



The Riksbank's oversight of the financial infrastructure

BY MARTIN ANDERSSON, GABRIELA GUIBOURG AND BJÖRN SEGENDORFF
*Financial Stability Department**

This article presents the philosophy behind the Riksbank's oversight of the financial infrastructure. In central bank circles there is currently considerable interest in systemising and upgrading this work. The article describes the Riksbank's oversight of the financial infrastructure by discussing the Riksbank's objectives and tasks, the arguments in favour of the central bank's role, methodology and resources. An earlier version was discussed by the Executive Board of the Riksbank on 5 April 2001.


The central role of the payment system

As almost every economic transaction involves some form of payment, the proper functioning of an economy presupposes a payment system that is safe and efficient.

**A safe and efficient payment system
is essential for the proper
functioning of an economy.**

Safety is important as a generator of confidence in the system and the markets in which the financial transactions take place. A breach in security may cause market players to hesitate about using the method of payment or financial instrument concerned, with possible repercussions for the stability of the financial system, as well as its efficiency. If a financial crisis were to arise, the social costs could be huge. The efficiency of the payment system is important because it contributes to an effective allocation of resources in the economy. The central government's interest in the payment system stems from the system's central role in the economy, and this in turn motivates the Riksbank's task of promoting a safe and efficient payment system. One of the ways in which the Riksbank fulfils this task is by

* The work has mainly been conducted by the Division for Financial Infrastructure Analysis in the Financial Stability Department.



overseeing the banking sector, which plays a key role in the payment system. Another way is by overseeing the financial infrastructure, i.e. the systems and instruments of payment that enable financial flows.

The Riksbank's objectives and tasks

The Riksbank's oversight is based on a formal responsibility inscribed in the *Sveriges Riksbank Act*.

The Riksbank's monitoring role is based on a formal responsibility inscribed in the *Sveriges Riksbank Act*, namely to “promote a safe and efficient payment system”. In principle, a central bank can fulfil its responsibility for the payment system in two ways. One confers direct operational responsibility as the supplier of the necessary infrastructure – the system or instruments of payment. The other involves acting as a public authority by overseeing systems supplied by private operators. In practice, central banks often use both methods. That is true of the Riksbank. The Riksbank's operational responsibility currently covers supplying a central settlement system (the RIX system) and issuing banknotes and coins.¹ As regards other components of the payment system, the Riksbank's responsibility is confined to oversight. Following the reorganisation of the Riksbank's operations just over a year ago, operational responsibility and oversight responsibility lie with two different departments. This article concentrates solely on the oversight responsibility.

Two central concepts deserve closer examination: safety and efficiency.

Like other central banks, to facilitate the oversight process the Riksbank needs to clarify and demarcate both its objectives and the actual objects of oversight. The wording of the Riksbank's objectives indicates two central concepts that deserve closer examination: safety and efficiency. Besides examining the objectives, we discuss the arguments in favour of a central bank's involvement in the payment system. The basic tenet is that there should be an incentive for the market to create safe and efficient systems on its own, without intervention from the authorities. Such intervention is only justified in the event of an obvious market failure, when the solution chosen by the market clearly differs from what can be assumed to be in the best interests of society as a whole. What deficiencies or imperfections exist in these markets that may motivate the exercise of public authority? This discussion can help to identify the areas that are covered by the oversight responsibility and the resources that are required, as well as the reasonable priorities.

¹ In July 2001 the Executive Board of the Riksbank decided to investigate the construction of a future central payment system in Sweden that would give the Riksbank a more limited operational role.



Recently, a number of central banks have recognised the need for a more in-depth examination of the oversight responsibility and for giving this responsibility a more concrete form.² This has received support and endorsement in the G10's work on Core Principles for Systemically Important Payment Systems³, where one of the main purposes was to make the central banks' oversight role more stringent and systematic.

FOCUS OF OVERSIGHT

The Riksbank's interpretation of its oversight responsibility has been described in earlier publications. In *Financial Market Report 1997:1*, the oversight and analytical work that constitute the Riksbank's statutory task in the financial field are described as being based on three aspects of the payment system:

- i) infrastructure
- ii) central companies and institutions
- iii) regulations

The definition of infrastructure that is relevant to the Riksbank's oversight covers *instruments of payment and technical and administrative systems that enable flows of financial assets between different institutions and marketplaces*.⁴ However, experience of

The definition of infrastructure that is relevant to the Riksbank's oversight covers instruments of payment.


earlier oversight work has made it clear that the risks and efficiency aspects of financial flows in the payment system cannot be assessed correctly without also monitoring the marketplaces and trading systems from which these flows stem. Well-functioning marketplaces and trading systems fulfil an important function for the efficiency of the financial system by improving transparency in the pricing of financial products and reducing transaction costs when trading these products. For stability, a high degree of integration between marketplaces and clearing houses is needed in order to shorten the duration of the settlement cycle.⁵ The risk that contracts cannot be fulfilled and that market participants are forced to retain unwanted positions in financial assets is directly connected to the settlement cycle's dura-

² See, for instance, Banca D'Italia (1999), Bank of England (2000) and Reserve Bank of Australia (2000).

³ BIS (2001).

⁴ This definition is slightly broader than that found in *Financial Market Report 1997:1*, where the instruments of payment – cash or account-based means of payment – were not included. However, instruments of payment must be said to constitute an important component of the payment system.

⁵ The settlement cycle is the time that elapses between an agreement to deal and the completion of the transaction.



tion. From an oversight perspective, it is therefore worth studying both the transparency of the price system and the degree of integration of marketplaces and clearing houses.

DELIMITATIONS

The Riksbank's oversight responsibility involves the overall stability of the financial sector as a whole, while the operations of the financial supervisory authority are aimed at risks in institutions, systems, or marketplaces.

The Riksbank and Finansinspektionen (the Swedish financial supervisory authority) have a joint responsibility for stability in the financial sector. The Riksbank clarified the difference between Finansinspektionen's supervisory responsibility and the Bank's oversight responsibility in Financial Market Report 1997:1. The Riksbank's oversight is aimed at

assessing and safeguarding stability in the financial sector as a whole. This covers surveying and analysing the risks that could lead to an institution, a system or a marketplace creating problems of such a nature that they could threaten the payment system. Finansinspektionen, on the other hand, aims its operations at risks arising in a specific institution or system, or in a specific marketplace, regardless of whether or not the risks constitute a systemic threat. However, on some points the two authorities' areas of responsibility overlap and the boundaries are not always clear. Recently, Finansinspektionen has been placing more emphasis on the analysis of system stability. It is important to clarify for the future the specific areas in which this overlapping occurs and how the work should be allocated. In addition, appropriate forms of co-operation between the authorities should be investigated. The resources at the authorities' disposal in exercising their responsibilities do differ, however. Finansinspektionen is in a position to issue regulations and apply sanctions, while the Riksbank is not.

The Swedish Competition Authority also has an area of responsibility that includes the financial market.

In addition to Finansinspektionen and the Riksbank, the Swedish Competition Authority has an area of responsibility that includes the financial market. The Competition

Authority shall work to promote competition on all markets, including the financial market. However, certain sectors have particularly high priority for the Competition Authority, depending on their economic significance, market structure, competition problems and the inflow of complaints. On the basis of these criteria, the financial sector has high priority. There is some overlap between the Riksbank's responsibility for the efficiency of the market for payment services and the Competition Authority's task of promoting effective competition on this market.



It is therefore also important to produce suitable forms of co-operation between these two authorities.

EFFICIENCY IN THE ECONOMY

The central bank's responsibility concerns *the efficiency of the economy*. However, it is not entirely self-evident when and why this responsibility arises. One starting point has been that markets usually achieve economic efficiency without any intervention from the authorities. However, market failures can lead to the markets themselves being unable to find the best solutions. There is a possibility that in the financial sector such failings can lead to higher levels of risk, inadequate risk management mechanisms, insufficient cost-efficiency and a low rate of innovation. Direct intervention by the authorities should be based on concrete and clearly identifiable cases of market imperfections.

Intervention by the authorities should be based on concrete and clearly identifiable cases of market imperfections.

However, the existence of market imperfections is not in itself sufficient reason for intervention by the authorities. Such intervention is also associated with costs, often in the guise of some form of distortion of the participants' incentives. The insight that the authorities will try to avoid a systemic collapse at any cost can, for instance, lead participants to take greater risks, a phenomenon known as moral hazard. Intervention by a public authority is justified from society's point of view when its costs are exceeded by those arising, in the form of efficiency losses or excessive risk-taking, from a policy of non-intervention.


However, the existence of market imperfections is not in itself sufficient reason for intervention by the authorities.

The central bank's responsibility for the stability and efficiency of the payment system can be deduced from reasoning on economic efficiency. However, there is a need to illustrate the concept of economic efficiency in greater detail and how this concept can be converted in practice into stability and efficiency objectives. The arguments that may exist in favour of central bank involvement can also be discussed in this context.

Different concepts of efficiency

The Riksbank, like most other central banks, already has operational responsibility for supplying a settlement system in central bank funds (the RIX system). In this case, the central bank's responsibility for efficiency is brought to the fore in a simple way. The

The system for which the Riksbank has operational responsibility shall be run efficiently.



system for which the Riksbank itself has operational responsibility shall be run efficiently. After due consideration for the role of public authority, operations shall be governed by normal business considerations. Existing technology shall be utilised to the maximum so that payment services can be produced at the lowest possible cost, while ensuring that a reasonable risk level is not exceeded.

The balance between risk level and costs is a central element in assessments of the payment system's efficiency.

This balance between risk level and costs is a central element in the assessment of the payment system's efficiency. From a static perspective, there is an inherent incongruity between the risks and the costs to which the system gives rise. The operation of the system involves costs. Financial assets are tied up in the system in the form of collateral, which is a liquidity cost. The risk that a participant shall become temporarily or permanently incapable of fulfilling its payment commitments exposes the other participants to risks, known as settlement risks. Settlement risks grow with the amount covered by the exposure, but also in relation to the time that elapses between contract and settlement of transactions.

A payment system's construction reflects a choice between risk and cost.

Thus, a payment system's construction reflects a choice between risk and cost. Different players can choose different combinations of risk and cost. A system is technically efficient if the resources it ties up are the minimum for the chosen level of risk. The risk level can be reduced only at the price of higher costs, and vice versa. Different risk levels and costs can be combined so that current technology is utilised to the full.

Systems that are both technologically efficient and reflect user preferences are economically efficient.

The users of a payment system also have preferences with regard to the additional cost they are prepared to accept to obtain a safer system. These preferences are expressed in the choice of system design. A system based on real-time settlement of gross transactions⁶ is safer than one that uses multilateral netting⁷ of transactions with settlement once a day. On the other hand, as the latter system requires less liquidity, it lowers the participants' costs. Both systems can be technologically efficient to the extent that they minimise the input of resources for the chosen level of risk. Systems that are both technologically effi-

⁶ Continuous settlement of payment orders on an individual basis, i.e. payments are not netted out prior to settlement.

⁷ Arrangements between three or more participants who net their mutual positions before the final settlement.



cient and reflect the users' preferences are economically efficient. In the absence of market imperfections, the price the users are prepared to pay to reduce the risks in the system represents the economic cost of doing so.

From a dynamic perspective, however, technological developments and the innovation process have a positive effect on the trade-off between cost-efficiency and safety. For instance, the utilisation of telecommunications and computer technology in production reduced both costs and risks in the payment system. The authorisation of payments is now carried out in real time and the interval between contract and settlement has been shortened.

Stability and systemic risks

The payment system connects economic operators, including financial institutions, by enabling transactions between them. The payment system can contribute in various ways to systemic crises and, in the long run,

Low efficiency in the payment system can contribute to increased systemic risk in the same way as low levels of accessibility and security.


even to financial crises. Firstly, an inadequately designed system can increase systemic risk – the risk of financial problems in one financial institution spreading to other financial institutions – by conveying financial problems between the institutions. Secondly, low accessibility through, for instance, recurring operational disturbances can create financial problems, such as liquidity problems, in one or more institutions, with the attendant risk of a systemic crisis if payments cannot be implemented as planned. Thirdly, low accessibility or a low level of security can mean that financial operators hesitate to use these methods of payment or financial instruments, which makes their risk allocation more difficult and can lead to systemic risk. Finally, a low level of efficiency in the payment system can contribute to increased systemic risk in the same way as low accessibility and a low level of security.

Systemic risk increases with the size of the transactions. In practice, this means that systems settling transactions originating from

Systemic risk increases with the size of the transactions.

wholesale systems in the money and foreign exchange markets and from inter-bank transactions are particularly important here. The timing of the settlement of large payments also tends to be critical, as payments are often part of a chain of transactions. Relatively speaking, therefore, systems for large payments are paid greater attention in oversight work, at least from a stability perspective.

Transactions in retail payment systems comprise smaller amounts that do not involve systemic risk in the same way as systems for larger transactions. Nev-



Transactions in systems for retail and private payments comprise smaller amounts that do not involve systemic risk in the same way as systems for larger transactions.

to substantial additional costs in the form of overdrafts beyond credit limits and lack of liquidity.

ertheless, the failure of a retail payment system can be serious in that it can cause disturbances in society, especially if there is only one system that can manage a particular type of transaction. For example, disturbances in the system for wage payments could give rise

Arguments for a central bank role

In a well-functioning market, economic efficiency can be attained by the market itself.

the risks correctly and resources for the production of payment services are allocated optimally. However, the payment market, like many other markets, does not always function perfectly. It has market imperfections in the form of positive or negative externalities, i.e. positive or negative side effects that are not taken into account by those who cause them.

In a well-functioning market, economic efficiency can be attained by the market itself; the authorities cannot improve on the market's results. The operators observe and price

NEGATIVE EXTERNALITIES

Government's interest in reducing risks can be greater than the combined interest of the individual operators.

from what is considered optimal for society. The individual operators will weigh risk and cost differently from, for example, the Riksbank and could choose an excessively high risk level. The difference could result from the fact that the costs of a breakdown in the system would to a great extent fall on others than the operators themselves. The excessively high risk level entails an increased risk of financial problems arising in one or more institution and thus an increased systemic risk. Government's interest in reducing the risks could thus be greater than the combined interest of the individual operators.

Threats to financial stability arise when individual operators do not take all the costs into account. The negative externalities that exist in the financial infrastructure may cause the balance between risk and cost to deviate



POSITIVE NETWORK EXTERNALITIES, ECONOMIES OF SCALE AND INFORMATION ASYMMETRIES

The payment market is also characterised by positive network externalities, that is, the benefits of participating in a particular payment system and of utilising its services,

increase with the number of users. However, it is not possible to price the additional benefit to existing participants when new users join the system. Unlike risks, positive externalities lead to the size of the system and the number of participants becoming “too low” from an economic perspective.

As the users’ willingness to pay for the system’s services grows with the size of the system, it can sometimes be difficult to establish new systems or innovative instruments,

even if they are more effective than those which exist already. Below a certain critical mass of users the willingness to pay is too low. This creates incentives for market operators to co-operate to achieve the critical mass by developing joint systems and standards or, alternatively, by linking up existing systems. From an efficiency perspective, this type of co-operation is positive as it leads to a better utilisation of network externalities. The market does not always attain such solutions, as market operators fail to co-ordinate their operations. In this type of scenario, a central bank can play the role of catalyst and instigator of increased co-operation.

Similar co-ordination problems can arise in the context of safeguarding stability. Even if users of the infrastructure want to reduce the system’s risks, co-ordinating what is required to achieve an optimal risk level can be difficult. Here, too, the Riksbank can fill the role of catalyst for change.


The payment system is characterised by economies of scale in production. The combination of economies of scale and network externalities leads to a high degree of concentration and thus to inadequate competition,

something that can have a negative effect on efficiency. This problem can lead to difficult trade-offs for the public authorities. While co-operative solutions are always positive, as they contribute to a better exploitation of economies of scale and network effects, they can also lead to a misuse of market power and give rise to entry barriers. Central banks and competition authorities need to co-operate to solve

The benefits to users of a particular payment system increase with the number of users.

Positive externalities create incentives for market operators to co-operate.

A concentration of systems leads to greater operational vulnerability.



this conflict of interests. A concentration of systems also leads to greater operational vulnerability, as there may not be an alternative if a system fails.

Correct price incentives could make the payment system more efficient.

Systematic differences in the access to information are common in the financial sector. They can arise, for instance, in the market for retail payments, where the users of payment services have insufficient information on the terms – transaction costs, time consumption, etc. – that apply for different products. When the price system does not function properly and customer tariffs do not adequately reflect production costs, demand does not stimulate the development of the most cost-effective instruments. Recent studies have illustrated the size of the efficiency losses that result from inadequate price transparency. The findings indicate that demand for payment services is price sensitive.⁸ The payment system could therefore be made more efficient by creating adequate price incentives. One reason for this inefficiency lies with co-ordination problems. The banks have insufficient incentive to change their pricing strategy, from cross-subsidising and float financing to cost-based charges. If one bank were to change its strategy without the others taking similar decisions, it would run the risk of losing customers to competitors. In this context, the central bank can play an educational role with regard to the general public and thus contribute to the market's endeavour to become more efficient.

Oversight strategy

The objective of the Riksbank's oversight work is to survey and analyse the sources of systemic risks and efficiency losses in the financial infrastructure and propose various methods of reducing these. An increased risk of disruptions and efficiency losses in the financial system arises if:

1. a clearing house, a marketplace or a payment system has an inadequate organisation or capital structure. The actual market structure can also lead to such deficiencies, for instance, with a high degree of market concentration.
2. legislation, regulations or regulatory frameworks create the wrong types of incentive.
3. transaction flows are very sensitive to external shocks or are not handled effectively by the system.

⁸ Humphrey et al. (1998).



The Riksbank's oversight work is directed at the financial infrastructure on the basis of these three considerations. The monitoring work in the three main areas – systems for large payments, retail payment systems, including cash, and the financial markets – covers all three problem sources. The emphasis can vary, depending on which part of the infrastructure is being studied.

OVERSIGHT OF THE FINANCIAL INFRASTRUCTURE'S ORGANISATION

Different components within a clearing house or marketplace and in the structure and organisation of a payment system can affect the system's stability and efficiency. The way in which a system or marketplace functions – how liquidity and operational

Identifying risks and efficiency losses requires that the Riksbank gathers information and analyses the organisation of the markets and systems.

risks are handled, for instance – can affect the size of the risks that may arise and the ability of these systems or markets to withstand stress. The degree of market concentration and centralisation determines how well the positive network externalities are utilised. On the other hand, this can lead to decreased competition on the payment market, which can have negative effects on efficiency. For example, insufficient competition can lead to restrictive entry regulations and high barriers to entry in the market. Identifying inherent risks and efficiency losses requires that the Riksbank gathers information on the current organisation of the markets and systems, as well as describing and analysing them.


The Riksbank should establish standards for the organisation of the infrastructure. These standards should be based on established international standards, such as Core

The Riksbank should establish standards for the organisation of the infrastructure.

Principles, and on an assessment of the stability requirement in the Swedish financial system. Keeping track of international developments and of trends that can be discerned in the Swedish financial system would contribute to keeping the standards up-to-date. One objective for monitoring the organisation of the infrastructure would be to compare the current infrastructure with the standard established by the Riksbank and use this as a basis for requirements on market operators.

Dual roles

The Riksbank, like other central banks, has a dual role in the payment system: an operational role for parts of the system and an oversight role for the system as a



The Riksbank has a dual role in the payment system: an operational role for parts of the system and an oversight role for the system as a whole.

system covers different forms of payment, including cash. The Riksbank's operational role in supplying cash – the distribution of banknotes and coins to all parts of the country – was delegated to Pengar i Sverige AB (PSAB), a fully-owned subsidiary of the Riksbank, in 1999. The Riksbank's operational responsibility is currently as client to PSAB. The Riksbank formulates its operational requirements in a contract and checks that this contract is followed. In addition, the Riksbank operates the RIX system, where the operational responsibility refers primarily to the operation of the system and the specialised analysis this requires. The oversight responsibility focuses on the overall perspective, the overall targets and the long-term analysis. The analysis work shall result in the production or revision of operational objectives and principles. The Core Principles produced by the G10 countries are the type of principles the Riksbank follows in its oversight work. They will be supplemented by the Riksbank's own objectives for areas that the Core Principles do not cover. The day-to-day monitoring will be conducted to ensure that the money market and the RIX system function in accordance with these objectives.

ASSESSMENT OF LEGISLATION, REGULATIONS AND REGULATORY FRAMEWORKS

The assessment of legislation's impact on the financial infrastructure is not a new activity for the Riksbank, which is constantly active in influencing legislation and regulations through submissions and participation in committees of enquiry. The Riksbank will continue with this work as part of its oversight operations, but will also intensify its oversight of the private regulations governing the financial infrastructure.

OVERSIGHT OF TRANSACTION FLOWS

The oversight work includes identifying each stage of a transaction to detect any weaknesses in the transaction chain.

whole. A conflict between these two roles can give rise to problems of credibility. It is partly with the aim of resolving this conflict that the Riksbank, like many other central banks, has chosen to make a clear organisational distinction between these tasks. The payment

Transaction flows are the common denominator for all parts of the financial infrastructure. At each stage of the flow, from business deal to final settlement, there is a possibility of disturbances arising or of large risks build-



ing up. Efficiency losses can arise if insufficient competition and incorrect pricing lead to a failure to utilise existing technology to the full. This can result, for example, in the interval between contract and final settlement being unnecessarily long or in a relative underutilisation of the most cost-efficient instruments. One aspect of the oversight involves the identification of every stage in a transaction in order to detect any weaknesses in the transaction chain. The Riksbank will also analyse the risk of external shocks disturbing the transaction flows. One example is contagion, which can arise when problems in the financial markets in one country spread to another country.


Instruments for oversight

The Riksbank's oversight has the purpose of achieving a safe and efficient payment system. If an analysis indicates shortcomings in target-fulfilment, the Riksbank must *react*.

"Moral suasion" is one of the most important means at the Riksbank's disposal.

The Riksbank's potential in this respect was discussed in some detail in *Financial Stability Report* 2000:1. It was concluded that one of the most important means at the Bank's disposal is "moral suasion". One way for the Riksbank to exercise moral suasion, which also fulfils the requirement for transparency, is to publish reports. The *Financial Stability Report* is one example. The result of the oversight of the infrastructure shall be published in a way that complements the current content in this *Report*. Another channel for moral suasion is participation in various working groups and regular meetings to discuss developments with counterparties. If moral suasion does not suffice, at present the Riksbank lacks further recourse.⁹ In practice this is not normally a problem. If the Riksbank were to detect a serious deficiency in its payment system, the Riksbank can co-operate with Finansinspektionen to issue regulations and with the Ministry of Finance to alter the existing legislation. The Riksbank also has the right, unique among Swedish public authorities, to submit a motion for a change in the law directly to parliament. These possibilities also enhance the effect of moral suasion. It is interesting to note in this context that the possibilities of exercising sanctions, which other central banks have at their disposal, have in several cases been upgraded, for instance in Norway, where interbank systems can only be created or operated

⁹ The Riksbank has previously had the right to issue regulations. This was withdrawn without motivation in 1999 and ought to be re-established.



with the permission of the central bank, and in Australia, where the central bank's Payment System Board can establish safety and efficiency standards, access terms and pass judgement on disputes.¹⁰

¹⁰ See LOV 1999-12-17 no 95 and Australia's Payment Systems Regulation Act 1998.



References

- Banca D'Italia, (1999), "White Paper on Payment System Oversight".
- Australia's Payment Systems Regulation Act 1998.
- Bank of England, (2000), "Oversight of Payment Systems".
- BIS (2001), "Core Principles for Systemically Important Payment Systems", CPSS.
- Humphrey, D., Kim, M. & Vale, B., (1998), "Realizing the Gains from Electronic Payments: Costs, Pricing and Payment Choice", Arbeidsnotat 1, Norges Bank.
- LOV 1999-12-17 no 95: Lov om betalingssystemer m.v.
- Reserve Bank of Australia (2000), Payment System Board, *Annual Report*.
- Sveriges Riksbank, (1997), *Financial Market Report* no 1.
- Sveriges Riksbank, (2000), *Financial Stability Report* no 1.