ISSN 1936-5330

THE FEDERAL RESERVE BANK of KANSAS CITY
ECONOMIC RESEARCH DEPARTMENT

What Can Financial Stability Reports Tell Us About Macroprudential Supervision?

Jon Christensson, Kenneth Spong, and Jim Wilkinson

December 2011
RWP 11-15

RESEARCH WORKING PAPERS

What Can Financial Stability Reports Tell Us About Macroprudential Supervision?

Jon Christensson, Kenneth Spong, and Jim Wilkinson*

December 2011

Abstract: Many countries have suggested macroprudential supervision as a means for earlier identification and better control of the risks that might lead to a financial crisis. Since macroprudential supervision would focus on the financial system in its entirety and on major risks that could threaten financial stability, it shares many of the same goals as the financial stability reports written by most central banks. This article examines the financial stability reports of five central banks to assess how effective they were in identifying the problems that led to the recent financial crisis and what implications they might have for macroprudential supervision.

The financial stability reports in these five countries were generally successful in foreseeing the risks that contributed to the crisis, but the reports underestimated the severity of the crisis and did not fully anticipate the timing and pattern of important events. While the stress tests in these reports provided insights into the resiliency and capital needs of the banks in these countries, the stresses and scenarios tested often differed from what actually occurred and some of the reports did not consider them to be likely events. One other major challenge for the central banks was in taking the concerns expressed in financial stability reports and linking them to effective and timely supervisory policy. Overall, the reports were a worthwhile exercise in identifying and monitoring key financial trends and emerging risks, but they also indicate the significant challenges macroprudential supervision will have in anticipating and addressing financial market disruptions.

JEL Classifications: E44, G01, G21

Keywords: macroprudential supervision, financial stability reports, financial crisis, banks

The authors are grateful for suggestions made by Snorre Evjen and other participants at the Norges Bank Research Conference on Government Intervention and Moral Hazard in the Financial Sector, September 2010, and by Reint Gropp and other participants at the 4th UniCredit Conference on Banking and Finance, December 2010.

*Jon Christensson is a marketing analyst at Cox Communications and Kenneth Spong and Jim Wilkinson are assistant vice presidents at the Federal Reserve Bank of Kansas City. The views expressed are those of the authors and do not necessarily reflect the positions of Cox Communications, the Federal Reserve Bank of Kansas City, or the Federal Reserve System.

Many of the origins of the recent financial crisis were in the United States, beginning with subprime mortgages and mortgage-backed securities. However, this crisis quickly spread on a global basis, enveloping countries with similar asset price bubbles and rapid increases in debt levels. It hit nearly every other major country because of linkages through interconnected markets, foreign funding sources, and international trade. Few market participants or regulatory authorities saw this crisis coming, and all underestimated its severity.

In every major country, the financial crisis is now sparking many proposals to address its perceived causes and prevent a recurrence. One idea for ensuring a more stable financial system that many central bankers and supervisory authorities are discussing is macroprudential supervision. Macroprudential supervision would attempt to focus supervision more on the financial system as a whole and on the overall risk to the economy. It would be a departure from the nearly exclusive reliance that supervisors have traditionally placed on microprudential supervision and its narrower goal of evaluating the condition of individual financial institutions.

Macroprudential supervision is receiving much attention now because supervisors, with their focus on individual institutions, failed to recognize and address a number of the critical risk factors behind the crisis. These factors include a surge in housing prices and rising imbalances in financial markets due to rapid debt growth. Also playing an important role in the crisis were common and interconnected exposures among institutions and the substantial growth in new and untested financial instruments, risk models, and funding and investment vehicles.

Consequently, there is a growing consensus that supervisors could benefit from more of a macroprudential supervisory approach, and a number of such steps have already begun, including the European Systemic Risk Board and the recently legislated Financial Stability Oversight Council and its Office of Financial Research in the United States. However, there are numerous questions about how a macroprudential approach could be implemented. For instance, what financial measures and trends should be analyzed and modeled, how successful will this analysis be in identifying imbalances and other factors that could lead to a crisis, and how will any of this be translated into appropriate supervisory or other policy actions?

Fortunately, most central banks already perform much of this role through the financial stability reports (FSRs) that they publish. These reports review the condition of the financial system, identify and assess major risks to the system, and suggest market or policy changes to address significant risk concerns. The reports are written on a regular basis, which provides a good perspective on how financial risks might be changing over time. Moreover, the primary goal of an FSR is to promote financial stability, thus linking FSRs closely to the expectations many have for macroprudential supervision.

The recent financial crisis provides a good opportunity to assess the effectiveness of these reports and, in turn, what macroprudential supervision might be able to accomplish and the challenges supervisors might face in adopting this approach. This article analyzes the FSRs prepared by five European countries that were affected by the financial crisis—the United Kingdom, Sweden, the Netherlands, Spain, and Norway. We examine whether the reports gave the central bankers and others useful information before and during the crisis.

Our analysis finds that the FSRs in these five countries were generally successful in identifying the risks that played important roles in the crisis—although the reports were less certain in deciding which risks might be realized, and the severity of the crisis was underestimated in nearly all the reports. While the FSRs may not have provided a full warning of this crisis, it would be a mistake to say that they didn't provide useful information and insights. These reports, in fact, may have given central banks and other public authorities a better understanding of the underlying structure of financial markets and the problems that would arise during the crisis, including whether such problems would result in liquidity or solvency issues. The FSRs may have further helped policymakers in deciding what actions should be taken. These results suggest that macroprudential supervision could offer similar benefits, as well as many of the same challenges.

The first section of the article describes the concept of macroprudential supervision and looks at FSRs and their purpose, benefits, and general characteristics. The second section gives a brief overview of the financial crisis. The following section discusses the FSRs of the UK, Sweden, the Netherlands, Spain, and Norway. These discussions highlight the unique aspects of the crisis in each country and the risks identified by the FSRs. A final section evaluates the effectiveness of FSRs and examines what they might tell us about macroprudential supervision.

I. MACROPRUDENTIAL SUPERVISION AND FINANCIAL STABILITY REPORTS

The topic of macroprudential supervision has been discussed for a number of years, including before the current crisis. It has yet to play a formal and well-defined role

in supervision, although supervisors historically have tried to consider the broader financial environment and its implications for individual financial institutions and their risk exposure. Macroprudential supervision, though, would take this broader view of the financial environment and its stability a step further and incorporate it more directly into a countercyclical approach to supervision.

While the use of macroprudential supervision is still in its infancy, financial stability reports have become an increasingly important tool over the last decade or so for promoting stability. One study notes that in 2005 almost 50 central banks published an FSR (Čihák (2006)).[1] The United States is the only major industrialized country that has not published one. However, the Federal Reserve and other U.S. regulatory authorities have regular surveillance and monitoring programs, and recent U.S. financial legislation will require the Office of Financial Research to begin reporting to Congress annually on financial stability.[2] Both macroprudential supervision and FSRs are described below, along with their potential for promoting financial stability.

Macroprudential supervision

Macroprudential supervision has been defined in a number of ways, but its basic objective is to develop a supervisory approach that is focused on ensuring the stability of the financial system in its entirety, while limiting systemwide financial distress and any resulting effect on the overall economy (Crockett (2000), Borio (2003), Group of Thirty (2010)). Macroprudential supervision thus represents a departure from the more traditional microprudential supervision, which focuses on the risks taken on by individual institutions in isolation (idiosyncratic risk) and whether these institutions are sound. Macroprudential supervision, in contrast, would look at factors that could affect the

stability of the financial system (systematic risk) and, in turn, the general economy. This could include giving greater attention to the largest institutions as systemic threats, examining common exposures and counterparty linkages among major institutions and markets, and any shocks that could develop from asset bubbles, credit expansion and leverage, and macroeconomic conditions (Borio (2003)).

On a more practical level, macroprudential supervision would entail monitoring systematic risk and designing supervisory steps to limit or address this type of risk in a timely manner. Financial researchers have suggested and, in some cases, tested a variety of indicators as macro-risk measures, including standard balance sheet or "financial soundness" indicators, indicators constructed from market prices, early warning indicators and financial stress indexes based on such factors as debt and asset price trends, and macro stress tests (Borio and Drehmann (2009), Smaghi (2009)).

Macroprudential supervision would also rely on a number of new or revised supervisory and policy steps. These policy approaches can be divided into three basic, but sometimes overlapping, categories: (1) countercyclical regulatory steps that may take the form of automatic, built-in stabilizers, (2) improved measures to deal with contagion, and (3) discretionary policies to address major threats to financial stability.

Among the suggested countercyclical approaches are regulations that would require financial institutions to strengthen their capital, liquidity, reserves, and/or loan-to-value ratios during more prosperous times to levels that would be sufficient to withstand periods of significant distress (Crockett (2000), Borio (2003), Group of Thirty (2010)). One current example of this is the dynamic provisioning process introduced in Spain in

early 2000, which requires Spanish banks to not only provision against individual identified loan losses (specific provision), but also set aside general provisions that reflect recent credit growth, historical and current specific provisions, and the average level of losses in a non-cyclical year (Saurina (2009)).

Another example is the Basel III agreement announced in September 2010, which calls for institutions to hold a capital conservation buffer and to build up a countercyclical capital buffer during periods when a country is experiencing excess credit growth (Basel Committee on Banking Supervision (2010), Caruana (2010)). This countercyclical capital buffer is to be composed of common equity or other fully loss absorbing capital in an amount of up to 2.5 percent of risk-weighted assets. In a similar manner, the recent Dodd-Frank financial reform legislation in the United States will require federal banking agencies to make their capital requirements countercyclical, so that the amount of required capital "increases in times of economic expansion and decreases in times of economic contraction."

Measures to address contagion risk could encompass stronger regulation and supervision of systemically important institutions, monitoring and control of large counterparty exposures, and strengthening of clearing and settlement systems. The Dodd-Frank legislation in the United States, for instance, calls for all systemically significant firms, including nonbank financial companies, to be subject to more stringent oversight by the Federal Reserve.

Discretionary approaches to macroprudential supervision could follow a somewhat different format than the countercyclical and contagion measures. In many

cases, these responses would be unique and would be whatever was necessary to correct large imbalances and significant risk exposures as they develop within the economy and financial system. For this discretionary form of macroprudential supervision to prove successful, policymakers would have to first identify the risks in a timely manner and then develop policy responses that would be effective and appropriate to the task. As a result, this form of macroprudential supervision would involve substantial challenges with regard to collecting and analyzing data on financial risks, identifying significant and real threats to financial stability, and designing the correct policy actions.

Financial stability reports

FSRs have the goal of promoting financial stability by identifying risks, imbalances, and adverse trends that might threaten the financial system. One of the first steps most countries take in producing FSRs is to develop a workable definition of financial stability. Financial stability can be difficult to define and has been used to describe a wide range of conditions. Financial stability can refer to the absence of a financial crisis or the "smooth functioning of the key elements that make up the financial system."[3] Alternatively, it can apply to financial systems that are robust and able to withstand various shocks or risk exposures. The Bank of England's December 2009 FSR states that a "stable financial system is able to sustain critical services to the wider economy—payments, credit provision and insurance against risk—even when it is hit by unanticipated events."[4] This definition of financial stability, which includes resistance to shocks, has been widely adopted by writers of financial stability reports.[5] Given this definition, an FSR should look for risks and shocks that are large enough to interrupt the smooth functioning of the financial system.

Potential benefits of FSRs. FSRs can promote stability by providing information that allows the central bank, other regulatory authorities, and market participants to understand the risks and potential problems that threaten the smooth functioning of the financial system. With timely information, regulatory authorities and market participants may be able to take actions to address such threats before they cause serious problems. This information may also be useful in understanding and developing sound policy responses in the midst of a crisis.

An FSR can help ensure a stable financial system by bringing a systemic focus to risk management. While market participants may be aware of risks at an individual or micro level, they may fail to see the build-up or the effect of risk taking at a broader level across the entire financial system.[6] This need for a more comprehensive view of risk exposure can be addressed if an FSR helps identify systemwide threats to financial stability and gives policymakers and supervisory authorities the insights needed to improve the financial infrastructure. As a result, FSRs seek to accomplish many of the same things as macroprudential supervision, although their link to supervision can be a little less direct, particularly if a central bank is not involved in supervision.

Publishing an FSR for public consumption on a regular basis also has advantages. Central banks undertake a wide range of surveillance activities, not all of which are suitable for public distribution.[7] However, by publishing an FSR, a central bank increases the transparency of its activities and concerns. Market participants that follow an FSR's results over time may be better able to interpret and respond to the results. Finally, having an FSR reviewed by the public and market participants should increase accountability and encourage the central bank to be more careful, accurate, and precise in preparing its reports. These factors should enhance the credibility of an FSR over time.

In short, an FSR may improve communication and cooperation between regulatory authorities and market participants and among regulatory authorities within or across nations. An FSR may help identify common risks and threats to financial institutions and enable market participants to better understand and respond to the concerns of their regulatory authorities. And, by providing a better understanding of common risks in different countries, FSRs may assist regulatory authorities in their efforts to cooperate more effectively on a global basis.

Characteristics of FSRs. In writing FSRs, central banks must decide what information, aspects of financial markets, and mode of analysis will provide the clearest assessment of financial stability within a country. An FSR is usually forward looking: it tries to identify and evaluate potential future problems that can impair stability. FSRs generally have a systemic focus. While it is necessary and important to evaluate individual institutions on a supervisory level, an FSR needs to assess risks to the financial system as a whole. Problems at individual institutions are important to the extent that they may create instability at the system level. In this regard, FSRs have much the same focus on risk as macroprudential supervision.

An FSR strives to identify and assess significant risks to a country's financial system. In writing FSRs, many countries divide these sources of risk into three broad categories—macroeconomic conditions or sectoral imbalances; financial sector risks; and external or international sources of risk.

Weaknesses in a country's macroeconomy pose a myriad of risks for the financial system. In this regard, an economic recession can lead to an increase in loan defaults and bond downgrades that may affect the solvency of financial institutions and, in turn, the

overall functioning of the financial system. Sectoral imbalances refer to potential problems in the nonfinancial sectors of the economy that can spill over into the financial sector. Examples include the build-up of excessive levels of debt or leverage in the household or corporate sectors, which could lead to stresses and defaults that would impair financial stability.

Financial sector risks can stem from problems at individual firms, common practices or exposures at financial institutions, financial market conditions, and weaknesses in the financial infrastructure. Failure or significant distress at a large financial firm could lead to breakdowns in the financial system if other firms are counterparties with large exposures to the distressed firm. Systemic effects could also arise from problems that are common to many firms. For example, in the recent crisis, many institutions held complex and illiquid mortgage-related securities that incurred large losses as the crisis unfolded. Volatile market conditions and asset price bubbles can further lead to financial instability. Other risks can arise from the financial infrastructure, including the payments systems, trade clearing and settlement systems, risk management systems of market participants, and the regulatory oversight system. Weaknesses in this infrastructure, for instance, can disrupt payments and financial flows or lead to losses from risks that could have been managed or avoided.

External or international exposures can also have a significant effect on financial stability. With increasingly connected, global financial markets, problems in one country can now be transmitted quickly to other countries. Furthermore, large financial institutions are likely to operate in multiple countries, so the failure of one of these institutions can affect financial conditions in each of the countries where it has operations.

FSRs typically assess each significant risk that might arise from the categories above and evaluate whether the risk is increasing and likely to be realized. This assessment usually includes the potential effect on the financial system if the risk is realized.

There are a number of approaches FSRs take to identify and assess risks. One approach is to use common financial indicators and ratios, based on currently reported data. The IMF has suggested a list of financial soundness indicators designed to assess the financial health of a country's banking system, nonbank financial intermediaries, and the nonfinancial sectors of the economy (Sundararajan et al. (2002)). These indicators include capital-to-asset ratios, liquid assets-to-short-term liability ratios, and return on assets for financial institutions; household debt-to-GDP and debt service-to-income ratios; and debt-to-equity and return on equity ratios for nonfinancial corporations.[8] Such indicators can provide useful information about the present state of the financial system, but they may be less helpful in evaluating future conditions and risks.

Many FSRs also look at market-based indicators as a means of providing a forward–looking perspective that reflects the views of many highly motivated market participants. For example, spreads on credit default swaps provide a market assessment of the creditworthiness of individual firms or sectors of the market. Other market-based indicators include stock prices, stock index values, and interest rate spreads on subordinated debt issued by financial institutions. Compared to common financial indicators and ratios, market-based indicators are likely to be more timely because they are based on investor expectations rather than on accounting data that may be dated.

In addition, FSRs may identify risks using qualitative indicators and analysis. Many central banks have access to supervisory evaluations or other qualitative

information. More generally, reports must rely on the insights and analysis of those preparing the report and their expertise in detecting risks and assessing threats to financial stability.

Beyond identifying the potential threats to financial stability, FSRs often attempt to assess the likelihood and severity of these threats or risks—and how they may change over time. Such assessments may be based on an analysis of financial or market indicators and trends or on a subjective analysis prepared by the report's authors. FSRs further use stress testing and scenario analysis to estimate how the conditions of financial firms or sectors might change given a specified change in market or economic conditions. Stress tests and scenario analysis rely on mathematical models or computer simulations to estimate the effects of a significant change in economic or market conditions on financial institutions. For example, a central bank might try to model the effects of a large increase in interest rates or loan losses on the banking system's capital and earnings. The usefulness of these techniques depends on the types of scenarios that are run and whether the underlying model of the financial system is realistic.

Each of these approaches to identifying and assessing risks has its own strengths and weaknesses. For a thorough evaluation of threats to the financial system, FSRs typically base their risk assessments on several approaches.

Risk evaluations and assessments require an extensive amount of information and data. Most countries regularly collect data on the condition of financial firms and debt levels of the household and business sectors. Some central banks collect additional data or undertake special surveys to get additional information. For example, the Sveriges Riksbank, the Swedish central bank, conducts a quarterly survey of counterparty exposures at Sweden's largest banks, thus providing a good indication of how problems

at one institution might affect others. Regular data collection is also important during a financial crisis because it provides transparency, can guide policy actions, and helps reduce the type of uncertainty that could lead to a loss of public confidence.

The approaches that FSRs take to identify and measure risk thus reflect much of what supervisors would have to do in a macroprudential supervisory approach. As a result, FSRs provide a good perspective on what the contributions of macroprudential supervision might be and what challenges it is likely to face.

II. CRISIS OVERVIEW

Before reviewing FSRs to assess their ability to anticipate and help react to the recent financial crisis, this section briefly reviews the significant factors and risks that led up to the crisis. Ideally, an FSR and a macroprudential supervisor would have identified these factors before or during the early stages of the crisis. This overview looks at how the crisis began and spread globally.

While a wide variety of factors contributed to the recent financial crisis, the most common element was a substantial underestimation of the inherent risks in many financial activities. Leading up to the crisis, a long period of prosperity, low inflation, and low interest rates in most major countries contributed to a highly optimistic economic environment—one characterized by historically low credit risk spreads on financial instruments, rapid credit expansion, and large increases in housing prices. High public and private savings rates in Asian countries also helped keep interest rates low and provided funds to finance rising debt levels in other countries.

Within financial markets, a number of developments and innovations led to a more fragile and vulnerable system. These included lax lending standards, misaligned

incentives in the securitization process for mortgages and other debt instruments, and an over-reliance on ratings agencies. Other significant factors were the growth of highly complex and opaque financial instruments, increased use of short-term funding to finance long-term assets, a wide array of counterparty exposures among financial institutions, and risk management practices and models that were less effective than many had anticipated.

The initial impetus to the financial crisis was rapidly declining house prices in the United States. This trend led to significant repayment problems and rising foreclosures in the subprime real estate market beginning in 2007. Through a variety of channels, problems spread to other parts of U.S. financial markets, particularly as the crisis deepened in the fall of 2008. Subprime mortgage-backed securities had been incorporated into a wide variety of complex financial instruments. Rapidly declining values of subprime securities cast doubt on the value of other financial instruments and the condition of institutions that held them.

These problems also spread to other major countries and foreign institutions through their holdings of U.S. financial instruments and through comparable trends in their own mortgage and credit markets. Declining asset values, in turn, led to further liquidity, capital, and public confidence problems—both in the United States and abroad. Other related events included trading breakdowns in certain markets, bailouts and failures of major institutions, deterioration in interbank markets, and serious liquidity issues associated with the excessive dependence on short-term funding. All of these financial problems resulted in more general economic problems. As economic activity declined, lenders became less willing or able to extend credit, causing economic activity to decline further. Unemployment increased in many countries as GDP decreased, leading to a drop-off in international trade and the start of a global recession.

The financial crisis affected the United States and the five countries whose FSRs

we examine in several different ways. The United States and a number of other countries, including the UK, were at the center of the crisis due to a combination of liberal lending standards, significant collapses in their housing markets, and their banks' reliance on complex instruments. Other countries, such as the Netherlands, were affected early in the crisis due to losses on complex securities and related liquidity problems. Many of the remaining countries, including Sweden, Spain, and Norway avoided these more direct effects but suffered from the global recession, decreased international trade, and the decline in global liquidity.

Of the five countries in this study, all but Norway suffered a GDP decline of around 5 percent or more, notable increases in unemployment, and, in most cases, some serious banking problems (See Table 1). The crisis had a relatively moderate impact on the Norway economy, while the Spanish economy is still experiencing declining real estate markets, slow economic activity, and very high unemployment. These differences are important in assessing the type of risks that the UK, Sweden, the Netherlands, Spain, and Norway identified in their FSRs, which are examined in the next section.

III. REVIEW OF FINANCIAL STABILITY REPORTS

This section reviews the FSRs of five countries from 2006 to 2010 and evaluates their effectiveness in identifying the risks that contributed to the financial crisis. The UK, Sweden, the Netherlands, Spain, and Norway all have considerable experience in preparing FSRs and thus provide good models for examining these reports. In addition, each country published reports leading up to and throughout the financial crisis and was affected by the crisis either directly or by the resulting global liquidity and economic problems. To supplement the discussion below, Tables 2, 3, and 4 of this paper further

summarize the risks identified in the FSRs and the information and tests each central bank used to assess these risks.

The UK: The Bank of England's Financial Stability Report

In many respects, conditions in UK financial markets leading up to the crisis mirrored those in the United States. The country and its financial markets could be characterized by a booming housing market, lax residential lending standards, substantial holdings of complex and opaque securities and derivatives, highly leveraged financial institutions, and a heavy reliance on short-term financing.

As the crisis unfolded, these conditions caused significant losses at many UK financial institutions. Credit concerns led to funding problems for Northern Rock, one of the largest mortgage lenders, causing it to seek liquidity support from the Bank of England and become nationalized in February 2008. In the third quarter of 2008, credit and interbank markets came close to freezing up, and asset and equity prices fell sharply, leading to the failure of several other UK financial firms. In September 2008, Lloyds TSB acquired the failing HBOS, the largest UK mortgage lender. Bradford & Bingley, a building society, was partly nationalized and partly sold to Abbey Bank, a subsidiary of the Spanish bank Santander. The Royal Bank of Scotland was effectively nationalized in October 2008 as the UK Treasury took a majority stake in the company.

UK banking problems also affected the underlying economy. Bank losses led to a decline in lending to the household and corporate sectors, contributing to slower growth and higher unemployment. This caused further home price depreciation, debt service stress, and personal insolvencies, which put additional pressure on bank balance sheets.

Risk identification. The Bank of England's FSRs identified many of the risks that

later would play a role in the financial crisis. The 2006 report noted potential problems in low risk premiums for financial instruments, which might have indicated inflated asset prices. Also noted were large trade imbalances between countries and the risk that these imbalances might unwind in a disorderly manner. The report cited risks from growing leverage in the corporate sector, highly indebted households, potential infrastructure disruptions, and growth in large complex financial institutions and their rising interconnectivity. The 2006 FSR also suggested that potential problems could be systemically amplified by various factors, such as illiquid instruments triggering a downward spiral in prices, increased dependence on wholesale funding, and growing counterparty exposures. Later reports discussed additional risks, including potential problems in wholesale markets and concerns over the valuation of complex assets. Except for trade imbalances, risks noted in the reports were all realized in some way during the crisis.

The analysis in the FSRs relied on extensive use of market data, vendor data, and regulatory data to evaluate trends, developments, and risks in the financial system. For example, the FSRs kept track of counterparty exposures among the largest financial institutions, including their off-balance sheet exposures. In addition, the FSRs conducted several market surveys, a few of which were instigated during the crisis, such as the credit conditions survey and the systemic risk survey.

Risk evaluation. The evaluation of these risks was based on an analysis of the information used to identify the risks and systemic stress testing of the resilience of UK banks (Box 1). The stress tests generally showed that each individual risk would not significantly reduce the capital base of UK institutions. However, the reports cautioned that more than one risk could be triggered and amplified during a severe negative shock.

As the initial phase of the crisis broke out, the FSRs noted shortfalls in the quantification of the interaction between market liquidity and funding.

Assessing the likelihood and severity of the risks identified in the Bank of England's FSRs proved to be challenging. One report noted: "It is much harder to judge the level of threats than to assess how they are evolving."[9] The UK's FSRs clearly underestimated the potential problems they identified. As subprime issues were surfacing in the United States and mortgage securities were being downgraded, the FSRs concluded that the U.S. subprime market was too small to have any systemic effect on the UK. The reports, though, suggested that subprime problems could potentially spill over to a loss of confidence in credit quality, which could affect the market for other structured securities. The April 2008 FSR reported that markets most likely had overreacted, allowing asset prices to fall too far. Although expressing caution about further declines, the reports thought the most probable outcome would be a recovery. In fact, the crisis became significantly worse in September 2008.

Sweden: The Sveriges Riksbank's Financial Stability Report

The Swedish financial system largely escaped the initial phase of the current financial crisis and the housing collapses that occurred in a number of other countries. While house prices in Sweden more than doubled between 1995 and 2007, they fell by only about 8 percent in the crisis and have more than fully recovered since then.[10]

After the financial crisis worsened in the fall of 2008, however, Swedish banks began to have trouble obtaining longer maturity funding, which significantly increased funding costs. In response, Swedish authorities took a series of steps to ease liquidity problems, including state guarantees of bank liabilities and increased issuance of treasury

bills by the National Debt Office. The Sveriges Riksbank provided liquidity assistance to banks, cut the central bank repo rate from 4.75 percent in September 2008 to 0.25 percent by July 2009, and entered into currency swaps with other central banks. Even with these actions, the Swedish economy slowed substantially as corporate bankruptcies, business debt problems, and unemployment all increased in response to a worsening global economy.

Risk identification. Several of the FSRs issued before the crisis identified concerns that later became important factors in the financial crisis. Historically low credit spreads and risk premiums were mentioned in the 2006 reports, which suggested that investors were turning to riskier assets to obtain higher yields, but without insisting on sufficient compensation for the risks. The reports also stated that an abrupt change in expectations and desire for more secure investments could lead to market unrest and greatly impaired liquidity in financial markets. And, as early as 2006, the reports cited concerns that the rapid growth of credit derivatives and hedge funds could allow disruptions to spread quickly from one market to another.

All of the FSRs from 2006 to 2009 suggested that the large credit exposures of several Swedish banks in the Baltic States posed a risk. The reports warned that a slowdown in the rapid economic growth and credit expansion in the Baltics might lead to large loan losses. With most of this lending denominated in euros, the reports mentioned an exchange rate risk in these loans. The second report in 2008 noted a more abrupt slowdown in the Baltic States than was previously expected.

As the financial crisis deepened, the FSRs identified a number of other risks, particularly concerning liquidity and credit quality. The risks were tied to the turbulence in foreign financial markets, sharp increases in short-term wholesale funding costs, and a

fall in the value of some assets at Swedish banks. Other factors were a significant dependence of Swedish banks on international wholesale funding and sharp increases in corporate lending, including lending to property companies at seemingly small margins. Soon, rising unemployment, deterioration in the financial condition of companies, rising corporate bankruptcies, falling housing and property prices, and substantial GDP declines in the Baltic countries were also cited as signs of worsening economic conditions and increasing financial risk.

Risk evaluation. To evaluate how the credit, liquidity, and contagion risks would affect the largest Swedish banks, the Riksbank conducted a number of stress tests on the country's four largest banks, as well as a household debt stress test. The tests were repeated throughout the financial crisis to gauge the resilience of banks as the crisis worsened. The credit quality tests were divided into several scenarios: 1) a substantial deterioration in creditworthiness within the Baltic countries; 2) impaired credit quality such as occurred during the 2000 downturn; and 3) a more severe credit test, which was added in the second 2008 report and was patterned after the Swedish property crisis of the early 1990s.[11] Generally, these tests found the largest Swedish banks would be able to cope with such developments. From one FSR to the next, though, the tests showed a pattern of decline in the banks' overall financial strength as the crisis worsened, until the second 2009 report noted an improvement.

The Riksbank conducted several contagion and liquidity stress tests during the crisis as questions arose about the condition of counterparties and as funding markets collapsed. The Riksbank's contagion stress tests used quarterly data collected from the major Swedish banks on their 15 largest counterparty exposures to estimate what would happen if one of the counterparties collapsed (Box 2). These tests found that the

contagion risk was moderate and declined throughout much of the crisis due to government guarantees and reduced interbank exposures. To test for liquidity stress, the Riksbank estimated how bank operating profits would be affected by higher funding costs. The tests found that profitability would decline, but not critically.

Based on the stress tests and other factors, the second 2009 FSR issued by the Riksbank viewed any recovery as likely to be slow and still vulnerable to new shocks. The FSRs provided a reasonable and generally accurate assessment of how the identified risks would affect the profitability, capital, and resiliency of the four largest banks, although the reports did not fully anticipate the depth and nature of the liquidity crisis in the Swedish financial system.

The Netherlands: The De Nederlandsche Bank's Financial Stability Report

The Netherlands has a relatively small economic and financial system, both of which are integrated with the EU countries and the United States. As a result, the financial crisis in the United States and UK hit the Dutch financial system in a similar way with only a short time lag. Dutch banks experienced losses on their holdings of mortgage-related and other complex securities. Market liquidity problems caused Dutch banks to "re-intermediate"—that is, to bring back onto their balance sheets securities previously moved off–balance sheet into special investment vehicles. Thus, funding requirements increased, adding stress to liquidity conditions at Dutch banks.

The financial crisis led to bank failures and to the nationalization of a significant banking operation in the Netherlands. ABN AMRO, the largest Dutch institution, was acquired in 2007 by a consortium of Royal Bank of Scotland, Fortis, and Banco Santander. Fortis, a Belgian banking and insurance company, assumed control of ABN

AMRO's Dutch operations. In 2008, Fortis suffered significant losses and a liquidity run, which required intervention and assistance from the Belgian, Dutch, and French governments. The Dutch government obtained full control of all Fortis operations in the Netherlands, including the former activities of ABN AMRO. As a result, almost one-third of the Dutch banking system came under government control.

Risk identification. The FSRs of the De Nederlandsche Bank (DNB) identified risks to the financial system both leading up to and during the crisis. The reports noted higher leverage and interest rate risk in the corporate sector and external risks, such as potential foreign exchange risks that might arise from a disorderly correction of global trade imbalances or from risks spreading from the U.S. financial system. Reports in 2006 and 2007 noted that banks were searching for higher yields and raising their risk tolerance, causing them to invest in more complex, less transparent, and potentially riskier financial instruments. Pointing to increasing leverage both within and outside the financial system, the March 2007 report suggested that "an abrupt correction . . . in the event of, say, a resurgence of risk aversion, could result in serious market turbulence."[12] The reports cautioned that the growth of complex and less transparent financial instruments had left the financial system more vulnerable to liquidity problems. The reports also identified weaknesses in the risk measurement systems in Dutch financial institutions.

The DNB uses a number of approaches to identify and assess risks. It has access to a wide range of data for the household, corporate, and Dutch and international financial sectors. The bank uses financial ratios to assess the current condition of financial firms.[13] Market-based information is frequently used to measure risk to financial firms. For example, the September 2008 report uses charts of credit default swap spreads

and stock prices to show the market's perception of increasing risk to Dutch financial firms.[14]

Risk evaluation. The primary tool for assessing the potential impact of the risks was scenario analysis. The reports used both a "top–down" scenario analysis, which was run by the DNB, and a "bottom–up" approach, in which individual banks were asked to implement and run the analysis. The identified risks were used to construct up to four stress scenarios.[15] The March 2007 report also discussed a bottom-up liquidity scenario run by Dutch banks. This range of scenarios covered the primary risks facing the Dutch financial institutions at the time the report was prepared.

The scenario analyses performed reasonably well in measuring risks to the financial system, although the results appear to have underestimated the full exposures to the banks and the financial system. While the scenario results showed that bank earnings and capital declined under the adverse scenarios, earnings remained positive and capital was above regulatory minimums for most banks, leading to the conclusion that the banks were adequately protected. However, bank losses and capital declines during the crisis were larger than anticipated in the simulations.

With the benefit of hindsight, it appears that the adverse scenarios were not adverse enough and the DNB was aware that its scenario analysis might underestimate risk. As noted in the March 2007 report, "in the event of a financial crisis, all kinds of second-order effects may materialize—resulting from, for example, confidence effects and herd behavior—which are difficult to quantify and may be underestimated in the hypothetical scenarios."[16] This accurately describes what, in fact, occurred with the analysis.

Spain: The Banco de España's Financial Stability Report

Leading up to the crisis, Spain experienced one of the most substantial economic expansions among all developed countries, coupled with significant house price appreciation and increasing debt levels, both in the household and the corporate sectors. Consequently, Spain's output and employment growth became increasingly dependent on the real estate sector.

As in Sweden, the initial phase of the financial crisis had a muted effect on Spanish banks due to insignificant exposure to U.S. subprime or other hard-to-value instruments.[17] As the financial crisis worsened in late 2008, Spain's real estate market declined more rapidly, the economy slumped into recession, and banks cut back on new lending. Household spending consequently declined and the downturn spread to the business sector. Unemployment rose to 20 percent in June 2010—a level only reached by Latvia in the euro area.

In response, the Spanish government implemented fiscal stimulus, expanded deposit guarantees, guaranteed certain debt, and recapitalized institutions. Even with these actions, two savings banks were taken over by the government, Caja Castilla-La Mancha in early 2009 and Cajasur in May 2010. In July 2010, the Committee of European Banking Supervisors carried out stress testing on European banks with the national supervisory authorities and the European Central Bank. The stress test resulted in an additional capital infusion of about €1.8 billion (or $2.4 billion) at four Spanish savings banks. Other Spanish banks have so far endured the crisis, but considerable challenges remain, especially for the savings banks that are more exposed to the real estate sector.

Risk identification. Early on, the Spanish FSRs noted many of the risks that would

later play a role in the crisis. These included global imbalances, low risk premiums and interest rates, the effects of changing risk perceptions on liquidity, and potential problems in certain U.S. and UK markets due to complex credit products and housing booms. Additional domestic risks identified were rising household and private-sector debt levels and rapid growth in lending, especially in the real estate sector, which was increasingly being funded in wholesale markets. As the crisis progressed, these risks became more pronounced, as evidenced by increases in doubtful asset ratios and the deteriorating global and domestic economy.[18]

Risk evaluation. To evaluate these identified risks, the FSRs mainly looked at financial statement and regulatory data using trend and ratio analysis. Some of these ratios and performance estimates were compared with previous periods in Spain and to European peers to assess the level of risk. Market data (such as stock prices, credit default swap prices, exchange rates, etc) were also used, though to a lesser degree. As a result, the data often experienced an inherent time lag, which limited forward–looking analysis. To calculate default rates, the FSRs also used the Banco de España's Central Credit Register—a comprehensive database on any loan over €6,000 originated in Spain. The reports found the default rates to be much lower than on U.S. subprime loans, and such information was further used in stress tests and to calculate probabilities of default.

Unlike the FSRs in some other countries, the Spanish reports did not systematically conduct stress testing. Instead, the FSRs conducted a few selected stress tests on certain risks. These stress tests first appeared in the fall 2006 report where a scenario of economic stagnation and dramatically higher interest rates was used to analyze the impact on bank losses and profits. The following FSR, May 2007, tested a scenario in which GDP declined for four consecutive quarters at a magnitude similar to

Spain's 1993 recession. The results indicated that the doubtful asset ratio at the end of 2007 would stay well below 1993 levels.

Other stress tests looked at bank credit exposures to corporations, the ability of depository institutions to operate in a constrained liquidity environment, and the performance of bonds and loans under a severely adverse scenario with significant house price declines. All tests found that Spanish depository institutions would be able to withstand the turmoil.

The assumptions used in many of the stress tests were thought, at the time, to be severe and highly unlikely, but in hindsight, these assumptions clearly underestimated the risk to the Spanish economy. Several stress tests, for instance, assumed a GDP decline similar to that of the 1993 recession. However, the current decline has been much deeper and more prolonged than in 1993. The reports also recognized the difficulty in assessing the risk of potential shocks to markets. For example, the May 2007 FSR cautioned that financial innovation (such as credit derivatives) may have made the financial system more resilient, but at the same time decreased transparency and made it harder to determine, with any accuracy, the outcome of shocks.

Norway: The Norges Bank's Financial Stability Report

The financial crisis had much less of an effect on Norway compared to most other European countries. During the worst part of the crisis in late 2008 and early 2009, Norway encountered several quarters of mild declines in economic output, but after that the Norwegian economy began growing again and unemployment has remained very low throughout the entire crisis. This economic and financial resilience can be attributed to such factors as the support the oil and gas sector provides to the economy, the substantial

macroeconomic stimulus provided by the Norwegian government and Norges Bank, and Norway's limited reliance on the type of securities and financial and economic activities that suffered the most during the crisis.

For Norwegian financial institutions, the greatest problem resulting from the crisis was funding. Because the major financial institutions in Norway had used foreign sources to help fund their growth in lending, these institutions experienced liquidity shocks after Lehman's bankruptcy and the ensuing global crash in interbank markets. To counter these liquidity problems, the Norges Bank and the Ministry of Finance took a series of steps, including a substantial reduction in the central bank's key policy rate, increases in its lending to banks and easier requirements for such lending, and additional lending through currency swap arrangements. Other key steps were a program allowing banks to exchange covered bonds for government securities and a Norwegian State Finance Fund to help banks restore capital levels. This assistance helped Norwegian banks avoid more prolonged liquidity problems, although the global downturn led to moderate declines in bank profitability, capital, and asset quality in Norway.

Risk Identification. In its FSRs prior to December 2007, the Norges Bank generally viewed financial conditions as stable, but with some longer-term and rising risks. Among the risks cited in the reports were rapidly increasing housing and commercial property prices, global trade imbalances, historically low credit premiums, and weak US housing markets. Beginning with its December 2007 FSR, the Norges Bank focused in on four risks to the country's financial stability. These threats to financial stability were the risk of an international recession, higher liquidity risk due to the turmoil in money and credit markets, high household debt burdens in Norway, and excessive optimism in the country's commercial property markets. These four risks

continued to be central to subsequent FSRs, although liquidity risk was acknowledged to be less of a concern after funding markets settled down globally and the Norges Bank took significant steps to create liquidity.

The December 2009 FSR cited an improving risk outlook for the Norwegian economy and financial sector and included a number of ideas for reforming and improving financial regulation. The May 2010 FSR saw further improvement in Norwegian banks, but mentioned concerns about renewed market turbulence abroad arising from high levels of public debt in many other countries.

Risk evaluation. The Norges Bank used a variety of tools to assess how the risks would affect financial stability and the condition of financial institutions. These tools included an analysis based on performance ratios and trends for the household, business, and financial sectors; business bankruptcy prediction models; bank failure and distance to default tests; and macroeconomic gap indicator analysis of financial vulnerability. The Norges Bank also used surveys of bank liquidity and lending, reviews of counterparty risk data, and comparisons of actual house prices with estimated long-run equilibrium values.

The most comprehensive means used by the Norges Bank to test for resilience to financial shocks was a stress test that incorporated a macro model of the Norwegian economy. This model was further linked to models of the household, business and banking sectors (Andersen et al. (2008)). These models allowed a variety of shocks to be introduced, such as wage, price, and interest rate changes; shocks to consumer confidence; and credit squeezes, along with changes in other parameters. The effect of these shocks was then estimated on corporate credit quality and bankruptcies, housing prices and consumer lending, and capital adequacy, loan losses, and earnings at major

Norwegian banks. A financial accelerator in the macro model provided feedback effects from financial markets to the general economy.

In the FSR stress tests and other analysis that were used before the crisis worsened in late 2008, the primary focus was on domestic developments and declines in consumer confidence that might influence housing and property prices. The stress tests included both a baseline test reflecting expected outcomes and more severe scenarios incorporating significant shocks to the economy. Under the severe scenarios, significant declines in housing prices were one result of the tests, but such declines have not been experienced in Norway. However, the stress tests did capture much of the decline in economic and financial conditions that was beginning to reach Norway. They also indicated that the major Norwegian banks had enough capital to survive such circumstances.

As the crisis worsened globally, the Norges Bank incorporated much more severe scenarios in its stress tests to reflect declining global conditions. These scenarios included significant declines in exports, very low oil revenue for Norway, and notably higher bank funding costs. A particularly severe stress test in the May 2009 FSR – one that was similar to what happened in the Norwegian banking crisis of 1988-1993 – suggested that the major banks would fall below minimum capital requirements if new capital was not found (Havro (2010)). While these tests were much more severe than what actually occurred, they provided a good measure of the amount of capital banks would need to survive a major crisis and what could happen if the appropriate private and public steps were not followed.

IV. EVALUATION OF FINANCIAL STABILITY REPORTS AND THEIR IMPLICATIONS FOR MACROPRUDENTIAL SUPERVISION

FSRs are a useful and publicly available surveillance tool. Many FSRs provide the types of broad-based information and insights that would be required as a basis for macroprudential supervision. The reports, for instance, can provide a systematic approach to tracking such key factors as household and corporate debt and income levels, housing and property prices, and various risk exposures across the financial system. The reports can also supply information about risks and potential problems that should give central banks, regulatory authorities, and financial institutions a better understanding of the financial environment. The information in FSRs can thus be a necessary precondition for preventing or responding to a financial crisis and could also prove to be an important element in macroprudential supervision.

The FSRs reviewed in this analysis identified many of the risks that led to the financial crisis (Table 2). The reports noted that risk premiums for a wide range of financial assets were below historical norms. The FSRs also spotlighted a number of unsustainable financial and economic trends, such as rapidly increasing housing prices and historically high debt levels. Other common conclusions were that banks and investors were searching for higher yields and increasing their leverage and that an abrupt change in market sentiments could lead to disruptions and liquidity problems.

It should also be noted that although the reports identified many of the risks that led to the crisis, some were described as low probability events or not the most likely or plausible outcomes. In addition, the FSRs identified a number of other risks that did not have a direct role in the crisis or have not yet been realized to any significant extent. Among such risks were global trade imbalances, prolonged disruptions in energy

markets, and major breakdowns in the financial infrastructure. From the standpoint of macroprudential supervision—where timely policy actions will need to be linked to identified risks—a more careful distinction may have to be drawn between likely and less likely outcomes. Also, the cost of responding to risks that may not be realized should be considered.

While the FSRs did identify many critical risks, evaluating the timing and magnitude of these risks and their effects on the financial system was an even greater, if not impossible, challenge—both before and during this crisis. The FSRs, in fact, typically underestimated the severity of the crisis, which should not be too surprising, given its unprecedented nature and the fact that much of the crisis originated from events outside several of these countries. Also, like most crises, this one was triggered by a number of unique factors and a changing financial structure—all of which would be difficult to capture in traditional financial models and stress tests. Such thoughts were expressed in the Norges Bank's May 2009 FSR: "It is difficult to estimate the probability and price the risk of all possible outcomes in financial markets. This applies particularly to events that occur rarely and have not occurred for a long time…The possibility of such shocks occurring may be given insufficient attention. In the long term, therefore, public authorities have an important role to play in maintaining a collective memory of previous crises."

Similar thoughts were expressed in other publications. As noted in the October 2007 UK FSR, "the speed, force and breadth with which these risks combined was not fully anticipated by the authorities or market participants."[19] The changing structure of markets and the challenges posed by a more market-dominated, interconnected system were discussed by Andersson (2008): "at the same time the market dynamics have

become more difficult to predict and market shocks have an increasing rapid sequence of events."

The strongest tool used in FSRs to judge the effect of different risks was through stress testing (Table 4). Some of the severe scenario stress tests did succeed in capturing the capital needs of banks, as well as the economic downturns that later occurred. However, banks and policymakers may have been less likely to heed the warnings in the severe stress tests, because FSRs often described the scenarios and assumptions as unlikely or very low probability tail events rather than as expected outcomes. Among the other tests used to predict the likelihood of a crisis were comparisons between current house prices and estimates based on fundamental factors, gap indicators comparing actual values to historic trends, and counterparty risk measures (Table 3). In particular, some of the gap indicators provided a good picture of how rapid debt growth and substantial increases in asset prices provide a good—although not foolproof—leading indicator of financial crises.

Each of these approaches thus has its strong points and weaknesses, and the use of multiple approaches is likely to be needed in assessing financial stability and conducting macroprudential supervision. The stress tests used in the FSRs, for instance, helped provide supervisors and bankers with a better guide to how much capital was needed and which institutions were most in need of it. The tests also provided some perspective on how selected events and risks might affect the financial system and helped to give a starting point for discussing various threats to financial stability and their magnitude. Such tests would thus potentially provide the type of insights needed in macroprudential supervision when assessing the amount of capital banks should hold and the likely impact of certain threats to the financial system.

At the same time, though, macroprudential supervisors may find serious shortcomings in the use of stress tests and analytical tools. For instance, Alfaro and Drehmann (2009) suggest a number of drawbacks with macro stress tests, including the difficulty in capturing structural changes and market innovations, the limited number of risk factors in many models, and the failure to incorporate market dynamics and a range of feedback effects between the financial sector and the real economy. They further find that banking crises have often been preceded by favorable economic conditions – an indication that these crises may have been initiated by unexpected shocks or trigger events. This point would correspond to many of the FSRs, which reported strong economic and banking conditions as late as 2007, but were then surprised by the channels and the severity through which the crisis spread at the global level.

The challenge of determining and quantifying the effect that particular risks might have on financial stability has a number of implications for macroprudential supervision. As those writing FSRs already know, there are dangers both from underestimating the threat of a crisis and from overestimating and overreacting to such threats. As a result, macroprudential supervisors will have to establish a good track record of identifying and assessing potential threats to financial stability. Macroprudential supervisors also may need strong evidence to overcome the political and public pressures that are likely to arise in any attempt to moderate or curtail credit booms and asset bubbles. We should further acknowledge that it is unrealistic to expect macroprudential supervision, just as with FSRs, to be the missing piece in our ability to prevent all, or even most, financial crises, which is a role many politicians are now giving to it.

Another aspect of macroprudential supervision is that it will require a close linkage between those that analyze the broader financial picture and the supervisors that

must implement policies to address any identified risks. In several countries, central banks were able to bring selected insights from their FSRs directly into the supervisory process and into ongoing discussions with banks, particularly when the central banks also had supervisory powers. Information from FSRs was of further help in deciding what form of public assistance should be provided during the crisis. However, FSRs would have been even more useful in the recent crisis if there had been a better way to tie the analysis with the supervisory process and to get regulatory authorities and financial institutions to respond more vigorously to the identified risks. Governor Stefan Ingves of the Riksbank noted that the bank issued "repeated warning about the development of risks in Baltic countries and the fact that risk was priced too low in the financial markets. Unfortunately, our warnings in these cases were not sufficiently acted upon" (Ingves (2009)).

Apart from accurately identifying risks developing in the financial system and recognizing the need to respond, macroprudential supervisors will also face a major challenge in overcoming the inherent delays associated with developing appropriate policy responses, implementing new regulations, and communicating supervisory policy changes through a large staff of examiners and individual institutions. The closer communication and supervisory linkages that many regulators are now pursuing with systemically important firms may provide one avenue for discussing and addressing identified risks in a more timely manner. Also, to the extent that macroprudential supervision can maintain the "collective memory of previous crises"—as described in the Norges Bank's FSR—market participants may be more likely to pay attention to warnings issued by public authorities and deal with emerging problems directly. The development of automatic or rules-based requirements for countercyclical capital,

liquidity, reserves, or loan-to-value ratios could provide another means for dealing with potential regulatory delays.

Given these difficulties in foreseeing a crisis and implementing corrective steps in time, it may be even more important to have macroprudential supervision focus on creating the type of financial system that is more resilient and less crisis-prone in the first place. Under this objective, identifying imbalances, misaligned incentives, and unsustainable trends in our financial system would still be essential. This knowledge, though, would not only be used to counter growing risk exposures and cyclical trends, but would also have a longer-term objective of establishing policies that could put the financial framework on sounder, more stable footings. This would mirror the approach that several countries have recently taken in their FSRs by discussing the structural weaknesses that led to the crisis and the policy options they could now implement to make lasting improvements to the financial system. Macroprudential supervision would still be concerned with preventing and mitigating crises, but with more thought given to the underlying structure of the financial system.

V. CONCLUSIONS

The recent financial crisis has renewed interest in regulatory proposals to strengthen the global financial system and increase its inherent stability. Macroprudential supervision is a key piece of this regulatory reform debate, and a number of steps toward macroprudential supervision are already in the works, including the European Systemic Risk Board and the Financial Stability Oversight Council in the United States. Other recent steps and ideas with a macroprudential focus are countercyclical capital, reserve, and liquidity requirements; tighter supervision of systemically important firms; and better

communications between financial supervisors and macroeconomic policymakers.

With this ongoing interest in macroprudential supervision, it is important to take a careful look at what such supervision should be, how it would work, and what it could realistically be expected to accomplish. This article looked at FSRs as a tool for promoting financial stability and as an insight into macroprudential supervision and the challenges it could face.

In this analysis, we assessed whether the reports prepared by the UK, Sweden, the Netherlands, Spain, and Norway provided useful information before and during the crisis. Our general findings were that the FSRs in these countries were successful in identifying the risks that led to the financial crisis although they underestimated the effects and gave insufficient warning as to the magnitude of the crisis. During the crisis, FSRs may have given the central banks a better understanding of the resiliency of markets and institutions in their own countries and the types of policy responses needed as the crisis continued. Lessons learned during this crisis may enable FSRs to be an even more effective tool in the future

Overall, preparing FSRs appears to be a worthwhile exercise that encourages central banks and international authorities to identify and monitor important financial trends and emerging risks and to develop a better understanding of the underlying structure of domestic and global financial markets. This understanding of financial markets and trends would also be an essential element in macroprudential supervision, and thus many of the steps taken in FSRs provide a good guide to what would be needed in implementing this supervisory approach. Much like FSRs, macroprudential supervision offers a means for creating a more resilient financial system and for responding quickly and appropriately to financial crises when they occur. The objective

of anticipating and preventing financial crises may be a much stronger challenge for macroprudential supervision, as it has been for FSRs.

Table 1 – Effect of the Financial Crisis

Countries	Effect on the Economy (OECD statistics)	Effect on the Financial System	Policy Actions
United Kingdom	6 Quarters of GDP decline (Overall decline of 6.5%), Unemployment increased from 5.1% to 7.9%	Significant losses at financial institutions (FIs), funding concerns, collapse of several large FIs – RBS, HBOS, Northern Rock	Takeover of some FIs, central bank rate lowered and lending liberalized, fiscal stimulus
Sweden	4 Quarters of GDP decline (Overall decline of 7.5%), Unemployment rose from 5.6% to 9%	Liquidity and longer-term funding issues, increase in bank loan losses	Repo rate cut to .25%, state guarantee of bank liabilities, more treasury bills issued
Netherlands	5 Quarters of GDP decline (Overall decline of 5.3%), Moderate rise in unemployment from 3.0% to 4.5%	Losses on mortgage-related securities, collapse of Fortis	Fortis takeover, bank debt guarantees and capital injections
Spain	6 Quarters of GDP decline (Overall decline of 4.9%), Unemployment increased from 7.9% to over 20%.	Liquidity and real estate lending problems, several takeovers of savings banks	Fiscal stimulus, deposit and debt guarantees, and bank capital injections
Norway	Several Quarters of mild GDP declines (Overall decline of 2.8%), Moderate increase in unemployment from 2.3% to 3.6%	Funding problems for banks relying on foreign sources, declines in bank earnings	Central bank policy rate lowered significantly and lending increased, capital injections, bond exchanges

Table 2
What Risks Did the Countries Identify?

Country	Low interest rates/credit spreads	Increasing Asset Prices	Increasing Debt Levels	Trade Imbalances	Risks originating in the U.S.	Other Risks
United Kingdom	"if risk premia rose abruptly, asset prices would fall sharply" *July 2006 FSR*	Asset prices appear to remain high relative to expected future income streams	"[Households] look strong in aggregate, but there are signs of stress" *July 2006 FSR*	"there is a risk of disorderly unwinding" *July 2006 FSR*	The U.S. sub-prime market is not "large enough to have a systemic effect on its own." *April 2007 FSR*	Large FI's are expanding rapidly, funded increasingly through wholesale markets. Also taking on more potentially illiquid instruments.
Sweden	"The risk premium is historically low, which can entail rapid corrections to credit market prices." *Dec. 2006 FSR*	"The rapid increases in house prices and household debt cannot continue in the longer run." *Dec. 2006 FSR*	"growth of Swedish property companies' borrowing from banks has continued at a high rate" *Dec. 2006 FSR*	"current account deficits remain substantial [in the Baltic countries]" *Dec. 2007 FSR*	"weakening of US economy [is]expect-ed to have negative effects on growth in the euro area" *June 2008 FSR*	Pronounced economic slowdown in Baltics, financial infrastructure
Netherlands	"a persistent risk tolerance, reflected in…low premiums for credit risk" *March 2007 FSR*	"rise in house prices in the first half of 2006 outpaced inflation by almost 5%" *Sept. 2006 FSR*	"[Netherlands'] household debt… remains high in international comparisons" *March 2007 FSR*	"the scenario of a disorderly correction of global imbalances …does not appear implausible" *March 2007 FSR*	"the liquidity squeeze…can be linked to spillover effects from the subprime crisis" *Sept. 2007 FSR*	Oil price increases, complex credit products, limitations of credit ratings, spillovers from U.S. and other countries
Spain	"contributed...to a greater appetite for risk." *May 2006 FSR*	Declining trend of house price growth since 2004, but still high	Household debt levels is a concern, but the financial situation remains sound	Global imbalances (U.S. negative savings rate and trade deficit)	Slowing real estate activity and increased concentration risk in the U.S.	Deposit funding is increasingly replaced with wholesale funding
Norway	"Risk premiums low in a historical context… increases vulnerability to negative economic shocks." *Dec. 2006 FSR*	"long period of strong debt growth and asset price infla-tion may be a source of instability" *June 2006 FSR*	"Household debt and house prices have increased…to historically high levels." *June 2006 FSR*	"Global imbalances in trade and capital flows are steadily increasing." *June 2006 FSR*	"Developments in the US housing market represent a source of uncertainty." *Dec. 2006 FSR*	Commercial property market, banks may reduce their capital under Basel II, liquidity risk, avian flu

Table 3
What Did the Countries Use to Evaluate Risk?

Countries	Financial Indicators and Ratios	Market Based Indicators	Qualitative Indicators, Surveys, and Specialized Data	Other Tests
United Kingdom	Numerous charts based on ratio and trend analysis of global, corporate, household, and financial sectors	Extensive use of market based data on a range of different issues	Data on counterparty exposures among the largest FIs, market and systemic risk surveys	Projected market values of mortgage-backed securities, modeling household distress, etc.
Sweden	Numerous charts based on ratio and trend analysis of banks and their customers -- companies, households, and foreign borrowers	Price data on equities, bonds, real estate, CDS, etc.	Household finance data, expected default frequencies from KMV data, risk survey of market participants	Failure of a major counterparty, effect of increased funding costs, household debt servicing ability
Netherlands	Charts and tables of economic and financial data that varied from one FSR to another (Many financial indicators are also on the Bank's website)	Some FSRs included charts on equity prices, CDS, credit ratings, etc.	Bank lending survey	Housing market correction, vulnerable households, avian flu, macro model of liquidity stress
Spain	Extensively use of trend and ratio analysis with financial statement and regulatory data	Used to a lesser extent	Data on all loans over €6,000 originated in Spain	Quality of Spanish MBS and comparison of Spanish and U.S. mortgage markets
Norway	Tables and charts with data and performance ratios on companies, households, and banks	Market data on equity and real estate prices	Bank lending survey, survey of counterparty exposures, bank liquidity survey	Gap indicator analysis using actual values vs. historical trend, bank failure probabilities, house price estimates

Table 4
How Did the Countries Conduct Their Stress Tests?

Country	Type of Model	Financial Institutions Included	Assumptions Used in Stress Tests	General Results
United Kingdom	Macro forecasting model with added models for household, corporate, and banking sectors	Major UK banks	2006 severe global corporate stress scenario: 1.5% decline in UK GDP 25% drop in house prices 35% drop for com. prop.	Losses equivalent to 15%-30% of Tier 1 capital (Stress test results became more qualitative after 2007)
Sweden	Loan portfolio model	Four largest banks	2009:1 Test – 2 years of annual loan losses of: 1.3% on loans in Sweden 10% on loans in Baltics 30% on loans in Ukraine	All four banks continue to meet Tier 1 capital requirements, but several have significant capital declines
Netherlands	Macro forecasting model, plus stress tests run by individual banks on their own models	Banks, insurance companies, and pension funds	Varies by FSR – severe test included 2-year drop in GDP of 6.3% and home prices of 30%, unemployment at 9.7%	At large banks, Tier 1 capital fell by 4 percentage points but remained well above minimum standards
Spain	Credit risk model	All depository institutions	Four quarters of consecutive declines in GDP similar to the 1993 recession. Two years before previous growth rate resumes.	Considerable increase in credit risk, but "…this shock would not jeopardize the strength of Spanish institutions."
Norway	Macro model with separate models added on for the household, enterprise, and financial sectors	Five or six largest banks	Varies by FSR -- most severe test similar to last crisis and assumed sharp fall in exports, oil prices, and foreign funding	Banks have a significant capital shortage under the most severe test, but generally adequate capital in other stress tests

BOX 1

STRESS TESTING

Stress tests or scenario analyses—the terms are used interchangeably—are computer simulations that assess the effects of one or more large risks or shocks on the financial system. Stress tests are used to identify the types and sizes of risks that can create instability in the financial system. The FSRs from the UK, Sweden, the Netherlands, Spain, and Norway use stress testing to assess the impact of various risks to their financial systems. This section explains how stress tests are conducted using an example from the Bank of England's (BOE) 2006 FSR. (Haldane et al. (2007)).

Stress testing requires four steps: describe the risk to be modeled; design a stress scenario that incorporates the risk; model how the risk is transmitted to the financial system; and estimate the impact on the financial system.

While the BOE identified several risks to be modeled, this example will look at the risk related to household debt levels. Rising debt relative to household income could lead to higher defaults and lower household credit capacity, especially if economic conditions deteriorate.

The BOE designed a moderate and a severe stress scenario to assess the household debt risk. The severe scenario was based on economic conditions during the UK's early 1990s recession. The severe scenario assumed that GDP for the year would decline by 1.4 percent, unemployment would rise to 10 percent, and housing prices would fall by 23 percent. This was judged a large enough shock so as to be unlikely but still plausible.

The BOE next modeled how these scenario shocks would affect banks and the financial system. The scenarios were assumed to affect credit risk, earnings risk and funding risks for banks. Declining economic conditions increased banks' credit risk through higher write-offs on consumer loans. Lower GDP and higher unemployment make households more likely to default, and falling house prices increase the loss rate on defaulted loans. Larger write-offs would reduce bank earnings and capital. Furthermore, earnings risk would grow because higher defaults and declining credit capacity would reduce loan balances and, thus, interest income and fee income. Finally, funding risk would be higher because lower bank earnings and capital cause creditors to demand higher rates on bank debts, which would increase funding costs.

The BOE used computer simulations to estimate the impact that the stress test scenarios have on the banking and financial systems' resiliency. The mathematical relationships in the stress test can become quite complex, especially when incorporating the macroeconomic effects. The BOE and many other central banks use macroeconomic forecasting models that enable the economic variables in the model to change and evolve in a reasonable and consistent manner.

The impact of the stress scenarios on banks is shown through key financial ratios or measures. The BOE results are shown as a change from an expected or base case scenario. In assessing risks from rising household debt under the severe scenario, the stress test found that aggregate bank income fell by £25 billion, or 16 percent of regulatory (Tier 1) capital. In some FSRs, the results include a range of values to reflect the uncertainty or imprecision in the estimates or the range of individual bank changes.

Reasonable and robust stress testing is very difficult to do. Good scenario design requires careful thought and analysis. The mathematical relationships in the model can be

difficult to estimate and calibrate, especially when there are a variety of indirect effects with important consequences. However, stress testing can be the best method for understanding the impact of risks that could lead to financial instability.

BOX 2

COUNTERPARTY RISK REPORTS IN SWEDEN

An important financial stability concern in Sweden is counterparty risk, especially since much of Swedish banking is concentrated in four large banks. As a result, mutual exposures among these banks can be substantial and could pose a contagion or systemic risk if one bank failed.

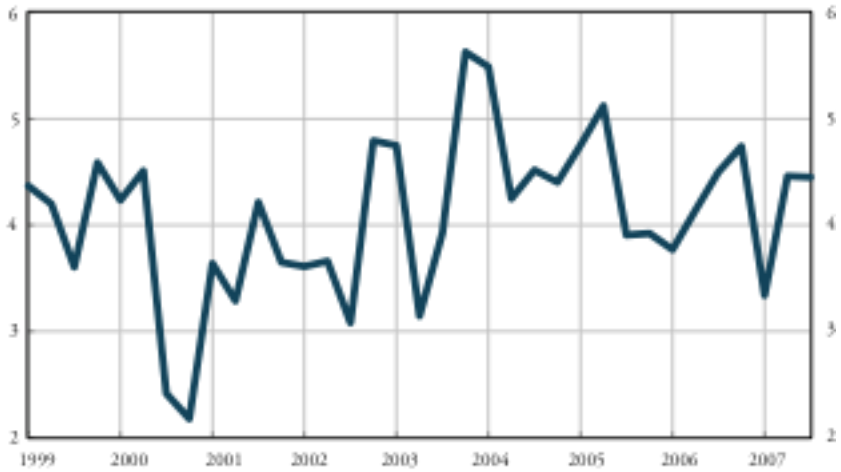
The Riksbank and its Financial Stability Department have collected data since June 1999 on counterparty exposures at each of the four major banks. Banks report on both on– and off–balance sheet exposures to each of their 15 largest counterparties at the end of each quarter. Banks report their gross exposures along with any risk-reducing instruments, such as netting provisions, collateral, or credit default swaps. The key categories in the exposure data are securities, derivative instruments, and unsecured lending, such as deposit holdings, overnight loans, and loan commitments.[1]

The Riksbank calculates each bank's net exposure to each of its 15 largest counterparties and then compares these numbers to the bank's Tier 1 capital. In testing for contagion risk, the Riksbank assumes a major bank defaults on its payments with only a 25 percent recovery rate. The resulting losses are deducted from capital at the other banks to see if they would still have sufficient capital or, in the extreme, pose further contagion risks. The chart below shows the projected Tier 1 capital ratio at the Swedish bank with the least capital remaining after this test.

Chart 1

THE MAJOR BANK WITH THE LOWEST TIER 1 CAPITAL RATIO AFTER ANOTHER MAJOR BANK DEFAULTED ON PAYMENTS

1999-2007 (The Tier 1 capital ratio is in percentage terms.)



Source: The Riksbank

The quarterly data provide helpful insights into the risk exposures that major Swedish banks have to each other and to other parties. Allowances must be made because counterparty exposures can change very rapidly, and such exposures can be valued in different ways, depending on the treatment of any risk-reducing features.[2] Moreover, outcomes in a crisis may be much different than in normal times, especially if there is a second wave of failures.

BOX 2 ENDNOTES

[1]For more information on how this data is collected, see *Financial Stability Report* 1999:2, Sveriges Riksbank, pp. 36-41; and *Financial Stability Report* 2008:2, Sveriges Riksbank, p. 77.

[2]According to one Riksbank publication, many of these data limitations could be

overcome during unstable periods, because the Riksbank and the reporting banks now have "routines and definitions for being able to produce these figures quickly if a crisis is imminent" (Andersson, p. 16).

ENDNOTES

[1]This study will focus on FSRs published by central banks in individual countries. However, FSRs are published also by the International Monetary Fund and the European Central Bank. For example, see International Monetary Fund, *Global Financial Stability Report, Navigating the Financial Challenges Ahead*, October 2009; and European Central Bank, *Financial Stability Review*, December 2009.

[2]In general, the results of these surveillance and monitoring programs are not publicly available. One exception was the Supervisory Capital Assessment Program, where U.S. regulatory agencies estimated future capital levels for the 19 largest banking organizations under scenarios that included significant declines in economic conditions. The results were released publicly in April 2009.

Under the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, the Office of Financial Research, which supports the new Financial Stability Oversight Council, will report annually to Congress on "potential emerging threats to the financial stability of the United States."

[3]Oosterloo et al. (2007), page 338.

[4]Bank of England, *Financial Stability Report*, December 2009, page 5.

[5]The ECB website (*http://www.ecb.int/pub/fsr/html/index.en.html*) defines financial stability "as a condition in which the financial system—comprising of financial intermediaries, markets and market infrastructures—is capable of withstanding shocks, thereby reducing the likelihood of disruptions in the financial intermediation process which are severe enough to significantly impair the allocation of savings to profitable investment opportunities." The Oesterreichische Nationalbank, Austria's central bank (*http://www.oenb.at/en/finanzm_stab/–finanzmarktstabilitaet/–finanzmarktstabilitaet.jsp#tcm:16-1060*) notes that "financial stability refers to a situation in which the financial markets fulfill their allocation function in a satisfactory manner, even in the case of shocks."

[6]Activities that create risks for the individual financial institution and for the financial system may lead to an under–provision of risk abatement. The financial institution has incentives to reduce its own risk exposures, but not the system-level exposures, since it does not face these risks directly. Economists refer to risks like these systemic risks (those not faced directly by individual institutions) as externalities. Externalities can lead to a less than socially optimal level of risk or cost abatement.

Supervision of financial institutions is also subject to problems with externalities. Currently, most supervisory oversight is focused on risk exposures within individual institutions. The recent financial crisis, though, has prompted much discussion on how public authorities should expand their focus to the overall level of risk–taking in financial markets through "macroprudential supervision."

[7]For example, central banks with responsibility for supervising financial institutions are generally unable to publish surveillance reports based on confidential examination findings or other confidential supervisory correspondence.

[8]Oosterloo et al. (2007) looked at the use of financial soundness indicators across a large number of FSRs.

[9]Bank of England, *Financial Stability Report*, April 2007, p. 10.

[10]Serious housing problems were avoided in Sweden due to little over–building,

almost no lending to households with poor credit histories, the important role Swedish banks play in holding mortgages and controlling their credit risk, and the fact that Swedish households remain liable for any remaining mortgage debt even after foreclosure.

[11]The first 2006 FSR has an article which describes how the Riksbank uses external information and a portfolio model to measure credit risk and expected losses at Sweden's four largest banks (see pages 75-88 of this report). The following FSRs describe the assumptions and calculations used in each of the credit quality scenarios.

[12]De Nederlandsche Bank, *Overview of Financial Stability in the Netherlands*, March 2007, No. 5, p 4.

[13]Although not referenced its reports, the DNB posts on its website a spreadsheet with the current and historical financial stability indicators, both core and supplemental, suggested by the IMF (*www.statistics.dnb.nl/index.cgi?lang=uk&todo=fs)*.

[14]De Nederlandsche Bank, *Overview of Financial Stability in the Netherlands*, September 2008, pp. 5, 6.

[15]For example, the March 2007 report included the results of three top down scenarios: a "malaise" scenario, a "global correction" scenario, and a "housing market correction" scenario. The malaise scenario incorporated economic stagnation and falling bond yields. The global correction scenario assumed disorderly correction of global imbalances, sharply rising bond yields, and substantial dollar depreciation. The housing market correction scenario included an initial rise in bond yields, a 30 percent drop in housing prices over three years leading to a slowdown in economic growth, and falling interest rates and equity markets. The scenarios were run using the DNB's MORKMON econometric forecasting model.

[16]De Nederlandsche Bank, *Overview of Financial Stability in the Netherlands*, March 2007, p. 13.

[17]Additionally, the securitization process in Spain differed from that in the United States. Spanish banks, for instance, retained a large portion of credit risk on their books and used securitization primarily as a means of obtaining funding.

[18]Doubtful assets "are considered unlikely to be fully or partially repaid on the contractually agreed terms, either due to customer arrears or for other reasons (if the institution has reasonable doubts regarding their recovery)," Banco de España, *Financial Stability Report*, Spring 2006, p. 88.

[19]Bank of England, *Financial Stability Report*, October 2007, p. 40.

REFERENCES

Alfaro,Rodrigo and Mathias Drehmann. 2009. "Macro stress tests and crises: What can we learn?" *BIS Quarterly Review,* December, pp. 29-41.

Andersen, Henrik, Tor O. Berge, Eivind Bernhardsen, Kjersti-Gro Lindquist, and Bjørn Helge Vatne. 2008. "A suite-of-models approach to stress-testing financial stability," *Staff Memo* 2/2008, Norges Bank.

Andersson, Martin. 2008. "Ten Years with the Financial Stability Report," Sveriges Riksbank, *Economic Review*, January, pp. 5-19.

Basel Committee on Banking Supervision. 2010. "Group of Governors and Heads of supervision announces higher global minimum capital standards," Press Release. Bank for International Settlements. September 12.

Borio, Claudio. 2003. "Towards a macroprudential framework for supervision and regulation," BIS Working Paper No. 128, Bank for International Settlements, February.

Borio, Claudio and Mathias Drehmann. 2009. "Towards an operational framework for financial stability: 'fuzzy' measurement and its consequences," BIS Working Paper No. 284, Bank for International Settlements, June.

Caruana, Jaime. 2010. "The challenge of taking macroprudential decisions: who will press which button(s)?" Bank for International Settlements. A paper presented at the 13th Annual International Banking Conference given by the Federal Reserve Bank of Chicago, in cooperation with the International Monetary Fund. Chicago. September 24.

Čihák, Martin. 2006. "How Do Central Banks Write on Financial Stability?" IMF Working Paper, WP/06/163.

Crockett, Andrew D. 2000. "Marrying the micro- and macro-prudential dimensions of financial stability," a speech given at the Eleventh International Conference of Banking Supervisors, Basel, Switzerland, September.

European Central Bank. 2009. *Financial Stability Review*, December.

Financial Stability Reports are available from:

Bank of England at *www.bankofengland.co.uk/publications/fsr/index.htm*.

Sveriges Riksbank at *www.riksbank.com/templates/YearList.aspx?id=10635*.

De Nederlandsche Bank at *www.dnb.nl/en/news-and-publications/dnb-publications/overview-of-financial-stability/auto80731.jsp*.

Banco de España at *www.bde.es/informes/be/estfin/estfine.htm*.

Norges Bank at *www.norges-bank.no/templates/article____41760.aspx*

Group of Thirty. 2010. "Enhancing Financial Stability and Resilience: Macroprudential Policy, Tools, and Systems for the Future," Washington, D.C. October 10.

Haldane, Andrew, Simon Hall, and Silvia Pezzini. 2007. "A New Approach to Assessing Risks to Financial Stability," *Financial Stability Paper No. 2* (April), Bank of England.

Havro, Gøril B. 2010. "Stress testing in Norges Bank before and after the crisis – an overview," Economic commentaries 5/2010, Norges Bank.

Ingves, Stefan. 2009. "Financial Stability—Where Are We Heading?" speech to Swedish Bankers' Association in Stockholm, Sweden, November 19.

International Monetary Fund. 2009. *Global Financial Stability Report, Navigating the*

Financial Challenges Ahead, October.

Oosterloo, Sander, Jakob de Haan, and Richard Jong-A-Pin. 2007. "Financial Stability Reviews: A First Empirical Review," *Journal of Financial Stability*, vol. 2, pp. 337-55.

Saurina, Jesús. 2009. "Loan Loss Provisions in Spain. A Working Macroprudential Tool," *Revista de Estabilidad Financiera*, No. 17 (November), pp. 11-26

Smaghi, Lorenzo Bini. 2009. "Going Forward: Regulation and Supervision after the Financial Turmoil," a speech given at the 4th International Conference of Financial Regulation and Supervision, Milano, June 19.

Sundararajan, V., Charles Enoch, Armida San José, Paul Hilbers, Russell Krueger, Marina Moetti, and Graham Slack. 2002. "Financial Soundness Indicators: Analytical Aspects and Country Practices," International Monetary Fund, Occasional Paper 212.

APPENDIX

STRUCTURE OF FINANCIAL STABILITY REPORTS IN THE UNITED KINGDOM, SWEDEN, NETHERLANDS, AND SPAIN

Financial Stability Reports in the United Kingdom

The key goal of the Bank of England's FSRs is to identify risks to the UK financial system and bring about a better understanding, evaluation, communication, and mitigation of these risks. The focus of the FSRs and their analysis is mainly on the financial system as a whole, as opposed to individual institutions. This includes not only the major UK banks, but also the markets and the infrastructures. A shock to any of these functions is assumed to have a greater systemic impact on the UK financial system compared to other sectors.

The Bank of England's FSRs generally consist of four sections. The first section reviews developments in the global financial system since the previous report and their impact on risks to the UK economy. The second section analyzes how the developments feed through to the UK financial system. The third section assesses the resilience of the UK financial system. Lastly, section four discusses actions required from market participants, public authorities, and at the international level to mitigate the risks in the system.

The UK's FSRs have developed and grown in content as the financial turmoil expanded. Not surprisingly, the reports evolved from a more domestic focus to a broader view of the risks in the global financial sector. The stress testing also evolved and grew in importance, both in the reports and at individual institutions. The reports conducted

systemic stress tests of the financial system against highly unlikely severe shocks throughout much of the crisis.

The reports extensively use market data, data from financial institutions, and market surveys. In addition, the UK's Financial Services Authority collects quarterly data on counterparty exposures among large financial institutions, and this information, is presented in the FSRs.

Financial Stability Reports in Sweden

In 1997, the Sveriges Riksbank became the first central bank to begin publishing a separate, semiannual FSR. The need for this report grew out of the Swedish banking crisis and real estate collapse of the early 1990s and the realization that policymakers must do a better job of identifying the risks in the financial sector and addressing threats to financial stability. In this regard, the forward to recent Swedish FSRs states that "An ongoing analysis of stability provides possibilities for the early detection of changes and vulnerabilities that together can lead to a serious crisis," and "A thorough analysis also facilitates the management of a crisis if one were to occur." To incorporate the reports into central bank thought and policy, the Executive Board of the Riksbank now discusses each new report at its meetings.

The Riksbank's FSR has evolved to a fairly consistent format, beginning with a summary statement of the report's overall stability assessment and a summary of the risks in financial markets. The main part of the report consists of a review of the condition, risk, and prospects of different borrower groups at Swedish banks—the household sector, corporate sector, commercial property market, and foreign borrowers; an analysis of profitability at Swedish banks and their credit, liquidity, and contagion risks; and

occasional articles on special topics. With the globalization of finance and the manner in which the current crisis spread across countries, the report pays increasing attention to economic and financial developments in other countries and their implications for the Swedish financial system.

In assessing the prospects and credit risk of the different borrower groups, the report examines such factors as trends in various debt ratios by sector, changes in house and commercial property values, and history of borrower incomes, defaults, and other relevant statistics. The Riksbank also conducts a number of stress tests on household debt servicing ability, including how rising unemployment or higher interest rates might affect the outcome.

Since the four major banks in Sweden have controlled 75 percent to 80 percent of the Swedish public's deposits and borrowings in recent years, the banking section in the FSR focuses largely on the profitability and risk exposures of these four banks. A number of stress tests are made in the reports with respect to each bank's resilience to various risks, including domestic credit risk, foreign lending risk, liquidity risk that might arise from an increase in funding costs, and contagion risk as measured by the banks' counterparty exposures to each other. During the crisis, the Riksbank performed several credit risk stress tests, including one scenario based on expected loan losses and a more severe scenario incorporating notably higher loan losses.

The Riksbank makes use of a variety of data sources in its FSR. These include a risk survey of participants in the Swedish fixed income and foreign exchange markets, an annual household finance survey supplemented by individual tax filings, external measures of credit quality, and quarterly reports to the Riksbank from the four major banks on their 15 largest counterparty exposures to each other.

Financial Stability Reports in the Netherlands

De Nederlandsche Bank is the national bank of the Netherlands. On a semiannual basis, it publishes its financial stability report "Overview of Financial Stability in the Netherlands." The reports review the current economic and financial conditions and assess the potential risks facing Dutch banks, insurance companies, and pension funds.

Dutch FSRs follow a standard format. The introduction gives a brief overview of the report and provides an assessment of the stability of the Dutch financial system. The second section reviews developments in the international economic and financial environment, highlighting aspects that generate risks for Dutch institutions. The next section reviews the corporate and household sectors of the Dutch economy, looking for imbalances and weaknesses that may lead to problems for the economy or the financial system. The fourth section reviews the financial condition of the banking, insurance, and pension sectors and identifies weaknesses and risks that could lead to systemic problems. The financial infrastructure is reviewed in the fifth section. This section looks at the payments system, securities and derivatives settlement systems, and risk management practices of financial firms. A concluding section of the report provides a summary.

To identify and assess risks to the financial sector, De Nederlandsche Bank uses data on the household, corporate, and Dutch and international financial sectors and also analyzes financial ratios to ascertain the condition of financial firms. The Dutch central bank further uses a scenario analysis or set of stress tests to measure the possible effects of the identified risks on financial institutions and financial stability. The central bank uses its own econometric forecasting model to run many of these tests and also has asked major banks to run their own liquidity tests and other risk assessments. De Nederlandsche Bank's

tests have included such scenarios as economic stagnation, disruptions from global imbalances, substantial dollar depreciation, and significant drops in housing prices.

Financial Stability Reports in Spain

Spain publishes a semiannual FSR with the goal of promoting financial stability and communicating the trends and risks seen in the financial system to the financial sector and, to a lesser extent, the public. A further rationale behind these FSRs is that the identified risks could possibly be mitigated if the reports adopt an effective and forward-looking approach.

The structure of the Spanish report, which has not changed significantly over time, is mainly built around the banking system. Though other financial market participants, such as insurance companies, pension funds, mutual funds, etc., are discussed in the FSRs, they are analyzed on a much smaller scale. The core part, the depository institutions, is divided into three banking parts: risks, profitability, and solvency. In all sections, the reports generally look at consolidated data. However, the FSRs include some distributional calculations to provide a more individualistic look at bank behavior.

The banking risk section uses a consolidated balance sheet analysis generally focused on bank lending to households and corporations. This section also looks at doubtful assets, loan loss provisions, loan defaults, and funding issues. Since the continued profitability of banks is central to coping with financial instability, the Spanish reports examine the consolidated income statements of depository institutions and various financial ratios, such as returns on assets, returns on equity, and efficiency ratios. In this profitability section, a number of market indicators, including CDS spreads and equity

prices for Spanish banks, are analyzed and compared to other countries' banks. The solvency section focuses on the capitalization of the banks and looks at such indicators as solvency ratios and Tier 1 and Tier 2 capital ratios.

As the crisis unfolded, the FSRs added a section reviewing macroeconomic and international issues. Further, the reports generally contain additional sections on such topics as changes in policy, regulation, or current developments.

Financial Stability Reports in Norway

Norway has published separate, semiannual FSRs since 2000. However, the Norges Bank first began producing internal reports on the financial sector and its outlook in 1995 and then published excerpts from these reports in its *Economic Bulletin* between 1997 and 1999. The main conclusions from these FSRs are summarized and submitted to the Ministry of Finance and are also discussed at a meeting of the Norges Bank's Executive Board. The Norges Bank views financial stability as one of its primary objectives in its efforts to promote economic stability and fulfill its lender of last resort and payments system roles. In its FSRs, the Norges Bank characterizes financial stability as when "the financial system is robust to disturbances in the economy and can channel capital, execute payments and redistribute risk in a satisfactory manner."

The FSRs in Norway begin with an editorial or forward by a key central bank official. Next is "The outlook for financial stability," which typically contains a summary of the economic climate, the risk outlook or the risks to financial stability in Norway, and, when important, a discussion of policy actions that have been taken or might need to be adopted. The main body of the reports contains separate sections on international financial markets and global challenges, the Norwegian financial sector, the outlook for

Norwegian borrowers, and stress tests of banks' capital adequacy, projected losses, and profitability. The FSRs also contain short articles or boxes to cover topics of current interest or to explain in more detail some of the stress tests and analysis used in the reports. An appendix to the reports contains tables with data on the structure, balance sheets, and income of Norwegian financial institutions and other sectors of the economy.

The section on international financial markets examines global trends of current interest, and during the financial crisis, this section has looked at such topics as changes in credit spreads in major countries, differences in GDP growth, individual country credit quality measures and loan surveys, international equity indices, and central bank balance sheets. In the banking and financial section, the FSRs analyze a wide variety of trends, including trends in bank profitability, interest margins, funding sources, nonperforming loans and loan losses, and capital and other balance sheet items. The outlook for Norwegian borrowers section looks at both households and enterprises, with a more focused discussion on several industries of particular importance to Norway, including shipping, commercial property, and oil and gas. For households, the analysis reviews trends in income, savings, debt service burdens, housing prices, and mortgage instruments. For businesses, such items as earnings, equity, funding, and debt service capacity trends are analyzed, while several FSRs have also forecasted or calculated business default and bankruptcy probabilities and commercial property values.

Beyond standard financial data and trends analysis, the Norges Bank's FSRs take advantage of several specialized data sources and financial tests. Detailed household, business, housing, and property data are collected by the national government, industry associations, and the Norges Bank and used in the FSRs. In conjunction with the financial supervisor, the Norges Bank conducts an annual survey of counterparty exposures at the

largest Norwegian banks and assesses what might happen if a major counterparty failed to meet its obligations. The Norges Bank has also instituted a quarterly survey of bank lending. For FSR stress tests, the Norges Bank uses a combined set of models: a small macro model for testing alternative economic scenarios, micro models of the corporate and household sectors to estimate how these groups and their credit risk would be affected by the economic scenarios, and a bank model to test the resulting outcome for the largest Norwegian banks. The FSRs further incorporate research summaries on current issues and specialized tests developed by Norges Bank economists.