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## ■ Assessment of RIX 2011

Banks that have accounts with the Riksbank can make payments to and from each other through the Riksbank payment system for large-value payments, RIX. Payments in Swedish kronor are settled via this technical system. RIX is also used as a tool in the Riksbank's monetary policy, in that the Riksbank determines the interest rates for overnight deposits and loans.

By statute<sup>1</sup> the Riksbank shall promote a safe and efficient payment system. In its work on the payment system, the Riksbank primarily aims to minimise systemic risk, that is, reduce the risk that a party's financial or technical problems will spread and threaten the stability of the financial system. An important task in this context is to oversee that part of the financial infrastructure that is assessed to be systemically important. RIX is a central element of this.

### Evaluation of the new system

The assessment is made on the basis of the Core Principles for Systemically Important Payment Systems issued by the Bank for International Settlements (BIS), which constitute an international standard for assessing this type of system. Altogether the assessment model contains ten "Core Principles", against which the system is assessed and evaluated. The system's compliance with each Core Principle in the assessment is categorised as follows: observed, broadly observed, partly observed, non-observed, or not applicable to the system being assessed.

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<sup>1</sup> Sveriges Riksbank Act (1988:1385), Section 2.

## Results of the assessment

The system complies with the Core Principles as follows:

Assessment	Core Principles
Observed	CPI, CPII, CPIII, CPV, CPVI, CPVII, CPVIII, CPIX, CPX
Broadly observed	
Partly observed	
Not observed	
Not applicable	CPV

## Comments

CP VII	<p>In the assessments of the RIX system from 2009 and 2010, it was pointed out that logical faults in the network may prevent both the Riksbank's main site and its backup site from being used for the operation of the RIX system, as they both use the same network. This meant that the assessment of CP VII for 2010 was "partly observed".</p> <p>The IT Department has now developed better routines for fault localisation in the network and has simplified the network structure, making it possible to discover any logical faults more rapidly. This also means that competent staff will be on site at those times when the RIX system is open, making it possible to rectify any faults more rapidly.</p> <p>According to recommendations from the ECB and others, there should be continuity solutions ensuring that different operating sites are not dependent on the same operating staff. It should be investigated how great the distance between operating sites should be, as well as whether there are other arrangements that can meet the continuity requirements, for example through cooperation with other operation centres.</p>
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## Legal status and supervision

Under the Sveriges Riksbank Act (1988:1385), Chapter 6, Section 7, the Riksbank may provide a system for the settlement of payments and participate in the settlement of payments in other ways. In addition, the Riksbank may grant participants in the RIX system intraday credit facilities if they can provide collateral. RIX is a registered

■ settlement system<sup>2</sup> under the Act (1999:1309) on systems for settlement of obligations on the financial market.

In “Terms and Conditions for RIX and Monetary Policy Instruments” (referred to below as the “Terms and Conditions”), drawn up and approved by the Riksbank, there are detailed provisions and instructions for the system participants. The Terms and Conditions provide the basis for the accession agreements that the Riksbank enters into with each participant.

Times for settlement of different transaction categories are governed by the Settlement Agreement, which is administered by the Swedish Bankers' Association.

Unlike other important payment systems, RIX is not under the supervision of Finansinspektionen (the Swedish Financial Supervisory Authority). However, the system is overseen and evaluated by the Financial Stability Department of the Riksbank in the same way as other systems that are deemed to be systemically important. The oversight work includes evaluating the system against the Core Principles<sup>3</sup>, as well as following day-to-day operations through regular meetings with the management.

### **Ownership and governance**

The Riksbank owns and operates the RIX payment system. The Asset Management Department has overall responsibility for the system. There is one system owner who is responsible for the system's data content, security level and administration.

The system owner chairs the RIX Management Committee, which is an internal Riksbank group dealing with operational and development issues concerning the RIX system. The Conditional Committee is also an internal Riksbank group. Its tasks include issuing recommendations to the head of the Asset Management Department on the approval of applications from institutions wishing to participate in the RIX system, and on the approval of the collateral against which participants may borrow intraday funds from the Riksbank and may be allowed to participate in the Riksbank's monetary policy transactions.

There is also a RIX Council, which is a consultative body in which strategic issues are discussed by the Riksbank and the system participants. In addition, there is a user group, which discusses operational and developmental issues.

### **Participants in RIX**

Credit institutions, clearing organisations, the Swedish National Debt Office and investment firms<sup>4</sup> may participate in RIX. The Riksbank is also a participant in RIX. A participant must fulfil the Riksbank's access criteria and can apply to the Riksbank to become a participant in the system. RIX currently has 23 participants, the majority of which are credit institutions.

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<sup>2</sup> With the European Commission

<sup>3</sup> Core Principles for Important Payment Systems, BIS 2001.

<sup>4</sup> A company permitted to trade in financial instruments on behalf of others in its own name or on its own account, or provide guarantees in connection with bonus issues.

## Structure of RIX

An institution that fulfils the Riksbank's access criteria can, on application, become a *participant in RIX*. A RIX participant can decide to act in two different roles: as an account-holder (on its own behalf), or as an agent (on behalf of a third party). An account-holder can choose between either itself sending transfer orders and receiving information from the system or entirely or partially engaging an agent, approved by the Riksbank, for this function.

For the RIX participants that participate on their own behalf, the Riksbank opens a principal account, which is used for debits and credits in connection with transfers and repayments of *intraday credit* received. In addition, the Riksbank opens other accounts, LOM accounts, for the specific settlement functions the RIX participant uses (see below). A loan account can also be opened, where current credit limits are registered, if the RIX participant is entitled to credit. These participants can be granted interest-free intraday credit by the Riksbank against adequate collateral<sup>5</sup>. The administration of collateral is, for the most part, automated, and calculation of credit limits occurs in the Riksbank's collateral information system, COLIN.

As mentioned above, there is a principal account in the system, RTM. All participants in the system have such an account. A payment to be processed in RTM is effected immediately. If there is not sufficient coverage in the principal or loan account, the payment is rejected.

Apart from RTM, there are 5 liquidity optimisation mechanisms, LOMs, in the system. Each LOM is an account in the RIX system, to which the participants can allocate liquidity.

- RIX-LOM. Most transfers take place in RIX-LOM. Payments are queued in this account if there is insufficient liquidity. Queue management in the RIX system is on the principle of "FIFO-next first fit bypass", which means that, if the first payment cannot be settled due to insufficient liquidity, a check is made of whether the next payment, which may be for a smaller amount, can be settled. If so, it is settled.
- VPC-LOM (Swedish Central Securities Depository (VPC) = Euroclear Sweden). The Riksbank has a special agreement with Euroclear Sweden, in which Euroclear Sweden has been tasked with effecting transfers on behalf of the Riksbank continuously during the day in connection with securities settlement in its settlement system. The participants themselves can transfer liquidity to and from accounts in RIX and the Euroclear Sweden system.
- BGC-LOM (Bankgiro system). A RIX participant that is an account holder and participant in the BGC clearing system has a BGC-LOM account. The BGC also has a BGC-LOM account. Settlement takes place at fixed times during the day under the settlement agreement drawn up between the participants.
- OMX-LOM. A RIX participant that is an account holder and settlement bank in the NASDAQ/OMX clearing system has an OMX-LOM account. NASDAQ/OMX also has an OMX-LOM account. As an agent, NASDAQ/OMX

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<sup>5</sup> The Swedish National Debt Office, which is responsible for central government payments, does not need to pledge collateral for borrowing.

sends all payments to and from OMX-LOM.

- CLS-LOM. The Continuous Link System, CLS, is an international system for settlement of large foreign exchange payments. Participants in RIX that also participate in the CLS have a CLC-LOM account in RIX. The account is used for transfers to and from the CLS.

The system also has a Gridlock Buster<sup>6</sup>, which is executed at certain intervals, currently every ten minutes.

Funds can only be in LOM-accounts during the day, when the system is open<sup>7</sup>. At the end of the day, the balance is transferred to the principal account. Consequently, during the night, there are funds only in the principal or loan account.

As mentioned the banks are also able to borrow (loan account) or deposit funds overnight in the RTM account<sup>8</sup> in the Riksbank, so-called standing facilities, against set collateral and at a set rate of interest. The Swedish National Debt Office can be granted intraday credit without needing to pledge collateral.

In its original form, the technical system is a standard system, but the Riksbank has ordered its own adaptations. The system was developed by Perago in South Africa, which is now part of the Italian SIA-SSB Group. A new version of the system was put into operation in the autumn of 2010.

### **Intraday loans and the COLIN system**

Participants in RIX can receive intraday credit on the loan account in the system by pledging collateral registered with Euroclear Sweden AB via the COLIN system. The Riksbank accepts the collateral as security and determines its value based on the present market value reduced by the appropriate haircut.

The Riksbank accepts a broad spectrum of securities as collateral for loans in the system. For example, in addition to those existing in Euroclear Sweden AB's system, assets in the Scandinavian Cash Pool (SCP) and euro pledged via Deutsche Bundesbank can be accepted as collateral for loans.

The National Debt Office does not need to provide collateral for its intraday credit in the system and, when the system closes, must not have any debt to the Riksbank.

### **Communication with participants**

Communication between the system and participants uses SWIFT messages. SWIFT is the international system for sending different types of standardised messages between financial institutions.

It is also possible, via the RIX-Online service, for participants in the RIX system to register payment orders, see their account status in the system, reprioritise the order of

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<sup>6</sup> For each LOM, the Gridlock Buster makes a check for a bank with payments that cannot be settled due to lack of liquidity of whether the circumstances are the same for receiving banks. If this is the case, underlying payments are netted as far as possible with subsequent settlement.

<sup>7</sup> OMX, VPC and CLS LOMs are open between 07.00–16.15 and the BGC LOM between 07.00–16.28.

<sup>8</sup> Also called principal account.

payments in queues, change the use of collateral, submit questions, etc. Communication then takes place via the Verizon Financial Network. Participants are obliged to have a connection to RIX Online, as well as having a SWIFT connection.

In that the system is based on SWIFT messages, it is possible to utilise Straight Through Processing (STP) with the participants' internal systems.

### Opening hours

The RIX system is open on weekdays between the hours of 07.00 and 17.00. There is a detailed schedule in the Swedish Bankers' Association agreement, which regulates when different types of payment are to be settled during the day.

The Riksbank can decide on longer opening hours if there has been a technical failure in the system or if there are other special reasons<sup>9</sup>. In the event of various types of problem, the RIX system can remain open until 22.00.

### Fees

The fees charged to participants must cover the Riksbank's costs for RIX.

The fee structure is based on a fixed and a variable component. Apart from a fixed monthly fee of SEK 70 000, with a supplement of SEK 10 000 for participants who are entitled to credit, participants with domestic revenues of at least SEK 1 billion shall pay a supplementary fee of SEK 2 650 000 per month. This fee is divided among the participants based on their domestic revenues. The fee per transaction is SEK 4.50. In addition, there is an admission fee for each new participant of SEK 125 000.

### Settlement

The settlement of payments in RIX is carried out according to the principle of real-time gross settlement (RTGS) whereby participants' accounts are debited and credited electronically. Payments are settled one by one in the principal account or in each LOM, and the funds transferred to the RIX participant's account are immediately available to the recipient. Each individual incoming and outgoing payment is settled gross individually in the system. In that the system is equipped with a Gridlock Buster, there is some netting in the system and, therefore, the system is not a pure RTGS, but a hybrid. There is also netting of some transactions internally in the BGC, NASDAQ-OMX and Euroclear Sweden systems before they are sent to the RIX system.

Payments that are settled are direct payments between RIX participants and payments made on behalf of RIX participants' customers. When settling in the RIX system, the receiving RIX participant's claim on the paying RIX participant is replaced by a claim on the Riksbank. At the same time, the paying RIX participant's claim on the Riksbank is reduced. A claim on the Riksbank involves no credit risk. A settlement in the RIX system is final when the recipient's account has been credited, at which point it becomes irrevocable<sup>10</sup>.

<sup>9</sup> The Riksbank can decide on longer opening hours if this is assessed to be important for monetary policy, financial stability or if acting otherwise would entail a significant limitation of the payment system's functionality.

<sup>10</sup> If a withdrawal request is made, the Riksbank will investigate whether revocation is possible. This depends on how far the transfer process has advanced. There are special rules for transfers in the VPC LOM, transfers included in a multilateral settlement and transfers in which the Riksbank has decided to use manual procedures.

## ■ Interdependencies between participants and systems

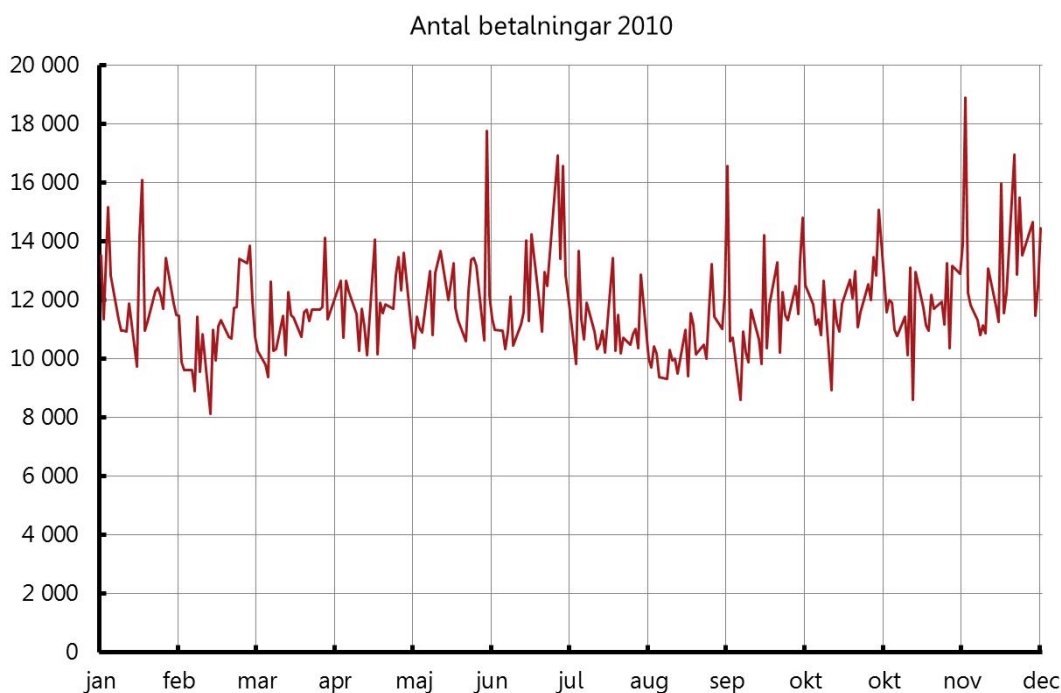
There are strong interdependencies between the participants and systems that make up the Swedish financial infrastructure. Technical developments have changed the structure of payment processes and payment volumes have grown in size, while demands for availability and speed of the payment systems have increased. There is also more integration between the systems, while other structural changes have led to increasingly strict requirements concerning the ability of the banks to handle and plan for short liquidity horizons. This means that disturbances of various kinds can have increasingly negative consequences for the banks. To better deal with such situations, the banks make daily forecasts that take into account variations in both their own and their customers' payment flows.

Liquidity disruptions can arise in RIX, as banks are often dependent on incoming payments for their liquidity. The banks can, however, create liquidity in RIX by pledging securities or foreign exchange balances.

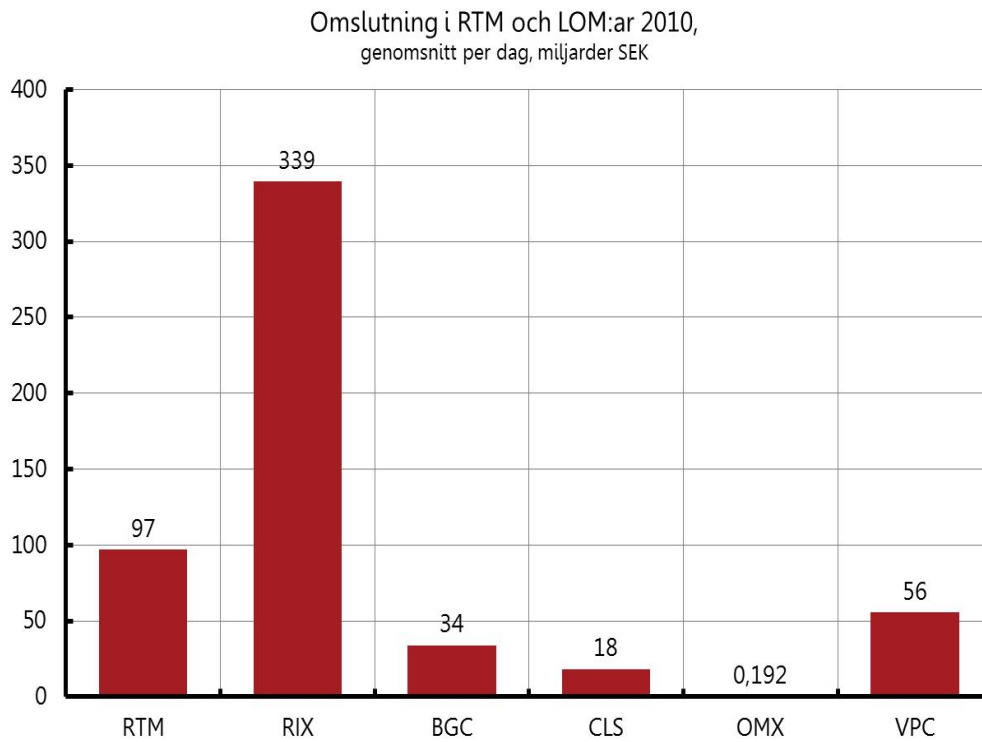
If a bank has difficulties in funding its operations or has disruptions in its IT system, these problems can spread to other banks, which can also face difficulties in making payments when expected payments are not received.

Even technical disruptions in a system or in the communication between systems can lead to liquidity disruptions if these technical disruptions are long-lasting. For that reason, the Terms and Conditions provide instructions for how the Riksbank and RIX participants are to proceed on such occasions. There are also contingency procedures that can be used in case of technical disruptions to reduce their negative effects.

The number of payments during the year is presented below.



As described above, the new system is equipped with a number of liquidity optimisation mechanisms. The majority of transactions are settled in RIX-LOM, as shown in the bar graph overleaf.





## ■ Core Principle I

***The system should have a well-founded legal basis under all relevant jurisdictions***

### Assessment

#### Observed

#### **Considerations**

In the assessment of the Riksbank, Swedish legislation and the Terms and Conditions provide an adequate basis for the operations undertaken in RIX.

#### **Description**

The *Sveriges Riksbank Act (1988:1385)* states that one of the Riksbank's tasks is to promote a safe and efficient payment system. The same Act also makes it clear that the Riksbank may provide a system for the settlement of payments and may participate in the settlement of payments in other ways. To enhance system functionality, the Riksbank can grant RIX participants intraday credit facilities provided they can offer adequate collateral. Under these provisions, the Riksbank provides payment services in the RIX system.

The Riksbank is subject to the provisions of the *Settlement of Obligations in the Financial Market Act (1999:1309)*<sup>11</sup>. However, the Riksbank needs no license from Finansinspektionen to operate a settlement system. The Settlement of Obligations in the Financial Market Act stipulates that a payment order in relation to a third party shall be honoured even if joint insolvency proceedings have been instigated against a participant in a notified settlement system, provided the payment order was registered in the system prior to notification of the insolvency proceedings. The Act also prohibits revocation of a payment order by a participant in a notified settlement system or by a third party after the time stipulated in the regulations that apply to the system. In RIX, a payment order can be revoked as long as it has not been effected<sup>12</sup>.

The *Rights of Priority Act (1970:979)* stipulates that a pledgee, in this case the Riksbank, has a specific right of priority to pledged assets in cases of distraint or bankruptcy. This entitlement means that, where payment of a pledge is involved, the Riksbank need not rank behind any other creditor.

The *Bankruptcy Act (1987:672)* enables the Riksbank to sell, without delay, any financial instruments it holds as collateral, as long as this is done in a commercially acceptable manner.

The *Contracts Act (1915:218)* constitutes the legal basis for handling many financial transactions in Sweden.

The Riksbank determines the terms and conditions for participation in RIX. These are published in the *Terms and Conditions for RIX and Monetary Policy Instruments*.

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<sup>11</sup> The Settlement of Obligations in the Financial Market Act is based on Directive 98/26/EC of the European Parliament and the European Council concerning payment and securities settlement systems (the so-called Settlement Finality Directive).

<sup>12</sup> Terms and Conditions for RIX and Monetary Policy Instruments, annex H3, 13.1.

## Core Principle II

*The system's rules and procedures should enable participants to have a clear understanding of the system's impact on each of the financial risks they incur through participation in it.*

### Assessment

Observed

### Considerations

The Terms and Conditions are comprehensive and clear and provide the participants with satisfactory information as to how RIX functions and the requirements made of participants in the system, as well as the obligations of the Riksbank and how various situations must be handled. This provides good opportunities for the participants to assess the financial risks they take by participating in the system.

### Description

The rights and obligations of the Riksbank and RIX participants are set out in the Terms and Conditions for RIX and Monetary Policy Instruments<sup>13</sup>. By signing an accession agreement with the Riksbank, the participant becomes a Counterparty in the manner specified by the Terms and Conditions, i.e. a Counterparty, Monetary Policy Counterparty, or both. The Terms and Conditions set out detailed instructions for the participants in the system.

Participants can gain access to intraday credit in the system by pledging eligible collateral<sup>14</sup>. The RIX system's operative risk management procedures are described in a separate document, RIX Instructions, Annex A7. *Special instructions for dealing with disruptions*.

New participants, as well as users among existing participants, are offered both theoretical and practical training in the RIX system and its operations. After training and before participants are permitted to access the system, practice exercises are carried out in a test system to verify correct use of the system by the participant.

The Riksbank can exclude a RIX participant if that participant breaches any provision in the Terms and Conditions, is declared bankrupt, goes into liquidation, is subject to an intervention pursuant to the Banking and Financing Business Act (2004:297)<sup>15</sup> or if the participant has not commenced using the RIX system within a year, or for any other reason that causes the Riksbank to consider that the participant no longer fulfils the requirements for being a counterparty.

Participants<sup>16</sup> in the RIX system can also sign a Settlement Agreement with the Swedish Bankers' Association. This specifies the settlement times for different types of payment during the day.

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<sup>13</sup> The Terms and Conditions use the term "transferring funds in accounts" instead of "payments". Correspondingly, the phrase "transfers are effected" is used instead of "payments are settled." In this assessment, the terms payments and settlement are used, as these are more familiar to the reader.

<sup>14</sup> See Terms and Conditions, Master E 1.1.

<sup>15</sup> Chapter 15, Sections 1-6 or 15-17.

<sup>16</sup> With the exception of the National Debt Office and clearing organisations.

### Core Principle III

*The system should have clearly defined procedures for the management of credit risks and liquidity risks, which specify the respective responsibilities of the system operator and the participants and which provide appropriate incentives to manage and contain those risks.*

#### Assessment

Observed

#### Considerations

Since the RIX system is an RTGS system<sup>17</sup> that executes instantaneous and irrevocable settlement, credit risks between system participants are eliminated.

For settlement, the liquidity risk is limited through free access to intraday credit against collateral. A broad spectrum of eligible collateral and collateral arrangements are accepted and can quickly provide possible liquidity through automated procedures.

The system has developed liquidity optimisation mechanisms, which means that liquidity risks can be brought to a minimum. Through these mechanisms, settlement is also possible with a low level of liquidity usage.

#### Description

Payments are settled in the RIX system using the real time gross settlement method (RTGS). Settled payments are deemed final and cannot be revoked once the account of the RIX participant has been debited. In other words, no credit risk exists. The Terms and Conditions set out the access criteria for capital adequacy, competence and technical systems, which are regularly reviewed.

Liquidity risk is minimised, in that the system has well-developed liquidity optimisation mechanisms and mechanisms for rapid provision of intraday liquidity against collateral. However, the participants have access to fast information on position, transactions, liquidity and collateral.

A participant can choose to immediately settle a transaction via its principal account (RTM) or to use one of the liquidity optimisation mechanisms (LOMs) that exist. There is one optimisation mechanism (RIX-LOM) which is used for most of the payments and there are also LOMs for special types of transaction (BGC-LOM, VPC-LOM, OMX-LOM, CLS-LOM). Liquidity can be reserved for individual LOMs and conditions can be set for how settlement is to take place. For the RIX-LOM and BGC-LOM, settlement can take place by utilising opposing transactions, bilateral netting or by netting transactions. For other LOMs, the mechanism is primarily used to reserve liquidity for a special settlement cycle and time-critical payments.

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<sup>17</sup> See footnote on page 5 concerning the Gridlock Buster, which means that the system can be regarded as a hybrid system.

■ Normally, settlement is on the FIFO principle but, in a queue situation, settlement is in accordance with "FIFO- next first fit bypass", which means settlement only takes place in queue order if there is sufficient liquidity available. If liquidity is insufficient, the next possible transaction is settled with reference to the liquidity that exists. It is also possible for a participant itself to assign priority to queued transactions.

If a participant has a technical disruption, the Riksbank can stop effectuation of that participant's settlement transactions (Stop Receiving) and store payments to the participant by a Conditional Release Mechanism.

To avoid a situation in which lack of liquidity causes a gridlock, the participants have access to unlimited credit against eligible collateral<sup>18</sup>. The Riksbank accepts a broad spectrum of Swedish and foreign assets as collateral.

For collateral that is registered with Euroclear Sweden or received from the Scandinavian Cash Pool (SPC), processing is automated, which makes rapid collateral changes possible.

Via a special interface, RIX Online, participants can see their own transactions and position. It is also possible to see queued transactions and reprioritise. Information on collateral and intraday liquidity can also be obtained via the same function.

RIX participants are responsible for the management of their liquidity in the RIX system. In the Settlement Agreement<sup>19</sup> the institutions have agreed on the times during the day when different types of payment are to be settled. The Settlement Agreement also stipulates the basic liquidity that users must supply as a minimum for settlement of their transactions.

If a participant is affected by disturbances that may disrupt the flow of payments in RIX, the participant is required, under the Terms and Conditions, to notify the Riksbank. The Riksbank is thereafter obliged to notify other participants.

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<sup>18</sup> The Swedish National Debt Office, however, has access to unlimited intraday credit without having to provide collateral.

<sup>19</sup> Section 4 of the "Agreement on domestic settlement and netting between participants in the RIX system".

## ■ Core Principle IV

*The system should provide prompt final settlement on the day of value, preferably during the day and minimum at the end of the day.*

### Assessment

Observed

### Considerations

Settlement of transfers is final and irrevocable when the paying participant's account has been debited and the receiving participant's account has been credited.<sup>20</sup> After this point, the transfer cannot be revoked. Before transfers are effected, an adequacy check is run against the account that will be debited.

### Description

RIX participants are responsible for ensuring that the information they provide in payment orders is correct and that there is adequate liquidity available in their principal or loan accounts. Payment orders that are not formally correct are rejected. If a participant does not have adequate liquidity in the principal or loan account, the payment order is queued. This does not apply, however, if the participant uses the RTM function for the transfer. If coverage in the principal or loan account is lacking, the payment is rejected.

Payments are settled using the real time gross settlement method. In cases where the payment information is correct and the sender has adequate liquidity in the principal or loan account, settlement takes place immediately. When settlement is made, the sender's account is debited at the same time as the receiver's account is credited and the settlement amount is then available for the receiver. Settlement is final, i.e. unconditional and irrevocable.

A transfer order, which is part of a multilateral settlement, is entered in the RIX system when all orders included in the same settlement process have been validated, i.e. appropriate checks have been carried out. When there is sufficient liquidity, the individual transfers included in the multilateral transfer are simultaneously effected.

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<sup>20</sup> In normal cases, the transfer takes place immediately. In multilateral net settlement of card transactions, a delay of no more than 30 minutes may take place.

## ■ Core Principle V

*A system in which multilateral netting takes place should, at minimum, be capable of ensuring the timely completion of daily settlements in the event of an inability to settle by the participant with the largest single settlement obligation.*

### Assessment

Not applicable

### Description

The RIX system is principally a gross settlement system<sup>21</sup>. However, the existence of the Gridlock Buster entails some netting. There is also netting of some transaction types, which are processed in BGC-LOM, NASDAQ/OMX-LOM and VPC-LOM, but this netting takes place before they are sent to the RIX system.

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<sup>21</sup> Transactions are settled on a gross basis, i.e. one at a time.

■ **Core Principle VI**

*Assets used for settlement should preferably be a claim on the central bank; were other assets are used; they should carry little or no credit risk and little or no liquidity risk.*

**Assessment**

Observed

**Description**

Assets used for settlement in the RIX system are claims on Sveriges Riksbank.

## ■ Core Principle VII

*The system should ensure a high degree of security and operational reliability and should have contingency arrangements for timely completion of daily processing.*

### Assessment

Observed

### Considerations

As mentioned previously, RIX is the central hub of the Swedish payment system, which means that security and continuity issues for the system must have high priority. A failure in the RIX system immediately affects other actors in the Swedish financial system. The target for availability is and must therefore be set high.

At the Riksbank, there is a separate PC based contingency solution, which can be used in the event of failures and when the problem cannot be solved by moving operations to the alternative operating site. The contingency solution has been tested together with the participants and the result was successful, which indicates that the necessary conditions exist to be able to deal with a system failure, at least for a short period of time.

There should not be any known deficiencies in the system structure which could entail any risk of system failure. As identified during the assessments of both 2009 and 2010, there is such a risk that a certain type of logical fault in the network could prevent the system from executing either at the ordinary or the alternative operating site, since these two sites are not completely independent of each other. The bank's network structure has now been reviewed and simplified, with the result that it is now deemed that the causes of faults in the network structure can be identified more rapidly than previously. Additionally, competent personnel are now on site during the hours that the RIX system is open. Together, these measures have considerably reduced the risk of logical faults arising in the network, while simultaneously increasing the possibilities of rapidly remedying such faults.

Demands for continuity change over time, as do the possible scenarios that can necessitate deployment of continuity solutions. This means that there are good reasons for continual review of requirements relating to sites, staffing, deadlines etc. The existing international recommendations relating to continuity requirements have been tightened in recent years, which means that the bank's continuity solutions should be reviewed from this perspective. This concerns, above all, the requirement concerning the alternative operating site, which, apart from being completely independent of the ordinary operating environment, must be located at a sufficient distance from it.

As a result of this more distant location of the alternative operating site, new staffing requirements arise, both for business operations and technical service operations, as staff cannot be moved between the operating sites within an acceptable period of time.



## Description

As mentioned above, the technical system was developed by SIA-SSB. The participants in the system communicate by sending and receiving SWIFT messages.

In the event of a failure in the application, the Riksbank is dependent on support from the supplier, which is not available in Stockholm. During occasions when support was needed, it has functioned well.

The volume of payments in the RIX system has risen steadily in recent years and, at the end of 2010, around 12 000 payments were settled per day. However, some days have greater payment volumes<sup>22</sup>. A large number of payments are processed within a limited time in the morning, which means the system's capacity has had to be calibrated accordingly. The system is adjusted towards managing this volume or an even higher one. System availability requirements are regulated in an agreement between the system owner and the supplier and with the IT Department<sup>23</sup> at the Riksbank.

The Riksbank's IT Department is responsible for the technical operation of the system and for ensuring that it meets set security and security management criteria. The RIX Division of the Asset Management Department of the Riksbank is responsible for the business operation part of the system.

The system owner, its participants and the IT Department sometimes call for modifications to the system. Clear procedures are in place for the ordering, new development, testing and approval of system modifications.

Disturbances and shutdowns in the RIX system and its communication are reported and investigated continuously. The target set for availability in the RIX system<sup>24</sup> is 99.85 per cent availability on a yearly basis.

The Riksbank's information security measures comply with the international standard *Code of Practice for Information Security Management* (ISO/IEC 177 99:2005).

The Internal Auditing Department carries out regular reviews of individual parts of the system and also follows up the audit reports. The Department reports to the Executive Board of the Riksbank.

The Riksbank conducts thorough testing of system changes before they are brought into operation, which implies that faults should be detected at an early stage.

In that the system is operated at the Riksbank, the staff is familiar with the operating routines and knows all about the system requirements for availability, which should reduce the risk of long stoppages and ensure that the system always receives high priority when problems arise. The RIX system is operated with a relatively small staff, which may entail risks of longer stoppages in certain situations than would be the case were more staff available.

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<sup>22</sup> Especially IMM days, when quarterly transactions involving standardised interest derivatives take place, but also on days immediately following U.S. public holidays. Volumes can then reach almost 15 000 payments.

<sup>23</sup> Service level agreement for IT support for the Riksbank's system for transfer of book-entry funds, Ref. no. 2008-532-ITA.

<sup>24</sup> Availability refers to the total time that RIX is open in minutes divided by the total opening time in minutes minus the period in minutes in which there were disturbances in the system.

■ Since the system supplier is not in Sweden, it has the possibility, via remote-access, to carry out fault localisation and correct acute faults in the system. Special measures have been taken to ensure that the security of this solution is acceptable.

There are technical back-up procedures to handle different types of operational interruption in the system, depending on the reasons. One of these is the RIX Online procedure, which makes it possible for the participants to manually register transactions in the system. In the event of an internal disruption, participants are also able to use reserve terminals at the Riksbank to register their transactions. Specific back-up procedures exist to process payments whose settlement is time critical, such as payments relating to CLS, which are effected according to an internationally-agreed schedule.

In other types of shutdowns, the Riksbank may decide to transfer the operation of the system to a back-up site and continue operations there. In that both operating sites use the same common network, such a transfer can be made easily. A transfer to the alternative operating site must be achievable within two hours of the system owner's decision.

In the event of a major system stoppage and when a transfer to the back-up site does not solve the problem, there is a separate PC system at the Riksbank that can be used to process a limited<sup>25</sup> number of transactions.

### ***Comments***

An investigation should be made to establish whether the distance between the operating sites is sufficient and how they should be staffed. The back-up site is currently dependent on being staffed by personnel from the Riksbank's main site, which means that if this should become unusable, there is no guarantee that there will be staff available to operate the back-up site. This is a problem inherent to small organisations like the Riksbank. One solution could be to seek cooperation with another organisation that is further away from the Riksbank. According to recommendations from the ECB, for example, there should be continuity solutions ensuring that different operating sites are not dependent on the same operating staff<sup>26</sup>.

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<sup>25</sup> A small number of transactions in the system account for a large proportion of the amount settled.

<sup>26</sup> Payment systems business continuity, ECB 2005.

## ■ Core Principle VIII

*The system should provide a means of making payments which is practical for its users and efficient for the economy.*

### **Assessment**

Observed

### **Considerations**

A large number of transactions are settled during a few hours in the morning. This is largely due to the design of the Settlement Agreement, but with the capacity of the system it does not delay settlement of payments.

The assessment is that use of LOMs contributes to a more effective payment flow and liquidity use in the system.

### **Description**

The Settlement Agreement, which governs, for example, when different types of transactions are to be settled and which codes are to be used, is signed by members of the Bankers' Association. Clearing organisations and the Swedish National Debt Office are consequently not bound by the Agreement.

Payments can be introduced into RIX for settlement at any time during the system's opening hours. There are no limits on amounts in the system. The majority of payments are settled in accordance with the "Agreement on domestic settlement and netting between participants in the RIX system" (the Settlement Agreement), drawn up by the Swedish Bankers' Association. This includes times at which different types of clearing products<sup>27</sup> must be settled, which means that participants can plan and forecast when different types of payment will be made.

Payment orders in the RIX system follow the SWIFT international standard, which is also the message format used in many of the banks' internal systems, thereby making Straight Through Processing possible, which makes the payment flow more effective and secure.

In order to obtain intraday credit in RIX, the participants<sup>28</sup> can pledge securities. This is done via the COLIN system, which allows participants to manage their securities in the RIX system simply, rapidly and securely, thereby changing their liquidity in the system.

Through the RIX Online function in the RIX system, participants can retrieve information about and change priorities for queued payments. The function can also be used to manually register payments in the system, for example if there is an interruption in the SWIFT communication.

Under the principles applied for pricing in the RIX system, the system must achieve full cost recovery. This means that the costs of the collateral processing system, COLIN, must also be paid by the participants.

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<sup>27</sup> For example, Dataclearing, OM (derivatives) settlement, BGC (Bank Giro Centre) settlement, VPC (securities) settlement.

<sup>28</sup> Those participants which are credit institutions.

## ■ Core Principle IX

*The system should have objective and publicly disclosed criteria for participation, which permit fair and open access.*

### Assessment

Observed

### Considerations

The rules of participation in RIX are clear and reasonably considered and all participants are treated alike. For participants with a small number of transactions, participation in the system may seem expensive, as fixed costs are high. These participants may, instead, choose to use a direct participant as agent.

### Description

Access criteria for participants in RIX are stipulated in the Terms and Conditions for RIX and Monetary Policy Instruments, which are available on the Riksbank website<sup>29</sup>. A description is also given there of which institutions can become participants. Applicants<sup>30</sup> must be credit institutions, investment firms, clearing organisations or the National Debt Office. Foreign-owned institutions may also be participants.

The qualifying criteria<sup>31</sup> that must be met before an institution can be admitted as a participant include compliance with capital adequacy and large exposure requirements applicable within the EEA<sup>32</sup>, being subject to supervision, having an appropriate organisation, necessary systems and routines for risk management and secure technical systems. In addition, the institution shall have valid legal status. An institution which has its registered office outside Sweden must be prepared to provide a statement regarding legal acts in the applicant's country of domicile with significance for the validity, application and enforceability of the RIX regulations in that country<sup>33</sup>. All RIX participants must meet technical equipment and communications requirements.<sup>34</sup>

Instead of choosing to become a participant in the RIX system, an institution may opt instead to become a customer of a RIX participant, which will then act as agent for that institution. The institution will then have no relationship with the Riksbank. This arrangement is frequent in the Swedish financial market.

The Riksbank must process applications for participation in the RIX system in accordance with the principles of *freedom of access* and *impartiality*. In conjunction with the admission of new participants to the RIX system, they are informed of the Swedish Bankers' Association's Settlement Agreement, which is described briefly under Core Principle VIII.

<sup>29</sup> [www.riksbank.se](http://www.riksbank.se). Under the heading Financial stability and the RIX payment system.

<sup>30</sup> Terms and Conditions for RIX and Monetary Policy Counterparties, B3.1.1.

<sup>31</sup> Terms and Conditions for RIX and Monetary Policy Counterparties, annex H9.

<sup>32</sup> The European Economic Area.

<sup>33</sup> Terms and Conditions for RIX and Monetary Policy Instruments, 4.2.2.b(ii).

<sup>34</sup> Terms and Conditions for RIX and Monetary Policy Counterparties, annex H9, 2.1.6.

## Core Principle X

- *The system's governance arrangements should be effective, accountable and transparent.*

### Assessment

Observed

### Considerations

The Riksbank normally makes decisions on modifications to the RIX system only after consultation with the participants. Participants are informed of the decisions that affect them and consequently they have a great influence on modifications. Operational objectives will be monitored continuously in terms of both accessibility and customer satisfaction<sup>35</sup>, as will the financial results.

All in all, this means that the necessary conditions are in place to ensure an effective, clear management and operational structure for the RIX system.

### Description

The Riksbank owns and operates the RIX system. The Executive Board of the Riksbank has the overall responsibility for RIX and takes decisions, for example concerning major investments in the system and operating sites. The system owner<sup>36</sup> decides on the Terms and Conditions and pricing in the RIX system.

There is also an internal steering group (the RIX Management Committee) at the Riksbank, as well as a RIX Council, which is a consultative body between the Riksbank and the participants. The operation, development and management of RIX are the responsibility of the head of the Asset Management Department, as provided in the appendix to Instructions for Sveriges Riksbank.

The RIX Division has regular meetings with the participants in the RIX system and also with the RIX Council, which is consulted before important decisions on system modifications.

The Internal Audit Department continually evaluates operations by appraising and assessing internal management and control.

The technical operation of the system is carried out by the Riksbank's IT Department, and the business operation part by the RIX Division of the Asset Management Department. Technical operation is regulated by a Service Level Agreement (SLA) between the departments. Development and modifications to the application are handled by the supplier, SIA-SSB. There is a special incident organisation whose task is to deal with system failures. The RIX system is continuously monitored by the Financial Stability Department. This task is completely separate from the technical operation of the system.

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<sup>35</sup> Measured through customer surveys.

<sup>36</sup> Head of the Asset Management Department.

## ■ List of sources

### **Laws**

Rights of Priority Act (1970:979)  
Bankruptcy Act (1987:672)  
Sveriges Riksbank Act (1988:1385)  
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ECB Payment System Business Continuity, 2005  
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online version  
ISO/EIC 17799 2005 International standard Information technology – Security  
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The Riksbank's internal audit reports

### **Websites**

<http://www.riksbank.se/>  
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