The Riksbank's work with financial stability before, during and after the global financial crisis

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When, following deregulation in the 1980s, Sweden was hit by an extensive banking crisis at the beginning of the 1990s, participants from both the private and government sectors were unprepared. The term 'financial stability' was coined, and work commenced on reducing the risks of a new banking crisis, and preparing in case a crisis nevertheless emerged. It was natural for the Riksbank to assume a leading role in this process, because it has a task of promoting a safe and efficient payments system, and a role of 'bank for the banks'. In this paper we describe how the Riksbank, after the domestic financial crisis of the 1990s, built up its capacity for analysing risks and vulnerabilities in the financial system. We also discuss the acute measures taken during the global financial crisis that culminated around 2008–2009, and a few lessons from that. Furthermore, we discuss how work has changed focus since the crisis subsided. We conclude by pointing out some future challenges for the work on financial stability.

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1 Background

Throughout history, from all parts of the world, there are plenty of examples of banks suffering liquidity problems, which have sometimes led to serious shocks and financial crises for the economy at large. A fundamental reason lies in the nature of banking business. Put simply, a bank's business concept is to lend money to companies and households on *long* term contracts, and raise funding through *short* term deposits from customers and *short* term borrowings on the capital market. This usually works without hitches. However, if for some reason doubts arise about the bank's financial position, this can lead to a bank run – that is, the bank's depositors wanting to withdraw their money at the same time, and the bank encountering problems in obtaining refinancing on the capital market. In that case, the bank's payment problems can force it to close. The problems can easily spread throughout the entire financial system due to concerns and uncertainty about the exposures and financial status of other banks.[1] When this occurs, we have been hit by a systemic financial crisis. The original concerns about the bank's financial position need not even be well-founded. It can suffice that there are concerns for this course of events to commence.

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1 A bank's exposure is an amount. The exposure is the result when the bank for instance grants a loan to a company or buys a bond. Exposures can also be created through derivatives and other transactions.

The economic costs of such financial crises are very high. In Sweden, the average growth rate of the economy was 3 per cent annually from 1950 to 1990. During the banking crisis in 1991–1993, Sweden's gross domestic product (GDP) instead dropped by 4 per cent in total. During the 2008–2009 financial crisis, it fell by 6 per cent in total. Since 1950, the only periods with tangibly negative effect on GDP are the two financial crises. Financial crises therefore also have significant monetary policy consequences.

The desire to avoid consequences of this nature is a fundamental reason for the existence of an extensive financial safety net in most countries, in the form of for example deposit guarantees and special supervision and regulation of banks. The central bank of the country naturally plays an important role in this safety net. The ability to quickly create large volumes of liquid funds enables the central bank to provide extra liquidity (for example in the form of emergency liquidity assistance) to banks facing temporary liquidity needs. The central bank is also the hub in the payment system used by the banks for intrabank payments. In Sweden, the Riksbank's role in this area is reflected in the Sveriges Riksbank Act, which stipulates that the Riksbank shall 'promote a safe and efficient payments system'.

There are thus good reasons for central banks to have a central role in both counteracting financial risks to reduce the risk of financial crises, and ensuring sound crisis management should a crisis nevertheless arise. The need for this work became obvious in connection with the banking crisis of the 1990s. It might therefore be of interest to describe in more detail how these efforts have progressed since then.

The Riksbank's work with financial stability in the past 20 years can be divided roughly into three periods – before, during and after the global financial crisis. These three periods are quite distinct and different in nature from each other. Before the crisis, focus was on drawing lessons from the Swedish financial crisis of the 1990s. Financial stability was established as a new policy area, and efforts primarily focused on assessing and explaining the risks in the financial system, and developing crisis management for future crises. During the global financial crisis, the work was about preparing and implementing concrete crisis measures. Many such measures had to be improvised, and there was not much time for theoretical rationale. Following the crisis, work was instead dominated by developing the global regulations and devising new, often cross-border institutions and collaborative initiatives to bolster the resilience of the global financial system. Put somewhat simply, it can be said that the pre-crisis financial 'fire brigade' attempted to analyse where the local risks of a fire were, and prepare to respond, while during the crisis they had to respond urgently and find new ways of putting out the fire. Finally, after the crisis, focus has largely been on preventive efforts to reduce the risk of both local fires and global financial forest fires.

2 Before the crisis

In the 1980s, after decades of strict regulation, some much-needed deregulation of the Swedish financial sector was carried out. However, the dramatic banking crisis that hit Sweden at the beginning of the 1990s made it painfully clear that both Swedish authorities and the banks themselves were ill-equipped to deal with the new financial landscape. Neither the Riksbank, nor the Bank Inspection Board (the predecessor of the Financial Supervisory Authority), nor participants in the financial sector had a sufficient overview of the risks that built up before the crisis. Furthermore, none of the authorities held an explicit mandate to systematically monitor developments in the financial system.

The crisis of the 1990s led to the insight that the Riksbank, in order to be able to carry out its task, needed to strengthen its analytical capacity relating to factors that could threaten the stability of the financial system. Not least, the analysis of banks needed reinforcing, as the banks' central role in the payment system meant that, in practice, stability in the banking system was fundamental to stable payments. When Urban Bäckström was appointed

Governor of the Riksbank and soon thereafter Stefan Ingves took the position of Deputy Governor, two people stepped into the bank who had each held a key role in managing the financial crisis of the 1990s – Mr Bäckström as State Secretary at the Ministry of Finance, and Mr Ingves as Head of the Swedish Bank Support Authority. From the mid-1990s, the new governors of the Riksbank focused consciously on building up a financial stability analysis. The objective was to avoid a new financial crisis. The means was to describe the existing risks.

2.1 The Financial Stability Report – a way of systematising the analysis

Much of the stability analysis came to be focused on the semi-annual report on stability in the financial system, which the Riksbank started issuing in November 1997. The Riksbank was clearly inspired by the Bank of England, which in the previous year had issued its first *Financial Stability Review*. Although at the time that publication did not contain any evaluation of the stability in the financial system, it nevertheless did contain a number of stand-alone articles on the theme of financial stability (see Bank of England 1996). Also, in December 1996, Norges Bank had published a report on financial stability with analyses of the banking sector and financial risks (see Norges Bank 1996).

So, although there were a couple of forerunners, the Riksbank was undeniably a pioneer in terms of publishing a separate, periodic financial stability analysis. In the beginning, disclosing the stability assessment of the central bank – or any other authority – was not without controversy. Many argued that it could rather lead to instability on financial markets. However, the Riksbank stuck to its view that there was a value in issuing a balanced assessment and that it would facilitate communication with financial market participants and other stakeholders (see for example Andersson 2008). Today, stability reports are issued regularly in a vast number of countries, as well as by a number of large international organisations such as the International Monetary Fund (IMF) and the European Central Bank (ECB).

From the start, the stability report was primarily an important tool for steering the Riksbank's internal analytical process. It forced the Riksbank to structure work and systematise the analysis. It also became an important channel for conveying messages to banks as well as authorities and politicians. By publishing in-depth analyses of observed risks in the financial system, the Riksbank hoped – in the absence of more concrete tools – that 'moral suasion' (that is, influencing through the power of words) could nudge Swedish banks into taking measures to reduce the risks.[2] The very approach of influencing through publicly discussing risks has come to serve as a model.[3]

During the well over 20 years in which the report has been issued, it has changed form and focus a few times. From the beginning, there were very limited analytical work to fall back on, and the Riksbank had to develop most of it on its own. The analyses were originally based more or less exclusively on public data, gathered from for example annual reports, quarterly reports, etcetera.

The analysis was subsequently refined with more detailed data, for example about the banks' lending and external financing as well as their exposures, which gave a clearer picture of potential contagion risks. This information was used in, for instance, stress tests, in which the banks' resilience to different types of shocks was tested. Initially, these stress tests were rather simple, even primitive, performed using, for instance, free software downloaded from the internet.

2 For a description of challenges in public communication, see for instance Meyersson and Mikiver (2018).

3 Examples include the IMF's Financial Sector Assessment Program (FSAP) and evaluations of different regulations, such as the Basel Committee's Regulatory Consistency Assessment Programme (RCAP).

2.2 Cross-border banks placed new demands

In 1997 the Swedish banking sector was essentially domestic, but at the end of the 1990s and beginning of the 2000s, the banks started to undergo sharp expansion in the Nordic and Baltic regions. As the foreign operations of Swedish banks expanded, it became clear that the Riksbank's stability analysis needed supplementing with information on the Swedish banks' foreign exposures and economic conditions in the countries concerned.

Because the banks were increasingly operating across borders, there was also a risk that dealing with a future crisis would be much more complex. Therefore, at the beginning of the 2000s, the Riksbank took a number of initiatives to improve cooperation and coordination in crisis management with the authorities of the Nordic and Baltic countries. For example, a number of cross-border *Memoranda of Understanding* were prepared (see for example Sveriges Riksbank 2006a, ECB 2005 and ECB 2008), and various working groups were set up to devise principles for both information sharing and burden sharing in a crisis. In the autumn of 2007, a large-scale crisis management exercise was carried out, involving a total of 18 authorities from the Nordic and Baltic countries (see Sveriges Riksbank 2007b, p. 73, for more details). A new such exercise is planned for 2019.

The Riksbank also pointed out early on the need for certain supranational agreements for managing crises in cross-border banks. Before the global financial crisis, however, political interest was limited in the EU, to put it mildly. The fact that Sweden subsequently chose not to join the Banking Union, which was launched in the wake of the crisis, might therefore possibly seem ironic in the context. Being part of the Banking Union would however have entailed a risk of Sweden losing influence, because it is not part of the euro zone. There is therefore good reason to hold back and carefully analyse what the consequences would be of deciding to join the Banking Union.

2.3 Articles in the stability report

Pretty much from the start, the Riksbank's stability report contained, besides the stability analysis itself, also articles on various themes. In the initial years, these articles focused on describing conceptually different types of risk in the financial system, although the articles also addressed current issues. For example, risks related to the 'millennium bug' and measures to deal with those risks were a recurring theme at the end of the 1990s, and ahead of the referendum on the euro in 2003, the euro and the potential effects on financial stability of switching to the euro were of course an important theme.

An article from the autumn of 2002 focused on the international expansion of Swedish banks. At that time, for instance, the banks' Baltic operations had not had time to grow to such a size that prompted concerns, and the risks were discussed at a fairly general and theorising level. The conclusions drawn were on the cautious side: '… [the risks] must be weighed against the lower risk concentration the banks achieve through diversifying their operations' (Sveriges Riksbank 2002, p. 69).

As the analysis was developed, however, the articles often started to have a more policy-focused content, in which the Riksbank could for instance point out deficiencies in financial regulations (Sveriges Riksbank 2001, pp. 66–73), develop the analysis regarding its role of acting as the lender of last resort – LoLR (Sveriges Riksbank 2003, pp. 57–73). It could be said that the Riksbank's fundamental stance during that period was that special regulation required the ability to demonstrate what, in microeconomic terminology, is usually called market failures, such as the presence of externalities or collective goods. Although it was easy to point to many well-known market failures that motivate special regulation and supervision of the financial sector, it could probably be said that the attitude to regulation before the global financial crisis was based more on theoretical rationale than in the subsequent years, when the view of the need for regulation was based more on tangible experience from the crisis.

2.4 The risks that led to the global financial crisis

How well did the Riksbank's stability report succeed in identifying the problems that led to the global financial crisis? With hindsight, it could be said both well and not so well. Pretty much nobody in the whole world had predicted a crisis of the global proportions that commenced in 2007 and became acute in September 2008, when the US investment bank Lehman Brothers filed for bankruptcy. However, in its stability report, the Riksbank highlighted at a relatively early stage the rapid credit expansion in the Baltic countries, and the risks this presented. However, like most other central banks, the Riksbank largely missed the risks in the banks' growing foreign funding, which, as it turned out, led to them encountering funding problems during the crisis.

2.4.1 The stability report and the Baltic countries

In the spring of 2004, the Riksbank warned of the risk of overheating in the Baltic countries (see Sveriges Riksbank 2004, p. 13). At the same time, the Riksbank pointed out that Estonia and Latvia had pegged their currencies to the euro via currency boards. Also, Latvia had pegged its currency via a basket of currencies which, in 2005, was to switch to a fixed rate against the euro. The Riksbank remarked – rather dryly – that, with fixed exchange rates, monetary policy would not be useful in curbing any overheating tendencies. In the 2005 autumn issue of the stability report, the Riksbank had a specific article on the lending of the large banks in the Baltic countries. Therein, the Riksbank observed that the expansion in the Baltic countries gave 'a positive diversification ... [but] that the development to date cannot continue at the same high rate ... [and that] increased volatility in earnings and more extensive exposures to non-traditional customers must therefore be seen as potential risks' (Sveriges Riksbank 2005b, pp. 38–39). In the spring of 2006 it was clear that credits in the Baltic countries were escalating at an unsustainably high rate in both the corporate and household sector, and in the summary of the stability report the Riksbank warned that the sharp credit growth could not continue 'indefinitely' (Sveriges Riksbank 2006b, p. 8). In the autumn of 2006, the Riksbank also pointed out that the risks to Swedish banks had become increasingly evident, especially for the two banks with the greatest exposure to the Baltic countries, and whose earnings largely came from operations there (Sveriges Riksbank 2006c, pp. 10–11, 29). The signs of the Baltic economies overheating were now becoming increasingly clear. The Riksbank determined that the fiscal policy measures taken by the Baltic countries had not sufficed to curb the growing demand, while at the same time the fixed exchange rates made it difficult to use monetary policy to counteract the overheating (Sveriges Riksbank 2006c, pp. 10–11, 29).

While the Riksbank pointed out worrying factors in the Baltics early on, with hindsight it could be said that the language used in the report initially toned down the risks that these developments posed to Swedish banks (Sveriges Riksbank 2005a, p. 30, and Sveriges Riksbank 2005b). It was not until 2006 that the tone of the stability report started to sharpen, and the risks to the Swedish banks were taken seriously.

2.4.2 The liquidity crisis of 2007–2008

In the spring of 2007 – in the yet relative calm before the storm – the Riksbank described, in a separate article in the stability report, the incipient problems on the American subprime market – a factor that had not yet had any really serious repercussions in the global financial system. However, these problems later came to largely form the basis of the confidence and liquidity crisis that broke out among banks with international operations. The subsequent analysis showed that nobody had fully understood how American banks had repackaged mortgages into investment-grade instruments, and what the link was between the US mortgage market and global financial markets.[4]

4 Some leading academics, such as Rajan (2005), pointed out that there were problems, but often underestimated the consequences and did not reach a wider circle.

In the stability report, the Riksbank also pointed out the historically low risk premiums on various asset markets, and the risks of sharp price corrections ahead in such markets (Sveriges Riksbank 2007a, p. 17). In light of the turbulence that prevailed during the period just before the bankruptcy of Lehman Brothers, the Riksbank published an article in the stability report on new challenges relating to financial stability. A number of 'new' risk factors were noted: reduced transparency due to complex instruments, increased dependence on market liquidity, faster-moving financial markets, an increased risk of cross-border contagion of problems, and growing operational risks. The Swedish authorities thus possibly had a somewhat greater understanding of the global financial risks than had been the case before the crisis of the 1990s. At the same time, they hardly suspected the full extent of the contagion risks before the crisis that commenced in 2007.

3 During the crisis

In August 2007, the Executive Board of the Riksbank found that the global risks could create a situation in which the Riksbank and other Swedish authorities would need to take concrete action at home too. The Swedish financial fire brigade needed to review its toolkit. Since there was no hardware store offering ready-made tools, the Riksbank had to largely develop its own, often completely new instruments. Although there was inspiration to be found in international and past examples, a lot thus had to be home-crafted (see Ingves 2018).

After the bankruptcy of Lehman Brothers in September 2008, the Riksbank developed several new extraordinary facilities by providing liquidity in different forms to different parts of the financial system.[5] At most, the Riksbank lent USD 30 billion in the spring of 2009, and around SEK 375 billion in November 2009 (see for example Sveriges Riksbank 2010a, p. 35). The size of the Riksbank's balance sheet more than tripled. During the crisis, the Riksbank negotiated swap agreements with the Federal Reserve (Sveriges Riksbank 2008b) and ECB (Sveriges Riksbank 2009b, p. 36, or Sveriges Riksbank 2010a, p. 24) and provided support to Latvia (Sveriges Riksbank 2008f) and Iceland (Sveriges Riksbank 2008a).[6] Furthermore, the Riksbank gave emergency liquidity assistance to the Swedish subsidiary of the Icelandic bank Kaupthing (Sveriges Riksbank 2008d) and Carnegie (Sveriges Riksbank 2008e) and assisted the Government with devising a stability plan and a guarantee programme for bank funding.

With a certain degree of self-criticism, it can be said that, before the crisis, the Riksbank had possibly focused too much on theoretical rationale and too little on operational issues in terms of how to provide liquidity in different ways. In operational issues, the Riksbank was forced to improvise and learn quickly from other central banks. Also, before the crisis, the departments worked rather in parallel and independently of each other. The crisis demanded new forms of decision-making, new forms of collaboration and new activities to create the facilities that were necessary for the Riksbank to fulfil its task of ensuring the functioning of the financial system in Sweden.

3.1 Central bank measures

More fundamentally, it could be said that there are at least six different types of measures that a central bank can implement in a financial crisis, besides the task that it normally performs.

5 For a summary of the measures taken by the Riksbank and other Swedish authorities during the financial crisis in autumn 2008 (see Sveriges Riksbank 2009a, pp. 29–31). Riksbank.se also contains a summary of the measures taken in 2007–2010.

6 A currency swap is an agreement to buy (or sell) a currency today and then sell (or buy) it back at a given future day and at a given price. A swap agreement between central banks is in practice a form of loan from one central bank to another.

First, the central bank can introduce general facilities that provide liquidity in the domestic currency to a greater extent than in normal times.[7] The central bank can create more central bank money by a simple push of a button, and there are no limitations on this type of liquidity supply. For example, during the crisis the Riksbank lent at most SEK 375 billion in various general facilities. As the payment system is closed, these measures are primarily aimed at creating trust between participants in the financial system. It means that a bank that borrows from the Riksbank must pledge collateral with a value equalling what the bank may borrow in liquid funds; collateral that it could normally otherwise use on the markets to access liquid funds. A bank granted a loan from the central bank uses these funds to pay another bank, and at the end of the day, everything comes back to the central bank. This type of central bank lending is thus primarily important if confidence between different financial entities has been undermined. In the same way, quantitative easing involves the central bank buying collateral and paying with central bank funds. Hence, the central bank's balance sheet expands and the banks can replace less liquid funds (such as different types of securities) with the most liquid ones – central bank funds. By lending on longer maturities at a predetermined interest rate, the central bank can also signal that the interest rate will remain low for a long period of time. This is exactly what the Riksbank did with the loans issued at a fixed rate in 2009 (see Elmér et al. 2012).

Second, a central bank can direct liquidity support at an individual bank, in the form of emergency liquidity assistance. During the crisis, for example, the Riksbank provided emergency liquidity assistance to Kaupthing's Swedish subsidiary, and Carnegie. There is a long tradition of emergency liquidity assistance, and it has long been considered a core task for central banks (see Sveriges Riksbank 2003, pp. 57–73). The background is the problem we described in the introduction – that banks normally lend on a long maturity, while their funding often has a short maturity and is determined nominally. This difference in maturities, combined with the fact that the deposits are nominally determined, creates a risk of bank runs (see for example Diamond and Dybvig 1983). Much of the discussion regarding emergency liquidity assistance comes from Walter Bagehot (Bagehot 1873), and Paul Tucker has summed it up as 'to avert panic, central banks should lend early and freely (i.e. without limit), to solvent firms, against good collateral, and at "high rates"' (Tucker 2009, p. 3). Another premise for a bank to obtain emergency liquidity assistance is normally that it must be systemically important. If all banks can obtain liquidity too easily from the central bank on extraordinary terms, this would risk weakening the banks' incentives to reduce their own risks, that is, it would create a moral hazard. However, it is not easy to quickly assess whether a bank is solvent and systemically important. Such assessments also vary significantly over time, as illustrated by the Kaupthing and Carnegie cases. It is highly improbable that either of these banks would have been considered systemically important before the crisis. However, in the volatile landscape that ensued from the bankruptcy of Lehman Brothers, and before more structural crisis measures (such as the reforms of the deposit guarantee) had been launched, the Riksbank found it far too risky to let these banks go bankrupt (see also Ingves 2018).

Third, the central bank can provide liquidity in a foreign currency. For example, during the crisis the Riksbank lent USD 30 billion in general facilities.[8] In order to do so, the central bank must have access to the foreign currency, either in its own foreign exchange reserve or by means of borrowing the currency as needed. Sometimes – if the international relations are good and it is in the interest of the counterparty – the central bank can borrow the foreign currency from other central banks via a swap agreement. If the central bank must instead obtain the foreign currency via markets, there is a risk that this would be very expensive if it

7 Normally, the central bank serves as a liquidity provider, by ensuring that the economy has access to the liquidity it needs. In order for this to work, however, the liquidity needs to flow fairly freely between different banks and other participants in the economy. In a financial crisis, these transfers do not function as smoothly, and the central bank may need to provide extra liquidity to ensure that the payment system continues to work.

8 Emergency liquidity assistance in foreign currency is also possible.

only borrows once a crisis has struck. During the crisis in 2008–2009, the Riksbank used both its own foreign exchange reserve and the swap agreement with the Federal Reserve that was specially created in the crisis. Liquidity support in foreign currency can either be granted in the form of a general facility, or directed at an individual bank. The banks need foreign currency if for instance they have obtained funding abroad, and need to repay the debt in a foreign currency. It should be noted that, if the central bank lends foreign currency and the banks can use collateral in Swedish krona, the total privately held collateral pool in Swedish krona shrinks.

Fourth, the central bank can adjust which collateral it accepts from banks. In normal times, the banks must have collateral for executing payments in the payment system. If the central bank accepts a wider set of collateral (or makes a downward adjustment to the haircut), banks can increase their borrowings. This measure was also used by the Riksbank during the crisis, as the banks were permitted to a greater extent to use their own covered bonds as collateral for loans from the Riksbank.[9]

Fifth, the central bank can interact with a wider set of counterparties in the economy. Normally, the banks are intermediaries between the central bank and the rest of the economy. For example, the main monetary policy tool is the repo rate which governs what the banks need to pay when they borrow from or deposit money with the central bank. Usually, only larger banks are included in this monetary policy process directly with the central bank. The repo rate directly affects the interest rates that the large banks (and other banks) charge to their customers, and through expectations about future interest rates which then also affect economic development. In a crisis, trust between the banks can vanish, and in that case the banks are not uniformly affected by the repo rate and the 'transmission mechanism' loses momentum. One way for the central bank to alleviate this is to increase the number of counterparties, that is, by acting directly in relation to more participants in the economy. Often, however, it is difficult to do anything about the number of counterparties in the short term, since this requires substantial operational resources, and takes time to implement. During the crisis, however, the Riksbank was also considering this to reach out to a broader set of banks.

Sixth, the central bank can also contribute its knowledge about financial crises by assisting in devising appropriate measures elsewhere. For example, during the crisis, the Riksbank seconded a number of its employees to the Ministry of Finance to participate in efforts to devise the Government's stability programme. Through its international contact network, a central bank can also sometimes act to reduce risks abroad, which can be important to the domestic financial stability. During the crisis, for instance, Riksbank employees helped analyse the problems in Iceland, and the Riksbank helped out with a swap agreement. In Latvia, Riksbank employees contributed to the IMF's evaluation of Latvia's banking problems and currency board. The Riksbank also signed a swap agreement with Latvia. A clear purpose of these measures was to reduce the risks of the crises in these countries spilling over to the Swedish financial system.

3.2 Some lessons from the crisis

In many ways, the global financial crisis put the Riksbank up against a number of challenges, and now, ten years later, it might therefore be important to consider which lessons can be learned from this.

One lesson is that it is important to *quickly identify the problem*. As early as when the problems on the global financial markets escalated in August 2007 – on 9 August the ECB was forced to provide EUR 95 billion in liquidity when French banks were teetering on the brink of collapse – signs could be seen of international liquidity risks increasing, and therefore a risk of a spillover into Sweden.

9 Covered bonds have an additional protective layer for the investor. In order for the investor to make a loss, two factors would be required – the bank would need to go bankrupt, and also the underlying assets, often mortgages, included in the cover pool would need to fail to generate sufficient cash flows.

Another lesson is that it is a case of *quickly identifying potential, concrete measures*. There is often urgency in a crisis and measures need to be implemented based on incomplete and uncertain information. The question is what can be done, and how fast. For a central bank, it is often a case of using its balance sheet. It is also a matter of being concrete, and finding measures that can be put into practice.

It is also a case of *carrying out measures sufficiently quickly and to a sufficient extent*. This requires decision-making power. Measures that are too small risk aggravating the situation – it is a matter of showing that the central bank is prepared to do what it takes to restore confidence.

It is therefore also important that there is *political consensus and coordination between authorities*. Authorities and politicians need to agree on the grounds of the various crisis measures, because political disunity can undermine confidence in the measures. Work must be distributed and coordinated both within the country and with relevant foreign authorities. Communication regarding measures and decisions also needs to be coordinated. An example of such coordination is the actions of the Swedish authorities and the Swedish government when international financial markets ceased functioning after Lehman Brothers went bankrupt. At the time, the banks could no longer borrow on capital markets, or could only do so by pledging their very best collateral. The Swedish National Debt Office then quickly offered a facility which, in practice, meant that the banks could exchange their covered bonds for treasury bills. The Riksbank carried out a number of crisis measures and supplied liquidity in a number of ways. The Government presented a bill for a higher deposit guarantee and a more extensive crisis package, including a government program whereby the banks could issue debt with a government guarantee.

There was also substantial and close cooperation on the international front. The large central banks continually shared information with each other, for instance as part of the Bank for International Settlements (BIS) cooperation. Important informal cooperation was also gained through the IMF. In the crisis, central banks also coordinated various measures to attain maximum effect. One example of this is that many of the terms and conditions for auctions in US dollars were synchronised across countries. As a longstanding member of the BIS and the central bank of a G10 country, the Riksbank could benefit from this cooperation, which facilitated crisis management, hence benefiting the Swedish economy. Dependence on *good relations and advanced cooperation with foreign authorities* thus increases drastically in an international financial crisis. It is therefore crucial, in times of financial stability, to build effective information channels and trust between authorities, both within the country and across borders.

Another lesson is that financial stability is ultimately about *trust*. This was the reason why the Riksbank, early on in the crisis, declared that it 'is prepared to provide the liquidity necessary to safeguard financial stability and ensure the smooth functioning of the financial markets in Sweden' (Sveriges Riksbank 2008c). In order to build trust, *transparency* is key (Meyersson and Mikiver 2018). Publicly disclosing the extent of the problems reduces the risk of speculation about how bad it is. Often, the very uncertainty about the scope of the problems is at least as large a source of concern as the actual problems themselves. When Kaupthing and Carnegie received emergency liquidity assistance, it was therefore important to the Riksbank to have the banks publish information about this. Also, it turned out that the information had a calming effect on markets, and strengthened the markets' confidence in these banks.

An internal lesson is that a *wide variety of different types of knowledge and expertise* is needed, of both an analytical and a more operational nature, in order to be able to deal with a financial crisis, and that it is crucial to have carried out *crisis simulation exercises*. During the financial crisis, it became clear that operational knowledge is essential to the ability to devise sufficiently concrete and viable measures. It is however too late to build up such knowledge once the crisis has actually struck. It is also important to create a climate internally at the organisation that breathes ‘decision time’. Questions cannot be discussed for too long, it’s a case of trial and error. It is more important to act fairly quickly and about right, than to analyse everything yet again to get everything completely right – but too late. If a decision is not quite right the first time, it can be corrected the next day. In such a situation it is important that there are clear lines of responsibility, that senior managers can delegate, that there are common goals and that there is sufficient flexibility to use new forms of working and cooperation. Experience also shows that *having a substantially different organisation in a crisis than in normal times does not work*. Before the crisis, the Riksbank had concrete plans to activate a separate crisis organisation in the event of a crisis. It turned out that this was not used in practice however; rather, the work fell back on the Riksbank’s regular organisation, with each department preparing the decisions of the Executive Board in their respective areas of responsibility. However, one aspect did change; in the crisis the cooperation between the departments increased considerably.

Many of the crisis measures that were launched during the financial crisis were analysed based on their expected effects, and how they could be introduced in practice. However, an aspect that attracted less attention was what happens afterwards, and the risk of the crisis measure being permanent. It is however important to *consider different exit strategies at an early stage*. The need to *follow up on what the banks do with emergency liquidity assistance* was also a new lesson. Before the crisis, the Riksbank assumed that one of the central bank’s most important roles in restoring financial stability in a crisis was deciding whether or not a bank should receive emergency liquidity assistance. It was not foreseen that the decision to grant emergency liquidity assistance was merely the start of that work.

In retrospect it is probably fair to say that the crisis management of the Riksbank and other Swedish authorities during the global financial crisis was relatively successful. The massive liquidity supply initiatives eased the financial crisis. Although such massive lending posed risks, it paid off. The payment system worked without any major disruptions. Lending and possibilities of managing risks took a blow in the most acute stages, but could nevertheless gradually be restored. While GDP indeed fell drastically in 2008 and 2009, the Swedish economy recovered relatively quickly. It can also be noted that the Riksbank actually made a profit from it.

4 After the crisis

Globally, the financial crisis exposed major risks in the banks’ operations, which both authorities and the banks themselves had grossly underestimated. The banks had too little capital, and insufficient liquidity. The contagion risks between banks in the same country and between banking systems of different countries were greater than most had imagined. The risks needed to be limited in many ways. It was clear that stricter rules were required, and that these rules needed to be global in order to promote financial stability effectively. The ten years that have passed since the crisis have therefore been dominated by a global regulation agenda, and this has also had institutional consequences. The crisis and the global changes have also affected developments in both the EU and in Sweden.

4.1 Global level

The aftermath of the global financial crisis gave rise, as we have described, to broad, global reform efforts aimed at reducing the risk of further financial crises and limiting their consequences should they nevertheless occur. The regulatory changes were so vast that some experts have spoken of a ‘regulatory tsunami’.

4.1.1 The institutional framework

At the global level, the Basel Committee took the lead following the crisis and tightened demands on the banks. As a consequence the Basel Committee became much more political than it had been before.[10] The Financial Stability Board (FSB) also took on a greater role in coordinating reform efforts between the global standard-setters and also transformed itself into a formal legal unit, which has given it a more significant role as the extended arm of the G20 countries in the financial area.[11, 12]

4.1.2 New rules and a new policy area

The most obvious examples of new rules after the crisis are found in the banking sector. In the Basel Committee on Banking Supervision, new and stricter requirements were agreed for banks in a comprehensive new set of standards, Basel III.[13] According to the new global standards, the banks must hold much more capital and also of better quality, that is, capital that can immediately cover losses. They also entail an obligation for the banks to fulfil a complementary capital requirement, the leverage ratio requirement, in which exposures are not risk-weighted. Basel III also contains completely new liquidity requirements; one that banks must have a certain volume of liquid funds (LCR) and one that the maturity of liabilities may not be too short in relation to the maturity of assets (NSFR).[14] Another element of Basel III is that countries shall introduce a capital floor forcing banks permitted to calculate their own risk weights to hold capital not lower than a percentage of what banks that use the Basel Committee's standard models have to hold. These standard models have also been reviewed and made stricter.[15]

Requirements on banks have thus been tightened. At the same time, another clear lesson from the global financial crisis is that it does not suffice to merely ensure that each individual institution is stable. The authorities must also analyse and assess the risks in the financial system as a whole, and tools are also needed for counteracting the system-wide risks identified. These insights have given rise to the development of a completely new policy area – macroprudential policy.[16] Unlike traditional (micro)prudential policy focusing on risks in individual financial institutions, macroprudential policy is about the risks in the financial system *as a whole*. It focuses on the links within the financial system, that is, how different institutions are exposed to each other, and the extent to which different institutions are exposed to the same type of sectors or risks, such as the real estate market.

Although macroprudential policy is still a policy area with theory and practice under development, and many macroprudential issues are rather national, the crisis led to some concrete measures at the global level. For example, Lehman Brothers' bankruptcy made it clear that, from a financial system perspective, it was more important to ensure that some banks survived than others. It was therefore natural to impose stricter demands on these *global systemically important banks* (G-SIBs) than on other banks. It also became clear that

10 The Basel Committee on Banking Supervision is the global standard-setter for banking rules. Its purpose is to promote global financial stability by improving and harmonising both banking rules and supervision of banks. Members of the committee are central banks and supervisory authorities from 27 countries worldwide. Both the Riksbank and Finansinspektionen are members.

11 Some of the most important global standard-setters in the financial area include the Basel Committee on Banking Supervision (BCBS), the Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO).

12 The FSB is an international organisation that monitors and assesses vulnerabilities affecting the global financial system and proposes actions needed to address them. Its members consist of the Ministry of Finance, central banks and supervisory authorities from the G20 countries, as well as a number of global standard-setters. No Swedish authorities are formal members of the FSB, but in a handful of cases Swedish authorities may participate by special invitation from the FSB.

13 The first part of Basel III was adopted in December 2010 (BIS 2010) and the last part in December 2017 (BIS 2017).

14 The Liquidity Coverage Ratio – LCR – entails, somewhat simplified, that a bank must hold sufficient liquid funds to survive a stressed scenario in which outflows are greater than normal during 30 days. The Net Stable Funding Ratio – NSFR – entails, somewhat simplified, that the bank must hold a sufficient amount of stable funding to cope with a stressed scenario for a year.

15 For a description of the Basel III standards, see for example Niemeyer (2016).

16 It can in any case be said that macroprudential policy has been *presented* as a new policy area. Some of the macroprudential measures discussed today however resemble measures that existed during the period with more regulated capital markets, see for example Sweden before 1985. A number of Asian countries introduced similar rules even before the global financial crisis.

the risks to financial stability varied over time. National authorities were therefore given the possibility of setting higher capital requirements during certain periods, and other countries undertook to respect these higher requirements under certain conditions.[17]

Also, together with IOSCO, the Basel Committee agreed on margin requirements when an institution trades in derivatives that are not centrally cleared. One of the reasons is to ensure that trade in standardised derivative contracts is largely cleared through central counterparties in order to reduce contagion risks.

Other global standard-setters also tightened demands on various financial institutions. For example, the FSB prepared guidelines for recovery and resolution plans for banks. The FSB also developed standards for a new type of debt that banks must have.[18] If the bank defaults, this type of debt must be able to cover losses or be converted to shares.

4.1.3 The Riksbank's work globally

For Sweden, which is a small, open economy with a large banking sector that largely obtains its funding abroad, the global risks of contagion to the Swedish financial sector are evident. After the crisis, the Riksbank has therefore put a lot of effort into working towards sufficiently strict global rules. When global agreements are actually in place, the strategy has been to ensure that they are not watered down. These efforts have been eased considerably by the fact that Stefan Ingves was elected Chairman of the Basel Committee in 2011. Although he does not represent Sweden in his chairmanship, employees of the Riksbank have, through this, gained a unique opportunity for insight into the negotiating game and for influencing the new global standards. His chairmanship has also made other countries' representatives much more interested in the Riksbank's views. The Riksbank has also actively participated in the IMF's work on global imbalances and risks.

4.2 EU level

It is difficult to make global agreements legally binding. Instead, the legislative acts are taken at EU or national level. The EU has largely introduced the new global standards and has chosen to increasingly do so in legislation through regulations that are directly applicable in all Member States, rather than through directives, which must be interpreted and introduced in national law. This has meant that EU regulations have been harmonised to a greater extent than was previously the case.

Negotiations regarding how the global regulations are to be implemented in the EU have been challenging however, because the structure of both the financial sector and other key sectors varies considerably between EU countries. For example, many of the identified imbalances have come from real estate markets, which function quite differently in different EU countries. Finding common EU frameworks for macroprudential policy regulations has therefore been particularly challenging, while at the same time there has been a great need for, and political pressure on, a common framework in order to promote the single market.

4.2.1 The institutional framework

The crisis also led to a significant change in the institutional framework in the EU. In 2011, the EU's three supervisory committees at the time were transformed into new, independent authorities: one for banks – European Banking Authority (EBA); one for insurance – European Insurance and Occupational Pensions Authority (EIOPA); and one for securities markets – European Securities and Markets Authority (ESMA). The powers of these authorities were

17 An example is the countercyclical capital buffer (CCyB); all Basel members are committed to follow the levels (additional capital requirement of up to 2.5 percentage points) applied by other Basel Committee member countries to exposures in that country.

18 Total Loss Absorbing Capacity (TLAC) for global systemically important banks involves, somewhat simplified, a requirement for the world's largest and most important banks to have sufficient capital – or debt that can be converted to capital – to tackle a major financial crisis.

also extended and now consist of making sure that the new financial rules are correctly implemented; devising technical standards to supplement the rules; and ensuring that regulation and supervision are appropriate, effective and harmonised in the EU. The supervisory authorities are the members of these three authorities.[19] If a country's banking supervision authority is outside of the central bank, the country's central bank is normally an observer in the EBA's board.[20]

Furthermore, insights that a system-wide perspective was needed had clear institutional consequences at EU level. The EU decided to create an entirely new organisation, a European macroprudential body – the European Systemic Risk Board (ESRB). This body, which started operating in 2011, was tasked with identifying, preventing and mitigating risks in the European financial system. The ESRB has soft tools, that is, the possibility of issuing warnings and recommendations to national and European authorities or organisations. Its board mainly comprises the heads of central banks and supervisory authorities in the EU, and the central banks hold the voting right.

A few years later, in 2014, further important steps were taken in developing the institutional framework for the financial sector in Europe, through the creation of the Banking Union. This involved the ECB assuming responsibility for supervising significant banks in the countries of the Banking Union.[21] The ECB was also given shared responsibility with national authorities for macroprudential policy in these countries. The institutional framework in the EU was further enhanced at the beginning of 2016, when the Single Resolution Board (SRB) started operating. It was given responsibility for the recovery and resolution of crisis banks under ECB supervision, and cross-border banking groups in these countries. A resolution fund to finance such measures is being built up.

4.2.2 The Riksbank's work at EU level

The Riksbank has been actively involved in the intensive regulatory work in the EU after the crisis, and contributed analyses and opinions to the Ministry of Finance ahead of the various EU negotiations in which the Government has participated. This has included how to devise the new European supervisory framework, the revised capital requirement regulation and directive and the new framework for crisis management in the banking sector.

The Riksbank has also been very active in the work of the ESRB. Already when the ESRB started operating at the beginning of 2011, Stefan Ingves was elected chairman of the ESRB's Advisory Technical Committee (ATC), a position he held until the spring of 2017. The Advisory Technical Committee came to develop into much of an 'engine' for the ESRB work.

For what will soon be eight years, the ESRB has highlighted risks to stability in the financial system in a number of different areas. For example, the ESRB has recommended that the authorities concerned reduce the risks related to the banks' lending in foreign currency and funding in USD, and issued warnings to a number of EU countries, including Sweden, regarding risks in the housing market. The ESRB has also been a driving force recommending EU countries to introduce effective organisational structures and instruments for macroprudential policy.

Through Stefan Ingves' chairmanship of the ATC, the Riksbank has had close contacts with the ESRB secretariat and good opportunities to help devise the ESRB's operations. This has also given a valuable insight into how the participants concerned view various issues. Also, Riksbank employees have participated in a large number of expert groups, enabling the Riksbank to influence the ESRB's work in specific areas. As Sweden is not part of the Banking Union, we lack access to the ECB's macroprudential discussions. It is therefore particularly important for Sweden to safeguard the ESRB as a forum for macroprudential discussions in the EU.

19 In Sweden's case, Finansinspektionen.
20 In Sweden's case, the Riksbank.
21 These countries are currently the same as those included in the euro area, but other EU countries are able to join.

4.3 Swedish level

The global regulatory agenda has also largely determined the development of the Swedish financial regulatory framework, particularly via directly applicable EU regulations. Furthermore, institutional changes within the EU have been reflected in Sweden, although the division of responsibility between the Swedish authorities has partly deviated from the structures in the rest of the EU.

4.3.1 The institutional framework

In early 2014, Finansinspektionen became responsible for macroprudential policy in Sweden and, in parallel, the Financial Stability Council started its operations. The idea is that the council would function as a forum for the authorities concerned and the government to share information and experience with regard to financial stability issues.[22] In March 2015, the Government decided that the National Debt Office would become the resolution authority for banks in Sweden. In addition, an inquiry is currently under way looking into the pros and cons for Sweden of entering into or remaining outside the Banking Union, and in a separate inquiry the Sveriges Riksbank Act is under review, so the Swedish institutional framework for financial stability is not necessarily finalised.

For the Riksbank, Stefan Ingves' chairmanship of the Basel Committee and the ESRB's Advisory Technical Committee (ATC) gave Riksbank officials opportunities to influence international reform work that would not otherwise have been available. As a result of primarily the global financial crisis, but also partly to give the Riksbank the staffing levels and brain power required to participate in the work, there was also a substantial reallocation of resources within the Riksbank, and the Financial Stability Department (AFS) grew from 35 full-time employees in 2007 to 68 full-time employees in 2013.[23] The entire Executive Board also became much more involved in matters relating to financial stability.

4.3.2 Greater focus on financial stability issues

The Executive Board's heightened interest in financial stability issues was, among other things, reflected in the financial stability report being transformed from an analytical product to a more policy-oriented document. For example, since the autumn of 2010 the Riksbank has been submitting recommendations to external parties in the report. These recommendations were initially aimed at the banks, which at the time were being encouraged to make their public reports more transparent.[24] However, over time the Riksbank's recommendations became firmer. The banks not only needed to satisfy the global minimum requirements. The Riksbank was of the opinion that Swedish banks' capital levels should be higher than that. The rationale was that the banking system is concentrated, that a large share of the major banks funding is market funding in foreign currency, that the market expects the major banks to have an implicit state guarantee and that the Swedish banks are big in relation to the Swedish economy (see Sveriges Riksbank 2011b). Certain recommendations were also gradually aimed at Finansinspektionen and politicians. The fact that the Riksbank chose to recommend what action other authorities should take was not uncontroversial, but the Executive Board believed it was important for the Riksbank to be clear about what measures were needed to improve financial stability in Sweden.

22 Members include the Ministry of Finance, the Riksbank, Finansinspektionen and the National Debt Office. A less formal collaboration between these authorities existed previously as well.

23 However, the number of employees in the Financial Stability Department has declined in recent years, to 52 full-time employees in June 2018. This is partly due to the completion of the intensive work on global reforming of the banking sector following the crisis. It is also in part a consequence of the fact that Stefan Ingves' chairmanship of ESRB's Advisory Technical Committee came to an end.

24 In the report from the autumn of 2010 the Riksbank writes, for example, that 'the transparency of the banks' public liquidity reporting needs to be improved, as shortcomings in public liquidity reporting create uncertainty' (Sveriges Riksbank 2010b, p. 11).

The analysis of the risks to financial stability has also gained significance in recent years for the Riksbank's monetary policy assessments. The financial crisis made it clear that, in practice, it is hard to separate financial stability from monetary policy. Measures taken in one area affect the other. The Riksbank has therefore gradually improved its analysis in order to facilitate a more effective assessment of how risks to financial stability can affect, and be affected by, the real economy. One example of this is how macroprudential measures affect financial stability risks and therefore the real economy and thus the conditions for monetary policy.

4.3.3 The Riksbank's views on the foreign exchange reserve and household debt

There are also certain financial stability issues that have been the subject of keen debate in Sweden over the past few years. The two most central of these are the size of the foreign exchange reserves, and household debt. It may be useful, therefore, to explain in greater detail how the Riksbank has formulated its policy and influenced opinion on these issues.

4.3.4 Foreign exchange reserves

Swedish banks' funding in foreign currency increased during the years leading up to the global financial crisis. In this way the banks financed currency-hedged assets in Swedish krona, and assets in foreign currency, particularly EUR-denominated loans to households and companies in the Baltic States. It was not an exclusively Swedish phenomenon, but part of an international trend that was often welcomed at the start of the 2000s for efficiency and diversification reasons. However, the course of events in 2008 and 2009, both in Sweden and internationally, revealed that the risks of extensive foreign funding had been underestimated. When the crisis hit in 2008–2009, the Riksbank had to lend the equivalent of USD 30 billion to Swedish banks and entered into a credit agreement with the Latvian central bank to help Latvia maintain its exchange rate. Although the Riksbank did not lose any money on this – quite the opposite – there were a number of fortunate circumstances that meant that, despite everything, Sweden emerged from the crisis relatively unscathed. The consequences could have been considerably more severe for the Swedish economy, public finances and households if, for example, the Riksbank had not had access to US dollars via the swap agreement with the Federal Reserve – dollars that could then be lent to Swedish banks – or if Latvia had devalued its currency. It was a wake-up call for the Riksbank to see the speed and scope of action required to assist Swedish banks with foreign currency loans, and it has affected the Riksbank's approach both to the regulation of banks' liquidity risks and the size of the Riksbank's foreign exchange reserve, and who should decide this.

One of the purposes of the new Basel III regulatory framework was precisely that: to restrict banks' liquidity risks. One important regulatory tool to restrict banks' liquidity risks in Basel III was the Liquidity Coverage Ratio, LCR, but several of the most influential countries in the Basel Committee have banking systems that either fund themselves in domestic currency or have access to reserve currencies via standing swap agreements with other central banks. Liquidity risks in foreign currency therefore did not have as prominent a role in Basel III or in the subsequent EU directive as had been justified from a Swedish perspective. The Riksbank was therefore quick to recommend that the major Swedish banks immediately reduce their funding and liquidity risks in foreign currency, and introduced such a recommendation in the first financial stability report for 2011 (Sveriges Riksbank 2011a, p. 76). In the following stability report the recommendation was further clarified to state that the major banks should at the time of writing already satisfy the LCR separately in EUR and USD (Sveriges Riksbank 2011d, p. 71). The Riksbank therefore welcomed Finansinspektionen's decision to introduce the LCR in USD and EUR in its regulations at the beginning of 2013.

Although the purpose of the LCR is for banks to insure themselves against liquidity risks, central banks have an important role in being able to act as the lender of last resort (LoLR), as a central bank has a unique, and in principle infinite, capacity to create money in the country's own currency. However, the logic that underpins the role of the central bank as the lender of last resort cannot be applied to liquid assets in *foreign currency*. A central bank's possibilities of providing liquidity support in foreign currency are limited to the currencies that the central bank has in its own foreign exchange reserve, or can borrow. Furthermore, liquidity support in domestic currency is free in accounting terms, provided the central bank does not make a credit loss on the lending, while the return on a foreign exchange reserve is typically negative if the funds also need to be borrowed.

Although the Riksbank had access to a certain amount of USD during the global financial crisis through its arrangement with the Federal Reserve, future access to dollars is by no means guaranteed. During the 2008–2009 financial crisis, it was in the interests of the USA to distribute dollars in the global economy. However, there is a good deal of uncertainty as to whether this will be the case in the next crisis. The Riksbank's analysis has therefore been built on the premise that the Riksbank should principally be able to lend from its own foreign exchange reserve. This begs the question of how large the foreign exchange reserve should be.

Before the crisis, the foreign exchange reserve amounted to an estimated SEK 200 billion. It was increased in 2009, and by the end of that same year totalled SEK 300 billion.

With the lessons learned from the financial crisis, the Riksbank launched an inquiry in 2012 looking into what the size of the foreign exchange reserve should be. What is a reasonable foreign exchange reserve for a country like Sweden is an important policy matter, with the answer ultimately depending on the risk aversion of the decision-maker. However, it also presents an analytically challenging task, as most rules of thumb and methods for calculating the need are based on developing countries or emerging economies whose circumstances cannot always be transferred to a financial system like that of Sweden. Based on data regarding the banks' liquidity risks, the Riksbank instead came up with various scenarios illustrating how much liquidity the Riksbank might need to contribute to the financial system in the event of a new crisis. The analysis indicated that between SEK 70 billion and just over SEK 900 billion would be needed, depending on the length of the crisis and the extent to which foreign central banks would assist Sweden. In 2012, following extensive discussions, the Rikbank's Executive Board decided to increase the foreign exchange reserve to SEK 400 billion. This was financed using loans from the National Debt Office. This process raised controversial questions as to the limits of the Riksbank's independence, the extent to which the Riksbank is able to request that the National Debt Office borrow currency for the foreign exchange reserve and who is therefore the ultimate decision-maker for Sweden's foreign exchange reserve. The Executive Board's decision coincided with the Government's inquirer Harry Flam presenting his findings from an inquiry into the Riksbank's financial independence and balance sheet (see Swedish Government Official Reports 2013). Put simply, the inquiry proposed that the Riksbank's foreign exchange reserve should be reduced to SEK 200 billion, thereby limiting the Executive Board's decision-making rights regarding the size of the foreign exchange reserve. But the proposal never became a bill, and the issue of the size of the foreign exchange reserve and who should make decisions regarding this is instead being addressed by the Sveriges Riksbank Act review, which is due to be completed in 2019.

4.3.5 Household debt and macroprudential policy in Sweden

Another matter that has played a significant role in the Riksbank's analyses and decisions is household debt and house prices, which have seen a rapid increase since the beginning of the 2000s. The Riksbank was one of the first to warn that households were building up greater debt. Increasing household debt was already being highlighted as a concern in the stability reports in 2005 (see for example Sveriges Riksbank 2005a, p. 24, and Sveriges Riksbank 2005b, p. 28).

An important issue was whether increasing household debt would cause direct credit losses for banks in a negative scenario, that is, if a sufficient number of households would struggle to pay off their loans if interest rates rose or if unemployment increased. It is true that the banks only made minor losses on their loans to households during the Swedish financial crisis in the early 1990s, but this experience may not necessarily serve as a compass for the future. Naturally the matter gained relevance in light of the rapid increase in subprime residential mortgages in the US at the time.

In response to the issue, the Riksbank had for some years been gathering large amounts of data from Statistics Sweden (SCB) regarding the financial status of individual households. This material included anonymised data about incomes, debts, assets, interest expenses and various household details such as number of children and geographical place of residence. Based on the data, the Riksbank was able to construct a large number of typical households and simulate how financial conditions for these households would be impacted if interest rates were adjusted, or if a member of the household lost their job. The conclusion from the simulations was that resilience among households with mortgages was generally high, and that the largest debts were in households with high incomes and two earners. Accordingly, the risk was small that a crash on the Swedish housing market would shake the Swedish banking system solely through the banks making *direct* credit losses on mortgages.

But there were still *indirect* channels through which a housing market crash could have serious consequences for financial stability in Sweden. For example, a major fall in house prices would make households that own their own homes poorer, and push them to save more to bolster their depleted balance sheets ('deleveraging'), which could in turn mean an extended period of weak economic development in Sweden. Another channel through which a weak trend on the housing market could affect the Swedish economy was through the banks' foreign funding. As we have previously mentioned, the Riksbank was surprised following the Lehman Brothers' bankruptcy in 2008 by how unstable foreign funding could be for the Swedish banking system. So it did appear reasonable to assume that a crash on the Swedish housing market could also cause funding problems for Swedish banks, and thus weaken the supply of credit for the Swedish economy, giving rise to negative macroeconomic outcomes.

To find out more, the Riksbank carried out an extensive inquiry into the housing market (see Sveriges Riksbank 2011c). The inquiry aimed to analyse the causes behind the increase in house prices and household debt, the role of monetary policy in this issue, the risks conveyed by the housing market trend and, in particular, measures that might reduce such risks. The inquiry was carried out by Riksbank officials and external consultants, and was completed in the spring of 2011. A key finding was that there is no single level at which it is possible to conclude that household debt or the risks to financial stability are too high. Instead it is the decision-maker (in this case the Riksbank's Executive Board) that must ultimately decide the extent of the risks that should be taken in order to determine the appropriateness of trying to reduce household debt, or at least lower its growth rate. A majority of the Executive Board then decided that the risks were so great that interventions were justified in the form of macroprudential measures.[25]

In the economic policy debate in Sweden, macroprudential policy has come to be more or less synonymous with measures or tools to tackle household debt, which reflects the fact that this has clearly been the dominant risk to financial stability in recent years.

Alongside the development of theory and empiricism about macroprudential policy, the Government and Swedish Parliament considered which authority should have primary responsibility for implementing macroprudential measures in Sweden. In early autumn 2013 it became clear that the Government intended to give primary responsibility to Finansinspektionen. However, the Riksbank continued to display a keen interest in household

25 This article does not refer to how the risk assessment of household debt affected the monetary policy conducted.

debt, and focused operations on developing policy proposals and recommending that Finansinspektionen adopts them. For example, in its first stability report of 2015, the Riksbank presented a catalogue of ‘Measures to manage financial stability risks in the household sector’ (see Sveriges Riksbank 2015, pp. 22–32). In all subsequent stability reports, household debt has been a constant theme when discussing risks to financial stability. Understanding of the risks posed by high household debt to the real economy has also filtered through to the Swedish political debate. Many of the measures that the Riksbank called for (mortgage caps, amortisation requirements, loan-to-income cap and adjustments to risk weights on mortgages) have been implemented, albeit later and to a lesser extent than advocated by the Riksbank. But there may still be cause for self-criticism. Namely that the Riksbank’s analysis and policy proposals were for a long time focused exclusively on the demand side of the housing market, on the effect of monetary policy and on how various macroprudential measures could be devised. However, many of the factors that determined the housing market trend were of a more structural nature, such as demographics, the tax system and supply factors. These circumstances have been known for a long time, and the Riksbank identified some of them back in 2011 (Sveriges Riksbank 2011c). Yet it was not until the end of 2015 that the factors took on a key role in the Riksbank’s analysis of the measures needed on the housing market.

5 Future challenges

In conclusion, it is natural to look ahead and think about what the most important challenges for safeguarding financial stability will be in the future. We will limit ourselves here to three.

A significant challenge is the ability to halt excessive growth in household debt and thus reduce the risks for a future financial crisis. Household debt continues to grow, although not as rapidly. Despite broad acceptance of the major risks associated with this trend, the measures that have been adopted to curb growth in household debt have almost exclusively only affected new borrowers. Furthermore, there have been almost no supply measures at all.

A second challenge is timely identification of the risks that are emerging as a result of the structural transformation of the financial sector. For example, there are clear indications that certain traditional banking services are starting to be provided by other operators as a consequence of technological advances and stricter rules for banks. Such a development will likely be positive, as it may make the financial sector more efficient, but it may also mean that risks arise in new ways and with new participants. Monitoring and understanding such risks will be a challenge for the Riksbank.

A third challenge is partly related to the previous one. Technological advances have meant that Swedes are using less cash. This poses new challenges for households and companies, but also for the Riksbank. Many households and companies are quick to adopt new technology and are increasingly using electronic forms of payment, but for some households and companies, new technology involves challenges. If cash cannot be used as it was previously, customers without access to banking services may get caught out and all customers may be forced to use payment methods that are determined by private interests.[26] The rapidly declining use of cash means that there may be a need for state-issued electronic money, an e-krona. This in turn brings to a head the question of the difference between public electronic money and funds kept at private banks’ accounts. How would an e-krona differ from standard bank deposits, and how would an e-krona affect banks’ deposits? How is the relationship between the two affected in normal times and during a crisis? What does this mean for the opportunities to promote financial stability? These are important questions for further investigation (see Sveriges Riksbank 2018).

26 An additional side effect of the decline in the use of cash for the Riksbank is that demand for its products is disappearing, which means that the seigniorage is plummeting, which in turn may hamper the ability to maintain the Riksbank’s financial independence.

To sum up, we can note that much has happened since the Swedish financial crisis in the 1990s. The Riksbank's work and analysis of financial stability risks has evolved and changed. Both the global financial crisis and the ensuing work has created a new regulatory and institutional landscape. Requirements for banks have been tightened and macroprudential policy has emerged as a new policy area. Meanwhile, major structural changes are occurring on the financial markets, which means that entirely new risks may materialise ahead. This presents a significant challenge for central banks, as for other authorities, as there is always a tendency to 'prepare for the previous war'.

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