Future RIX

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SVERIGES RIKSBANK

Table of contents

1 Summary and proposed decision 3
2 Introduction 5
3 Remit 5
4 Concepts 5
5 The Riksbank's mandate 6
5.1 The Sveriges Riksbank Act 6
5.2 Proposal for a new Sveriges Riksbank Act 6
6 RIX-RTGS 7
6.1 Governance 7
6.2 Participants 7
7 Monetary policy and financial stability 8
7.1 RIX-RTGS role in monetary policy 8
7.2 RIX-RTGS role in financial stability 8
8 The future RIX system 8
8.1 SIA-RTGS/CGI 9
8.1.1 Operational security 9
8.1.2 Governance; updating/new functions 9
8.1.3 Agreement 10
8.2 TARGET2/T2 10
8.2.1 Operational security 11
8.2.2 Governance 11
8.2.3 Agreement T2 12
8.2.4 Regulatory framework 13
8.3 Procure a new system 13
9 Protective security 14
9.1 Protective security regulatory framework 14
9.2 SIA 15
9.3 Eurosystem's T2 15
10 Analysis 15
10.1 Security and continuity 15
10.1.1 Security 16
10.1.2 Continuity 16

10.1.3 Security screening of personnel 16
10.1.4 Summary 17
10.2 Contingency procedures 17
10.2.1 SIA-RTGS/CGI – manual routine 17
10.2.2 T2 – ECONS II 17
10.2.3 Summary 18
10.3 Monetary policy 18
10.4 The Riksbank's collateral management system 19
10.5 ISO 20022 messaging standard 20
10.6 Data for analysis 20
11 Consequences of T2 20
11.1 Functionality 21
11.2 Oversight and RTGS monitoring 21
11.3 Communication 21
11.4 Liquidity management 21
11.5 Adaptation of routines 22
12 Comments from banks and other actors 22
12.1 Consultation with the market 22
12.1.1 The payment market and its development 23
12.1.2 Today's RIX-RTGS 23
12.1.3 T2 23
12.1.4 Other alternatives 24
13 Assessment and proposal 24
13.1 Introduction 24
13.2 Future challenges 24
13.3 Considerations 25
13.3.1 SIA-RTGS/CGI 25
13.3.2 Eurosystem's T2 25
13.3.3 Assessment 26

1 Summary and proposed decision

The aim of the Future RIX project is to continue to offer the Swedish market a modern, cost-effective and secure system for the settlement of payments in Swedish krona. Increasing internationalisation, where banks and others are active on several markets, increases the need for harmonisation and thus also the use of common standards. Additionally, there is a need for payment systems to manage increasingly large amounts of data and to be able to interact with other systems. Another challenge is the operational risks that arise when the financial infrastructure serves an increasing number of actors, at an increasingly fast pace and greater distance. This development also leads to greater demands with regard to security and robustness in the systems to ensure they are resilient to attacks and maintain a high degree of continuity. Additionally, the Riksbank needs to manage the requirements of the market and society regarding cost-effective and safe system solutions. The freedom to make transactions for monetary policy purposes on conditions that the Riksbank itself determines, and the maintenance of financial stability are also essential components of the payments infrastructure.

Two main alternatives have crystallised from the analysis; to retain the current system where the application support is provided by Italian SIA and operations are run by CGI, or to use the Eurosystem's T2 as a platform for settlement of payments in Swedish krona. A third alternative could be to develop/procure a new settlement system, which is not considered realistic, as it would require considerable resources, without providing anything more than is offered by the current system.

The market consultation showed that the current SIA-RTGS is appreciated and functions well. If the Riksbank were to choose to retain SIA's system, both the market and the Riksbank would avoid the major costs ensuing from a change of settlement system. The management of SIA-RTGS and CGI is in addition less complex, as it concerns a two-party agreement. However, the question is not whether SIA/CGI can meet the market's current needs, but instead what system can best manage the market's requirements for efficiency and safety in the longer run.

The requirements regarding the safety and robustness of the systems are increasing, particularly with regard to cyber security, which is becoming more and more important and where the effects of attacks and costs related to these may be very extensive. Requirements for greater resources and broader competence for further development and system security, as well as greater efficiency and cost limitation, increased automation and secured continuity in the systems are all questions requiring substantial resources, which can be perceived as a burden within smaller systems.

The use of the Eurosystem's T2 platform would give the Swedish market access to an established European settlement platform with major resources and broad competence. T2 is also expected to provide strong security, for instance with regard to cyber safety, and operational continuity with several operating sites in different countries. Participation in T2 would give the Riksbank and the RIX-RTGS participants an enormous base and a harmonised development with other countries in the EU, which could stimulate competition between participants and reduce entry barriers to settlement in Swedish krona. A platform such as T2 could moreover provide economies of scale, in that more parts of the costs for operation, development and security, and access to the Eurosystem's collective knowledge and capacity.

The consultation with the market also showed that the market sees a number of advantages with T2, such as significant economies of scale in the form of administration and development, which could altogether lead to greater efficiency and lower costs. Increased resources for security, and in

particular cyber safety, were also mentioned as a considerable advantage. The importance of effective contingency procedures was pointed out, however, as well as the fact that connection must take place in ways acceptable to the participants. It was also considered important to clarify how the Riksbank can be guaranteed influence within the structure of the Eurosystem.

However, the advantages mentioned above shall be reviewed over a longer period of time. A transition from SIA- RTGS/CGI to T2 would initially be both costly and resource-intensive for both the Riksbank and the participants in RIX-RTGS. After the transition has been completed, a reversal would probably be difficult, in that a transition to T2 requires major adjustments by both the Riksbank and the participants. In addition, participation in T2 will also mean a change in governance. Instead of the Riksbank having one-on-one contacts with the supplier of the payment system, as with the current SIA/CGI system, the Riksbank will be one of twenty central banks. The governance and control of T2 will be exercised via the Riksbank's participation in the Eurosystem's channels, committees and working groups, which means that the Riksbank cannot always be sure that its suggestions will gain support. A specific question that might need further investigation is the possibility for the Riksbank to extend the opening hours of RIX-RTGS where necessary, for instance, in the event of disruptions on the Swedish market.

As an important part of the Swedish payment infrastructure, a transition to using the Eurosystem's T2 would come under SäkL-Riks[1]. The project has therefore consulted with the Swedish security police and made a special security protection analysis. The requirements in SäkL-Riks entail security screening of personnel involved in the operation of RIX-RTGS. In the T2 alternative, this means that foreign personnel would need to be security screened. This is not without problems, as it would involve several different instances. Robust contingency procedures and a reserve system for the settlement of payments in Swedish krona in Sweden could facilitate compliance with the regulations. Here, further analysis of possible alternative solutions that comply with the regulations is required, including an analysis of which transaction level and capacity such contingency procedures would be required to maintain, as this would also affect the costs of the chosen solution.

Regardless of which settlement system the Riksbank chooses for the future, the agreement with SIA will need to be extended, either as continued supplier of the system application or for the period until connection to the T2 platform. Time frames, contents and possible phasing-out will therefore need to be investigated further.

Many of the Swedish financial institutions are already largely moving over from national to international infrastructures. The project concludes that to obtain full benefit from the extensive infrastructure established at European level, platform sharing with the Eurosystem would entail substantial economies of scale and access to the Eurosystem's resources and competence. This benefits the participants in the system. This form of platform sharing also has the potential to increase competitiveness and benefit Swedish society through more cost-effective payments. It is difficult to attain these advantages in a national system where the Riksbank is sole actor. On condition that the questions concerning security protection and contingency procedures can be resolved, and that the Riksbank can continue to pursue an independent monetary policy, the assessment of the project is that a transition to using the Eurosystem's T2 platform would offer substantial advantages and efficiency gains.

[1] Act on Protective Security for the Riksdag and its Authorities (2019:109).

2 Introduction

Sweden and its financial industry have benefited considerably from the digitalisation and internationalisation processes in recent years. Standardised and automated processes have been introduced, operations have been refined and/or outsourced to sub-contractors, economies of scale have been attained by concentrating operations to one country, in the cases where the same company has operations in several countries. Digitalisation has also meant that operations are not dependent on a fixed office in a particular country, but can be carried out almost anywhere on earth, as long as the regulatory framework allows it. All of this has contributed to making operations more efficient.

What may be perceived from the citizens' point of view as genuinely Swedish, is therefore something of a chimera, the Swedish infrastructure for payments is already closely integrated with other countries and behind the scenes operations are located where the conditions are best, regardless of whether this is within or outside of the country. It appears likely that this development towards an even greater degree of integration and internationalisation will continue.

One of the Riksbank's tasks is to promote a safe and efficient payment system. This task is aimed at the Swedish market, but carried out within a context where a large part of the operations are based on international standards and agreements and where many of the participants have operations in other countries. The Riksbank is in this respect not a solitary agent, but in many ways already a part of Europe and the rest of the world.

3 Remit of inquiry

The current RIX RTGS, the Riksbank's payment system for large-value payments, was launched in 2009 and has functioned well. The agreement with SIA S.p.A. (SIA), which is responsible for the application support, runs until May 2025, and it is now time to consider whether the Riksbank wishes to continue the cooperation with SIA or to change supplier. The aim of this preliminary study is to produce a base for the Riksbank's decision on the future settlement system for payments.

The work has been conducted on an interdepartmental basis, under the leadership of the Payments Department, both with regard to the steering group and project group. As the project is so complex, the project group has been divided into four working groups; regulations, policy, security and systems. During the final phase, a smaller working group was appointed to work with a holistic approach and to discuss outstanding issues. The project has also had regular contacts with various experts within the Riksbank. The project has also consulted with the market, been in contact with the Danish central bank and had a dialogue with the ECB/Eurosystem to obtain further information. In addition, reports have been presented to the Executive Board of the Riksbank on four occasion.

4 Concepts

The following concepts are used in this preliminary study:

RTGS – Real Time Gross Settlement, a system for the settlement of large-value payments.

TARGET2 – The Eurosystem's current settlement system for large-value payments.

T2 – the settlement system for large-value payments that will be provided by the Eurosystem after consolidation in November 2022. This system consists of an RTGS module and a module for central liquidity management that is shared with the other TARGET services.

RIX-RTGS – the settlement system for large-value payments that the Riksbank supplies to the Swedish market.

SIA-RTGS – the system application used in RIX-RTGS and that is supplied by SIA S.p.A.

SIA-RTGS/CGI – this refers to both the system application supplied by SIA S.p.A. and the operation of the settlement system supplied by CGI.

5 The Riksbank's mandate

5.1 The Sveriges Riksbank Act

Chapter 1, Article 2 of the Sveriges Riksbank Act states that the Riksbank shall promote a safe and efficient payment system. Chapter 6, Article 7 of the Sveriges Riksbank Act states that the Riksbank **may** provide a system for the settlement of payments and may participate in the settlement of payments in other ways. According to the preparatory work for the act, this should be regarded in the light of central banks historically having concentrated on large-value payments with regard to the stability of the payment system, as these entail greater strains for financial actors. To enhance system functionality, the Riksbank can grant system participants intraday credit facilities provided they can offer adequate collateral. The promotion of smoothly functioning payment systems is according to EU law[2] a fundamental task for the central banks, like the Riksbank, that are part of the European System of Central Banks (ESCB).

5.2 Proposal for a new Sveriges Riksbank Act

In the proposal for a new Sveriges Riksbank Act[3] (NRBL) it is stipulated that the Riksbank **shall** supply a system for the settlement of payments and that the Riksbank shall determine which financial companies and authorities may be participants in this system[4], taking into account the principles of free access and neutrality. In addition, the Riksbank shall receive payments to the state and mediate outward payments on behalf of the state.

The wording of the first paragraph that the Riksbank shall supply a system of this type means that the Riksbank shall ensure that the Swedish financial system can implement the settlement of payments in Swedish kronor in central bank money. It is not necessary that the Riksbank itself operates the technical platform required for the system. According to the proposal, the Riksbank also has the right to take part in corresponding systems in another state within the European Union, for instance the Eurosystem for the settlement of payments.

[2] Article 105.2 of the Treaty on the Functioning of the European Union and Article 3.1 of the Statute of the European System of Central Banks and of the European Central Bank.
[3] Council on Legislation consultation response on A new Sveriges Riksbank Act.
[4] This shall take place within the circle stated in Section 8 of the Act on Systems for the Settlement of Obligations on the Financial Market (1999:1309).

6 RIX-RTGS

RIX-RTGS is the Riksbank's name for the central settlement system for large-value payments in Swedish kronor that is supplied to the Swedish market. RIX-RTGS is also an integral part of the Riksbank's operational framework for the implementation of monetary policy, in other words, the hub of the Swedish financial infrastructure. At present, RIX-RTGS has 38 participants, which are comprised of credit institutions, central counterparties, clearing organisations, central securities depositories and the Swedish National Debt Office and the Riksbank[5]. The system processes around 531,000 payments per month, the turnover is around SEK 670 billion daily and the average value of a payment is around SEK 35 million.

The provision of RIX-RTGS follows the principle of full cost coverage, which means that all costs (both internal and external) shall be covered by the participants[6]. 10% of the costs are attributable to monetary policy and are not charged to the participants. The cost base for RIX-RTGS was established in accordance with the current principles for cost allocation within the Riksbank.

6.1 Governance

The responsibility for RIX-RTGS as financial infrastructure is divided between different departments at the Riksbank in the roles of user, system administrator, monitor and responsible for security. To attain a cohesive governance and follow-up, the Riksbank has established a special management group for RIX[7]. This group deals on a general level with certain issues related to RIX-RTGS. If required, questions can be escalated to the Riksbank's Management Group, and if they cannot be resolved there, to the Governor of the Riksbank.

The Riksbank has several different forums and cooperation groups to keep in contact with the market and ensure that RIX-RTGS develops and adapts in a dialogue with the market[8]. The Riksbank also conducts news monitoring and where necessary new working groups are appointed, or forums to capture the market's views regarding specific needs in relation to changes in the outside world that in various ways affect RIX-RTGS.

6.2 Participants

There are Terms and conditions[9] for participation in RIX-RTGS that have been established by the Riksbank. On condition that the applying institution meets the requirements for participation, an accession agreement with the Riksbank may be signed regarding participation in RIX-RTGS. The agreement terms state, for instance, the conditions for the Riksbank to execute transfers and what measures the Riksbank can take if a participant no longer meets the requirements for participation.

[5] Participants in RIX | Sveriges Riksbank
[6] "Principles for pricing the supply of RIX services etc.", Ref. no. 2008-569-KAP
[7] The Head of the Payments Department is chair of the RIX management group. Other members include the Head of the Corporate Services Department, the Head of the Markets Department and the Head of the RIX Division, or the person the respective manager has appointed to be member of the group in their stead. The Chief Risk Officer, the Compliance Officer and the Head of the Internal Audit Department are co opted members.
[8] For example, RIX Council, RIX User Group
[9] Terms and conditions for RIX and monetary policy instruments.

7 Monetary policy and financial stability

The Riksbank has the task of maintaining price stability, and of promoting a safe and efficient payment system system. Two important parts of this task include formulating policies and taking decisions with regard to monetary policy, and maintaining financial stability. The task includes implementing the transactions needed in RIX-RTGS. These include implementing payment of interest justified by monetary policy deposits and loans and payment of participants' fees. In addition, the Riksbank needs to carry out transactions in Swedish krona outside of the actual policy operations, such as correspondent bank services to foreign central banks and international bodies, or the transactions in Swedish krona in connection with currency exchanges when paying Sweden's EU fee and other payments.

7.1 RIX-RTGS role in monetary policy

The role of RIX-RTGS in the implementation of monetary policy consists mainly of two components, one being that the participants' balance on their accounts in RIX-RTGS is collected automatically at the end of the day and used to calculate interest rates for monetary policy counterparties' use of the Riksbank's standing loan and deposit facilities overnight. The second component is that payments of interest that are justified by monetary policy counterparties' use of monetary policy instruments such as deposits and lending by the Riksbank and investments in Riksbank Certificates are made in RIX-RTGS.

7.2 RIX-RTGS role in financial stability

The fact that the Riksbank supplies a payment system contributes to financial stability in itself, as the participants do not have any credit risk on the payments settled. The Riksbank, as an independent authority, has a credibility that it is difficult for private parties to attain, and thereby an expectation that it will act impartially in its role of being responsible for the payment system. During financial crises, the Riksbank can directly use RIX-RTGS to implement important transactions where emergency liquidity assistance can be transferred by RIX-RTGS. There are also some more advanced tools in the payment system that the Riksbank can use in a financial crisis, such as changing participants' authorisation in the system to minimise risks.

8 The future RIX system

The future RIX RTGS shall, like the current system, act as the hub in the Swedish financial system where financial institutions can exchange large-value payments with one another in central bank money (settlement)[10]. The Riksbank's objective for the financial infrastructure including the future RIX-RTGS system is to supply a system for settlement in central bank money that complies with global standards[11]. The systems and their support functions shall be safe and cost-effective, and correspond to the market's expectation to the extent that this is possible. They shall as far as possible be based on international standards and facilitate the provision of services by Swedish operators outside Sweden and the provision of services by foreign operators in Sweden. It is also desirable to be able to connect together and create interoperability with other systems. It must be

[10] More precisely, settlement is the final regulation of claims or financial commitments. This is usually through transfers between accounts in a special financial infrastructure – a so-called settlement system.

[11] Principles for Financial Market Infrastructures (bis.org)

possible to carry out the Riksbank tasks that are supported by the systems at all times. Freedom for the Riksbank to implement transactions for monetary policy purposes on terms and conditions determined by the Riksbank is another fundamental condition that must be met in the payment infrastructure.

In the analysis of the future RIX-RTGS two different main alternatives have crystallised; to retain the current system supplied by Italian SIA S.p.A. (SIA) or to use the Eurosystem's T2 settlement platform. A third alternative would be to develop/procure a new system, which would probably require considerable resources without giving anything over and above what is offered in the current system.

8.1 SIA-RTGS/CGI

The current RTGS system is a procured application supplied by SIA, which has been in operation since 2009 (SIA-RTGS when this system is specifically referred to)[12]. SIA-RTGS began to be developed in 1999 by Perago in South Africa, which is now a part of the SIA group. SIA supplies the actual system application, including support for it. Around 20 central banks are currently customers to SIA and in addition to Sweden, Norway, Denmark (which decided in December 2020 to join T2), Iceland, New Zealand and Canada (under implementation) are using SIA-RTGS. With regard to the actual operation of RIX-RTGS, the Riksbank has outsources this and currently has an agreement with CGI Sverige AB[13]. This means that applications development and support, as well as operation, are currently carried out by two private international companies.

8.1.1 Operational security

Since the start in 2009, operational security at SIA-RTGS has been at 100% for four out of twelve years[14]. Availability in the event of operational disturbances has varied between 99.70% and 99.98%. Potential disturbances can either be attributed to SIA's system application or to the IT operations provider[15]. On discovery of potential errors in the functioning of the system, they are registered as an incident with SIA, which then has a certain agreed amount of time to resolve the problem, depending on how serious it is. In the case of a serious operational disturbance, the incident shall be resolved within two hours, according to the agreements with CGI or SIA, depending on the type of incident. Incidents are followed up according to an established incident process.

8.1.2 Governance; updating/new functions

With regard to updates or the addition of new functions, the Riksbank makes a request to SIA, which returns with a tender. Priority and price are partly dependent on to what extent the new function may be useful to other users, too. The development projects implemented since 2009 have required considerable commitment from the Riksbank, and also from RIX participants, both with regard to specification of requirements and testing, as well as governance and follow-up of time, cost and quality of the deliveries. With regard to functions with limited use that are not within the scope of

[12] The company SIA S.p.A. was founded in 1977 by Banca d'Italia, the Italian Banking Association and the major Italian banks. SIA had a turnover of around EUR 750 million in 2020.
[13] CGI Inc was founded in Canada in 1976 and currently has offices in more than 400 places around the world. CGI Sverige AB is a wholly owned subsidiary of CGI Inc, which has its head office in Montréal, Canada.
[14] 99.98 year 2009, 99.93 year 2010, 99.87 year 2012, 99.70 year 2013, 99.97 year 2014, 99.98 year 2015, 99.70 year 2018, 99.97 year 2019
[15] Gradual transition from TietoEvry to CGI during the period 2019/2020

SIA's strategic orientation, SIA may decided to phase them out, which means that new versions will not be developed and ultimately no support will be given.

8.1.3 Agreement

The current agreement with SIA was signed on 23 May 2018, and runs until 23 May 2025 at the longest. If the Riksbank wishes to continue using SIA's settlement system after this date, a new agreement would need to be signed. Normally, this type of agreement is preceded by a competitive procurement. However, the Swedish Public Procurement Act contains exemptions for situations where there is only possible supplier of the product or service to be procured, what is known as a negotiated procedure. On condition that no other supplier than SIA can supply applications support for RIX-RTGS, it could be procured directly from SIA with the aid of this type of procedure. If one also wanted to add increased functionality, the conditions would need thorough analysis. Procurement of further functions would in that case not refer to independent functions of a larger scope, that is, those that could be provided by another supplier.

Regardless of which settlement system the Riksbank chooses for the future, the agreement with SIA needs to be extended, either as continued supplier of the system application or for the period until connection to the T2 platform. Time frames, contents and possible phasing-out therefore need to be investigated further.

The Riksbank's agreement with CGI runs until December 2022, with the opportunity to extend further, but at the longest until the end of December 2028; after that a new procurement procedure would be required.

8.2 TARGET2/T2

TARGET2 is the Eurosystem's platform for the settlement of large-value payments in real time (RTGS). Unlike SIA-RTGS, the Eurosystem offers both system applications and operation through TARGET2. The aim of TARGET2 is to support the implementation of the euro area's monetary policy and a functioning market for the euro, to minimise systemic risks on the payment market and to ensure efficient management of cross-border payments in euros.

In legal terms, TARGET2 is divided into independent national systems, but technically it is based on a joint platform, which is maintained by the central banks in Germany, Italy and France (3CB). TARGET2 offers its customers uniform services, prices and terms and conditions in all countries. More than 1,000 banks use TARGET2, either on their own behalf or on behalf of their customers, and through them a total of around 44,000 banks around the world can be reached. TARGET2 mediates payments to a value of more than EUR 1,800 billion per day.

The Eurosystem is currently working on consolidating TARGET2 and T2S into a single platform. TARGET2 will then be replaced with a new RTGS system, called T2. The aim is to optimise liquidity management in all TARGET services, T2, T2S (securities settlement) and TIPS (settlement of instant payments). T2 will have the capacity to manage several currencies at the same time, which is a necessary condition for being able to use T2 for the Swedish krona.

8.2.1 Operational security

Since the start in May 2008, operational security for TARGET2 has been at 100% for eight out of twelve years[16]. Availability in the case of operational disturbances has varied on an annual basis between 99.89% and 99.98%, apart from the year 2020, when three major incidents occurred and operational security was then 99.58%, which is the lowest figures since TARGET2 was launched. Following these incidents, the Eurosystem tasked an external consultancy firm with carrying out an independent investigation into the incidents to be able to learn from them and remedy the problems identified. The firm's report and the Eurosystem's overall list of measures were published in July 2021[17].

When there are operational disturbances in TARGET2, operations can be moved to an alternative site, either in the same region, or in another region. Additionally, the operator has the possibility to extend the opening hours to be able to process waiting transactions. In the event of a serious disruption, the current contingency procedure can be activated, although this can also supply a basic level of service.

8.2.2 Governance

An agreement with the Eurosystem on using the T2 platform means that the Riksbank will become one of several central banks taking part in T2. This means that governance and control take place via the Eurosystem's channels.

The T2 platform will be formally supplied by the Eurosystem's four largest central banks (4CB[18]) and owned by the Eurosystem, which has as its highest decision-making body, the ECB Governing Council[19] (level 1). The Riksbank is not represented on the ECB Governing Council. If the Riksbank were to use T2, it would be represented at the decision-making level below this (level 2), that is, on the Market Infrastructure Board (MIB). The MIB is the management body that has responsibility for the Eurosystem's market infrastructure services[20] and for its initiatives in market infrastructure issues. At present, the MIB has two seats for central banks that do not belong to the Eurosystem, which are currently held by Danmarks Nationalbank[21] and the Riksbank[22]. The MIB, as system owner, is ultimately responsible for all decisions regarding TARGET Services. In the case of further non-euro central banks joining TARGET Services, these two seats would be allocated on a rotating schedule. There is a group for non-euro central banks called the Non-Euro Central Bank Steering Group (NECSG). The NECSG can refer questions directly to the MIB, and if the question cannot be resolved within the MIB, it can be raised to the Governor's Forum[23]. If Sweden joins the T2 platform, the

[16] 99.89% year 2011, 99.98% year 2015, 99.98% year 2018

[17] Response of the Eurosystem as operator of TARGET Services to the external review carried out by Deloitte on the incidents that affected TARGET Services in 2020 (europa.eu)

[18] Deutsche Bundesbank, Banque de France, Banca d'Italia and Banco de España.

[19] The ECB Governing Council consists of the euro zone's central bank governors and the ECB's Executive Board.

[20] Target2, T2S and TIPS

[21] Danmarks Nationalbank has accounts for Danish krone in T2S.

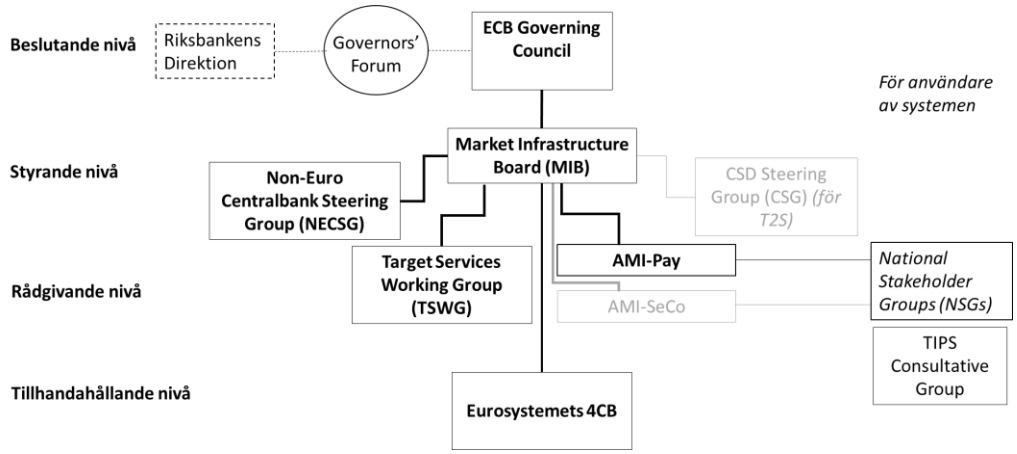
[22] The Riksbank received a seat on the MIB after entering into an agreement with the Eurosystem on joining TIPS and is also represented on a number of groups related to TIPS that report to the MIB.

[23] The Governors' Forum is composed of the Governors of the Connected CBs that have signed the Agreement on the Use of [TIPS] Service and an equal number of Governing Council members. It discusses in exceptional circumstances matters of relevance for Connected CBs in TIPS that could not be resolved by other bodies. It is the clear objective of the Governor's Forum to discuss and settle such disputes by agreeing on a common resolution in consensus.

Riksbank's participation will be extended from the current groups related to TIPS to also include groups working on issues related to T2.

For contacts with the market, there is an advisory group for payments, AMI-Pay, which is consulted on questions relevant to T2 and TIPS. Participants in AMI-Pay include representatives of the market and also 4CB and eight national central banks on a rotation basis. In addition, each central bank has a national forum for communication with the national market participants, National Stakeholder Groups (NSG). Together these comprise level 3. The Riksbank's current national cooperation body, the RIX Council and the RIX user group will be included into this structure in the event that T2 is used.

Figure 1. The ECB's and Eurosystem's management and leadership structure for market infrastructure issues



Sources: The Eurosystem and the Riksbank

8.2.3 Agreement T2

If the Riksbank were to choose to share a platform with the Eurosystem's T2, it would involve outsourcing the operations in the same way as is done with the current SIA-RTGS and CGI. However, it would not be necessary to have a public procurement procedure in this case, as the Swedish Public Procurement Act is not applicable to services offered by a central bank.

To gain access to the Eurosystem's T2 platform for RIX-RTGS, the Riksbank needs to enter into an agreement with the Eurosystem on the right to use the T2 platform and on the terms and conditions for this. However, this does not mean that the relationship between the participants in RIX-RTGS and the Riksbank changes. The Riksbank would continue to supply a settlement service to its participants that is regulated by the terms and conditions stipulated by the Riksbank, but the Riksbank's conditions and agreement with the participants must where relevant reflect the contents of its agreement with the Eurosystem, for instance, so the Riksbank can meet the obligations ensuing from its agreement with the Eurosystem.[24]

[24] Terms and Conditions for RIX and Monetary Policy Instruments has been supplemented with some additional formulations as a result of the Riksbank's agreement with the Eurosystem on the use of the TIPS platform.

If the Riksbank is to sign an agreement with the ECB and the Eurosystem regarding connection to the T2 platform, there are a number of “red lines” that must be met according to Swedish law:

- The agreement must not entail any impairment of the Swedish National Audit Office’s possibility to audit the Riksbank.
- The agreement must respect the Swedish principle of public access to official documents.
- Statutory requirements of security protection must be met.

In the case of a decision of principle on T2, a more in-depth analysis must be made regarding areas that require special regulation, exemptions or additions.

8.2.4 Regulatory framework

The regulatory framework for TARGET2 is currently based on a guideline from the ECB[25]. TARGET2 is based on a joint shared platform, but the national central banks manage their own connections of participants in their own countries. In legal terms, TARGET2 is structured as several national payment systems, where the sub-systems are given exemptions only for cases that are necessary due to limitations in national legislation, this is something that will require further investigation in the event of a decision to join T2. The ECB's guideline also covers an appendix with harmonised terms and conditions for participation in TARGET2, which are designed as agreement terms, to be used with regard to national participants.

If the Riksbank were to choose to use TARGET Services for both of its settlement services (RTGS and INST), there would be a smaller need for specific Riksbank regulations with regard to, for instance, liquidity transfers to the different services. The relationship with the participants will continue to be managed by the Riksbank, which means that support and incident management questions need to be regulated specially, as with the implementation of the Riksbank's monetary policy transactions, etc. There will therefore also continue to be a need for Riksbank-specific Instructions for the Riksbank's settlement services, which in many cases will refer to the documentation from TARGET Services.

8.3 Procure a new system

In addition to the two main alternatives, retaining the current SIA-RTGS or using the Eurosystem’s T2 platform, the possibility of procuring a new system could be considered. The procurement of a new settlement system should be preceded by a preliminary study to examine what needs and requirements the Riksbank has with regard to a new system, which alternatives are available on the market, which companies can supply the system or consultancy services, and which requirements should be made regarding security. After that, a specification of requirements and an agreement need to be drawn up, a procurement procedure needs to be advertised, the tenders need to be assessed and negotiated with the suppliers. It then takes time to implement and launch the new system. This is a process that would probably take six to eight years before the new system was in full operation, assuming that the Riksbank purchases a standard system. If a new system is to be built up, it would probably take even longer.

Compared with the established alternatives, such as SIA-RTGS and the Eurosystem’s T2, however, the procurement of a new system, or alternatively constructing an RTGS of one’s own, would appear to

[25] Guideline (EU) 2019/1849 of the European Central Bank of 4 October 2019 amending Guideline ECB/2012/27 on a Trans-European Automated Real-time Gross settlement Express Transfer system (TARGET2).

be a complicated and expensive process that would not provide any specific added value in relation to the current SIA-RTGS. There are at present only a handful of RTGS applications that can be procured, one of which is SIA, which in recent years has signed new agreements with several central banks[26], and offers a modern and reliable RTGS application. We have in this preliminary study therefore chosen not to analyse the other applications on the market in depth.

9 Protective security

RIX-RTGS is an important part of the Swedish payment infrastructure. The Riksbank therefore assessed that regardless of which supplier is contracted, the future settlement service will fall under the Swedish protective security regulations, as disruptions in accessibility could affect Swedish society to a greater or lesser degree. This chapter summarises the relevant parts of the currently applicable protective security legislation. It also includes an analysis of what should be taken into account in the assessment of the two main alternatives for the future settlement system; SIA-RTGS/CGI and T2.

9.1 Protective security regulatory framework

The protective security regulatory framework is intended to protect operations and information that is significant to Sweden's security or covered by international commitments regarding protective security. With regard to the Riksbank, the applicable law is the Act on Protective Security for the Riksdag and its Authorities (SäkL-Riks) [27], which in some parts refers to protective security legislation[28] (SäkL)[29]. What is relevant in this case is not related to protective security classified data, but operations that are security-sensitive and the impact on the Swedish economy that could arise in the event of a serious disruption in a critical national payment system such as RIX-RTGS.

An authority that is covered by SäkL-Riks shall when making a procurement regarding an agreement on goods, services and public works contracts enter into a protective security agreement with the supplier, if the procurement concerns or gives the supplier access to security-sensitive operations that are significant to Sweden's national security. The protective security agreement shall state how the supplier will meet the requirements for security protection. The protective security agreement also forms a base for the principal's/authority's decision on which types of employment and persons involved at the supplier company need to be security classed.

The preliminary study interprets the concept of procurement in SäkL as also covering situations where the acquisition is covered by an exemption from the obligation to carry out a procurement in accordance with the Public Procurement Act. The preliminary study also finds that a settlement system for large-value payments such as RIX-RTGS can be regarded as operations significant to Sweden's national security and that it therefore comes under SäkL-Riks, and requires a Protective security agreement with the supplier.

[26] The Icelandic central bank, New Zealand's central bank and Canada's central bank.
[27] (2019:109)
[28] (2018:585)
[29] In addition to SäkL and SäkL-Riks, there are other ordinances and regulations that may be significant, for instance, the Protective Security Ordinance (2018:658), (SäkF), the Swedish Security Service's regulations on security, PMFS 2019:2 and the Protection Act (2010:305). In addition, the security police have produced a number of guidelines, including the document Guidance: Security-protected public procurement. It can be noted that SäkF and the security police's regulations do not apply to the Riksdag and its authorities.

9.2 SIA

At present, the Riksbank does not have a protective security agreement with SIA, because SIA does not have independent access to RIX-RTGS. This is because SIA does not participate in the operation of the system and does not have its own access in RIX-RTGS for support. Access is only given via screen shots under monitoring by the Riksbank's operational supplier CGI, with which the Riksbank has a protective security agreement. In other words, SIA only has the possibility to see into the system under certain specific circumstances. Since the agreement was signed with SIA, the protective security regulations have been updated. A new security screening therefore needs to be carried out in consultation with SÄPO (the Swedish security police) if the agreement with SIA is renewed. The need for a protective security agreement depends on this analysis. In addition, a continuing protective security agreement is required with the company managing the operation of RIX-RTGS at the Riksbank, which is currently CGI.

9.3 Eurosystem's T2

As mentioned above, use of the Eurosystem's T2 would probably regarded as a "procurement" as this is understood in Article 12 of SäkL-Riks. Unlike the current RIX-RTGS, where SIA supplies the applications support and CGI is responsible for operation of the system, the Eurosystem would in this case provide both the actual application and the operation of the system. This means that there is an obligation to enter into a protective security agreement with the ECB and the Eurosystem in their role as provider of the service. The protective security agreement could, in the same way as for TIPS, be signed in a way that means it comprises a security annex to the Accession Agreement with the ECB and the Eurosystem.

10 Analysis

The above chapter has described the regulatory framework and the role of the settlement system in monetary policy and financial stability. In addition, the different alternatives for future settlement systems are presented, as well as the Swedish protective security regulations. The chapter below contains a first overall analysis of various aspects related to the two alternatives SIA-RTGS/CGI and T2, such as security and continuity, monetary policy, managing collateral, message standards and access to data for analysis.

10.1 Security and continuity

The Riksbank has high demands concerning the protective security and continuity, as well as information and cyber security for RIX-RTGS. The starting point is that the same high requirements will apply to the future settlement system, regardless of whether this would be SIA-RTGS/CGI or T2. The preliminary study has analysed what it would entail from a security perspective if the current SIA-RTGS/CGI remains, or alternatively if the Riksbank were to use the T2 platform. The assessment has in addition included consultation with the Swedish security police and a special protective security analysis.

10.1.1 Security

The Eurosystem's information and cyber security regarding T2 is assessed to have a high level and be in line with recognised standards and good practice. On the whole, T2 is affected by the same international cyber security guidelines as the Riksbank's current RTGS system, where operation is managed by CGI. On the other hand, T2 is assessed to be subject to stricter oversight with regard to complying with the CPMI guidelines[30]. In addition, the Eurosystem is assessed to have much greater resources and opportunities to meet and exceed the requirements than a small central bank such as the Riksbank. One area where this is expressed is the Eurosystem's establishment of a dedicated Security Center for oversight, analysis and information sharing with regard to cyber security incidents, as well as cyber security tests and the development of an overall cyber security framework for the TARGET services.

10.1.2 Continuity

T2 is also considered to give a strong protection against operational disruptions as the Eurosystem has a contingency procedure with alternative operational sites within the region and also in another region. At present there is no corresponding alternative for SIA-RTGS/CGI to move operation to an entirely different region.

There are several differences between the contingency routines for SIA-RTGS/CGI and those for T2 in the case of disruptions to availability. The contingency routines for T2 are more digital and automated, while the contingency routines the Riksbank has chosen for SIA-RTGS are more manual[31]. To be able to assess whether the contingency routines for T2 entail an equal or higher level of security, the Riksbank needs to ensure that the solution has minimum dependence on T2 and is separate from the technical solution.

If the Riksbank were to choose to go towards T2, a more in-depth analysis would need to be made of how such outsourcing might affect the need for contingency procedures. A continued dialogue with the ECB and the Eurosystem, and also with the Riksbank's suppliers, is necessary to be able to produce relevant and reliable solutions.

10.1.3 Security screening of personnel

With regard to personal security, SäkL-Riks requires security screening of personnel who take part in security-sensitive operations. Security screening of security-classed personnel in other countries requires the involvement of several authorities and is therefore often time consuming. It is at present unclear how the central banks responsible for the operation of T2 will react to this type of security screening. A protracted security screening would probably also mean that personnel being screened would not be able to take part in operations covering Swedish payments, which could entail additional costs. It should therefore be investigated what roles might affect the systems and how such an impact can be minimised to enable security screening without the involvement of foreign authorities. The degree of security classification is dependent on whether effective contingency procedures are available, that is, to what extent the system's function can be

[30] These assessment criteria (Cyber resilience, oversight expectations, often abbreviated as CROE) include a long list of specific requirements that are more detailed than the CPMI guidelines.
[31] SIA also supplies a more automated reserve system known as RECS, but which the Riksbank has chosen not to use.

maintained in the event of an attack/disruption in operations. This area thus requires in-depth analysis and a continued dialogue with the ECB and the Eurosystem.

10.1.4 Summary

All in all, the assessment of the preliminary study is that T2 would entail stronger security with regard to cyber security, for instance, and also operational continuity as the Eurosystem has several operating sites in different countries.

The requirements in SäkL-Riks regarding security screening of security-classified personnel will require further work and be more complicated to meet if T2 is used. Employers in other countries could object to such screening, for instance, due to integrity reasons and screening of foreign citizens will take longer, as it requires the involvement of several different authorities. Questions also arise as to how to deal with personnel waiting to be approved, and to who will bear the costs. One alternative could be to establish a contingency procedure for prioritised payments in Sweden. Having a contingency procedure in Sweden means that dependence on the supplier would be reduced and lead to a reduction in the requirements for security screening of personnel in this security class. These questions require further analysis and investigation with the support of the security police. It is important that the Riksbank complies with the appropriate protective security legislation regardless of which supplier(s) are chosen for the settlement system.

10.2 Contingency procedures

10.2.1 SIA-RTGS/CGI – manual routine

The Riksbank currently has a contingency procedure for SIA-RTGS/CGI that is based on the Riksbank manually registering payments in an “accounting system” and where the underlying data for the payments is sent by the participants via fax or a safe alternative channel of communication. This solution requires that the participants can aggregate payments internally and that they have routines to exchange information with one another regarding the underlying data for the aggregate payments. Even if the solution has more manual elements than the T2 contingency procedure, it has a major advantage in that the current balance on the settlement account in RIX is known and it is therefore not necessary to add further liquidity. However, this solution can only manage a very limited number of payments and has difficulty functioning over a longer period of time. The increasing share of instant payments also puts increasing demands on automated contingency procedures.

10.2.2T2 – ECONS II

ECONS II is the Eurosystem’s contingency procedure for T2, where time-critical payments can be made in an alternative way if T2 were to fail. Settlement is through special contingency accounts in ECONS II, which are only used in the event of a disruption in operations, that is, when it has not been possible to maintain operations at any of the various sites. This means that there is no ingoing balance on these accounts, unlike the SIA-RTGS/CGI manual solution, where current accounts are automatically saved on a continuous basis. Liquidity therefore needs to be added to enable payments to be made. The participating central banks must therefore give credit to their participants, which presupposed sufficient collateral. Either they have to pledge new collateral, or alternatively some of

the collateral already pledged can bee “reserved” for the contingency account. Such a scenario could be set up in the Riksbank's own IT environment, either as a necessary function in the Riksbank's collateral management system, QCMS, or as a more manual management with some increased operational risk. When the disruption to operations has ceased and use of ECONS II ends, the balances from continuity accounts in ECONS II are transferred to T2 and the liquidity accounts in CLM, which is the Eurosystem’s module for central liquidity management. A repayment of the liquidity transfers made can then be initiated against the limit for overnight credit for liquidity accounts in CLM increasing (at the same or a lower extent).

A Riksbank-specific contingency solution based on the current account status would be preferable, as additional liquidity would not need to be supplied. Such a solution could be established if the Eurosystem could be convinced to regularly send the balances on the liquidity accounts and settlement accounts, information that is not currently accessible in ECONS II. A solution based on the current account status has other complications, however, for instance with regard to the return to normal routines and when the new balance is to be transferred to T2. This would probably require the development of appropriate functions in T2. Another disadvantage with a separate Swedish contingency procedure is that the Riksbank would also be able to manage liquidity transfers to RIX-INST in ECONS II. If the TIPS platform were to function, there is a possibility for the Riksbank to make liquidity transfers in the form of payments in RIX-INST, which can take place independent of ECONS II.

10.2.3 Summary

The current manual contingency procedure in SIA-RTGS/CGI is probably too limited and slow for future needs. If the Riksbank chooses to continue with SIA-RTGS, this routine will need to be reviewed with regard to the future transaction pattern and an increasing number of instant payments.

The Eurosystem has no equivalent manual routines, the solution in ECONS II has a significantly higher degree of automation and is implemented in the cases where operation cannot be maintained in one of the various operating sites.

In the event of a potential use of T2, there are three alternative solutions; 1) establish a routine for transferring liquidity to the zero accounts in ECONS II, 2) examine the possibilities of obtaining access to regular balances from T2/CLM, including a solution to be able to incorporate current balances in T2 when the disruption to operations has been remedied, 3) obtain access to a Swedish version of ECONS II.

It would be preferable if the Riksbank were to receive access to a Swedish version of ECONS II, as this would be in place in Sweden and thus it would be possible to use it even in the event of a disruption in contact with the Eurosystem (see Chapter 10.1). Further analysis of these alternatives in consultation with the supplier of the future settlement system appears necessary before a decision is taken on the way forward.

10.3 Monetary policy

National independence in the payment system is important for the capacity to operate an independent monetary policy. In the event of platform sharing with the Eurosystem, the Riksbank's influence will be shared with other central banks, for instance with regard to further development

and opening hours. Relevant support systems, such as QCMS, facilitate the implementation of monetary policy in this respect. The Riksbank's strategy in recent years has been to move monetary policy functions from RIX-RTGS to QCMS to refine RIX-RTGS as a settlement system and use QCMS for implementing monetary policy.

Unlike SIA-RTGS, where liquidity is managed within the system, the use of T2 adds a separate module for central management of liquidity and credit, CLM, which must be regarded as positive. CLM supplies information on the participants' liquidity and management of credit. Moreover, CLM is the central component for supplying liquidity in T2. However, all of the monetary policy functionality the Riksbank needs will not be available in CLM. It is therefore important that the Riksbank has its own system that can manage interaction with CLM and that together with other systems within the Riksbank can manage different credit and collateral systems. The Riksbank's current collateral management system, QCMS, should take on this role after adjustment to CLM's messaging standard. With effect from autumn 2021, QCMS will also have functionality for calculating interest, which means that if the Riksbank's desired rate-setting does not come within the scope of what CLM can manage, then it can be managed within QCMS.

One question that could cause problems, and should therefore be investigated further, is the possibility for the Riksbank to extend the opening hours of RIX-RTGS where necessary, for instance, in the event of disruptions on the Swedish market. Extended opening hours in T2, for instance after 6 pm, are only permitted in a certain number of listed cases, and do not appear to be allowed in the case of problems experienced by individual banks. At present, the Riksbank can extend the opening hours in RIX-RTGS in the case that an individual bank or clearing house, such as Bankgirot, experiences problems. The opportunity to make this extension is also valuable to provide scope for monetary policy measures. If the Riksbank does not have an independent opportunity to decided on extended opening hours for settling payments in Swedish krona, this could have an impact on all actors/participants in the RIX system.

10.4 The Riksbank's collateral management system

The Riksbank's collateral management system (QCMS) largely meets two needs. One is to manage collateral as a pledge for offering credit in RIX-RTGS and thereby facilitate the settlement of payments, and the other is as a system for implementing the Riksbank's monetary policy. It is therefore very important to verify that QCMS can be retained and integrated with the RTGS system the Riksbank decides to use in the future.

QCMS is used today for in principle all transactions that the Riksbank makes for monetary policy purposes, i.e. for the implementation of monetary policy and to promote financial stability. [32] The transactions that concern cash are not managed by QCMS.[33] On the T2 platform, the CLM module is used to manage overnight credit. These transactions will, in the event of a possible use of T2, be managed over the Riksbank's and the counterparties' liquidity accounts in the CLM module.

In the event of joining the T2 platform, messages to and from CLM will need to be adapted to ISO20022. The message flows in QCMS also need to be adapted to the message flow used in CLM. QCMS may also need to adapt its calculation of interest to the report and message flows applying in

[32] Transactions that are connected to the Riksbank's correspondent bank services for other central banks and international financial institutions are not regarded here as monetary policy transactions. These transactions are managed by the business system DIMENSION.
[33] Cash transactions are managed by the OLFI system.

CLM. In addition, QCMS could possibly be developed to support contingency solutions based on zero balances.

10.5 ISO 20022 messaging standard

SWIFT supplies standards for payment orders, which are used by in principle all payment mediators around the world. The standardised format makes it possible to automate and simply the payment flows, in that the information is in particular fields and thus can be read by a machine. In November 2025, SWIFT will no longer support some of its messages[34], which means that these message formats cannot be used after that date, and this will affect all actors in the payment chain at a global level. The Riksbank has initiated a preliminary study into how and when RIX-RTGS will migrate to the new standard. Within the framework of this preliminary study, the Riksbank has carried out a market consultation, where a clear request from the banks that currently participant in RIX-RTGS is to follow the method the Eurosystem has chosen for implementing ISO 20022.

It is clear now that an accession to the T2 platform would probably not be complete by November 2025. The Riksbank will therefore need to migrate the current SIA-RTGS to ISP 20022. The aim is as far as possible to implement this change as close as possible to T2's message structure, which would also facilitate a future connection to the T2 platform.

10.6 Data for analysis

To evaluate the monetary policy implementation, oversee the financial sector, and follow up counterparties' actions in RIX, it is important that the data is easily accessible to the participants, researchers and also to the Riksbank. Historical data is available in SIA-RTGS, but it is difficult to get hold of and analyse this data. This is primarily because a limited circle has direct access, and also the data volume is large and difficult to handle. In some cases, it has led to analysis being given lower priority or not being carried out because it is too complicated for outsiders to use this data[35].

In T2, data is transferred from T2-RTGS and CLM to a data warehouse once a day. The participants can request standardised reports that can be obtained in a number of different ways. Central bank users can edit the standardised reports and create their own, something that entails a major improvement in relation to SIA-RTGS.

There is a project at the Riksbank on establishing a joint analysis platform, in which, for instance, data from RIX-RTGS can be made available. The in-depth analysis will also include how T2 could supply data to the Riksbank's analysis platform.

11 Consequences of T2

In the event of a decision to use the T2 platform, a number of today's routines and services would need to be adjusted, for instance, functionality, oversight, communication and liquidity management. The project has carried out a first preliminary analysis, which is described below on a general level.

[34] The 100-, 200- and 900-series.

[35] The solution for extracting data that the Riksbank has offered participants for some time will not be supplied in the long term by the Riksbank's system suppliers.

11.1 Functionality

The structure of the current SIA-RTGS/CGI is well-known and well-established, and the participants have built their services to end-users on the basis of this structure. However, the functionality in T2 appears able to cover most of the needs of the Swedish market. In some cases, improved functions are also offered, such as the CLM module and a user-friendly service for the analysis of data. It should therefore be difficult to claim that it is not possible to adapt to the functionality in T2 and to make payments efficiently with the aid of this, even if this takes considerable effort.

However, initially a transition to T2 will require major adjustments and changes in the participants' systems and procedures. This will take time and require resources, but can be partly seen as part of a European harmonisation process. With regard to the Riksbank, it will require adjustment of the systems that currently communicate with RIX-RTGS. This applies in particular to the Riksbank's security system, QCMS (see Chapter 10.4) to ensure that the Riksbank's policy tasks can be carried out in the way the Riksbank finds appropriate.

11.2 Oversight and RTGS monitoring

In the event of the use of T2, the Riksbank will no longer have access to real-time information regarding the settlement of the platform to the same extent as with SIA-RTGS/CGI. This also applies to the TIPS platform, which will be used to supply the RIX-INST settlement service.

The Riksbank has a responsibility to both the Eurosystem as platform supplier and to the participants in RIX, and it is therefore essential for the Riksbank to be able to follow and analyse the payment flows in RIX in real time to detect at an early stage risks to, for instance, financial stability or cyber-related irregularities. Carrying out this type of follow-up and analysis efficiently requires analysis tools that are integrated into RIX-RTGS, where data can be extracted for analysis in real time.

11.3 Communication

A large part of the technical connection that will be made in connection with a possible connection to T2 will be carried out during the connection process now underway for TIPS. Both T2 and TIPS come under the Eurosystem Single Market Infrastructure Gateway (ESMIG). The Riksbank has procured SWIFT as supplier of network services to ESMIG for TIPS, but as a potential use of T2 was not on the cards at that time and nor were there facts that could be included in the procurement (end of 2019/beginning of 2020), this procurement only covers TIPS. If the Riksbank were to choose T2 as settlement platform, it is likely that a new public procurement/competitive procurement will need to be made regarding the supplier of the actual content of the communication. However, the actual connection to ESMIG for T2 will be made in the same way as for TIPS, but if another network supplier than SWIFT is procured, it would probably require some adjustment at the Riksbank.

11.4 Liquidity management

If a platform is shared with T2, the participants in RIX will need to reconcile today's transactions in both RIX-RTGS and RIS-INST to discover and manage possible deviations. As the participants have payments that are aggregated in RIX-RTGS from, for instance, clearing houses, they will also need to review routines and routine descriptions for this reconciliation. This requires adjustment of the participants' internal systems.

A future RIX-RTGS must be able to provide the Riksbank's other settlement services with liquidity, such as RIX-INST or T2S if the Riksbank were to choose to use it for securities settlement. The functionality to hold reconciliation and interest calculation together in RIX-RTGS should therefore work together with the other services in RIX as a whole.

One question that can give rise to discussion is the opening hours in CLM[36]. The participants in RIX-INST will with effect from the introduction in early summer 2022 be offered the opportunity for liquidity transfers 24/7 to and from SIA-RTGS. These opening hours will be restricted in the event of a connection to T2, as a result of the Eurosystem's CLM module having limited opening hours nights and weekends (see footnote), something that might entail a change for the worse for participants. .

11.5 Adaptation of routines

For participants in RIX-RTGS, sharing a platform with T2 would mean that they need to adapt their internal systems and routines to the structure of T2, for instance with regard to reconciliation of accounts, initiation of automated processes, routine descriptions, contingency files and possibly also powers of authority and approvals/authorisations of transactions. The degree of adjustment will probably vary between participants and is something the Riksbank has difficulty foreseeing at present. However, it is clear that is is not only the technical part with communication that will have effects, but also practice and administrative routines. The participants, including the Riksbank, need to adapt to and learn a new graphic interface and its functions. In addition, the Riksbank needs to adapt its instructions and routine descriptions. These changes refer to both the normal situation and the contingency situation.

12 Comments from banks and other actors

The participants in RIX-RTGS are important to the system and it has therefore been important to involve them at an early stage of the analysis of the Future RIX. The Riksbank has two contact groups; the RIX Council and the RIX Users' Group. Both of these groups received information about the project in connection with its start. The project has also kept these groups informed on a regular basis, for instance by presenting the results of the market consultation and inviting them for a dialogue.

12.1 Consultation with the market

The project has also consulted with the market to obtain information on the views regarding RIX-RTGS, developments on the payments market and what should be included in a future settlement service. The consultation was sent to RIX participants, the Swedish Bankers' Association and P27, as well as to Finansinspektionen and the Swedish Ministry of Finance for information, and it was published on the Riksbank's website on 19 February 2021. The consultation period ran until 19 March

[36] Both T2-RTGS and CLM close for the day at 1800 hours and then at 1930 open up for what is known as night-time settlement for liquidity transfers, for instance (CLM opens at 1900 for central bank transactions). Liquidity transfers can refer to transfers between CLM and RIX-INST, for example. Between 2200 and 0100 hours T2 is closed, and the same applies on Saturdays, Sundays and public holidays in the euro area, which means that liquidity transfers cannot be made at these times/on these days.

2021. 22 responses were received, some of them via the Swedish Bankers' Association. Below is a summary of the responses[37].

12.1.1 The payment market and its development

Most of the respondents considered that instant payments would comprise an increasing share of future payment flows. Some of them even saw a future where all payment transactions are settled via RIX-INST, including traditional batch payments, which could also be settled at times when there is less traffic the system. However, a larger number of the respondents considered there would still be a need to be able to make batch payments at set times in the RTGS system. Standardisation and harmonisation were mentioned in general as an important part of making the payments area more efficient.

Several respondents pointed to the importance of having functioning reserve routines at national level that ensure it is possible to settle transactions even in the case of substantial and protracted disruptions or a crisis. In addition, it was considered important to have continuous and systematic work to increase security in the systems through, for instance, threat analyses, joint security audits and/or contingency exercises and checks of personnel.

12.1.2 Today's RIX-RTGS

The current RIX-RTGS is much appreciated and the respondents are satisfied with both the functions and the opening hours, although it was mentioned that some functions have limited use. Respondents also expressed appreciation of the existing contingency routines and the regular exercises held. However, it was pointed out that an increasing number of individual payments would make manual routines more difficult to manage. Several of the respondents thought that the user-friendliness of the system could be improved, for instance through an improved user interface and more automated processes. Interest was also expressed in being able to settle securities in the same system, which would facilitate liquidity management for VPC.

12.1.3 T2

A large majority of the respondents thought that use of T2 would give significant economies of scale in the form of joint processes, administration and development, which altogether would lead to greater efficiency and lower costs. It was also pointed out that T2 is a system that is already familiar to the larger banks and that it has the same interface for all participating currencies, which will facilitate the flows and liquidity management. Increased resources for security, and in particular cyber safety, were also mentioned as a considerable advantage. It was also said that connecting to T2 could open up for cross-currency transactions.

In response to the question of potential disadvantages in using T2, the actual connection was said to be costly and time-consuming, as it also entails adaptation of business systems and services to the participants' customers. Some functions which are currently in the RIX-RTGS will probably not exist to the same extent in T2. Some concern was expressed that a potential membership would clash with the transition from Bankgirot to P27 and the importance of coordination was emphasised. Reduced influence was also mentioned, as the Riksbank would become one participant among many in T2,

[37] The consultation and a more detailed summary of the responses are available on the Riksbank's website: Study of the Riksbank's future settlement service | Sveriges Riksbank

and the question of whether Swedish banks' possibilities to develop new innovative services might thus be limited. Several respondents took up the question of concentration risks and that a large joint settlement system could be vulnerable to attack, and they also pointed to the importance of settlement being supplied at national level in the event of crises or major disruptions to the T2 platform.

12.1.4 Other alternatives

An overwhelming majority of the respondents to the consultation did not see any other alternative than to continue with the current system provided by SIA or to connect to the Eurosystem's T2.

13 Assessment and proposal

13.1 Introduction

The future RIX RTGS shall, like the current system, act as the hub in the Swedish financial system where financial institutions can make large-value payments between one another in central bank money. The system and its support functions shall be safe and cost-effective, and correspond to the expectations of the market and society as far as possible. The system shall as far as possible be based on international standards and make it easier for Swedish operators to offer competitive services, as well as making it easier for foreign operators to offer services in Sweden.

In addition to the settlement of payment transactions, RIX-RTGS shall also be able to manage monetary policy measures and measures to maintain financial stability. The Riksbank's provision of RIX-RTGS follows the principle of full cost coverage, which means that all costs (both internal and external) shall be covered by the participants.

13.2 Future challenges

The continued increase in internationalisation, where banks and others are active on several markets, increases the requirements for harmonisation and thus also the use of common standards. Additionally, there is a requirement for payment systems to manage increasingly large amounts of data and to be able to interact with other systems. Another challenge is the operational risks that arise when the financial infrastructure serves an increasing number of actors, at an increasingly fast pace and greater distance. This development leads to greater demands with regard to security and robustness in the systems to ensure they are resilient to attacks and maintain a high degree of continuity.

Much of the above also came to light in the market consultation made in February/March 2021, where harmonisation and common standards were highlighted as an important part of making the payments area more efficient. Several respondents pointed to the importance of having functioning contingency procedures at national level that ensure it is possible to settle transactions even in the case of substantial and protracted disruptions or crises. Moreover, it was considered important to have continuous and systematic work to increase the security of the systems. A majority of the respondents also believed that instant payments would comprise an increasing share of future payment flows.

13.3 Considerations

The challenges listed above will make greater demands on settlement systems in the future. Coming closer to Europe and the rest of the world, requirements for greater resources and broader competence for further development and system safety, requirements for improvements in efficiency and cost limitations, increased automation and guaranteed continuity of the systems are all factors, not forgetting the Riksbank's independence with regard to monetary policy and financial stability.

13.3.1SIA-RTGS/CGI

The current settlement system functions well, as described earlier, and is appreciated by the participants. The system rests on two pillars, the applications support supplied by SIA and the operations supplied by the Riksbank's IT provider, CGI. Retaining SIA-RTGS would entail a stable and reliable system. The market and the Riksbank would also avoid the major costs following on from a change in settlement system. Moreover, the opportunities for influence with regard to SIA-RTGS and CGI are less complex, as the system is based on a two-party agreement, updates and system amendments would be essentially a question of price. If parts of the payments flows are moved to RIX-INST, as implied in the responses to the consultation, the number of transactions in the RTGS system would probably decline. The SIA application would, however, need to continue being developed in terms of function to meet the requirements of the Riksbank and the participants over time. The question is moreover not whether SIA can meet the market's current needs, but instead which system can best manage the market's requirements for efficiency and safety in the longer run.

Security issues and in particular cyber security, will become increasingly important and the costs of an attack could be very high[38]. Raising and even retaining the same level of security in operations and systems will require an increasing amount of resources and ever higher specialist competence, which can be difficult for a small central bank like the Riksbank. Broad cooperation and shared competence will become increasingly necessary to avoid falling behind.

With regard to continuity, the manual contingency routine for SIA-RTGS at present is appreciated, but is not considered to have the capacity to manage longer stoppages or an increasing number of individual payments that would require a higher degree of automation in the future.

The division between SIA and CGI also means that the supplier management becomes more difficult and that the Riksbank needs to put effort into coordinating between the two, for instance with regard to protective security, where SIA does not have its own access to RIX-RTGS for support. Access is only provided via screen shots under the supervision of CGI.

13.3.2Eurosystem's T2

A connection to the Eurosystem's T2 platform would give the Swedish market access to an established European settlement platform with major resources and broad competence. T2 is also considered to provide stronger security, for instance, with regard to cyber security, depending on the Eurosystem's competence and greater resources. This also applies to operating continuity, where the Eurosystem has several data centres in different regions.

[38] A recent example is the attack on the Coop supermarkets' cashier system at the beginning of July 2021.

Participation in T2 would give the Riksbank and the RIX-RTGS participants a joint base with a large share of the EU's banks, which could stimulate competition between participants and reduce entry barriers for participants in the Swedish market. A platform such as T2 could moreover provide economies of scale, in that more central banks are sharing the costs for operation, development and security, and in addition, access to the Eurosystem's collective knowledge and capacity. With T2, both application and operation are provided by the same supplier and the Riksbank could avoid the current division between SIA and CGI. In addition to the benefits of the T2 platform described above, there could also be an advantage in being able to use the same user interface for several currencies; Swedish krona, Danish krone and euro. A combination of CLM and QCMS is also considered to give the Riksbank the same possibilities as with the current system for implementing monetary policy.

However, the advantages mentioned above shall be reviewed over a longer period of time. A connection to the T2 platform would initially cost more in terms of energy and resources, both for the Riksbank and the participants in RIX-RTGS. This is probably not a decision that could be reversed, as it requires major changes by both the Riksbank and the participants. In this context, it is also important to be aware that use of T2 would entail a change in the means of exercising influence; instead of direct contacts with the supplier as with SIA/CGI now, the Riksbank would be one of twenty central banks. Governance and control would be exercised via participation in the Eurosystem's channels, committees and working groups, and the Riksbank would not be represented on the Eurosystem's highest decision-making body, the Governing Council. Exercising influence through the Eurosystem's structure would require considerable resources, anchoring and impact would thus become important elements and the process for possible changes would take much longer than with the current system. As one of twenty central banks, the Riksbank cannot be sure that all of its proposals will be accepted. Another question that requires further investigation is the possibility for the Riksbank to extend the opening hours of RIX-RTGS where necessary, for instance, in the event of disruptions on the Swedish market (see Chapter 10.3).

An important question that is still being investigated is how a connection to T2 could be managed under the current protective security regulations. The requirements for security screening of foreign personnel could be problematic, both with regard to time and the attitude of the employer concerned. Robust contingency procedures and a reserve system in Sweden could mean that the requirements for security screening in the security class are removed and thus facilitate compliance with the regulations in the protective security legislation. The question regarding protective security legislation therefore requires further analysis. Before one can begin outlining a reserve solution, it is also necessary to have an analysis of what level of settlement this solution would be expected to cover, including the degree of automation, and for how long.

13.3.3Assessment

Network services, such as settlement of payments, provide economies of scale. They are costly to both set up and operate, while the marginal cost of adding additional participants or transactions is low. This means that the costs tend to be higher in a small system than a large one.

Many of the Swedish financial institutions are already largely moving over from national to international infrastructures. Standardisation is a part of this process, and work is already under way on joint messaging formats, for instance. However, the project sees an advantage in going a step further to fully benefit from the extensive infrastructure that has been established at European level. Platform sharing with the Eurosystem entails considerable economies of scale and access to the

Eurosystem's resources and competence, which in turn benefits the participants in the system. It also has the potential to increase competitiveness and benefit Swedish society through more cost-effective payments. It is difficult to attain these advantages in a national system like the current SIA-RTGS/CGI, where the Riksbank is sole actor.

In the event of a decision to connect to the Eurosystem's T2 platform, a more in-depth analysis will be required for a number of issues related to T2, see further Appendix 1. On condition that the questions concerning protective security and contingency procedures can be resolved, and that the Riksbank can continue to pursue an independent monetary policy, the assessment of the project is that using the Eurosystem's T2 platform would offer substantial advantages and efficiency gains.

Appendix 1

Detailed analysis

In the event of a decision to connect to the Eurosystem's T2 platform, a more in-depth analysis will be required for a number of issues related to T2. Below is a list of a number of areas that probably require further investigation.

General overview

- What operational capacity does the Riksbank need to have in relation to today.
- Rough timetable and estimate of the resources required for the accession project.
- Estimate of costs with regard to the accession project, and the management and maintenance when the system is in operation (including internal costs for governance). Estimated cost for ECB invoicing.

Protective security regulatory framework

- Protective security legislation and its application in the case of accession to T2.
  The outstanding issues need to be investigated further, that is, security screening of foreign personnel and continuity of the system.
- Contingency and reserve solution;
  investigate what level of payments traffic a reserve solution is expected to maintain
  produce a proposal for a reserve solution(s) and a timetable and cost estimate for implementation.

Monetary policy and financial stability

- The possibility to use T2 for standing facilities including interest calculation
- The possibility to extend opening hours in the event of national disruptions

Agreement

- Extension of the agreement with SIA;
  The current agreement with SIA can be extended at the longest to May 2025. A connection to T2 will not be in place by then, and the agreement will therefore need to be extended. Changes in relation to the current agreement, time frames and phasing out of current service need to be analysed.
- The agreement with the Eurosystem; are there areas that require special regulations, exemptions or additions? Is there any adjustment that is absolutely necessary.

The market

- Information to the market and to citizens;
  how will the message be worded, what channels will be used for communication, and when.
- Dialogues with RIX participants and other interested parties to anchor and gather their needs/views on the project and after connection.

ECB/Eurosystem

- Establish points of contact and forums with the ECB, Bdl and Bundesbank to identify and manage questions regarding connection to T2.
- Riksbank-internal organisation to take part in the Eurosystem's governance processes involving other departments than the Payments Department.
  A connection to T2 means that the Riksbank will be one of 20 central banks in the Eurosystem instead of, as today, having a direct agreement relationship with a single supplier. This also means other ways and forms of influence. The Riksbank will therefore need to organise in a way that corresponds to the Eurosystem's drafting and decision-making process to keep up-to-date and be able to exercise influence.

Riksbank-internal

- T2 in relation to monetary policy and financial stability;
  What adjustments need to be made to guarantee that the Riksbank can continue to conduct an independent monetary policy and maintain financial stability.
- How shall T2 be used to replace the functionality in the current RIX-RTGS;
  Analyse to what extent functions in the current RTGS can also be offered in T2.
- How will the connection take place, internally and to the participants;
  What other systems within the Riksbank need to be adapted and in what way. Structural connection process, timetable, who does what, internal and external dependencies.
- CLM/QCMS;
  What changes need to be made to be able to connect QCMS to T2. What changes are needed if QCMS will be used in the event of a reserve solution.
- Network Service Provider (NSP);
  Investigate which NSP can be warranted for connection to T2 and what is required for an agreement.