# Lívia Sánta: The role of central banks in crisis management – how do financial crisis simulation exercises help?

*The fundamental task and responsibility of central banks is to maintain and promote the stability of the financial system. In order to achieve this, central banks strive to prevent crises using all the instruments at their disposal. If a crisis occurs, central banks play a significant role in efficient crisis management and the crisis resolution process. In spite of the crisis prevention activity of the authorities – including central banks – crisis events can not be avoided.*

*The crises potentially emerging in modern banking systems are basically the consequence of the imperfect functioning of financial markets. In addition, external shocks can trigger crises as well. In order to support the stability of the financial intermediary system and to help restore market confidence, there may be a need for central banks to carry out aggregate liquidity increasing measures which affect the market as a whole and for emergency liquidity assistance based on individual consideration, in line with the 'lender of last resort' function. Continuous development of crisis management work and the related instruments is needed in order to ensure quick and efficient central bank decisions. One of the most important elements of crisis management is the organisation of crisis simulation exercises.*

*Within the European Union, special emphasis has been placed on the development of a crisis management framework aimed at promoting more efficient co-operation between the competent authorities, since a significant number of cross-border banking groups have been formed throughout Europe recently. A potential crisis in a parent bank's country affecting a larger banking group may jeopardise the stability of the financial intermediary system in the countries of subsidiary banks as well, through the interrelationships within the group. This article outlines the significant assistance that these exercises can provide for central bank decisions and for the development of co-operation between authorities.*

## INTRODUCTION

Over the last 20-30 years there have been numerous crises which have affected the entire financial intermediary system and/or individual financial institutions. The reasons behind these crises have been varied: some were brought about by macroeconomic, or structural/institutional factors (e.g. inadequate regulation during financial liberalisation), whilst others can be traced back to microeconomic causes (e.g. excessive growth, inefficient risk management methods).

The basic underlying reasons for the crises potentially emerging in modern banking systems are the inefficient and imperfect functioning of financial markets and the asymmetrical information emerging in markets. Financial crises can be triggered by external shocks as well. The fact that a significant number of cross-border banking groups have come into being throughout Europe may also increase the probability of a crisis situation. A crisis can affect a particular country, but through the ownership and funding channel, the crisis can easily spread to the financial intermediary system of other countries as well. Furthermore, the occurrence of crises can be facilitated by the recent strengthening in the integration of financial markets and the appearance of increasingly complex financial products, as risk management cannot always keep pace with the complexity of the products.

Although the probability of the emergence of crises is lower in a balanced economic environment, the negative effect of such crises may be more serious as a result of markets and products becoming more complex. In the event of a general lack of confidence in the money market and/or if the crisis at the credit institution(s) concerned jeopardises the stability of the financial intermediary system,[1] aggregate liquidity increasing measures by central banks and emergency liquidity assistance to individual banks on the basis of the 'lender of last resort' function may become necessary,[2] in order to restore confidence and support financial stability.

The importance of central banks' role in crisis management and solving liquidity problems is highlighted by the fact that

[1] A crisis jeopardises the stability of the financial intermediary system if it triggers a significant negative effect among credit institutions, at financial markets, in the financial infrastructure or in the real economy.

[2] 'According to the Magyar Nemzeti Bank Act, in the event that circumstances arise which jeopardise the stability of the financial system due to the operation of a credit institution, the MNB may extend an emergency loan to the credit institution, observing the prohibitions on monetary financing.

the crisis on the US sub-prime mortgage market also affected the European money and capital market. As a result, in addition to central bank measures which increased aggregate liquidity and affected the market as a whole (e.g. European Central Bank, Bank of England), central bank intervention for individual bank also became necessary (e.g. emergency liquidity assistance by the Bank of England to the Northern Rock credit institution).

On the one hand, this article explores central banks' role in crisis management, and on the other hand it shows how crisis simulation exercises facilitate and strengthen the efficient resolution of liquidity problems and crisis situations. In addition to describing the general objectives, successes and lessons drawn from simulation exercises, this article also discusses the MNB's prominent role in developing and organising such exercises.

## CENTRAL BANKS' ROLE IN CRISIS MANAGEMENT

In recent years, financial markets have become strongly integrated, and increasingly complicated, complex financial products have come to existence. Furthermore, with the creation of banking groups pursuing cross-border activities, increased attention has been paid to risk and crisis management work.

Complex financial products facilitate a more flexible, efficient distribution of risks among the participants of the money and capital market, but they also contribute to the more rapid spread of emerging new risks. Regarding the risks at banking groups, subsidiaries significantly rely on the parent bank's financial resources in general, and as a consequence a shock affecting the parent bank may cause serious financial problems at the subsidiaries as well. On the other hand, a crisis at a major subsidiary can also have a negative influence on the parent bank through the contagion channel within the group.

As a consequence, the development of risk management tools as well as the preparation of stress tests and 'emergency scenarios' for solving unexpected situations has gained special importance, both for market participants and individual authorities.

In terms of risks, a wide range of changes have taken place recently in the evolution and management of *liquidity risks*. For participants in the financial intermediary system, including credit institutions, it is primarily the responsibility of the institution's management to take steps to provide for the liquidity required for operations, and to continuously develop the techniques and instruments employed to reduce and manage liquidity risks. It is important to emphasise that in the event of a crisis or liquidity problems,[3] the primary task and responsibility of the management and the owners (parent bank) of the credit institution is to take the measures necessary for solving the liquidity problem. This can include a wide range of measures, e.g. additional source of funding from the owner or another member in the banking group, using central bank standing facilities, borrowing with collateral on the money market, etc.

In addition to the authorities (such as central banks, supervisory authorities and ministries of finance), which are responsible for supporting the stability of the financial intermediary system, it is a primary task of central banks to prevent crises. Supervisory authorities and ministries of finance contribute to the achievement of this target through their prudential supervisory activities, focusing on risks and the formulation of regulations which facilitate the efficient operation of money and capital markets, respectively. Central banks, in turn, using various macroeconomic scenarios analyse the resilience of the financial intermediary system to macroeconomic shocks, and, using stress tests, examine market participants' vulnerability to various risks. In addition, central banks inform the participants in the financial intermediary system about current issues regarding financial stability in their various publications, in order to increase the risk awareness of those concerned. In the event of a crisis, however, the authorities are responsible for ensuring efficient management, i.e. solving the problems within the shortest period of time possible and at the lowest cost for society.

Central banks usually play a prominent role in solving crises emerging on the money market, at credit institutions and in the financial infrastructure, since the first signs of a crisis usually appear as significant liquidity troubles. By monitoring developments in money markets and developments of problems in payment and clearing transactions, non-payments and 'queuing' it is possible to draw conclusions regarding the seriousness of the potential danger of contagion. In other words, this makes it possible to determine whether a liquidity problem is unique or the troubles emerging in the interbank market may generate a general liquidity shortage, and whether the liquidity problem of the credit institution concerned can result in serious troubles in the payment transactions of other credit institution(s), due to non-payment.

In the event of a general confidence crisis in the money market and liquidity problems affecting the market as a whole, the central bank can apply – in addition to the normative monetary policy instruments – general liquidity increasing

[3] Liquidity trouble: short-term payment problem. A credit institution is illiquid if it does not have sufficient funds to be able to meet its obligations over the short run.

measures which help the whole market. If the crisis appears as an individual credit institution problem, it is important to emphasise the absolute priority of crisis solution within the private sector. This means that if the credit institution turns to the central bank for emergency liquidity assistance, the central bank primarily insists that the crisis be solved by the owners and the creditors. Beyond this, it can undertake an active mediatory role in the organisation of a solution within the private sector, e.g. in the organisation of a syndicate providing the additional liquidity.[4] In the event of an incident in the financial infrastructure, the central bank can also extend the working hours of the settlement system.

The emergency liquidity assistance which the central bank can grant is really the last of the central bank's crisis solution instruments. It is the central bank's discretional right and depends solely on its assessment and decision whether to grant such credit, and if so, on what conditions, in order to maintain and support the stability of the financial intermediary system and to restore the confidence of the money market.

Of course, crisis management and solving liquidity and solvency problems[5] require close co-operation between the responsible authorities and efficient co-ordination of the necessary measures, including market solutions as well. In order to maximise the efficiency of crisis management, the authorities also formulate internal rules of procedure to be applied in the event of a crisis. As central banks, supervisory authorities and ministries of finance have different instruments at their disposal in a crisis situation and they can take different measures at the various stages of a crisis: thus, it is very important to ensure the flow of information between the authorities and to clearly delineate the scope of duties, responsibilities and decision-making powers. Laying new foundations for co-operation between authorities and creating a framework for crisis management have gained special importance recently, both at the national level and between the authorities of individual countries.

## CREATING A CRISIS MANAGEMENT FRAMEWORK WITHIN THE EUROPEAN UNION

Recently, a significant number of banking groups pursuing cross-border banking activities have been formed in Europe. A potential crisis in a parent bank's country affecting a larger banking group may also jeopardise financial stability in countries where subsidiary banks are located, through the interrelationships within the group. In addition, a broader crisis may significantly weaken the efficiency of the central bank's monetary policy measures as well.

Despite the increasing activity of cross-border banking groups, the supervisory structure and central banks' emergency liquidity assistance activities have remained at the national level. Furthermore, the practices in the regulations governing the financial intermediary system differ somewhat from country to country, despite the steps towards legal harmonisation within the EU. In order to eliminate the resulting problems, within the EU greater emphasis is being placed on co-operation between authorities and the creation of frameworks which facilitate more efficient crisis management. This purpose is served by the provisions regarding crisis management of the EU directives,[6] as well as national-level, bilateral, regional and EU-level voluntary agreements – in the form of Memoranda of Understanding – between the authorities of individual countries to be applied in the event of a crisis, and also by simulation exercises which test these co-operation frameworks.

Voluntary agreements which set out procedures for co-operation between authorities constitute a prominent element of the crisis management framework. As the tasks and interests of individual authorities are different, conflicting interests may emerge during crisis management. Therefore, it is important that the authorities determine the scope of duties, responsibilities and decision-making powers in the form of preliminary agreements, define the processes for the flow of information, and clarify issues which require co-operation between authorities.

Within the European Union, two Memoranda of Understanding have been adopted which determine the basic principles and establish a practical co-operation framework for cross-border crisis management.[7] An example of regional co-operation is the agreement between the central banks of some North European countries (Denmark, Finland, Ireland, Norway and Sweden), aimed at strengthening co-operation in the event of a crisis. As for bilateral co-operation, e.g. the Dutch and Belgian authorities have concluded an agreement to increase the efficiency of their supervisory and crisis management activities.

[4] In the USA, the Fed coordinated among the market participants during the LTCM crisis.

[5] Solvency problem: if the regulatory capital of the credit institution declines below the level required by the relevant provisions of law. A credit institution is insolvent, if it is unable to meet the claims outstanding vis-à-vis it, as the market value of its assets does not reach the value of its obligations.

[6] The CRD (Capital Requirements Directive: 2006/48/EC, 2006/49/EC) and the FCD (Financial Conglomerates Directive: 2002/87/EC) also contain provisions regarding crisis management and co-operation between the authorities of the countries of the parent bank and subsidiary banks.

[7] Memorandum of Understanding on high-level principles of co-operation between the banking supervisors and central banks of the European Union in crisis management situations (2003). Memorandum of Understanding on co-operation between the Banking Supervisors, Central Banks and Finance Ministries of the European Union in Financial Crisis Situations (2005).

A crisis at a banking group pursuing cross-border activities and the management of such a crisis raises a number of questions, both for the authorities which supervise the parent bank and for those responsible for supervision of the subsidiaries (branches). Due to the high level of foreign ownership, this is an important aspect for Central East European (CEE) countries, including Hungary as well. In the region's banking sector, except for Slovenia, the ratio of foreign ownership ranges between 59% and 83%. In the Central East European region, several large banking groups operate with parent banks which have their respective seats within the EU and significant subsidiaries in at least two CEE countries.

Most probably, a potential credit institution crisis in a regional banking group will not remain an isolated problem within a single country, as the crisis may have a negative impact on the financial intermediary systems of several countries and on the real economy as well, due to the ownership and financing channels. In the event of a crisis, solving the problem and taking the necessary measures is primarily the responsibility of the owners (the parent banks).

If the owners are not able or willing to provide for the measures required for averting the crisis, and according to the authorities' assessment the crisis may jeopardise the stability of the financial system, the efficient management of the crisis may require intervention by the authorities and co-operation.

In the event of a crisis at a cross-border banking group, the EU-level crisis management framework lays out certain basic principles for the co-operation between the authorities of the countries of the parent bank and the subsidiary/branch. Accordingly, the main responsibility of the authority of the parent bank country, i.e. the authority performing consolidated supervision, is the co-ordination of crisis management and decision-making, as well as supplying individual authorities with adequate information, and also, if necessary, involving the relevant countries affected by the crisis in the process of crisis management. In the event of a liquidity crisis, the central bank of the parent bank country, while in case of a solvency problem the ministry of finance, may also become active players in co-ordinating the crisis solution.

In addition to the primary responsibility of the national authorities responsible for the parent bank, the authorities of the country where the subsidiaries/branches have their seats also have to prepare for taking the necessary measures, if they are of the opinion that the crisis jeopardises the financial stability of the given country. This preparation is facilitated by the simulation exercises.

## GOALS AND TYPES OF CRISIS SIMULATION EXERCISES

Creation of the aforementioned agreements which set out procedures for co-operation between authorities is an important step towards more efficient crisis management. However, when there is no crisis situation, the most efficient and practically only tool to test the operation of the framework is to carry out financial crisis simulation exercises.

The basic goal of such exercises is to test in the period preceding a crisis those areas affecting co-operation, based on which individual organisations' demand for information, the scope of duties, responsibilities and decision-making powers as well as the issues which require co-ordination between individual authorities can be defined. A preliminary clarification of all this greatly contributes to more efficient, faster decision-making, i.e. to crisis resolution resulting in the lowest cost for society.

Accordingly, the goal of the exercises is to maximise the efficient management of a potential crisis, and to facilitate the preliminary formulation of rules of procedure, information channels, decision-making mechanisms and communications tactics, which allow the restoration of confidence in the financial intermediary system and the strengthening of financial stability.

Central banks usually play a prominent role in the organisation of simulation exercises. This also stems from the fact that it is central banks which encounter the first signs of a crisis, through troubles emerging in the money market and the problems arising in payment and settlement transactions. In addition, on the basis of taking account of the circumstances and the negative effect of the crisis, the central bank can provide temporary liquidity assistance until further steps, if any, are taken by the supervisory authority or the ministry of finance. The central bank must make such decisions in a short time and very often in an ambiguous solvency situation. Moreover, it is also a very complex task to decide to what extent the crisis jeopardises the stability of the financial intermediary system. Simulation exercises provide valuable assistance for considering and answering all these questions and for identifying decision points and alternatives.

There are several types of exercises, depending on the area of crisis management which the authorities intend to test.

- Exercises *within the central bank* can concentrate on testing central bank steps to be taken in the event of a crisis, the process of emergency liquidity assistance and the communication necessary in a crisis. If the given country is an important financial centre, the central bank concentrates for example only on the testing of troubles emerging in the payment and settlement system and in the money market in a special exercise for each case. In other central banks' practices, these latter issues are embedded among the other goals intended to be tested.

- At the *national level,* the basic objective of exercises carried out with the involvement of the central bank, the supervisory authority and the ministry of finance is to test the co-operation, flow of information and decision-making mechanisms between authorities as well as to strengthen all these by exploring any deficiencies which are identified.

- A *regional* exercise – held for example by Scandinavian countries – tests co-operation in the event of a crisis of banking group members present in the member countries.

- *At the European Union level,* the first simulation exercise was held in 2003, with the involvement of the representatives of the central banks and supervisory authorities of all member countries. Ministries of finance were also represented in the second exercise held in 2006. The objective of the EU-level simulation exercises was to evaluate the flow of information, co-ordination and decision-making mechanisms between authorities, the systemic implications of the crisis, sharing of costs, if any, as well as to test the efficiency of the voluntary agreements concluded, in the event of a cross-border crisis.

- During the two simulation exercises (management of a complex financial crisis) held by the central banks belonging to the *Eurosystem,* the Eurosystem's crisis management activity and ways to harmonise the common monetary policy decision-making with the emergency liquidity assistance belonging to the decision-making powers of national central banks was tested.

## CRITERIA FOR THE SUCCESS OF SIMULATION EXERCISES

Organisation and performance of such simulation exercises poses significant challenges for both the experts who prepare the exercise and the participating decision-makers.

*On the one hand, the success of an exercise depends on the design of the crisis scenario.* The majority of exercises comprise fictive countries, credit institutions, financial markets and payment systems. It is a trend that scenarios strive to be increasingly realistic. Experts who prepare the exercises need to carefully consider what factors may trigger a crisis at the national, regional and EU levels and what so-called channels of contagion may be relevant. Stress tests may help in highlighting the vulnerable points. In national-level simulations, actual banking data modified in accordance with the goal of the exercise are often used.

Depending on the objective, crisis scenarios can vary widely. A crisis can be triggered, for example, by fraud at a credit institution, the bankruptcy of an important client that has representations in several countries, which results in considerable losses for the bank(s), and sudden, unfavourable money market developments as well. Furthermore, as a consequence of interrelationships within the group, a crisis within a banking group may start both from the parent bank or any of the subsidiaries. For example, a sudden reputation loss at a member of the group and the resulting external financing problems can easily spread to the other group members as well. In more complex scenarios, in addition to crises at credit institutions, negative impacts appearing in the infrastructure and in real economy also play a prominent role.

*A scenario is good, if it poses the greatest challenges possible for the decision-makers,* i.e. for example, if the crisis evolves quickly, an unforeseeable contagion effect develops, the systemic implication of the crisis is very complex and difficult to assess in advance, and if the solution of the crisis may have various outcomes. A further difficulty for decision-makers is if it is not clear whether the bank(s) concerned has (have) a liquidity or a solvency problem. (Although it should be noted that in the event of a crisis, in most cases it is the solvency situation of the bank affected by the crisis which is questionable.) The challenge is increased, if decision-makers must make their decisions on the basis of imperfect and insufficient information, as well as under significant time pressure and pressure from the media.

In the course of the exercise, decision-makers continuously receive news and updated information on the developments in the crisis. Those preparing the exercise have to consider decision-makers' potential reactions, and corresponding outcomes have to be planned. The general practice of preparing a simulation is that the expert staff prepare all theoretically necessary information and materials for the preparation of the decision, and hand them over at the decision-makers' request. (This also includes the case when the experts want to present insufficient information deliberately.)

*On the other hand, the success of an exercise depends on the reactions of the decision-makers.* It is essential that those high-level executives of authorities participate in the exercise who actually make the necessary decisions during a crisis. It is also necessary that they enter fully into the spirit of the exercise, and behave as in a real crisis. To a great extent, success depends on whether the decisions made under significant time pressure are indeed realistic.

In addition to the decision-makers and the experts running the simulation, spokespersons for the authorities may also participate in the exercise when testing external communication, and other players as well, who for example represent the bank in trouble, journalists or foreign authorities.

## LESSONS AND FINDINGS OF SIMULATION EXERCISES

A simulation exercise is successful and fulfils its objective if it provides a lesson and highlights the weaknesses, deficiencies and potential conflicts in the co-operation of authorities. Furthermore, if based on the above, the decision-makers specify tasks to remedy the deficiencies and if the problems that arise are resolved.

In the simulation exercises at various levels, numerous problems and deficiencies with many different aspects have cropped up, and identification and/or solution of these problems and shortcomings has significantly contributed to improving co-operation between authorities. The main issues can be summarised as follows:

- In the event of a crisis, in order to provide the necessary information for decision-making and to reduce the data supply burdens of the bank affected by the crisis, the authorities (central banks and supervisory authorities) harmonised the scope of extraordinary data supply. The authorities also harmonised who contacts foreign authorities and the parent bank, if such measures become necessary. Based on the exercises, the scope of all relevant pieces of information – available only at one of the authorities – was identified, the provision of which is absolutely indispensable for the other institution's decision-making. Timely information flow with adequate contents and efficient communication between the authorities is absolutely necessary for rapid decision-making which involves the smallest possible burden for society.

- It can be considered as a significant result that the co-operation agreements to be applied in a crisis were refined upon on the basis of the experience of simulation exercises, and in several cases the agreements were formulated after the exercise. The exercises contributed significantly to the refinement of the scope of duties and responsibilities to be discharged by central banks, supervisory authorities and ministries of finance as well as of the areas which require co-ordination, even if the fundamental principles of co-operation were previously included in the framework of an agreement.

- The experiences gained in simulation exercises called attention to the necessity to formulate systemic assessment criteria, i.e. to elaborate the factors based upon which the systemic implication of a crisis can be evaluated. As a result, a common framework for systemic assessment was formulated at the EU level, the adoption of which by member countries allows the comparability of evaluations prepared on the basis of the common methodology. The exercises also showed how important it is that authorities discuss – and if possible, harmonise – their assessment regarding the systemic implication of a crisis, and inform one another about the measures planned and the impacts thereof. Harmonising these issues is extremely important for efficient crisis management, both between the national authorities of a country affected by a crisis and between the authorities of individual countries in the event of a cross-border crisis.

- Basic principles to provide guidance for the authorities of the EU member countries for the management of cross-border crises with systemic implications were formulated on the basis of exercises simulating banking group crisis management. These exercises also allowed the identification of all potential problems stemming from the differences in regulations and practices between countries, the elimination of which is indispensable for efficient crisis management. Simulations facilitated the consideration of various crisis solution possibilities as well as the development and refinement of the relevant instruments and techniques and also clarification of the areas where costs can be shared between individual authorities.

- Exercises highlighted that in the event of a crisis the formulation of adequate external communication and its harmonisation between authorities is extremely important for the restoration and strengthening of market confidence. Based on all of the above, individual authorities formulated the external communication strategies to be applied in the event of a crisis.

- In the course of the exercises it was demonstrated that it is necessary to formulate the basic principles determining the measures of authorities and relating to crisis management in advance, but it is very important to apply the available instruments in a flexible manner, depending on the developments in the crisis. As a result of the simulations, internal procedures and regulations became more concrete and practice-oriented, and the relevant contact persons for crisis situations were also specified at the specific authorities.

- In the course of the exercises and their evaluation, decision-makers at the various authorities discussed the issues which caused problems, the conflict situations which emerged, and thus became more aware of one another's reactions and ways of thinking, which may greatly facilitate crisis management during a real crisis.

- Based on the experiences of the exercises they also determined all of the future tasks both at national and EU levels, the fulfilment of which is necessary for the development of crisis management. In various committees of the EU, work is in progress in order to make the co-operation between competent authorities more efficient, and to enable EU-level co-operation agreements and the crisis management framework to keep pace with the development of financial markets.

There are a number of new ideas and opportunities for progress arising in connection with the organisation of future exercises and the formulation of scenarios. Making simulations more realistic is the aim of those ideas, for example, which suggest that the exercise should be unexpected, decision-makers should not be aware of the date of the exercise in order to make them experience the outbreak of the crisis as a real stress situation, and also e.g. that the person to be notified in the event of a crisis should not be available. Testing of market solutions would also be facilitated by involving real market participants in the exercises.

## THE PARTICIPATION AND ROLE OF THE MAGYAR NEMZETI BANK IN CRISIS SIMULATION EXERCISES

Under the direction of the MNB, the Hungarian authorities organised the first simulation exercise with the involvement of the central bank and the supervisory authority in 2005. It can be considered as progress in co-operation that in the exercise held in the first quarter of 2007 the Ministry of Finance was also an active participant. In the exercises, in addition to testing the sharing of information and co-operation between authorities in the event of a crisis, special emphasis was laid on external communication and, in the second simulation, on testing crisis solution possibilities with the involvement of the MoF. Senior executives of the organisations described the exercises as successful and useful, as they contributed significantly to the improvement of the efficiency of co-operation.

One of the important results of the exercise was that, also taking account of the experiences gained from the simulation, in 2006 the MNB and the Hungarian Financial Supervisory Authority (HFSA) signed an agreement on the principles and framework of co-operation in crisis situations, in order to increase the efficiency of their co-operation. Following the simulation held with the participation of the MoF in 2007, in accordance with the practice in the EU, the agreement is completed with the undertaking of a role by the Ministry of Finance in crisis solutions.

In addition to national-level exercises, the MNB's representative participates in EU-level simulation exercises as well. In the exercise held in 2003, the MNB's representative, as one from a future member country, participated only as an observer, while in the second exercise held in 2006 the MNB's representative was an active participant, together with the representatives of the HFSA and the MoF.

In terms of the simulation exercises formulated with the MNB's co-ordination, the Hungarian authorities play a leading role among newly joined countries. At regional and EU-level conferences and special expert meetings the MNB shares its experience relating to the challenges and lessons of crisis simulation exercises as well as the future tasks stemming from the exercises. Within the framework of co-operation with central banks of the region, during expert visits it also provides information about the methodology of formulating and organising the exercises.

In accordance with international practice and in order to increase the efficiency of domestic-level crisis management work, the MNB intends to organise regular simulation exercises in the future as well, focusing on various areas. In addition, in the future the MNB intends to test co-operation between domestic and foreign authorities in a crisis situation, and also urges regional-level simulation exercises.

Moreover, in order to develop the crisis management framework, the MNB – together with the supervisory authority – plans to conclude bilateral co-operation agreements to be applied in crises situations with the authorities of countries responsible for parent banks which have systemically relevant subsidiaries in Hungary.

## CONCLUSIONS

Recently, developments in the international money market, the impact of the US sub-prime mortgage market crisis on the European money market and the mitigation of its negative impact on the markets have been factors which have required very quick reactions from central banks. All of these events call the attention to the necessity of the continuous development and fine-tuning of the central bank crisis management framework and instruments.

A prominent element of this crisis management framework is the performance of crisis simulation exercises, which is practically the only instrument to test crisis solution before an actual crisis. Crisis situations cannot be prevented by the exercises, and it is obvious that all crisis and decision situations and crisis solutions cannot be tested in the course of the simulations. However, the deficiencies and problems which emerge during the exercises, the identification of potential conflicts of interest between authorities and the solutions thereof contribute to the improvement of the co-operation between authorities and to quick solutions, which result in the lowest possible costs for the society both at the national level and when managing cross-border crises.

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