond markets can be shown to influence the effectiveness of financial market discipline and thus reduce overlending. An important policy implication of this analysis is the role of market development in helping to avoid emerging market crises.

Ultimately, thinking about these models helps improve our understanding of the real world. In turn, this understanding should eventually be reflected in risk management tools and prudential policies. I have myself spoken more than once on the need to add a degree of macroprudential orientation to existing regulatory and supervisory frameworks. But what are the appropriate instruments? Some have pointed to stress testing techniques or provisioning practices. Stress tests, for example, are used to supplement traditional risk measurement approaches, like value-at-risk. They are, therefore, recognition of the limited ability of such statistical models to accurately capture exposures under exceptional circumstances. These are just some of the questions we will be addressing during this first day of sessions.

Endogeneity of risk and market liquidity

I have already talked about how important it is, for market participants and policymakers alike, to understand the implications of endogeneity of risk. Nowhere is this endogeneity clearer or more important than in the matter of liquidity risk. Liquidity is, almost by definition, the combined result of the actions of a multiplicity of market players. Its availability depends on the existence of a diversity of market views, something that is in turn influenced by the evolution of risk management practices.

We know that, at times, market liquidity can evaporate, making trading impossible or, at least, much more difficult. In response, market participants, partially due to events like the LTCM crisis, have come to grasp the importance of liquidity risk. But work still needs to be done to more fully understand the sources of market liquidity and to deal with liquidity risk in a more sophisticated fashion, for example,

by applying stress testing techniques. I am encouraged to see that some of the papers to be presented at this conference address, in various ways, these issues. Other related topics include, for example, the potential importance of large investors in the determination of market prices and liquidity, and the microstructural specifics of liquidity provision on electronic FX trading platforms and in the Treasury and corporate bond and equity markets.

Exposure to extreme events

A number of the conference papers present efforts to enhance our understanding of the tails of statistical distributions of returns. And, indeed, it is the tails of the distributions that, from a financial stability perspective, matter most. For it is in times of stress, rather than in normal times, that traditional risk measurement models tend to convey imprecise or misleading information. One of the papers to be presented tomorrow compares two popular summary measures of financial risk, value-at-risk and expected shortfall, while another describes how the tail of the loss distribution in portfolio credit risk models depends on modelling assumptions and certain parameter choices. Developing our understanding of these issues is central to moving beyond summary statistics such as VaR as a sufficient expression of the risk profile of an enterprise or a trading activity. Doing so, however, involves addressing even more complex issues. For example, how might the strategic interaction of market participants and use of standard measures of risk lead market participants to underestimate the true risk of their positions? Can this tendency to underestimate be quantified? Can offsetting incentives be designed? We understand by now that the strict application of certain risk management tools such as VaR can reduce risk-taking in normal circumstances at the expense of increasing exposure to extreme events. This could well make crises much worse once they strike. Of course, we don't want to "turn back the clock". What we need to do, however, is to understand the potential implications of what is being done and to avoid that the processes used are implemented in an overly rigid fashion, potentially impairing the scope for independent judgment by the decision-maker.

Monitoring of systemic risks

It should be clear by now that the analysis of systemic risks is high on the policy agendas of central banks. Some of the papers to be presented tomorrow show how financial market and banking data can be used to monitor the fragility of banking sectors. One paper, for example, attempts to show how Merton-type, market-based indicators can be usefully employed to predict banking fragility by adding to the information gained from more traditional, balance sheet-based indicators. In this regard, I find it particularly useful to have the opportunity to hear how a central bank assesses potential contagion risks in the banking sector in practice - by monitoring counterparty exposures in the interbank market using unique data detailing the largest uncollateralised exposures of the four major market players.

Conclusion

Let me again highlight the main goal of the conference, which is to bring together the research and policy communities in order to achieve a "virtuous loop" of interaction that provides feedback from the policy agenda to research and back to the policy agenda. I am sure that this conference will take us a step further in this regard, and I look forward to a stimulating two days of discussions.