Financial Infrastructure Report

2016

SVERIGES RIKSBANK

Contents

Foreword

The financial infrastructure consists of Financial Market Infrastructures (FMIs) through which payments are made and payments and transactions with financial instruments are handled. This infrastructure makes it possible for individual households, companies and authorities to make and receive payments in a safe and efficient manner. It also makes it possible to safely and efficiently pay for and deliver shares, fixed income securities and other financial instruments traded on the financial markets.

The financial infrastructure thereby plays a central role in the financial system and is a necessary condition for its functioning. This means that problems arising in the financial infrastructure can have serious negative consequences for the financial system, with potentially substantial costs to society as a result. It is thus of great importance for the stability of the financial system that the financial infrastructure functions in a safe and efficient way.

The Riksbank oversees the financial infrastructure with the objective of identifying and analysing the sources of risks and efficiency losses and acts to reduce these. This work falls under the Riksbank's responsibility for safeguarding financial stability. The Financial Infrastructure Report is intended to allow the Riksbank to present its assessment of the stability and efficiency of Sweden's financial infrastructure. The report also describes the bases for the Riksbank's oversight work and how this is conducted in practice.

The report is aimed at FMIs in the financial infrastructure, their participants, authorities in Sweden and abroad, the Riksdag, the Swedish parliament and other interested actors. By publishing its assessments, the Riksbank wishes to encourage continual improvements to benefit the financial infrastructure and thus the financial stability of Sweden. The report is issued once per year and is available from the Riksbank's website, www.riksbank.se. This year's report takes into account data available until 31 March 2016.

Stockholm, 31 March 2016

Kasper Roszbach
Head of Department,
Riksbank’s Financial Stability Department

Abbreviations

BIS – Bank for International Settlements
CPMI – Committee on Payments and Market Infrastructures
CSDR – Central Securities Depositories Regulation
EBA – European Banking Authority
EMIR – European Markets Infrastructure Regulation
ESMA – European Securities and Markets Authority
FMI – Financial Market Infrastructure
IOSCO – International organization of securities commissions
LCH – London Clearing House
OTC – Over the Counter
PFMI – Principles for Financial Market Infrastructures
PSD2 – Payment Services Directive 2
T2S – Target2-Securities

Summary

The Financial Infrastructure Report 2016 presents the Riksbank's assessment of the stability and efficiency of Sweden's financial infrastructure. The report also describes the bases for the Riksbank's oversight work, how it is carried out in practice and the areas on which the Riksbank will focus in 2016. The report is divided into three chapters. The first chapter takes up current issues arising from changes in the international environment and the regulatory issues that Financial Market Infrastructures (FMIs) must adapt to. In the second chapter, the Riksbank presents its focus areas in its oversight of the financial infrastructure in Sweden as well as assessments of the efficiency and stability of the Swedish FMIs. In the third and final chapter, the Riksbank provides information on the outcome of the oversight cooperation concerning foreign FMIs active on the Swedish market. The report takes into account developments in the financial infrastructure during 2015 and until 31 March 2016.

The overall assessment of the Riksbank

The Riksbank considers that the financial infrastructure in Sweden consists of safe and efficient FMIs.[1, 2] The FMIs largely fulfil the requirements of CPMI-IOSCO's Principles for Financial Market Infrastructures (PFMI) but there is also scope for improvements. The Riksbank's overall assessment is therefore that the financial infrastructure in Sweden functions well.

The replacement of Euroclear Sweden's system for securities settlement has been initiated, which the Riksbank supports as it is aimed at providing a more safe and efficient system for securities settlement. However, such a project is inherently associated with risks as many participants on the Swedish securities market will be affected by the project. Operational risks in the Swedish financial infrastructure will therefore remain heightened until the system replacement has been completed.

Below is a presentation of some important measures that have been implemented in the financial infrastructure as well as a number of actions that need to be taken to further improve the safety and efficiency of the financial infrastructure in Sweden. Finally, there is a presentation of two areas which the Riksbank will focus its oversight work on during 2016, and which will be followed up in the report published in 2017.

Measures that contribute to increased safety and efficiency in the financial infrastructure

- ***The introduction of mandatory clearing of OTC derivatives in SEK is leading to better management of counterparty risks:*** The European Commission is currently considering a proposal from the European Securities and Markets Authority (ESMA) that the most liquid

[1] The FMIs referred to here are the Swedish FMIs included in the Riksbank's oversight: The Riksbank's payment system for account transfers RIX, Euroclear Sweden AB's settlement system for securities (the VPC system), Nasdaq Clearing AB's central counterparty system for financial derivatives, commodity derivatives and repos and Bankgirocentralen BGC AB's payment system for clearing retail payments.

[2] See Sveriges Riksbank (2015), "The Swedish Financial Market 2015" for further information on the financial infrastructure in Sweden.

and standardised OTC derivatives[3] denominated in SEK would be covered by the requirement for central counterparty clearing. Central counterparty clearing of sufficiently liquid and standardised OTC derivatives contributes to increased financial stability through the improved management of counterparty risks. Despite these positive effects, the clearing requirement means that it may become more difficult for certain participants to manage their risks, as it cannot be taken for granted that all participants have access to a central counterparty. The Riksbank is largely positive to the clearing requirement and particularly towards its expansion to cover OTC derivatives denominated in SEK.

- ***The new Payment Services Directive is opening the way for increased competition and reduced risks on the payment market:*** In January 2016, a new directive on payment services in the internal market entered into force. The directive introduces two new types of payment service: payment initiation services and account information services. For both of these services, the user engage a party other than the party (usually a bank) with whom it has its payment account, either to request that a payment be initiated or to gather information about the account. The party that provides the payment account thereby becomes obliged to execute payments initiated by suppliers of payment initiation services and to provide account information to suppliers of account information services. These new service providers are placed under the supervision of Finansinspektionen (the Swedish financial supervisory authority). The Riksbank takes a positive view of this as it creates a level playing field with clear ground rules and contributes towards the strengthening of safety and efficiency on the payment market.
- ***All FMIs have sufficient tools to carry out regular analyses of risks linked to indirect participants:*** All FMIs now have sufficient system support to be able to export statistics on actors participating indirectly via a direct participant. The FMIs now intend to conduct regular analyses of how the risks arising as a consequence of indirect participation influence the FMI and how these risks change over time.

Actions that should be taken to further increase the safety and efficiency of the financial infrastructure

- ***Both Euroclear Sweden and its participants must ensure there are enough resources for the ongoing system replacement:*** In October 2015, Euroclear Sweden decided to switch to a more modern platform. The decision was taken after Euroclear Sweden had established that adapting the old settlement system to the new requirements set out in the European CSDR[4] regulation would entail considerable systemic risk. The Riksbank welcomes this decision but also notes that such a project is associated with risks, among other reasons because many actors on the Swedish securities market are affected by the project. To reduce these risks, both Euroclear Sweden and a large number of other participants in the Swedish securities market need to allocate significant resources over the entire duration of the project. The Riksbank's assessment is therefore that the operational risks in the Swedish financial infrastructure will remain heightened until the system replacement has been completed.
- ***It is important that the Commission soon presents a regulatory framework for the recovery and resolution of central counterparties:*** If a central counterparty encounters serious financial problems that it is unable to manage in its ordinary operations, it may need to enter a recovery phase. If the recovery fails or if the financial problems are so serious that no recovery is possible, the central counterparty needs to enter into resolution. In contrast to the requirements for banks, there are no statutory requirements for the recovery and resolution of central counterparties, either on the EU level or in

[3] The requirement covers forward rate agreements with maturities of between 3 days and 2 years and interest rate swaps with maturities of between 28 days and 15 years.
[4] The CSDR introduces new rules and places new requirements for both CSDs and their participants.

Sweden. The absence of a resolution procedure for central counterparties means that central counterparty encountering problems may be declared bankrupt, along with all the negative consequences for financial stability this would entail. The increased significance of central counterparties increases the need to get a resolution procedure into place without delay. It is therefore important that the Commission present a proposal for resolution of central counterparties in conjunction with the clearing requirement entering into force in the EU in 2016.

- ***New guidelines provide the FMIs with guidance in their work against cyber threats:*** An operational risk that FMIs must manage is the risk of being exposed to various IT-related attacks. The IT-systems used by the financial sector are becoming increasingly interconnected and the focus has shifted from protecting systems and information within organisations to protecting interconnected IT-systems and the information transported between and processed in these systems. The consequences of a cyber-attack may be that systems and information in the systems become unreliable, become open to access by unauthorised persons or become impossible to access at all. For example, this could mean that central financial services such as the clearing and settlement of financial transactions become inaccessible, which, in turn, could have a negative impact on the stability of the financial system as a whole. In 2015, the Riksbank and Finansinspektionen (the Swedish financial supervisory authority) carried out a survey aimed at gaining a better view of how FMIs subject to the Riksbank's oversight are working to ensure resilience against cyber threats. The results of the survey show that the respondents overall have adopted measures to manage cyber threats but that there is scope for improvements. The Riksbank considers that the FMIs should work against cyber threats on the strategic level and should complement the existing framework for information security to respond to cyber threats and it therefore intends to continue monitoring this in its ongoing oversight.

Focus areas for the Riksbank's oversight work in 2016

- ***Analysis of the possible consequences of a participant entering into resolution:*** The Resolution Act, for banks among others, entered into force on 1 February 2016. The Act gives the Swedish National Debt Office, in the capacity of resolution authority, powers to reconstruct or wind down banks in crisis. The bank entering resolution needs to have continued access to the FMIs. It is therefore extremely important that the FMIs are prepared and have taken the necessary measures so that a participant in resolution can be managed and the resolution proceedings supported. In its oversight in 2016, the Riksbank will follow up whether the FMIs are analysing the consequences that may be entailed by a participant in resolution.
- ***Evaluation of plans for orderly wind-down:*** FMIs provide critical services that are often difficult to replace. When an FMI decides to wind down its operations, for whatever reason, it is therefore important, from a social perspective, to ensure that these critical services are replaced in some way. FMIs should therefore have plans for how an orderly wind-down of their operations should proceed. The requirements of the PFMI make it clear that such plans should be in place. In 2016, the Riksbank will focus on monitoring the FMIs' work to draw up plans for an orderly wind-down. Once these plans have been drawn up, the Riksbank will analyse and evaluate them according to the requirements of the PFMI.

The Riksbank's oversight work

The Riksbank's work on the oversight of the financial infrastructure has its starting point in the Sveriges Riksbank Act (1988:1385) and the responsibility held by the Riksbank to promote a safe and efficient payment system.[5]

The aim of this oversight is to identify and analyse the sources of risks and efficiency losses in the financial infrastructure and to act to reduce these. However, it is important to point out that the Riksbank's oversight does not in any way absolve the Financial Market Infrastructure (FMI) of responsibility for its own risk management. The ultimate responsibility for the activities being safe and efficient always lies with the FMI itself.

What is the financial infrastructure?

The financial infrastructure consists of FMIs through which payments are made and payments and transactions with financial instruments are handled. More precisely, the Riksbank defines the financial infrastructure as the FMIs which handle financial positions and/or enable financial flows between various participants, the FMIs' legal frameworks and procedures and the participants' use of these FMIs. In addition, there are a number of related functions[6] that are critical to the FMIs and for this reason are also subject to the Riksbank's oversight.

The financial infrastructure thereby plays a central role in the financial system and forms a precondition for the efficient functioning of the financial system. It also means that weaknesses in the financial infrastructure may result in problems that affect one participant or FMI spreading to other participants and FMIs. Weaknesses can thereby affect the functioning of both the payment market and the financial markets - with major economic costs as a potential result.

The Riksbank and Finansinspektionen cooperate

The Riksbank oversees the financial infrastructure with the aim of safeguarding the stability of the entire financial system. Finansinspektionen also takes responsibility for financial stability through its supervision of the individual FMI. Finansinspektionen also grants licenses to engage in such activities as clearing and settlement, as well as operations as central counterparty. The areas of responsibility of the two authorities occasionally overlap. In these cases, we endeavour to develop efficient forms for cooperation. Formalised cooperation exists between the two authorities aimed at achieving this.

Foundation for the Riksbank's assessment

The Riksbank oversees the FMIs that are considered essential for the Swedish financial system to function efficiently. To assess which FMIs are appropriate for oversight, the Riksbank uses the following criteria:

- the number and value of the transactions handled by the FMI
- the size of the FMI's market share
- the markets on which the FMI is active
- the available alternatives that could be used at short notice
- how closely the FMI is interlinked with other FMIs and financial institutions
- the FMI's significance for the implementation of monetary policy

[5] See Sveriges Riksbank (2013), "The Riksbank and financial stability 2013".
[6] One example of a related function that is critical to the FMI is the legal entity responsible for its activities.

The Riksbank's oversight covers several national and international FMIs

With the Riksbank's task of safeguarding financial stability as a starting point, the Riksbank oversees the financial infrastructure. The oversight focuses on monitoring and analysing the FMIs and related critical functions.[7] Using the criteria given above as a basis, the Riksbank assesses that the following Swedish and international FMIs are currently central to financial stability and should therefore be subject to oversight:

- the Riksbank's payment system for the transfer of funds (RIX)
- Euroclear Sweden AB's settlement system for securities (the VPC system)
- Nasdaq Clearing AB's central counterparty system for financial derivatives, commodity derivatives and repos[8]
- Bankgirocentralen BGC AB's payment system for clearing retail payments[9] (Bankgirot)
- the international FMIs CLS[10], SWIFT[11], EuroCCP[12], and LCH[13]

Oversight is based on international standards

The Riksbank bases its oversight of the financial infrastructure on the requirements for security and efficiency set in accordance with international standards. For FMIs, there are standards issued by the Committee on Payment and Market Infrastructures (CPMI)[14] and the International Organization of Securities Commissions (IOSCO)[15] - "Principles for financial market infrastructures" (PFMI). These standards are aimed at strengthening the financial infrastructure. They entail minimum requirements, and the specific characteristics of the Swedish market may mean that the Riksbank needs to place higher requirements. The Riksbank expects the FMIs to meet the requirements in the standards or the higher requirements it sets.

The standards also include requirements aimed at central banks and other authorities overseeing or supervising the financial infrastructure. The Riksbank endeavours to meet the requirements in the standards in its own oversight work.

The FMIs assess themselves

The Swedish FMIs themselves assess how well they comply with the requirements set by the principles, in consultation with the Riksbank and Finansinspektionen. This takes place at least every third year, or more frequently if the Riksbank and Finansinspektionen see reason for this, for example if an FMI has undergone major changes. Based on the FMIs' self-assessments, the Riksbank then makes its own assessment of where improvements are needed to increase the safety and efficiency of the financial system. For Bankgirot, Euroclear Sweden and Nasdaq Clearing, these assessments are made together with Finansinspektionen.

Communication concerning deficiencies in the FMIs

The Riksbank has no binding tools to influence participants in the financial system. Instead, the bank primarily exerts influence by communication. In cases in which the Riksbank's analysis points to deficiencies in safety or efficiency, the Riksbank discusses this with Finansinspektionen and encourages the FMIs to remedy the deficiencies. This takes place in the form of dialogue and meetings with the FMI's representatives as well as public statements, speeches and publications.

The Riksbank's assessments of the safety and efficiency of the financial infrastructure are communicated via this

[7] See Sveriges Riksbank (2012), "The Riksbank's oversight of the financial infrastructure", and www.riksbank.se.
[8] As of 2013, the Riksbank participates in the supervisory college for NASDAQ Clearing according to the *European Market Infrastructure Regulation* (EMIR).
[9] The Riksbank monitors Bankgirot's clearing and settlement service.
[10] CLS is a global FMI for the settlement of foreign exchange transactions.
[11] SWIFT is a global network for financial messages.
[12] As of 2013, the Riksbank participates in the supervisory college for the supervision of EuroCCP.
[13] LCH (LCH Clearnet Limited) is a British central counterparty which clears several different classes of derivative (equity, fixed-income and commodities).
[14] The CPMI is a committee within the Bank for International Settlements (BIS) and was previously known as the Committee on Payment and Settlement Systems (CPSS).
[15] IOSCO is an international organisation dealing with the oversight of securities.

report, the Financial Infrastructure Report. The Riksbank may also need to give clear suggestions for appropriate measures to counteract the risks, and may then publish recommendations to the FMIs and their participants in the Financial Stability Report. One further way of communicating a deficiency in an FMI is to discuss it in the Financial Stability Council, in which representatives of the Government, Finansinspektionen, the Swedish National Debt Office and the Riksbank participate.

The Riksbank's oversight and operation of RIX are organisationally separate

The Riksbank owns and runs the RIX system and is also a participant in it. The department of the Riksbank that runs the RIX system is organisationally separate from the Riksbank's oversight of the financial infrastructure. The Riksbank's Financial Stability Department is responsible for the oversight of RIX, but the Cash and Payment Systems Department is responsible for the ownership and operation of RIX. RIX is dealt with and assessed on the same basis as other FMIs. However, one difference is that the Riksbank does not cooperate with Finansinspektionen as regards the oversight of RIX, as RIX does not fall under the supervision of Finansinspektionen.

CHAPTER 1 – Current issues

In this chapter, the Riksbank presents its view of the developments that could affect the financial infrastructure in Sweden, as well as regulatory issues connected to central counterparties, access to the banks' account structures, access to Financial Market Infrastructures (FMIs) and the FMIs' work on cyber safety. The chapter also includes an article giving the reader the opportunity to learn more about the block chain technology that may transform the financial infrastructure.

Current issues

Major international developments can affect the Financial infrastructure

Current events outside Sweden influence the financial infrastructure in Sweden. It is therefore important that the Riksbank follows international developments. One matter that has been of interest for a longer period is the referendum[16] in the United Kingdom on whether the United Kingdom should leave the European Union, the so-called Brexit.

The outcome of the referendum is especially important as it can affect the United Kingdom's and in particular London's position as a major financial centre for the EU financial markets. This, in turn, could affect the financial infrastructure in Europe and thereby also financial infrastructure vital to the financial stability of Sweden. For example, London-based LCH.Clearnet acts as CCP for Swedish interest-rate swaps.[17] The consequences of a Brexit are not entirely apparent. It is clear that there will be some effects, for example because legislation concerning financial markets is largely harmonised throughout the EU. However, it is difficult to predict how this harmonisation would be affected by a country leaving the EU.

Removing obstacles to cross-border transactions and increasing the efficiency of the European financial markets have been targets of the EU's work on regulation and harmonisation. If the United Kingdom decides to leave the EU it can cause the structure of the European financial infrastructure to change. Among other things, mergers of various FMIs may become more attractive.

The Riksbank is carefully monitoring both of these current events and is analysing the possible consequences of this for the Swedish financial infrastructure and the Riksbank's oversight of it.

Regulatory issues

Central counterparties in focus

Central counterparties have been in focus since the financial crisis[18] and particularly since the G20 agreement that more OTC derivatives should be cleared via central counterparties. Briefly, this agreement involves requirements for central counterparty clearing for certain standardised OTC derivative contracts, but also lower capital requirements for banks if they use central counterparty clearing for derivative contracts that are not subject to clearing requirements. These measures have contributed towards an increase in the proportion of

[16] The referendum will take place in June 2016.
[17] See the section "LCH – central counterparty for derivatives and equity" in Chapter 3.
[18] Up until the financial crisis, many financial participants had chosen to enter into bilateral derivative contracts with their counterparties. In conjunction with the financial crisis, a lack of confidence in counterparties arose, as it was unclear whether they would fulfil their commitments. Consequently, more participants started using central counterparty clearing.

transactions cleared centrally and towards more financial participants using central counterparty clearing.[19]

The increased use of central counterparties and the introduction of requirements for central counterparty clearing means that the significance of central counterparties for the financial system has increased considerably. At the same time, this increased usage means that counterparty risks are concentrated in the central counterparty to a greater degree. This, in turn, places greater demands on their resilience. If a central counterparty encounters serious financial problems or even goes bankrupt, this may have serious negative consequences for financial stability. A bankruptcy would probably lead to significant shocks and even to interruptions in trade on the financial markets. The central counterparty's participants would probably incur major losses. This, in turn, could lead to more participants encountering financial problems in a situation in which the stress on the financial system would already probably be high. An alternative to bankruptcy for central counterparties is therefore needed.

The introduction of mandatory clearing of OTC derivatives in SEK is leading to better management of counterparty risks

At the end of 2015, the European Securities and Markets Authority (ESMA) submitted a proposal to the European Commission that the most liquid and standardised OTC derivatives[20] denominated in SEK should be covered by the requirement for central counterparty clearing. The proposal also requires that certain OTC derivatives denominated in NOK and PLN should be covered by the clearing requirement. The proposal is currently being prepared by the European Commission. The European Commission has already decided on clearing requirements for certain OTC derivatives denominated in EUR, USD, GBP and JPY. For these currencies, the requirement enters into force in June of this year. As the European Commission has not taken a decision on clearing requirements for OTC derivatives denominated in SEK, it is currently uncertain when the requirement would start to apply.

Central counterparty clearing of sufficiently liquid and standardised OTC derivatives contributes towards increased financial stability through the improved management of the counterparty risks. However, it is important that ESMA regularly checks that the preconditions[21] for the clearing requirement remain valid for the OTC derivatives covered and, if appropriate, reassesses its earlier positions. Despite these positive effects, the clearing requirement means that it may become more difficult for certain participants to manage their risks, as it cannot be taken for granted that all participants have access to a central counterparty. This would mainly affect minor participants who usually trade in small volumes. Their opportunities for becoming participants in a central counterparty are limited, in addition to which it may be difficult to participate indirectly via another participant.

Due to the improved management of the counterparty risks, the Riksbank is largely positive to the clearing requirement and particularly towards its expansion to cover OTC derivatives denominated in SEK. The Riksbank will follow the development of the clearing requirement, the access of different participants to central counterparties and how these affect their ability to continue to manage their risks in OTC derivative trading through the use of central counterparty clearing.

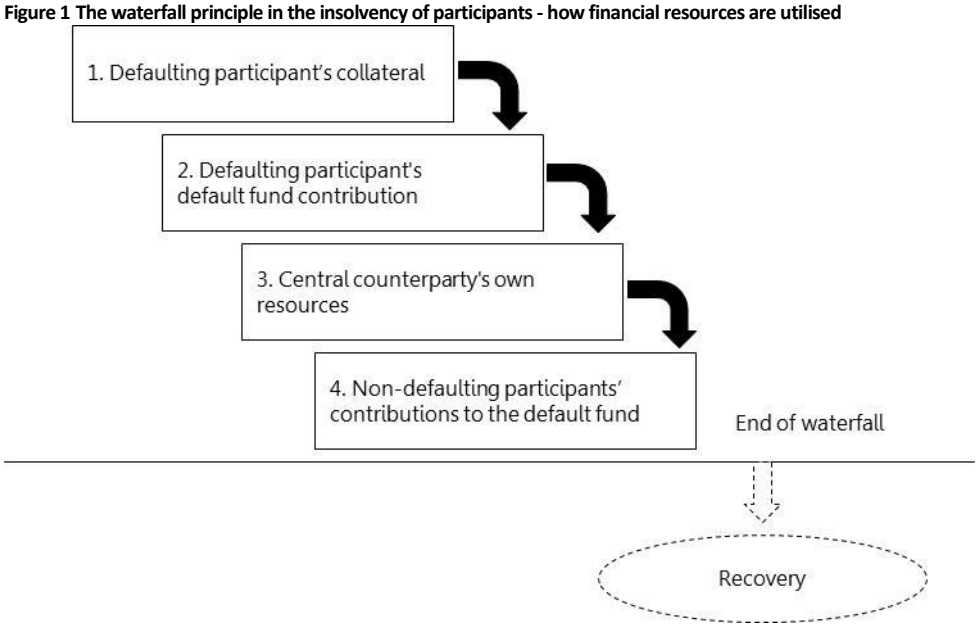
It is important that the Commission soon presents a regulatory framework for the recovery and resolution of central counterparties

If a central counterparty encounters serious financial problems that it is unable to manage as part of its ordinary operations, it may need to enter into a recovery phase. The recovery phase commences when the central counterparty's buffer of prefunded financial resources is

[19] See BIS (2015), "Central clearing: trends and current issues", BIS Quarterly Review.
[20] The requirement covers forward rate agreements with maturities of between 3 days and 2 years and interest rate swaps with maturities of between 28 days and 15 years.
[21] To be covered by the clearing requirement, derivatives must be traded in a sufficiently high volume and value and must have reliable and accepted pricing, among other requirements.

insufficient. Prefunded financial resources includes the collateral the participants pledge to the central counterparty, the participants' contributions to the central counterparty's default fund and the central counterparty's equity to manage participants' insolvency. These resources must be used in a certain sequence, also referred to as the waterfall principle (see Figure 1). To prepare itself for a situation in which the prefunded resources are depleted, a central counterparty needs a plan that describes how the company can recover from its financial problems.[22] This may involve, as an example, finding tools to allow losses to be allocated, by demanding further provisions of liquidity from the participants or by applying a haircut for each of the participants with a positive market value for its derivative contracts. According to the PFMIs, a recovery plan is required of all FMIs and CPMI-IOSCO has also published a guidance on recovery of FMIs.[23]

Figure 1 The waterfall principle in the insolvency of participants - how financial resources are utilised



If a participant fails, the prefunded financial resources included in the waterfall must be utilised in a specific order. First, the failing participant's collateral is taken. If this is not enough, its contribution to the default fund is utilised, followed by the central counterparty's financial resources that are earmarked for the failure of a participant. If the losses are greater than this, the surviving participants' contributions to the default fund must also be utilised, following which all prefunded financial resources will have been depleted.

In the case that the recovery fails or if the financial problems are so serious that no recovery is possible, there is a need for a resolution regime for central counterparties. In brief, resolution means that the government takes control of the central counterparty with the aim of safeguarding the continuity of the central counterparty's services and maintaining financial stability. However, resolution should be a last resort in dealing with a central counterparty's problems.

There is no trigger specifying when a central counterparty should enter the recovery phase or be placed in resolution. Instead, this depends completely on the size of the losses that must be covered before the central counterparty can return to its ordinary operations. Occasionally, the recovery phase can be started when the waterfall has been depleted, but this needs not always be the case. If the losses are large, recovery or even resolution may be appropriate before the waterfall has been depleted.

In contrast to the rules for banks, there are no statutory requirements for the recovery or resolution of central counterparties and other FMIs[24], either on the EU level or in Sweden.

As regards recovery plans, there are, as mentioned, requirements that such be prepared in the international standards (PFMI). Similarly, the Riksbank considers that recovery plans

[22] See "Focus areas for the Riksbank's oversight work" in Chapter 2.
[23] CPMI and IOSCO (2014), "Recovery of financial market infrastructures".
[24] With the exception of central securities depositories. In article 22 of the EU-regulation (EU 909/2014) there is a requirement that central securities depositories should have recovery and resolution plans.

should be required for all FMIs as is the case for banks.[25] Until this occurs, it is important that all Swedish FMIs have recovery plans in accordance with the PFMIs.

The absence of a resolution procedure for central counterparties means that a central counterparty facing problems will be declared bankrupt, along with all the negative consequences for financial stability this would entail. This is not a desirable situation, as the Riksbank has previously pointed out. The increased significance of the central counterparties increases the need to get a resolution procedure into place without delay. It is therefore important that the Commission presents a proposal for a resolution framework for central counterparties in conjunction with the clearing requirement entering into force in the EU in 2016. Given that not only central counterparties but also FMIs in general are important to the financial system, a framework for recovery and resolution should be developed for all FMIs. This could also be carried out on a national level.

The new payment services directive is opening the way for increased competition and reduced risks on the payment market

In January 2016, a new directive on payment services (PSD2) in the internal market entered into force.[26] The overall objective of the directive is to increase the competition on the payment market, facilitate innovative payment services and ensure that payment services are safe and offer complete consumer protection. The directive, which is to be introduced into the member states in January 2018, introduces two new types of payment service: payment initiation services and account information services.

Both payment initiation services and account information services have the characteristic that the user engages a party other than the party (usually a bank) with whom it has its payment account either to request that a payment be initiated or to gather information about the account. The payment is then executed and information compiled by the party with whom the user has its payment account. An example of a payment initiation service is when a bank customer purchases goods or services via a website by approving the amount and then approving that the supplier or the payment initiation service mediates the payment order to the bank. An example of an account information service is when a bank customer with accounts in several banks uses an account information service to gain an overall view of the balance of these accounts.

The directive implies that the provider of payment initiation services and account information services will be placed under the supervision of Finansinspektionen. Under the directive, any payment service supplier providing payment accounts for a payment service user is obliged to execute payments initiated by suppliers of payment initiation services and to provide account information to suppliers of account information services.

The division of responsibilities between suppliers of payment initiation services, account information services and the provider of the users' payment accounts will be clarified by the detailed technical standards that the European Banking Authority (EBA) has been given the responsibility of drafting over the period 2016–2018. This refers to standards for how the exchange of information is to take place in a safe manner between the provider of the payment account, providers of payment initiation services and account information services.

The Riksbank takes a positive view of the regulation of these operations. This creates clear ground rules and a level playing field for the payment market's participants and reduces risks by ensuring that information on payment transactions and user information is exchanged in a safe and uniform manner. The directive thus contributes towards strengthening the safety and efficiency of the payment market. As the technical standards that the EBA is responsible for producing will not be fully in place before 2018, the Riksbank wishes to emphasise the importance of payment service providers on the Swedish market applying the guidelines for secure Internet payments drawn up by the EBA in 2014.[27]

[25] See Chapter 6a, Section 1 of the Banking and Financing Business Act (2004:297).
[26] Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market.
[27] EBA, Final guidelines on the security of internet payments, EBA/GL/2014/12_Rev1, 2014.

Access to FMIs on equal terms is important for competition and the entrance of new actors

A high level of innovation and competition on the financial market is an important objective for regulators. As was mentioned above, one aim of the payment services directive (PSD2)[28] is to increase competition on the payment market. For example, the directive specifies that certain actors must have access to the banks' payment account services on an objective, non-discriminatory and proportional basis.[29] This is an example of how regulators generally attempt to strengthen competition in parts of the financial system by facilitating access to the financial infrastructure. They wish, in this way, to make use of the new possibilities created by technological developments. For example, when it comes to payments, this may involve entirely new actors entering the market and wishing to gain access to the payment system. The availability of access to FMIs either as a direct participant or, when appropriate, via a direct participant is necessary to support innovations and competition on the financial market. Technological developments also mean challenges for the financial infrastructure. At the same time as there is a desire to facilitate access to the financial infrastructure, there are also tendencies pointing in the other direction – that both new and established actors are finding it difficult to gain access to the financial infrastructure and risk being excluded from it to a greater degree.

It may be difficult to gain access to the FMIs for various reasons. One of these may be that the requirements for participation are often quite high. In certain cases, the legislation limits the actors which may have access to the FMIs. One example is the Settlement Finality Directive[30], which has been implemented into Swedish law[31] and which regulates the types of institutions that are entitled to participate in a notified settlement system. This may mean that actors that do not fit into the categories that the law defines will not be able to gain access to FMIs. For minor actors, the comparatively high fees may also make it difficult to become direct participants in the FMIs.

According to the PFMI, an FMI must offer direct participation in its services on equal terms on the basis of the prevailing legal conditions. Under PSD2, the access rules for payment systems must be objective, non-discriminatory and proportional. The assessment of whether an actor is to be accepted as a participant should therefore be based on reasonable risk-based appraisal with the aim of guaranteeing the safety and efficiency of the FMI. To reduce the risk that the terms for direct participation impede competition, it is also important that the terms for participation and the associated costs are transparent.

Another way of gaining access to an FMI, instead of becoming a direct participant, is that the party needing access reaches an agreement with a participant in the FMI to act as agent on its behalf. This is known as indirect participation. In certain cases, indirect participation can be a good solution, for example if the requirements for direct participation have not been fulfilled or if this means that transactions can be carried out for lower costs. However, there is a trend towards banks no longer being as willing to act as agents for other actors, particularly not minor actors. Internationally, this has been noted by the Financial Stability Board (FSB), the CPMI and the World Bank.[32, 33] In particular, these organisations have pointed out that the number of banks offering foreign actors the possibility of gaining access to the payment systems has decreased. One reason for this may be that regulations for counteracting money laundering and the funding of terrorism make high requirements on the banks that act as agents for other actors to control the origin of their financial transactions. The Riksbank also sees signs of similar tendencies within the financial infrastructure in Sweden. One example of the banks' reassessment of their role as agent is that several actors no longer are able to

[28] Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market.
[29] See also the section "The new Payment Services Directive is opening the way for increased competition and reduced risks on the payment market" in Chapter One.
[30] Directive 98/26/EC of the European Parliament and of the Council of 19 May 1998 on settlement finality in payment and securities settlement systems.
[31] Systems for the Settlement of Obligations on the Financial Market Act (1999:1309).
[32] BIS (2015), "Consultative report – Correspondent banking".
[33] World Bank (2015), "Withdrawal from Correspondent Banking; Where, Why, and What to Do About It".

utilise the direct participant they have previously used to carry out payments in the RIX system. PSD2 includes regulations that may counteract these tendencies. According to PSD2, a direct participant in a notified settlement system that acts as an agent for other actors also has the obligation to offer other payment service suppliers access to the settlement system in an objective, proportional and non-discriminatory manner.

The objective of supporting innovation and competition on the financial market needs to be weighed against the importance of having safe and efficient FMIs, which requires stable participants. There may also be other social objectives such as counteracting money laundering and the funding of terrorism. Consequently, in its ongoing oversight work, the Riksbank will conduct a dialogue with the FMIs on access to their services.

New guidelines provide FMIs with guidance in their work against cyber threats

Information security is something that, for a long time, has received attention within the financial sector, with the focus on protecting information within a specific organisation. As IT-systems become increasingly interconnected, threats to these and the information processed and transported in them has increased, which has led to the broader concept of cyber security becoming established.

The operations of FMIs are dependent upon IT-systems. Consequently, one operational risk that they must manage is the risk of being exposed to various IT-related attacks. CPMI-IOSCO defines cyber threats as a circumstance or event with the potential to intentionally or unintentionally exploit one or more vulnerabilities in an FMI's systems, resulting in a loss of confidentiality, integrity or availability.[34] The consequences of a successful cyber-attack may be that a system and information in the system become unreliable, open to access by unauthorised persons or impossible to access at all. For example, this could mean that central financial services such as the clearing and settlement of financial transactions become inaccessible, which, in turn, could have a negative impact on the stability of the financial.

CPMI-IOSCO has established a working group that, since 2012, has investigated how FMIs can build up resilience to cyber-attacks.[35] The working group has produced two reports. The second of these, recently on consultation, includes proposed guidelines for how FMIs should work to maintain resilience against cyber threats.[36] The guidelines are expected to be established in the summer of 2016. The guidelines are a clarification of existing international principles that the Riksbank uses in the oversight of FMIs.[37] The guidelines also underline the importance of clear routines for the recovery of operations following a cyber-attack. The guidelines specify that cyber threats should be considered in the strategic governance of FMIs and that a framework for tackling cyber threats should be developed. The framework should consist of the following components:

- Tests aimed at verifying that software and hardware comply with set standards.
- Methods for identifying the business operation's critical resources and processes and the information stored and processed in the operation.
- Routines and regulations for granting personal authorisation to systems and information.
- A compilation of the connections FMIs have with other actors such as participants, other FMIs and suppliers.
- A culture in which the company is constantly learning from earlier incidents and has flexible international monitoring.
- Clear routines for the recovery of operations following a cyber-attack.

In 2015, the Riksbank and Finansinspektionen carried out a survey based on CPMI-IOSCO's first report on resilience to cyber threats from 2014.[38] The aim of the survey was to gain a better view of how FMIs subject to the Riksbank's oversight are working to ensure resilience

[34] CPMI and IOSCO (2015), "Cyber Resilience in financial market infrastructures".
[35] CPMI-IOSCO Working Group on Cyber Resilience (WGCR).
[36] See CPMI (2014), "Cyber Resilience in Financial Market Infrastructures".
[37] See CPMI-IOSCO (2012), "Principles for financial market infrastructures", page 9.
[38] CPMI (2014), "Cyber Resilience in Financial Market Infrastructures".

against cyber threats.[39] The results of the survey show that all respondents state they have introduced operational security measures such as intrusion detection, firewalls and analysis of transactions to prevent, detect and address cyber threats and have also introduced routines for the recovery of operations after an attack. On the other hand, the responses indicated that not all have an overall strategy to counteract cyber threats. There is therefore reason to take account of cyber threats in the strategic governance of FMIs so that the FMIs' management, personnel and decision-making processes are involved. It should be stressed that the actual ability to respond to cyber threats can only be verified through physical visits and tests of implemented security measures and strategies. The survey also showed that the majority of respondents see cyber threats as a major challenge and that they would like to see increased cooperation with authorities in this matter.[40]

The Riksbank considers that the FMIs covered by the Riksbank's oversight should have a strategy and framework to counter cyber threats that complements the existing strategies and frameworks for information security. Cyber-attacks against FMIs may have major negative consequences for the stability of the financial system. They may also influence the general public's confidence in financial services and financial actors. The Riksbank therefore intends to continue to follow up the FMIs' preparedness to address cyber threats as part of its ongoing oversight.

[39] The joint survey covered Bankgirot, Euroclear Sweden and Nasdaq Clearing. The Riksbank also asked the operator of the RIX-system to provide answers on the same survey.

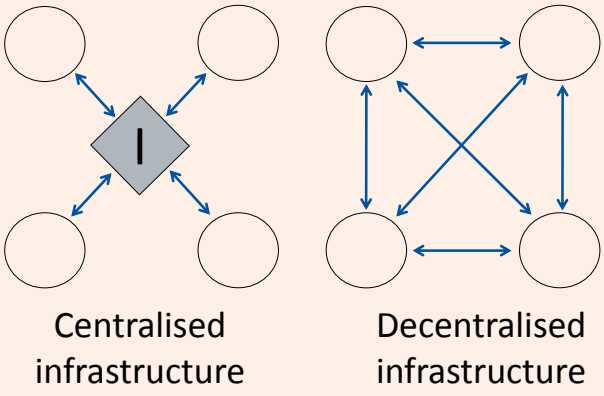
[40] In the spring of 2016, the Riksbank carried out a similar survey aimed at the major banks with the aim of increasing understanding of the need to cooperate and to gain information on the banks' work against cyber threats from a broader perspective.

ARTICLE – The block chain – a potentially important innovation

The financial infrastructure is basically formed of various IT-systems used to intermediate payments and clear and settle securities transactions or financial transactions. These systems link together financial institutions, often banks, to ensure that these are able to conduct transactions. Traditionally, each infrastructure is built up with a central function for clearing and/or settlement of a certain type of transaction – a central point through which the transactions must pass, like the model on the left in Figure 2.[41] The transaction information is only processed in the central infrastructure to which all participants are connected.

The Block chain technology[42], which is described below may possibly, entirely or partially, enable a new kind of financial infrastructure that is decentralised. This could mean that the clearing and/or settlement of the transactions takes place in decentralised form in a network in which there is no central point - see the model on the right in Figure 2. This article explains the basic characteristics of block chain technology and discusses the potential consequences of its use within the financial infrastructure.

Figure 2 Centralised and decentralised financial infrastructure.



How does a block chain work?

A block chain is, in practice, a database of settled transactions. What makes it special is that it is not stored on a central IT-platform but on a number of computers in a network. It is also the network that verifies the transactions' contents and registers them in the block chain. This must take place in a way that is very difficult to manipulate.

A transaction starts with a party that wishes to execute a payment, for instance, proposing the transaction to the network by sending a transaction instruction to the computers included in the network. Each participant in the network has a unique pair of keys that are used for encryption and it is through these that the participant can be identified in a secure manner.[43] After a certain time interval, the network gathers all the proposed transactions together and processes them together in a 'block'. This block can be conceptualised as a clearing batch or settlement round.

The network checks that the transaction information is correct, for example that the recipient exists and that the sender owns the asset to which the transaction refers. Transactions that cannot be verified are rejected by being lifted out of the block. Those transactions that remain in the block are registered and are thereby executed.

Registration takes place by the block being 'stamped' with what is known as a hash value, which is the solution to a special hash function and which depends on the information in the block that is to be registered and on the information in all previously-registered blocks.[44] The hash value is difficult to calculate but easy to verify once it has been identified. The computers in a network all try to find the hash value at the same time, and, when a computer has found it, it suggests the solution to the network. When a predetermined majority of the computers in a network have verified the solution, it is considered to be correct and the new block is stamped with the hash value and added to the block chain. The transaction has now been completed.

The integrity of the block chain, meaning that it must be impossible to manipulate or damage, is mainly based on two factors. Firstly, it is stored on most of the computers in a network and it is difficult to manipulate all of these simultaneously. Secondly, the solution to the hash function will be changed if the information in a block is changed. This means that the new hash value for all subsequent blocks must also be calculated again if the manipulation is to remain undiscovered. As the network constantly adds new blocks, a party attempting to

[41] The accounts needed may be gathered in one place, such as in Euroclear Sweden's clearing and settlement system and the Riksbank's large value payment system RIX, or among the FMI's participants, as is the case with Bankgirot, where the accounts are located in the banks.

[42] See Segendorff (2014), "What is Bitcoin?" for a detailed description of block chain technology and bitcoin.

[43] The method is known as PKI (Public Key Infrastructure). Each participant holds two keys. One key is private, which means that only the issuer knows it, while the other is public. If the sender of a transaction instruction encrypts the transaction with the sender's private key, the instruction can only be unlocked by the public key and thus the sender be verified.

[44] See Segendorff (2014), "What is Bitcoin?" for a short description of the hash function.

manipulate the block chain will find itself in a race against the network and its computing power. This is because, in the event that there are different versions of the block chain, it is the longest that is considered to be the true version. In an open network in which any interested party may participate, it is ultimately the network's computing power that guarantees the block chain's integrity. In closed networks in which only approved computers may participate, the requirement for computing power and the degree of difficulty of the hash function can be lowered.

Advantages and disadvantages

Compared with a traditional financial infrastructure, block chain technology has a number of potential advantages. Firstly, there is no central hub that can fail, be manipulated or be disabled. The general availability of the block chain and its information, at least to the network, also contributes to transparency. Secondly, a central infrastructure is often expensive to construct and it is possible that a solution based on a block chain would have lower investment costs, at least initially. Block chain technology should also allow faster settlement than a centralised infrastructure in which settlement and clearing usually take place once or twice per day.[45] This, in turn, could reduce the need for collateral and liquidity among the participants. Its decentralised nature could also contribute towards reducing the need for intermediaries, for example in the management of securities transactions. In this context, it is worth noting that transactions in the block chain may also be contingent on events. For example, an equity transaction may be contingent on the counterparty approving a contingent payment, thus achieving delivery vs payment. This is called a smart contract.

Block chain technology also has a couple of potential disadvantages. One is that the size of the block chain grows over time and increases with the size of the block, which is to say the number of transactions and the amount of information that can be linked to each transaction.[46] It is therefore possible that block chain technology is better suited to flows in which the transactions are relatively few in number, for example securities settlement and correspondent bank payments, and less well suited to flows with a very large number of transactions such as credit transfers and card payments. Information on executed transactions is also generally available, at least for the network, which may give rise to integrity problems. It is also possible that smart contracts may give rise to new trading strategies and thereby to new instabilities on the financial markets. Moreover, it is not possible to recall incorrect transactions. A network and thus the block chain may be spread over a number of different jurisdictions, which may give rise to legal risks. Decentralisation may also give rise to problems with the governance and administration of the regulatory framework surrounding the block chain. As with the outsourcing of IT services within the traditional infrastructure, there is a risk that clearing and settlement via a block chain would end up outside the financial sector. How various financial and IT-related risks would be affected is an open question and depends on how the network and the specific block chain are designed, as well as what they are used for.

Many potential areas of use

This description of block chain technology is of a general nature and the technology can be tailored to different types of transactions and registration requirements. In theory, therefore, it could just as easily be used for trading in securities as for payments, property registration and so on.

Block chain technology is still very new but has aroused great interest in the financial sector, where many major players are themselves developing block chains or have invested money in companies specialised in this. It is therefore likely that we will see many experiments with block chains in various contexts. As far as Sweden is concerned, it is relevant that Nasdaq has announced that a block chain will be used experimentally to facilitate the issue and trade of shares in private companies on NASDAQ Private Market.[47]

It is unclear whether, and, if so, how and to what extent, block chain technology will be used in the financial infrastructure in the future. The Riksbank will continue to monitor the development.

[45] The central banks' Real Time Gross Settlement (RTGS) system is an exception in which payments are settled in real time.

[46] The bitcoin blockchain can currently manage about 300,000 transactions per day, which is a serious limitation. As a comparison, in 2014, more than 7 million card transactions were effected per day in Sweden alone. At the end of December 2015, Bitcoin's block chain was greater than 50 megabytes and it seems to be growing exponentially (see https://blockchain.info/).

[47] http://www.nasdaqomx.com/newsroom/pressreleases/pressrelease?messageId=1404324&displayLanguage=en

CHAPTER 2 – The Swedish FMIs

The chapter begins with the focus areas that the Riksbank intends to work on together with the Swedish Financial Market Infrastructures (FMIs) in 2016. The Riksbank then presents its assessments of the stability and efficiency in the Swedish FMIs, RIX, Bankgirot, Euroclear Sweden and Nasdaq Clearing.[48] The starting point for these assessments is how well the systems meet the requirements set in the Principles for Financial Market Infrastructure (PFMI).

The FMIs largely fulfil the requirements in the PFMI but there is also room for improvement, which is analysed in this chapter. The Riksbank's overall assessment is therefore that the financial infrastructure in Sweden functions well. A replacement of Euroclear Sweden's system for securities settlement has been initiated, which the Riksbank welcomes as it aims to provide a more safe and efficient system for securities settlement. However, such a project is associated with risks as many participants on the Swedish securities market are affected by the project. Operational risks in the Swedish financial infrastructure will therefore remain heightened until the system replacement has been completed.

Focus areas for the Riksbank's oversight work in 2016

Each year, the Riksbank performs a number of activities in its oversight of the FMIs. Some activities focus on the identification of risks and subsequent analysis and assessment of whether these risks can threaten financial stability. Examples of the analysis to be performed by the Riksbank in 2016 include concentration risks at central counterparties and the extent to which central counterparties should have access to deposit and lending facilities at the Riksbank.

Some activities also include work by the FMIs themselves in the form of conducting analyses, developing strategies, methods and different types of plans for their operations. The areas on which the Riksbank plans to focus in particular in 2016 and which also involve some work for the FMIs include an evaluation of Swedish FMIs' plans for orderly wind-down and analysis of how well the FMIs are prepared to deal with a participant in resolution. One of the focus areas for the Riksbank's oversight in 2015 was the assessment of the Swedish FMIs' recovery plans.[49] In 2016, the Riksbank will continue with a follow-up of the FMIs' efforts to develop their recovery plans.

Follow-up of the recovery plans and evaluation of plans for orderly wind-down will be performed in 2016

Recovery plans and plans for orderly wind-down of FMIs are important in order to ensure that the critical services they supply can be maintained. This applies both in case the FMI encounters financial problems and in the worst case scenario in which the company can no longer carry on its operations and therefore is forced to wind them down. It is therefore important from a societal perspective to ensure that critical services can be maintained under the management of the existing FMI or be replaced by something else. In the PFMI, as

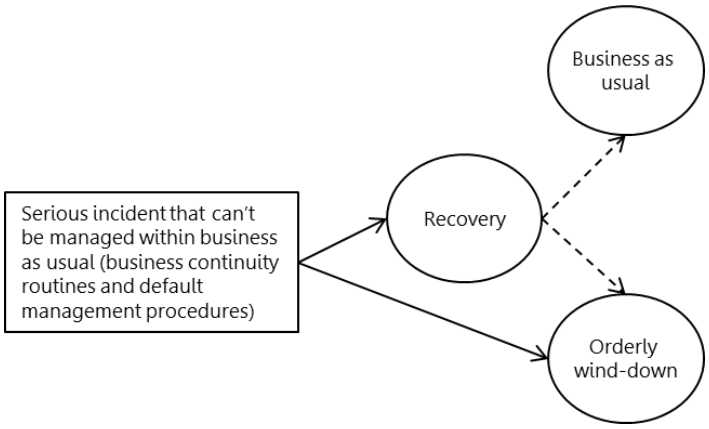
[48] See Sveriges Riksbank (2015), "The Swedish Financial Market 2015" for further information on FMIs that make up Sweden's financial infrastructure.
[49] See Sveriges Riksbank (2015), "Financial Infrastructure 2015", pp 20.

applied by the Riksbank, it is clear that all FMIs, with the exception of systems owned by the central bank[50], shall have plans for recovery and orderly wind-down.[51, 52]

When an FMI runs into problems, most often of a financial nature, the FMI can tackle the situation in three different ways (see also Figure 3):

- The FMI takes care of the problems within its normal operations, for example via its business continuity or default management routines.
- The FMI activates its recovery plan.
- The FMI chooses to close down its operations by implementing its plan for orderly wind-down.

Figure 3 Relationship between normal operations, recovery and orderly wind-down.



Follow-up of recovery plans

In 2015, the Riksbank assessed the recovery plans drawn up by the FMIs. This analysis showed that these plans were, to a varying degree, in need of improvement.[53] The Riksbank will therefore continue the dialogue with the FMIs regarding how their recovery plans can be improved. The Riksbank bases its analysis on the CPMI-IOSCO's guidance[54] on recovery plans and the FMIs should develop their recovery plans so that they are completely in line with this guidance.

The aim of recovery plans is to increase the possibility of recovery if an FMI encounters serious financial problems. It is crucial therefore that a recovery plan contain descriptions of scenarios that are so severe that they can lead to the FMI finding itself in a recovery situation. These scenarios are vital in order to be able to identify suitable measures to include in the recovery plan. The FMIs also need to identify tools that can be used in the recovery situations reflected in the scenarios.

The requirement for recovery plans is new and exactly how the plans are to be designed in practice is still an ongoing issue. In the assessments of the FMIs' recovery plans, the Riksbank has focused on the following three points:

- That the scenarios identified by the FMIs are sufficiently severe.
- That the tools specified in their recovery plans are applicable and reliable and that tools that involve the FMI's participants are permitted under its rules.
- That the content of the plans is in line with the CPMI-IOSCO guidance.

In addition to identifying scenarios and tools that can be used for recovery, it is essential to identify the conditions under which the tools are to be used, the person or persons at the FMI who are responsible for the plan, how often the FMI should conduct exercises and update the

[50] This means that the RIX system is not required to have a recovery plan.
[51] See CPMI-IOSCO (2012), "Principles for financial market infrastructures", Principles 3 and 15.
[52] See CPMI-IOSCO (2015), "Application of the Principles for financial market infrastructures to central bank FMIs.
[53] The assessments of Bankgirot and Nasdaq Clearing have been performed jointly by the Riksbank and Finansinspektionen.
[54] CPMI and IOSCO (2014), "Recovery of financial market infrastructures".

plan and how information about the measures which have been implemented is to be communicated in a recovery situation.

Analysis of plans for orderly wind-down

In 2016, the Swedish FMIs should start work on developing a plan for orderly wind-down unless such a plan is already in place. A plan for orderly wind-down shall prepare an FMI for a situation in which it needs to wind down a critical service so that this can take place in a way that affects society as little as possible. The critical services provided by FMIs are often difficult to replace and winding them down can therefore be problematic from a societal perspective. The vast majority of FMIs are, however, private sector entities. This means that it is the company itself that takes any decision to wind down. When an FMI decides to wind down its operations, for whatever reason, it is therefore important, from a societal perspective, to ensure that these critical services are replaced in some way. A wind-down of an FMI and the critical service it provides therefore needs to take place in an orderly way that allows time to develop new solutions or in some other way adapt the market to the new situation. The need for plans for orderly wind-down is amplified in Sweden by the fact that it is still not possible to put a Swedish FMI into resolution, i.e. for the state to intervene and take control of a company that wishes or needs to close so that the state can safeguard the continuity of its critical services.

In 2016, the Riksbank will focus on monitoring the FMIs' work on drawing up plans for orderly wind-down. Once these plans have been drawn up, the Riksbank will analyse and assess them according to the requirements laid down in the PFMI. The Riksbank's analysis and assessment of the plans will focus in particular on their content and scope.

The FMIs' plans for orderly wind-down should at least cover those operations that the Riksbank oversees and be designed so that the wind-down of operations does not disturb the functioning of the financial market. The plan for orderly wind-down needs to pay special attention to agreements, operational costs and the impact on the market and the FMIs' participants. It is also very important that the plan specifies:

- The services which need to be wound down in an orderly way so as not to risk having a negative impact on financial stability
- How long is reasonably and realistically needed to implement an orderly wind-down
- How much capital is required to implement the plan

In addition to this, the FMIs also need to identify scenarios that can lead to their critical operations having to be wound down. The purpose of these scenarios is to make it easier to determine how long a wind-down can take and what it might cost. They should also make it easier for FMIs to build up suitable strategies to wind down operations in an orderly way.

Furthermore, the plan for orderly wind-down should contain information on who activates it and how, who within the FMI is responsible for the plan, how often it should be updated and how measures implemented are to be communicated in the event of a wind-down. The FMI should also show how it will maintain enough capital that is intended for orderly wind-down in order to ensure that there is always enough capital for an orderly wind-down of the company.

The FMIs' ability to manage a participant in resolution will be reviewed in 2016

Recovery and orderly wind-down refer to when the FMI itself encounters problems. Another serious event is when a participant in an FMI encounters financial problems and the participant is deemed so important for financial stability that it is put into resolution. In 2016, the Riksbank will put considerable focus on following up the FMIs' analyses of the potential impact a participant in resolution may have on their operations. It is of the utmost importance that FMIs implement the necessary measures in order to be able to manage such a situation.

A new act on the resolution of institutions including banks[55] came into force on 1 February 2016. As a result of this act, most of the Banking Recovery and Resolution Directive (BRRD)[56] have now been incorporated into Swedish law. Resolution is an alternative to bankruptcy and is about ensuring that at least some of the failed bank's operations can continue without too much of an interruption. According to the act on resolution, the Swedish National Debt Office, in its capacity as resolution authority, is responsible for dealing with a bank in crisis. The Swedish National Debt Office has thereby been given powers to reconstruct or wind down banks in crisis if it is deemed necessary in order to maintain financial stability. The aim of resolution is to ensure that critical services are maintained. The principle is that it is primarily the bank's shareholders and creditors, and not the taxpayers, who are to bear the costs for a bank that has been put into resolution. However other players are also affected by a bank in resolution. In particular, players who have a contractual relationship with the bank are affected, for example an FMI.

This means that the bank being put into resolution still needs to have access to FMI services. Similarly, other companies that may be used within the framework for resolution, for example a so-called bridge institution,[57] also need access to the services offered by the FMIs. Under the new act, therefore, it is forbidden for contractual parties to terminate an agreement with a bank that fulfils its contractual obligations, purely because the bank has been put into resolution.

It is extremely important that FMIs are prepared and have taken the necessary measures to be able to handle a participant that has been put into resolution. This can, for example, mean that they need to make changes to not only their rules and frameworks but also their routines and processes. The aim is to create preparedness at FMIs but also to make it easier for a participant in resolution to continue to participate. A participant must also be able to continue to make and receive payments and hence obtain liquidity, otherwise the resolution may fail.

The RIX system– the payment system for large-value payments

The Riksbank has different roles in relation to the RIX system. The Riksbank owns and operates the RIX system but is also responsible for oversight of the system. However, the department of the Riksbank that is responsible for operating the RIX system is organisationally separate from the department responsible for the Riksbank's oversight of the system and is referred to in this section as the RIX operator.[58]

Banks, the Swedish National Debt Office, clearing organisations and the Riksbank are participants in the RIX system. The banks' accounts in the RIX system are used to settle direct payments between the banks as well as payment orders from bank customers. This means that most of the payments involving a transfer from an account in one bank to an account in another bank are settled through the banks' accounts in the RIX system. In 2015, an average of 17 000 payments were settled per bank day and the average turnover was about SEK 430 billion per bank day. The availability of the RIX system was 99.98 per cent in 2015 and has been over the availability target of 99.85 per cent for four of the past five years.

The operator of the RIX system should analyse and highlight the risks that arise as a result of internal dependencies

The operator of the RIX system is organisationally separated from certain other parts of the Riksbank's operations upon which it is dependent. This concerns, for example, functions for

[55] The Resolution Act (2015:1016) concerns the resolution of banks, credit market companies and securities companies.
[56] Directive 2014/59/EU of the European Parliament and of the Council of 15 May 2014 establishing a framework for the recovery and resolution of credit institutions and investment firms.
[57] A bridge institution is a limited company wholly or partly owned by the state. The institution is established to receive assets and liabilities from the company in resolution in order to continue to maintain critical operations that have been performed or offered by the company in resolution.
[58] This means that the Riksbank's Cash and Payment Systems Department is responsible for the operational activities of RIX, while the Financial Stability Department is responsible for the oversight of RIX.

management of the IT environment, regulatory frameworks, analysis and risk management. From a cost perspective, there are benefits to be derived from using existing functions within the Riksbank, but this also creates dependencies. These dependencies can give rise to risks that can reduce the efficiency and stability of the RIX system.

The operator of the RIX system should therefore analyse the risks that these dependencies pose and whether the resources earmarked for RIX system operations are sufficient. Another question that should be considered is whether the cost of the functions not included in the RIX organisation is covered by the Riksbank's principle of full cost coverage. This analysis should be performed in 2016 and result in a report highlighting the risks that arise as a consequence of these dependencies and whether any measures need to be taken as a result.

The work on analysing the need for developing a strategy and a framework to counter cyber threats is under way

As the RIX system constitutes the hub of the Swedish financial system, its function is very important for confidence in the payment system and for financial stability in Sweden. The RIX system must therefore have a high level of operational reliability. Crucial for operational reliability is a well-functioning IT-system with a high level of resilience against cyber threats.

The Riksbank's organisation is built around broader range of tasks than just the operation of the RIX system, which means that current strategies and frameworks for information security have a more general approach. The operator of the RIX system has therefore begun an investigation aimed at identifying the need for developing a strategy and a framework for information security and cyber threats specifically targeted at the RIX system. The objective should be for the operator of the RIX system to complete this investigation during 2016.

Regardless of whether the investigation indicates a need to draw up a special strategy and framework for information security for and for countering cyber threats against the RIX system or to complement the existing strategy and framework, it is important to take the forthcoming guidelines on cyber security from CPMI-IOSCO into consideration.[59] Once the strategy and framework have been developed they should then be implemented into the organisation.

Work on developing a strategy for how to approach future participation in the RIX system has begun

The possibility to make payments in the RIX system is a prerequisite for an institution whose operations are based on making payments in Swedish kronor in one way or another. An institution obtains access to the RIX system either by participating directly in the system or by employing an existing participant who makes payments on the institution's behalf.[60]

There is a regulatory framework which specifies the conditions for participating in the RIX-system and the costs associated with such participation. Swedish legislation establishes certain general requirements for how this regulatory framework relating to participation may be designed and the PFMI also contain some guidance on this. Since the regulatory framework has an important effect on the participation in the RIX system, it is important that it is reviewed regularly so that it is adapted to current conditions.[61]

The Riksbank welcomes that the operator of RIX has initiated a project to review the conditions for participation and how these are monitored in order to ensure, among other things, that the right categories of institutions have access to the RIX system and its ancillary services.

[59] See "New guidelines provide FMIs with guidance in their work against cyber threats" in Chapter 1.
[60] See Ingves (2016), "Time to rethink - inside the head of a central bank governor", page 4.
[61] See "Access to FMIs on equal terms is essential for competition and innovation" in Chapter 1.

Follow-up of issues relating to the RIX system from the Financial Infrastructure Report 2015

- The operator of the RIX system has performed an analysis that indicates a need for a third operating site and a timetable for when this is to be done has been drafted during the year. A preparatory phase will begin in the autumn of 2017 to be followed by a project that is planned to continue until 2019, when the third operating site is expected to be up and running.
- The operator of the RIX system has performed an initial analysis of the risks posed by indirect participants and has added a new function that makes it possible to derive statistics on indirect participants in the RIX system. A more detailed analysis of indirect participation in the RIX system will be performed. This will then result in a strategy for how the operator is to relate to indirect participation and the risks this can entail for the RIX system. The work is expected to be concluded in 2016.
- The operator of the RIX system was called on to perform a review of the RIX system's availability target. Work with this will begin during the fourth quarter of 2016 and is expected to be completed during the first half of 2017.
- The operator of the RIX system was called on to perform a review of the RIX system's classification and follow-up of incidents. The work has begun and is expected to be concluded during 2016.
- In 2013 and 2014, a number of minor disruptions occurred in the RIX system which could be traced back to the issuing of certificates. For this reason, the operator of the RIX system has performed a review of processes and routines focusing on the operator's, the client organisation's and the external supplier's responsibility for issuing certificates. The review was concluded during 2015.

Bankgirot – payment system for the clearing of retail payments

Bankgirot is a bank-owned clearing organisation and is the central actor in the mediation of retail payments in Sweden. An average of over four million payments for a total value of approximately SEK 53 billion are cleared through the Bankgirot payment system each bank day.[62] Several different types of payments and transfers are made through Bankgirot, for example credit transfers, direct debits, suppliers' payments, salary payments, account-to-account transfers, and the clearing of card payments and ATM withdrawals.

In 2015, availability in the Bankgirot payment system was 99.92 per cent, which means that the availability target of 99.75 per cent was met. Seen in a five-year perspective, the availability target has been achieved the last four years and been below target for one year (2011).

Bankgirot should publish information about its fee structure

As the Riksbank has mentioned previously,[63] Bankgirot should make information about fees more available. This helps existing and potential participants to evaluate costs and also to compare them with alternative arrangements. The possibility to compare prices and terms is vital for healthy competition in the market. Players other than banks should be able to enter the payment services market and all participants in Bankgirot and their customers should have similar terms for access to and utilisation of the payment system. It is the opinion of the Riksbank therefore that it is important for Bankgirot to publish its fees before the end of 2016.

Bankgirot's recovery plan needs to be improved

Since 2014, there have been new guidelines from CPMI-IOSCO regarding recovery plans for the financial infrastructure. The Riksbank and Finansinspektionen have therefore gathered information about Bankgirot's recovery plan and evaluated it based on the guidelines. A recovery plan for an FMI like Bankgirot should contain identification of the critical services

[62] Refers to the Bankgiro system and Dataclearingen.
[63] See Sveriges Riksbank (2014) and (2015), "Financial Infrastructure 2014" and "Financial Infrastructure 2015", pages 24 and 25 respectively.

that need to be maintained, different types of stress scenarios that can lead to activation of the plan and tools for dealing with different types of recovery situations.

Some of these parts are missing in Bankgirot's existing recovery plan. The Riksbank will therefore have an ongoing dialogue with Bankgirot in 2016 about how the recovery plan can be improved.[64]

Bankgirot has begun implementing a strategy and a framework for cyber security

A common feature of payments that go through Bankgirot is that they are of considerable importance for Swedish households and companies. A large number of transactions are processed in the payment system and it is also interlinked with a large number of financial institutions and payment systems. Bankgirot should therefore have sufficient protection against cyber-attacks.

Since the beginning of 2015, Bankgirot has been working to complement the existing strategy for information security with a separate plan for cyber security. A strategy and a framework for cyber security are in the process of being implemented in the organisation. The Riksbank welcomes the fact that Bankgirot has begun the work and is of the opinion that it is important that the plan considers CPMI-IOSCO's forthcoming guidelines[65] for cyber security and that the framework is completed by 2017.

Major volume increase in Bankgirot's payment system for real-time payments

There has been a large increase in Bankgirot's payment system for real-time payments over the past 12 months. About 80 million payments went through the payment system in 2015, compared to 20 million in 2014. In terms of value, SEK 42 billion went through the system in 2015, which can be compared to SEK 11 billion in 2014.

Swish is the first service to use Bankgirot's payment system for real-time payments. Initially, the service was for mobile payments between private individuals but since 2014, Swish has also been used by companies and in the autumn of 2015, Swish for e-Commerce and mobile commerce was launched.

Payments in real time have many advantages compared to other clearing services which make it attractive for banks to use the infrastructure for other types of payments in the future. The fact that the payments are made in real time means that all times of the day and night can be utilised regardless of whether the payment occurs on a weekday, at the weekend or on a public holiday. The main advantage with real-time payments is that the money is deducted from the payer's account and transferred to the recipient's account a couple of seconds after the payment has been initiated. The recipient's bank does not therefore have any credit risk in relation to the payer's bank.

The fact that we are seeing a substantial increase in the payment system for real-time payments has prompted the Riksbank to monitor developments very closely. If volumes and values continue to grow substantially, it is possible that the payment system for real-time payments will eventually be subject to the Riksbank's oversight.

Settlement in euros is disappearing as a result of the SEPA end-date regulation

A previous report[66] mentions the Single European Payment Area (SEPA) project, the aim of which is to harmonise the market for payments in Europe. According to the SEPA end-date regulation[67], which entered into force in 2012, all non-euro countries are to have migrated to the SEPA standard by no later than 31 October 2016. As a result of the regulation, Bankgirot will no longer handle payments in euros as from the end of October. Instead, the banks will make euro payments and develop payment solutions that comply with the SEPA end-date regulation.

---

[64] See "Follow-up of the recovery plans and evaluation of plans for orderly wind-down will be performed in 2016" in Chapter 2.
[65] See "New guidelines provide FMIs with guidance in their work against cyber threats" in Chapter 1.
[66] See Sveriges Riksbank (2014), "Financial Infrastructure 2014", page 19.
[67] The regulation (EU) No 260/2012 of the European Parliament and of the Council of 14 March 2012 establishing technical and business requirements for credit transfers and direct debits in euro.

Follow-up of issues relating to Bankgirot from the financial infrastructure report 2015

- Bankgirot has developed a tool that makes it easier to gain an overview of their indirect participants' flows and begun an analysis of any risks which may be associated with indirect participants. The Riksbank considers it important that the analysis of any risks which may be associated with indirect participants is completed before the end of 2016 and that Bankgirot drafts an action plan identifying the risks posed by indirect participants as well as the actions that should be taken to manage them.
- As the Riksbank has pointed out in previous reports, there is a lack of easily accessible and clear information about transaction values and volumes on the Bankgirot website. The Riksbank expects Bankgirot to publish statistics on its website during the first half of 2016 concerning incoming and outgoing payments broken down into different payment types as well as volumes and values for payments in real time.

Euroclear Sweden – securities settlement system and central securities depository

Euroclear Sweden clears and settles transactions mainly in Swedish equities and fixed income securities. In its role as a Central Securities Depository (CSD), Euroclear Sweden keeps a register of securities and their owners, provides securities accounts and administers corporate actions. Euroclear Sweden's settlement system constitutes an important component of the Swedish financial infrastructure and is interlinked with several other Swedish FMIs.

Furthermore, many participants in Euroclear Sweden's settlement system have several different roles. They may, for example, be issuers or participants for clearing and settlement but may also offer services to other participants in their role as a settlement bank.

In 2015, an average of about 47,000 transactions for an approximate value of SEK 46 billion were settled per bank day on the equity market, and about 1,200 transactions for an approximate value of SEK 325 billion on the fixed-income market. The availability of Euroclear Sweden's settlement system was 99,98 percent in 2015 and has been above the availability target of 99.93 per cent for the last five years.

Both Euroclear Sweden and its participants must ensure there are enough resources for the ongoing system replacement

Several times previously[68], the Riksbank has highlighted the importance of Euroclear planning for the replacement of its securities settlement system, as the current one is far too inflexible to be able to meet the demands for change set out in new regulations and market requirements.

In 2015, Euroclear Sweden has consulted its participants and continued to examine how it might replace its inflexible settlement system. In October 2015, Euroclear Sweden took the formal decision to change to a new, modern platform. The decision was taken after Euroclear Sweden had established that adapting the old settlement system to the new requirements set out in the European CSDR[69, 70] regulation would entail considerable systemic risk.

In October 2015, First Deputy Governor Kerstin af Jochnick sent a letter to both the Euroclear Group's CEO[71] and the CEOs of the major Swedish participants in Euroclear Sweden. In it, she pointed to the elevated risks posed to the financial infrastructure in Sweden by the system replacement and urged all parties to ensure that the replacement was given the highest priority and given the necessary resources and expertise.

[68] See Sveriges Riksbank (2014 and 2015), "Financial Infrastructure 2014" and "Financial Infrastructure 2015", page 26 respectively.
[69] The CSDR introduces new rules and places new requirements for both CSDs and their participants.
[70] See Sveriges Riksbank (2015), "Financial Infrastructure 2015", page 15 for more information on CSDR.
[71] Tim Howell, CEO of Euroclear S.A., the parent company of the Euroclear Group, which owns Euroclear Sweden.

The elevated operational risks must be limited

The system replacement project was initiated in January 2016 and is expected to continue for two and a half to three years. A project of this scope and complexity poses elevated operational risks during the entire project period. The fact that many participants on the Swedish securities market are affected by the project is a risk in itself. Many of these participants must conduct their own projects to adapt their own IT-systems and processes to Euroclear Sweden's new platform. Another risk is posed by the fact that Euroclear Sweden shares its organisation and project resources to a certain extent with Euroclear Finland, which is in the middle of a similar project to replace its securities settlement system. Another factor that increases the risks is the time pressure caused by the fact that Euroclear Sweden must have its new settlement system up and running in order to fulfil the new requirements in the CSDR. Euroclear Sweden must also apply for authorisation as a CSD in accordance with the CSDR.[72]

In order for Euroclear Sweden to be able to limit the project risks, it is essential that there are sufficient resources in order to ensure that all phases of the project are conducted in a way that delivers high quality in a timely manner. It is also important for Euroclear Sweden to ensure that there are earmarked resources for the Swedish project so that any problems that may arise in the Finnish project do not lead to resources being transferred there from the Swedish project. The Riksbank supports Euroclear Sweden's decision to use an external party to assess the quality of the project plan.

In order for the system replacement to be implemented, it is very important that the participants in Euroclear Sweden also allocate the necessary resources, both in Euroclear Sweden's project and in their own internal projects to adapt internal IT-systems to the new settlement system. The Riksbank's assessment is that the operational risks to the financial infrastructure will be elevated until the system replacement has been implemented. The Riksbank is therefore pursuing a dialogue with both Euroclear Sweden and its participants and will intensify its oversight of Euroclear Sweden and the project for the entire duration of the project.[73]

The system replacement provides an opportunity for making the Swedish securities market more efficient

Euroclear Sweden's new settlement system will provide opportunities for the Swedish market to modernise, rationalise and harmonise many processes in accordance with European standards. The Swedish market should derive benefit from this in its long-term strategy for the Swedish securities market. The new settlement system will also be compatible with Target2-Securities[74] (T2S), which can mean new conditions for the Swedish market to join T2S.[75] The Swedish market therefore has reason to reanalyse the benefits and drawbacks of joining T2S. The Riksbank welcomes the opportunity provided by the system replacement to introduce effective and flexible solutions for the Swedish securities market and urges the Swedish market to plan for consideration of the T2S issue, as part of its long-term strategy for the Swedish securities market.

Euroclear Sweden's recovery plan covers the areas expected

Euroclear Sweden drew up a recovery plan in 2014 and has updated it in 2015 in accordance with the requirements laid down in CPMI-IOSCO's guidance on recovery plans. The Riksbank's assessment of the plan shows that it is well considered and largely fulfils the stipulated

[72] This application must be submitted within six months of the new rules coming into force, which is expected to occur during the winter of 2016/2017. Two years after the rules have come into force, parts of the new regulatory framework will start to apply. All the requirements in the CSDR must be fulfilled for authorisation to be granted. Euroclear Sweden's new securities settlement system will contain the new functions required to fulfil the requirements in the CSDR.

[73] As well as overseeing the FMI, the Riksbank is also a participant, issuer and outsourcer to Euroclear Sweden as regards administration of the central bank accounts in the VPC system. The Riksbank is therefore affected by the system replacement in several ways and is running its own internal project to make adaptations to the new platform for securities settlement.

[74] Target2-securities is the ECB's central platform for securities settlement launched in June 2015. CSDs that join T2S outsource their securities settlement to T2S, but retain other functions, such as issuance management.

[75] See Sveriges Riksbank (2015), "Financial Infrastructure 2015", pp 18-19.

requirements. However, there is room for improvement. Euroclear Sweden updates the plan annually with the changes that occur in order to ensure that it is up-to-date, that the scenarios are sufficiently serious and that the plan is applicable to its operations. The Riksbank follows up this work on a regular basis.

Follow-up of issues relating to Euroclear Sweden from the Financial Infrastructure Report 2015

- The Riksbank has previously highlighted that Euroclear Sweden did not have a well-documented IT strategy and has urged Euroclear Sweden to develop such a strategy. In 2015, Euroclear Sweden has worked on documenting its IT strategy, which has resulted in a strategy document that comprehensively describes the company's mission and vision, strategic principles and priorities and objectives for its IT environment. Euroclear Sweden will finalise the document within the framework of the system replacement project.
- In 2015, Euroclear Sweden has performed an analysis of indirect participants. The Riksbank expects Euroclear Sweden to conduct an annual review of its indirect participants in the future and analyse the associated risks.

Nasdaq Clearing – the central counterparty for derivatives

Nasdaq Clearing AB, often referred to as Nasdaq Clearing, is a central counterparty (CCP) for equity derivatives, interest-rate derivatives, commodity derivatives and repos.[76] In 2015, Nasdaq Clearing cleared an average of 458,000 derivative and repurchase agreements per day. The availability of the clearing system was 99.99 per cent in 2015 and has been on or over the availability target of 99.90 per cent for the past five years.

Nasdaq Clearing has a recovery plan in place but there is room for improvement

Nasdaq Clearing has a recovery plan based on CPMI-IOSCO's guidance. Nasdaq Clearing's approach is to have a living document that is to be continuously reviewed and updated as operations and other factors develop. Nasdaq Clearing updates the plan once a year. However, the Riksbank sees the need for the plan to be improved so that it is a more useful tool. The Riksbank will follow up the annual update and the changes made by Nasdaq Clearing to the plan in 2016.[77]

Continued development of operations

Nasdaq Clearing has introduced new services during the year. Two of these services are cash optimisation and automated compression.

Cash optimisation is a service that facilitates and optimises participants' liquidity flows to and from Nasdaq Clearing. The service means that different liquidity flows can be combined into one flow instead of several separate ones. For example, the liquidity flow for collecting margins[78] is combined with the liquidity flow intended for settlement.[79] This means that the funds on account which are released in one flow can be used directly in another flow. The Riksbank is positive to the service in that it improves the efficiency of the participants' liquidity flows. The efficiency and speed of the service does, however, place higher requirements on Nasdaq Clearing's liquidity planning as the flows can vary to a higher degree compared to before the service was introduced.

Automated compression is another service that Nasdaq Clearing started to offer. Currently, the service has been introduced only for interest rate derivatives[80] which are not

[76] The derivative instruments cleared by the company can be either exchange-traded or OTC derivatives.
[77] See "Follow-up of the recovery plans and evaluation of plans for orderly wind-down will be performed in 2016" in Chapter 2.
[78] Here, this refers to collateral in the form of recorded funds.
[79] For example, the daily settlement of options.
[80] Interest rate swaps, forward rate agreements and overnight index swaps denominated in SEK, DKK, NOK and EUR.

traded in a market place, that is to say OTC. In simplified terms, compression means that participants who have OTC derivative contracts, in which they are to both make and receive payments, can remove these contracts.[81] This means that not only the outstanding nominal amount for the contracts but also the number of contracts is reduced. Because the nominal amount is lower, the participants' debt will also be lower and because the participants have fewer contracts to administer, the operational risks may also decrease slightly.

The aim of compression is to simplify the management of OTC derivatives without changing a counterparty's risk profile in their derivative portfolio, which means that the market risk will remain the same. Since the number of contracts and the nominal values decrease, it may also be somewhat easier for Nasdaq Clearing to cope with any participant default that may occur.

Good availability important especially when a lot of development is taking place

The availability of Nasdaq Clearing's services is high and has been for a longer period of time. The clearing system[82] used by Nasdaq Clearing is crucial for availability but other IT-systems are also important for their operations and the availability of Nasdaq Clearing's services. One of these is the IT-system for collateral management and settlement.[83] This IT-system is important for Nasdaq Clearing's day-to-day monitoring and management of collateral and so that settlement takes place during the day as predicted. In 2015, availability in the clearing system was 99.99 per cent and 99.87 per cent in the collateral management system.[84]

During the year, Nasdaq Clearing has had incidents in its IT-systems, but these have not affected availability to such an extent that the availability targets have not been met. In a company like Nasdaq Clearing, where substantial development occurs simultaneously and rapidly, it is important to have well-developed change management. The Riksbank therefore deems that it is a beneficial that Nasdaq Clearing continues its work to prevent the risks associated with the development of operations so that the level of availability remains high.

Follow-up of issues relating to Nasdaq Clearing from the Financial Infrastructure Report 2015

- The Riksbank has previously highlighted that unsecured bank guarantees as collateral can pose contagion risks in a failure situation. As of March 2016, the use of unsecured bank guarantees as collateral is no longer permitted. This is a direct effect of the removal of the exemption that was previously in the European Market Infrastructure Regulations (EMIR). The contagion risks previously identified by the Riksbank in connection with bank guarantees therefore no longer exist, something which the Riksbank welcomes.

[81] In compression, contracts can be removed in contrast to netting, where no contracts are removed but are only netted against each other.
[82] Nasdaq Clearing's clearing system is Genium INET.
[83] Nasdaq Clearing's collateral system is Wizer.
[84] The availability target for the clearing system is 99.90 per cent and 98.50 per cent for the collateral management system.

CHAPTER 3 The international FMIs

There are several international Financial Market Infrastructures (FMIs) that have considerable significance for financial stability in Sweden. CLS, which is a FMI for settling foreign exchange transactions, and SWIFT, which is a network for financial messages, are two examples. In addition, there is EuroCCP, which is a central counterparty for equity transactions, and LCH, which is a central counterparty for several different financial instruments, including derivatives and equity. They both play an important role in the clearing of financial instruments in Sweden.

The Riksbank therefore participates in oversight cooperation concerning these international FMIs. However, it is the international FMIs' home authorities that are ultimately responsible for their oversight and supervision and which therefore head up the oversight work. The Riksbank thus does not make its own assessments of these FMIs. On the basis of the information shared in the oversight cooperation, the Riksbank can nevertheless note that the international FMIs function smoothly but that here, as in the Swedish FMIs, there is room for improvement.

CLS – settlement system for foreign exchange transactions

CLS (Continuous Linked Settlement) works to reduce settlement risk in foreign exchange transactions by ensuring that both currencies in such transactions change owner at the same time, regardless of time zones. The Federal Reserve is the supervisory authority responsible for CLS and is chair of the CLS oversight committee, which includes representatives of the central banks for all 18 currencies settled in CLS. The Riksbank is one of these central banks.

During 2015, CLS settled foreign exchange transactions equivalent to an average value of SEK 40,000 billion per banking day. All of the major Swedish banks take part in CLS and the corresponding figure for settled transactions in SEK was around SEK 540 billion.

CLS has launched new services during 2015 and included an additional currency

- A portfolio compression service for certain foreign FX-derivatives[85] was introduced in October 2015. The main purpose of compression is to attain more efficient management of FX-derivatives and to reduce participants' counterparty risks.[86]
- With effect from November 2015, a collaboration with a company called Markit enables settlement of FX-transactions from cross currency swaps. Markit will send payment instructions directly to CLS on behalf of its participants.
- With effect from November 2015, it is possible to settle FX-transactions in the Hungarian currency (HUF) through CLS.

SWIFT – a global network for financial messages

SWIFT[87] is a so-called critical service provider to FMIs and thus plays a very important role for the safety and efficiency of the financial infrastructure. SWIFT's services are used in more

[85] FX Forwards and FX swaps.
[86] See the section on Nasdaq Clearing in Chapter 2 for further information on compression.

than 200 countries and their users sent approximately 6.1 billion financial messages in 2015. Swedish users sent and received around 138 million of these messages.[88] SWIFT is a member-owned cooperative society and has its headquarters in Belgium. The Riksbank participates in the joint oversight work[89] which is headed up by the Belgian central bank.

The oversight work, which is based on the requirements in "Oversight expectations applicable to critical service providers",[90] includes regularly following up incidents, examining SWIFT's self-assessments and examining audit reports. Moreover, selected risk areas that have been given particular priority are also examined. Over the past year, the focus has been on cyber security and several large projects run by SWIFT.

Improvement of existing IT-systems and new payment solutions

During 2015 the work on modernising the FIN platform[91] has proceeded according to plan. The project has been under way since the end of 2010 and is expected to be completed in 2016. The purpose of the project is to renew the platform in order to avoid technology obsolescence. The new platform will also reduce operating costs.

SWIFT invests in innovation and during 2015 has been appointed to be the supplier of a new solution for real-time payments in Australia. In this project SWIFT is the provider to the Australia New Payments Platform set up by a consortium of Australian banks. The project will be followed up within the scope of the authorities' oversight.

Continued focus on cyber security

It is very important to SWIFT that their messaging services are reliable and have a high level of security and availability. Cyber security is therefore a top priority and SWIFT invests considerable resources in this. The authorities regularly follow up cyber security in their oversight of SWIFT.

[87] SWIFT is an abbreviation of the Society for Worldwide Interbank Financial Telecommunication. The Riksbank is both a part-owner of SWIFT and user of its services. The Riksbank's oversight of SWIFT is separated in organisational terms from its ownership and use of SWIFT.

[88] The figure refers to FIN messages which mainly are payment and securities messages.

[89] The oversight is conducted within the SWIFT Co-operative Oversight Group (SWIFT OG), which consists of central banks in G10, and within the SWIFT Oversight Forum, which is an extended group of selected central banks.

[90] See CPMI-IOSCO (2012), "Principles for financial market infrastructures", Annex F.

[91] The FIN service is used for payment and securities messages.

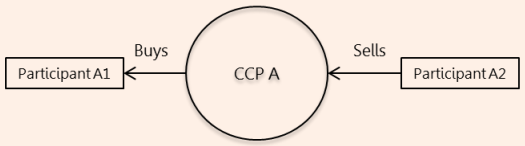
ARTICLE – Interoperability between central counterparties has many advantages, but also entails risks

Interoperability is when two or more central counterparties enable their participants to buy and sell securities from one another even if they are not participants in the same central counterparty.

The use of a CCP for the clearing of equity transactions on the Stockholm stock exchange[92] has been a requirement for a long time. All those who buy and sell equity on the Stockholm stock exchange have been obliged to be participants of the same central counterparty, namely EuroCCP. [93] When there is only one central counterparty for a trading venue, all transactions go via this one as there is no alternative. This is illustrated in Figure 4 where Participant A1 is able to buy a share from Participant A2 and the transactions cleared via CCP A.

Figure 4 Schematic picture of CCP-clearing on a trading venue

Trading venue – with one CCP



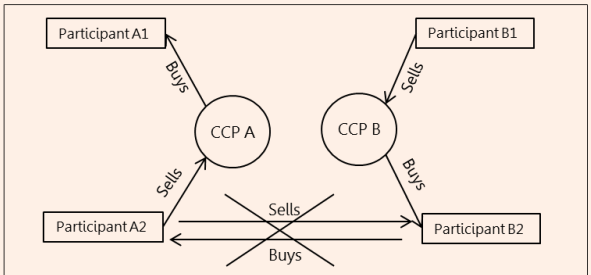
Trading venue with only one CCP, all participants need to participate in the same CCP, all participants can buy and sell securities from each other.

As of November 2015, LCH has also begun to clear transactions from the Stockholm stock exchange.[94] When an increasing number of central counterparties clear for the same trading venue, the participants buying and selling shares on the stock exchange in Stockholm can choose which central counterparty they wish to use, unlike before when they were all forced to use EuroCCP. If one agent that is a participant in a central counterparty wants to buy a share from another agent that is a participant in another central counterparty, it will not work unless there is interoperability between the two central counterparties.

The case where there is more than one central counterparty clearing transactions from the same trading venue, but there is no interoperability between them, is illustrated in Figure 5. If participant A1 wants to buy a security from participant A2, there is no problem as they both participate in the same central counterparty, CCP A. On the other hand, if participant A2 wants to sell a security to participant B2 instead, it is not possible as participant A2 is participant in CCP A and participant B2 is participant in CCP B.

Figure 5 Schematic picture of CCP-clearing on a trading venue with several central counterparties without interoperability

Trading venue – with several CCPs without interoperability

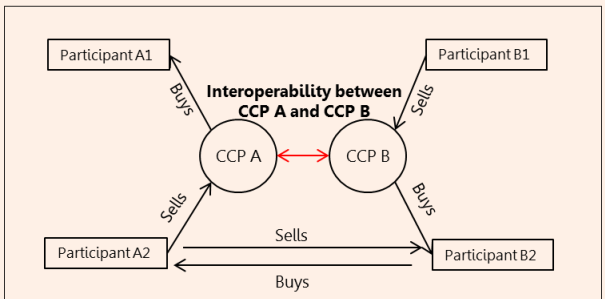


Participant A1 and A2, who are both participants in CCP A, can buy and sell securities from each other. Participant B1 and B2, who are both participants in CCP B can buy and sell securities from each other. Participant A1 and A2 cannot buy and sell securities from participant B1 and B2 who are participants in CCP B.

Interoperability is therefore a necessary condition if several central counterparties are to clear transactions from the same trading venue and all participants are to be able to trade securities from one another regardless of which central counterparty they participate in. Figure 6 illustrates a trading venue that has several central counterparties with interoperability. This means that all participants can buy and sell shares with one another, regardless of which central counterparty they participate in. When there is interoperability, participant A2 can sell a security to participant B2, which would not be possible otherwise.

Figure 6 Schematic picture of CCP-clearing on a trading venue with several central counterparties with interoperability

Trading venue – with several CCPs with interoperability



All participants, regardless of whether they are participants in CCP A or CCP B can buy and sell securities from each other since the CCPs interoperate.

[92] The Stockholm stock exchange refers to the stock market operated by NASDAQ Stockholm AB.

[93] If one is not a participant in EuroCCP one can nevertheless execute transactions but then via someone who is a participant in EuroCCP, that is, one uses for instance a bank that is a participant as an agent.

[94] See "LCH extends operations on the Swedish market" in Chapter 3.

Interoperability between central counterparties has many advantages compared to a situation in which there is only one central counterparty on a trading venue. Firstly, it can make clearing more cost-effective for the parties. If a trading venue has interoperable CCPs one or more of these CCPs may offer services to a number of trading venues. Parties can then use the same central counterparty for transactions from several different trading venues. Another positive effect is that if there is more than one central counterparty clearing on a trading venue, the participants can use two of these and thus have one central counterparty as a back-up if the other were to suffer operational problems. It should thus facilitate business continuity. Thirdly, interoperability increases competition among central counterparties, which in certain cases may be good. However, it must not be that CCPs compete with deteriorating risk management to be able to deliver services to a lower cost.

Interoperability can, however, entail further risks relative to a situation with only one central counterparty. This is because the central counterparties get exposures towards one another when their participants trade with each other. It means that they need to manage the risk in their exposures to each other, which EuroCCP and LCH do. Planning for business continuity can also become more complicated in the case of interoperability, as more parties are involved and dependent on one another. The regulation EMIR, contains requirements for interoperability in the stock market. The interoperability between EuroCCP and LCH is approved by their home authorities and has been discussed by the supervisory colleges.

EuroCCP – a central counterparty for equities

EuroCCP N.V. (EuroCCP) currently clears the majority of the Swedish equities that are cleared through a central counterparty. EuroCCP cleared Swedish equities for a value of around SEK 49 billion on average per banking day in 2015.[95] In its role as central counterparty, EuroCCP makes clearing and settlement more efficient by netting transactions, and the value finally settled was around SEK 15 billion.

EuroCCP is a Dutch company and the Riksbank takes part in the supervisory college, which is headed up by the Dutch central bank. Over the past year, the work in the supervisory college has focussed on changes in the operations of EuroCCP.

EuroCCP is beginning to clear for more Trading venues but is also facing competition

During 2015 EuroCCP has increased the number of trading venues for which it offers clearing. For instance, it has begun to offer clearing for participants trading equity on the London Stock Exchange. This provides an opportunity to increase the number of transactions cleared through EuroCCP.

At the same time as EuroCCP has gained access to clearing flows from other trading venues, several central counterparties have been given the opportunity to clear shares traded by participants on the stock exchange in Stockholm. Since the end of November 2015, it also became possible to clear transactions on the stock exchange in Stockholm via LCH.Clearnet. The fact that more central counterparties have access to the transaction flows from the stock exchange in Stockholm could affect EuroCCP market shares and thus affect the number of transactions cleared in SEK. This development is being closely monitored by the Riksbank, as it could change EuroCCP's significance for the Swedish financial system.

LCH – central counterparty for derivatives and equity

LCH (LCH Clearnet Limited) is a British central counterparty that clears several different types of assets. Three of the major Swedish banks are currently participants in LCH and others clear at LCH through agents. The part of LCH that supplies central counterparty clearing of fixed-income swaps is called Swapclear, and it is with Swapclear that the Swedish banks are most active. During 2015, Swapclear cleared interest derivatives with a nominal value of around USD 111 billion, of which around 1 per cent were denominated in SEK.

As several of the major Swedish banks are participants in LCH, it is important for the Riksbank to follow developments and to have insight to its activities being conducted in a safe and efficient manner. Any problems in LCH could affect Swedish banks that are participants and thereby spread to the Swedish market and the Swedish financial system as a whole. The Riksbank is not part of the supervisory college for LCH, unlike EuroCCP. However, the Riksbank participates in a global cooperation with the purpose of sharing information regarding LCH, together with other authorities and led by the Bank of England.

LCH extends operations on the Swedish market

Previously, LCH's clearing of interest rate swaps has been the most relevant for the Swedish market, and it still is, but now equity clearing must also be taken into account. This because LCH's clearing of equity, known as Equityclear, now clears transactions from the stock exchange in Stockholm. The flows in SEK may therefore increase in LCH, although the values and risks in equity clearing are lower than in the clearing of interest rate swaps. The Riksbank will therefore continue to focus primarily on Swapclear. However, the Riksbank will follow how the exposures in SEK develop for LCH both with regard to Swapclear and Equityclear.

[95] The value presented here should not be confused with the value of total Swedish equities traded in 2015. This is because central counterparty clearing gives rise to more transactions in that the central counterparty replaces (novates) all transactions and thus one transaction always becomes two transactions.

Participants trading equity on the stock exchange in Stockholm can now choose to clear their transactions either via LCH or EuroCCP. The fact that there is more than one central counterparty clearing on a trading venue means that they need to have what is known as interoperability.[96]

[96] For further information, see the article "Interoperability between central counterparties has many advantages, but also entails risks" in Chapter 3.

References

CPMI and IOSCO (2012), CPMI-IOSCO Principles for financial market infrastructures, April 2012.

CPMI and IOSCO (2014), Recovery of financial market infrastructures, October 2014.

CPMI (2014), Cyber resilience in financial market infrastructures, November 2014.

CPMI and IOSCO (2015), Cyber resilience in financial market infrastructures, November 2015.

CLS Bank International (2014), Disclosure, December 2014.

Directive 98/26/EC of the European Parliament and of the Council of 19 May 1998 on settlement finality in payment and securities settlement systems.

Directive 2014/59/EU of the European Parliament and of the Council of 15 May 2014 establishing a framework for the recovery and resolution of credit institutions and investment firms.

Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market.

The Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories.

The Regulation (EU) No 909/2014 of the European Parliament and of the Council of 23 July 2014 on improving securities settlement in the European Union and on central securities depositories.

The Regulation (EU) No 260/2012 of the European Parliament and of the Council of 14 March 2012 establishing technical and business requirements for credit transfers and direct debits in euro.

NASDAQ OMX Clearing AB (2014), Disclosure Framework, March 2014.

National Bank of Belgium (2007), Financial Stability Review 2007, June 2007.

The Riksbank Act (1988), the Sveriges Riksbank Act (1988:1385).

Sveriges Riksbank (2012), The Riksbank's oversight of the financial infrastructure, May 2012.

Sveriges Riksbank (2013), The Riksbank and financial stability 2013, February 2013.

Sveriges Riksbank (2014), The Swedish Financial Market 2014, August 2014.

Sveriges Riksbank (2014), Financial Infrastructure 2014, March 2014.

Sveriges Riksbank (2014), ref. no. 2014-559-STA.

Sveriges Riksbank (2016), Time to rethink - inside the head of a central bank governor, April 2016.

Relevant publications

Segendorf, Björn (2014), What is Bitcoin?" Sveriges Riksbank Economic Review 2014:2, Sveriges Riksbank, pp. 71–87.

Sveriges Riksbank (2012), The Riksbank's oversight of the financial infrastructure, May 2012.

Sveriges Riksbank (2013), The Riksbank and financial stability 2013, February 2013.

Sveriges Riksbank (2013), Financial Infrastructure 2013, March 2013.

Sveriges Riksbank (2014), Financial Infrastructure 2014, March 2014.

Sveriges Riksbank (2015), Financial Infrastructure 2015, March 2015.

Sveriges Riksbank (2015), Financial Stability Report 2015:2, November 2015.

Sveriges Riksbank (2015), The Swedish Financial Market 2015, August 2015.

Sveriges Riksbank, website www.riksbank.se

SVERIGES RIKSBANK
SE - -103 37 Stockholm
(Brunkebergstorg 11)

Tel +46 8 - 787 00 00
Fax +46 8 - 21 05 31
registratorn@riksbank.se
www.riksbank.se

PRODUCTION SVERIGES RIKSBANK
ISSN 2001-6034 (online)