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EDITORS: STAFFAN VIOTTI, KERSTIN MITLID

AND THE COMMUNICATIONS DEPARTMENT

Sveriges Riksbank, SE-103 37 Stockholm, Sweden.

Telephone +46 8 787 00 00

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Information Riksbanken

SE-103 37 Stockholm

E-mail forradet@riksbank.se

Fax +46 8 787 0526.



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■ Crisis exercises make for crisis readiness

BY GÖRAN LIND

The author is an advisor to the Executive Board.

At 9 a.m. on a Monday morning the Governor of the Riksbank gets a call from the managing director of a major Swedish bank and hears that during the weekend a large fraud in the bank was uncovered. The head of the bank cannot be sure that the bank will have sufficient liquidity in the course of the day to meet its commitments, including those in the RIX payment system. The same message has been sent to Finansinspektionen. A scenario such as this is not uncommon in the run-up to a crisis situation.

General crisis preparations and their inadequacy

The financial crises¹ in many countries, including Sweden, in recent decades have prompted a rapid development of various instruments, organisations and processes for crisis prevention. So we now have broad and growing experience and theories about optimal ways of managing crises of different kinds and with different courses.

In Sweden, proposals for improving crisis management have been submitted by the Banking Law Committee;² they include a legal structure for the temporary protection of banks from creditors' demands for bankruptcy proceedings as well as a crisis management authority that would take over the responsibility for one or more banks in a crisis. The Riksbank in turn works continuously to develop both the system for large-value payments (RIX) and other parts of the financial infrastructure to enhance their resistance to shocks. Another regular concern of the Riksbank is how its function as lender of last resort (the possibility, under certain conditions, of supplying emergency credit to a bank with liquidity problems) should be used in a crisis. The Deposit Guarantee Board has established

In Sweden, the Banking Law Committee has submitted proposals for improving crisis management, including a legal structure for the temporary protection of banks from creditors.

¹ In this article I use the term "crisis" in the wide sense of problems in one or more banks, other major financial institutions or systems for financial infrastructure that, if they are not resolved, constitute a potential threat to the stability of the financial system.

² See *Sveriges Riksbank Economic Review*, 2000:3, pages 64–92. The proposals are being considered at present in the Finance Ministry.

procedures whereby deposits can be paid out promptly to account-holders in the event of a crisis. Finansinspektionen (the Swedish Financial Supervisory Authority) has concluded a memorandum of understanding (MoU) with the Riksbank as well as with supervisors in other countries concerning cooperation in crises. Moreover, an MoU on the management of a crisis in a cross-border banking group has been set up between central banks and banking supervisors in the Nordic countries. There is also a similar MoU between the corresponding authorities in EU countries.

The reinforcement of both national and international crisis management stems from an awareness that a crisis can arise at very short notice.

The reinforcement of both national and international crisis management stems from an awareness that a crisis in a bank or a payment system can arise at very short notice.³ There is then no time to institute laws and regulations, perhaps not even to produce interpretations of existing rules. Moreover, fundamental functions such as the collection and analysis of essential information need to work quickly in a crisis. The ways in which information is handled must also be carefully thought-out – many bank crises have been exacerbated by information that is imperfect or uncoordinated.

Many countries have made general preparations for a crisis. They have constructed the requisite legislative framework. *Crisis management schedules* are available in the filing cabinets of central banks, supervisors and finance ministries.

The Riksbank has found that general crisis preparations are not enough.

In the Riksbank's experience, this is not enough. General preparations are of limited use if they have not been tested in the reality of a crisis situation. Laws may turn out to lack provisions for handling a particular situation; it may not be clear which authority, or which person or department in an authority, or even which country is to take the lead in the management of a specific crisis; solutions planned in advance may be hobbled by conflicting political forces. Even such basic matters as a lack of up-to-date information from distressed banks and payment systems may make it more difficult to cope with a crisis. Last but not least, the stress inherent in such situations may mean that key individuals in crisis management perform less well.

Another way of putting this is as follows. There is now an extensive set of rules for the management of financial crises and these rules have been interpreted in the analyses and policy decisions of various authorities and organisations, not least in international fora. But virtually all the established rules and policies are designed for applications under certain given conditions, for instance that distressed banks have adequate high-

³ Unlike the case in Sweden, where in the early 1990s problems in the bank sector grew gradually and gave the authorities a certain amount of time to construct the laws and regulations that were needed to handle the crisis.

quality collateral at their disposal. In an acute financial crisis these solutions are often inapplicable because the conditions are different. Working against the clock, the decision-makers then have to improvise so as to comply with current rules and procedures while adapting to the situation at hand. Experience of decision-making in an uncertain environment shows that the preferred solutions tend to be those that seem *safe* (for instance in the sense that they minimise the risk of subsequent criticism) but are not necessarily optimal for the particular situation. If the crisis managers do not feel secure in their roles, there is also a greater risk of irrational decisions, influenced for example by current political considerations. A desire to minimise the risk of undue influence can lead in turn to rules and manuals being excessively detailed and constrictive, leaving less scope for adapting decisions to a particular crisis.

Practical crisis exercises

The Riksbank considers that some of the problems mentioned above can be reduced by devoting a relatively large part of the authorities' crisis preparations to *practical crisis management*. Many very different matters come under this heading, ranging from cooperation agreements between authorities and countries to crisis management routines and practical aids such as *crisis manuals*. They are all important and contribute to sound crisis management. MoUs are needed so that, for example, it is clear when an authority is legally entitled to depart from the standard of confidentiality that normally applies and exchange information in a crisis. Crisis routines are important for a swift initiation of analyses and decisions when signs of a crisis are detected. Crisis manuals are efficient tools for locating key information without delay. All this aims to speed up and facilitate crisis management.

One component of crisis management the Riksbank considers particularly important and has therefore emphasised both nationally and internationally is practical crisis exercises in forms that are simulated but do resemble reality. For some years now the Riksbank has been arranging such exercises regularly.

Here is a summary of the Riksbank's exercises to date and their primary focuses:

1. Such exercises for one or more departments at the Riksbank have been arranged in recent years with the participation of the Bank's *managerial group for crises in the financial system*. A common aim of the exercises has been to test the Riksbank's function as a supplier of emergency liquidity assistance to banks that are illiquid but

The Riksbank considers that some of the problems can be reduced by devoting a relatively large part of crisis preparations to practical crisis management.

solvent in a situation where the financial system's stability may be threatened. Another purpose has been to exercise the Riksbank's organisation for crisis management. The exercises have also served to test and improve the Riksbank's function of providing information in a crisis. The issue of sharing information in a crisis is in fact a common theme of most crisis exercises (aspects of information are considered in more detail on page 13–16).

2. Two exercises have been held with joint participation by the Riksbank and Finansinspektionen. An important purpose in these cases has been to exercise cooperation between the two authorities in a crisis institution because the former is responsible for the stability of the financial system as a whole and the latter supervises the individual credit institutions. The exchange of information between the Riksbank and Finansinspektionen in a crisis situation is dealt with in general terms in the MoUs mentioned earlier (bilateral between these two authorities in Sweden and multilateral between all the banking supervisors and central banks in the European System of Central Banks). Joint exercises of a practical nature lead to more precise applications.
3. A joint exercise by the central banks and banking supervisors of the Nordic countries was held in summer 2002 against the background of the growing prevalence of cross-border banking establishments in this region and the problems this may entail for handling a crisis in such a bank. The theme of the exercise was therefore a crisis with different effects for a banking group's⁴ different subsidiaries located in the Nordic countries. The exercise contributed to the Nordic central banks' discussions of an MoU⁵ on cooperation in a crisis situation.
4. A crisis exercise was organised in Stockholm at the Riksbank by an ECB working group⁶ in September 2003. The participants represented virtually all the central banks and supervisory authorities in the fifteen EU countries. The theme of the exercise was a crisis in a (fictitious) large European bank with establishments in several countries. One of the purposes was to test the application of the multilateral MoUs between the countries' central banks and bank-

⁴ The scenario featured Nordea, not because this bank was considered to have any current problems but because its structurally complex organisation, with extensive establishments in a number of countries, calls for effective cooperation between the competent authorities under normal circumstances as well as in the event of a crisis.

⁵ This MoU was subsequently signed in June 2003.

⁶ The Task Force on Crisis Management, chaired by Lars Nyberg, a Deputy Governor of Sveriges Riksbank.

ing supervisors concerning the exchange of information in a crisis situation. Another purpose was to make a larger group of authorities and countries more aware of the benefits of crisis exercises.

As indicated above, crisis exercises are needed at different levels and from different aspects: the choice of participants, what to exercise and the form of the exercise (on the latter, see the Appendix). It is hardly surprising that crisis exercises have been initiated by the central bank, not just in Sweden. It is the central bank that administers the central payment system in many countries, besides being generally responsible for the safety and efficiency of the financial infrastructure. The central bank is also answerable for the supply of emergency credit to banks and other financial institutions with liquidity problems. Early signs of an acute banking crisis are likely to be discernible in the payment system and in the worst case, contagious effects will spread through this system. For a bank in a liquidity crisis, emergency credit may be a first line of defence to keep the bank operational. In both these cases the central bank may be obliged to make a very quick decision on the basis of incomplete information. That it was Sweden's central bank which arranged the first exercises in the management of financial crisis has to do with the country's experience of a bank crisis in the early 1990s.

It is also natural for a central bank and the banking supervisor to have joint exercises because they complement each other in a crisis. The information about the distressed bank and other financial institutions and markets that is available to the supervisor is vital for assessing what measures may be needed. The supervisor is also in a position to obtain up-to-date information by visiting the bank at short notice. Including the finance ministry in crisis exercises, as is now planned, is also meaningful as a way of broadening the context to include overall considerations to do with solutions that involve the financial structure in general. Moreover, in a crisis the finance ministry has the important function of drafting decisions by the government and parliament on solvency support, legislation and other measures. Multinational exercises are increasingly warranted as banks extend their operations and establishments to other countries so that crises are liable to spread across national borders.

The Riksbank has found that practical crisis exercises are a very useful complement to crisis preparations in terms of principles and policies. There have been several instances of exercises revealing shortcomings and obscurities in laws and regulations. Exercises have resulted in policies being made more concrete and thereby more practical in specific crisis situations. The requisite data and other information have been specified. Processes for spreading information have been refined. Basic material for

Crisis exercises are needed at different levels and from different aspects.

In that they complement each other in a crisis, it is natural for a central bank and the banking supervisor to have joint exercises.

The Riksbank has found that practical crisis exercises are a very useful complement to crisis preparations in terms of principles and policies.

resolving crises – lists of people to contact, telephone numbers, telephone filters,⁷ check-lists – has been augmented. The arrangements for external cooperation between central banks, supervisors and finance ministries have been reassessed, including the cross-border procedures where applicable. Last and perhaps most important, the individuals who would have to work together in a real-life crisis have been trained in this, leading to greater self-assurance about factual matters and greater safety in crisis resolution under pressing circumstances. The exercises have also generated better personal relationships inside and between the authorities. The exercises have become increasingly worthwhile as scenario-writers and participants have grown accustomed to their design. This has resulted in exercises that are broader and deeper.

The purposes of practical crisis exercises

As indicated above, a crisis exercise can serve a variety of purposes. A systematic classification yields three categories: facts, cooperation and logistics.

The facts category includes:

- testing how existing laws, rules and processes work,
- discovering and being aware of consequences of *omissions* and shortcomings in laws, rules and processes, so that appropriate action is taken,
- testing existing preparations for crisis management, such as the content of *crisis manuals*, and
- establishing the information that must be available in a crisis.

The exercises often result in the participants discovering that laws, rules or processes have not been adequately designed to deal with the specific crisis situation.

As mentioned earlier, the exercises often result in the participants discovering that the general nature of laws, rules or processes makes them inadequate for dealing with a particular crisis situation. A mandate may be lacking for the central bank or supervisor to decide a certain measure or there may not be time in an acute situation for the government or a law court to reach a decision. Such deficiencies can be detected during an exercise, so that steps are taken to rectify them. At the same time, there are numerous situations that neither can nor ought to be regulated in advance. Such *over-regulation* could be counter-productive by reducing the scope for flexibility when resolving a crisis. In certain situations, more-

⁷ Read more about this in the section on information issues.

over, some uncertainty may be desirable for the normal functioning of the financial market.

A clear example of the latter is a phenomenon that can be called *constructive ambiguity* in connection with the utilisation of the function of lender of last resort. It can be difficult to interpret the general principles for emergency liquidity and apply them in an acute situation that requires the central bank to take highly important and potentially costly decisions at very short notice despite imperfect information on the solvency of the bank in question and whether or not the crisis jeopardises the financial system's stability. The decision-makers are often also under external pressure from politicians, owners of the distressed bank and other interested parties. For these reasons, the implementation of the central bank's emergency liquidity function has been a prominent theme in virtually all crisis exercises to date.

It is wrong to suppose that a crisis exercise should be designed so that there is only one *correct solution* and the participants can be expected to reach uniform and *correct* decisions. The Riksbank considers, on the contrary, that the scenario for a good exercise should be compiled so that the participants are uncertain what the optimum decisions would be, as that is usually the case in a real-life crisis. In the Riksbank's opinion, a successful exercise is one where the information provided is interpreted differently or where the various authorities or countries arrive at different decisions on account of conflicting rules and interests. It is just such outcomes that can stimulate continued discussion and lead, if necessary, to changes in laws, rules and processes.

The cooperation category includes:

- joint exercises for individuals, functions and units in an organisation,
- exercising cooperation and information exchange in a country, for example between the central bank, supervisors and the finance ministry,
- exercising cooperation and information exchange between organisations in different countries, and
- developing contacts and confidence between individuals as well as organisations.

Those with experience of a *real-life banking crisis* are aware of the special circumstances that apply when handling an acute crisis. Major decisions – often involving large financial and political risks – have to be made under stress and in the light of imperfect information. Under such conditions,

The implementation of the central bank's emergency liquidity function has been a prominent theme in virtually all crisis exercises to date.

It is wrong to suppose that a crisis exercise should have only one correct solution and the participants are expected to reach uniform, correct decisions.

Exercising crisis routines enhances the ability to function efficiently in a real-life crisis.

people react differently; some perform less well than usual, others grow with the difficulties. Although crisis exercises can never be fully as realistic as a *real-life crisis*, experience has clearly demonstrated that they can be sufficiently real to give the participants insights into how they and their colleagues react to a crisis. Exercising crisis routines enhances the ability to function efficiently in a real-life crisis. Establishing contacts between individuals as well as organisations, even between countries, is important, too. Mutual acquaintanceships and mutual confidence make contacts during a crisis much easier. A good example is the situation during and after 11 September 2001, when informal networks were quickly formed, nationally as well as internationally, between people who already knew each other. That made it easier to work out procedures for exchanging information and taking common steps to support the financial markets.

The logistics category includes:

- testing that the physical conditions for efficient crisis management work, e.g. telephones, telefax, computers, premises and relocations (if called for).

Earlier crisis preparations have tended to overlook logistics.

Earlier crisis preparations have tended to overlook logistics, probably because their significance for crisis management was not properly understood. They have therefore been thoroughly tested in a number of the Riksbank's crisis exercises and a number of potential problems have been detected. An example of such problems is that, in the event of a crisis, those ultimately responsible for managing it – the Riksbank's managerial group for crises in the financial system – are liable to have their official telephones jammed by all the calls from journalists, politicians and people in general. In order to safeguard the group's essential lines of communication, internally as well as externally, this calls for separate *crisis telephones* with unlisted numbers and *telephone filters* to distribute incoming calls. Such changes to the crisis preparations have now been made.

In most of the crisis exercises to date, these three aspects – facts, cooperation, logistics – have been tested together. But there have been situations where it proved more appropriate to tailor an exercise for a narrower topic. In 1999, for instance, an exercise was held on the theme: *How to manage a crisis in a bank in the event of IT problems connected with the millennium changeover*. Another, considerably broader theme for tailor-made crisis exercises has been the handling of issues to do with information.

Information issues in a crisis

Information issues are almost always a central feature of practical crisis exercises because information as such is an important component of crisis management. Insufficient or faulty information hampers the analysis of a crisis. Crises have actually been exacerbated by information that authorities or other parties provided without due consideration. Communication experts therefore need to be attuned to experts in factual matters so that they understand each other's arguments and arrive together at solutions that represent the best combination of knowledge about the facts and knowledge of how information should be provided. Communication functions also need to be tested under severe external pressure in terms of time, the volume of incoming queries and the awareness that even minor mistakes in the supply of information can be major setbacks in crisis management. Crisis exercises are also necessary to identify just what information is required in different crisis situations and where it can be obtained.

INCOMING INFORMATION

In order to gauge the extent of the crisis and propose countermeasures, the authorities must have quick access to topical information, for instance about the distressed bank, its creditors and other counterparties (e.g. in clearing and payment systems), other financial institutions and the financial markets in general. When international banks are involved, information is also needed about operations in other countries. What matters most for crisis management by the Riksbank is information about the current liquidity and solvency of the distressed bank, together with its positions in different payment and clearing systems.

The Riksbank must know what information it requires, where it can be obtained and how to analyse it. While much of this can be planned under normal conditions, it is the specific nature of a particular crisis that dictates the detailed requirements in terms of information and analysis. Crisis work can be speeded up if check-lists have been prepared for the collection of information. The Riksbank must also make arrangements with other authorities and banks to ensure that the requisite up-to-date information will be available at short notice. As many of the regular reports to Finansinspektionen are produced periodically, in a crisis the existing information will probably have to be updated. The banks' information systems need to be constructed so that crucial information can be generated at short notice, for instance on liquidity positions and counterparty exposures in the next few days. If that is not possible at present, then Finansinspektionen and/or the Riksbank should require the banks to improve their systems.

Information issues are almost always a central feature of practical crisis exercises because information is an important component of crisis management.

The authorities must have quick access to topical information in order to gauge the extent of the crisis and propose countermeasures.

The Riksbank must know what information it requires, where it can be obtained and how to analyse it.

It is important to ensure in advance that there are no legal obstacles to the collection of information.

Of course it is also important to ensure in advance that there are no legal obstacles to the collection of information. In a crisis situation, rules of confidentiality concerning *bank-strategic information* must defer to the provision of information to the authorities that are handling the crisis. Undertakings to exchange additional information in a crisis situation are a feature of many national as well as bilateral and multilateral MoUs.

OUTGOING INFORMATION

The causes, development and resolution of financial crises are often a reflection of confidence.

The causes, development and resolution of financial crises are often a reflection of confidence. A bank that lacks people's confidence can experience a flood of withdrawals. The supply of liquidity may dry up for a bank that is not credible in the eyes of its interbank counterparties. If the authorities do not inspire confidence, the crisis will be more difficult to manage and may even be exacerbated. Confidence can be created/eroded by adequate/inadequate information. Many bank crises have arisen or grown because information was insufficient or faulty in that, for instance, bank managements and authorities issued conflicting statements.

The Riksbank considers it important to have relatively far-reaching plans for handling information issues in a crisis.

As a consequence of experience from Sweden's bank crisis, the Riksbank considers it important to have relatively detailed plans for handling information issues in a crisis. These plans have been tested in practical crisis exercises under simulated real-life situations. Some of the aspects have been:

- How will questions from politicians, media, the banks' counterparties and people in general be handled?
- Are the authorities to provide information freely or to a limited extent?
- Which channels are to be used for information?
- How is coordination arranged between authorities, with market players and, if relevant, with other countries and international organisations?

The crisis exercises have demonstrated the importance of ensuring that incoming questions are answered promptly in a way which shows that the competent authorities know about the banking problem in question and are working for a solution. It may also be appropriate to publish the time when more specific information will be provided at, say, a press conference. At the same time, the exercises have shown that until a decision has been made, in many cases it is not advisable to discuss the current situation or conceivable solutions in public because this may create premature and unsubstantiated expectations and reactions. This applies to crisis exercises with a short time horizon. In a more protracted crisis, a public

debate can on the contrary help to build up confidence, though there is a risk of confidence being eroded if the government and authorities fail to handle the debate properly.

In order to minimise the risk of conflicting messages, the right to issue information in a crisis situation should be restricted to a small group at each authority, consisting of the management and those in charge of communication. The Riksbank considers, not least in the light of the crisis exercises, that those in charge of communication should be integrated as far as possible in the group that is dealing with the crisis as such. A concrete result is that the head of the Communications Department is now a member of the crisis management team and those who are responsible for information accordingly have full and up-to-date knowledge of the crisis and how it is being managed. That makes it easier for them, in consultation with the crisis managers, to decide suitable information measures.

It is also important that the authorities' task of providing information does not obstruct their resolution of the ongoing crisis. Those who seek information – internally at an authority as well as from outside – naturally turn to those in a managerial position who are also responsible for handling the crisis. The latter, however, need to devote most of their time to dealing with the crisis without delay. To tackle this problem, the Riksbanken has arranged for a telephone filter to be set up in the event of a crisis. The filter is manned by communication and financial specialists who answer factual questions in accordance with instructions that are updated continuously by the crisis management team. Queries that require an answer from senior officials are passed on to them.

Those responsible for information at the Riksbank have already – under normal conditions – drafted press notices for different situations. The wording needs to be thoroughly perused in an unstrained atmosphere because shades of meaning and phrases are all too easily misunderstood in a crisis. Press notices should also be scrutinised in advance from different angles by people with different knowledge and insights, for example specialists in information and those responsible for financial market issues. It seldom happens that a particular crisis situation exactly matches the situation for which press notices have been prepared, so the drafts will have to be adjusted; but the preparations do save time in a crisis and improve the end result.

It is highly important to coordinate the content and timing of information. During the Swedish banking crisis, approval of the content and wording of press notices was preceded by close consultations between the Finance Ministry, Finansinspektionen, the Riksbank and the relevant banks. The parties also agreed on a time schedule whereby the notices

To minimise the risk of conflicting messages, the right to issue information in a crisis situation should be restricted.

The need of information from authorities must not obstruct the work of resolving the ongoing crisis.

Coordinating information – its content as well as its timing – is highly important.

were published in a predetermined order at intervals of just a few minutes. Without preparations, however, such close coordination is difficult to achieve, so this is something that should be included in crisis exercises.

Scepticism about crisis exercises

The Riksbank, as indicated above, has found crisis exercises valuable and has accordingly recommended them as a part of the cooperation in international fora. In some quarters, however, the idea has been received with scepticism, for a number of stated reasons:

- Certain policy issues, particularly the function of lender of last resort, are best left without much discussion because their implementation should not be specified.

The Riksbank considers that its interpretation of the possibility of providing emergency liquidity should be clarified in advance.

The Riksbank's opinion, partly in the light of experience of and conclusions from the 1990s banking crisis, is that this argument is not relevant, at least in the Swedish environment. The Riksbank considers, on the contrary, that its interpretation of the possibility of providing emergency liquidity should be made clear to other authorities, banks and the general public in advance. This reduces the risk of costly misunderstandings and improper influence. At the same time, the Riksbank subscribes to the prevalent view that certain issues – of which the use of the function as lender of last resort is a typical case – neither can nor should be specified exactly; interpretations must allow some flexibility.

The Riksbank sees a reluctance to discuss difficult or controversial crisis management issues in advance as being counter-productive.

The Riksbank sees a reluctance to discuss difficult or controversial crisis management issues in advance as being counter-productive. Successful crisis management is highly dependent on the authorities generating confidence that they control the situation. This in turn presupposes that other parties and people in general are prepared to believe what the authorities are telling them. Such credibility needs to be established when conditions are normal. If the authorities are not prepared to discuss important issues even internally, there is a large risk of their public messages in an acute crisis not being clear enough to inspire trust.

- Exercises with participants from a number of countries may turn into an unconstructive *beauty contest* in the sense that they mainly focus on which are the “best” laws, rules and/or practices.

Comparisons of laws and practices serve the important purpose of detecting and handling differences that lead to problems for crisis management.

The joint crisis exercise for Nordic central banks and banking supervisors included comparisons of the countries' laws and practices, which led to the detection of substantial potential obstacles to joint crisis management. However, such discrepancies in laws and practices do not always call for harmonisation, provided the problems can be resolved some other way. The important thing is the first step of identifying the differences. The

same applies at the national level, that is, differences between different authorities' interpretations and practices. Comparisons of laws and practices in connection with a crisis exercise accordingly serve an important purpose. The exercises are seldom intended to reveal what is *best*, whatever that may mean, but to detect and deal with differences that may lead to problems for crisis management.

- Crisis exercises may take too much time and resources both for their preparations and for the participants.
- As the nature of the next bank crisis is not foreseeable, there is little point in exercising certain specific situations.
- Information that a crisis exercise is to be held may be leaked and cause public concern on such grounds as “no smoke without a fire”.

The first two arguments can be met by constructing crisis exercises appropriately. When planning some exercises, the mistake has been made of choosing a scenario that is excessively complex and extensive. As mentioned earlier, it is better if the issues that management wishes to have illuminated are spread over a number of exercises. That also makes smaller demands on the participants' time; a single day may suffice for holding the exercise and assessing it. The argument that the next financial crisis is unforeseeable overlooks that fact that crisis exercises are about so much more than practising *solutions* to financial problems. Moreover, those who write the scenarios have a good idea of the most probable ingredients of a future crisis and adapt the exercises accordingly.

Fears of leaks to the general public can be handled by being open about exercises. The risk of misunderstandings over exercises will be smaller if the central bank has a generally open attitude. The Riksbank does not actually announce a particular crisis exercise but neither does it attempt to conceal either that exercises are arranged from time to time or what their general purposes are. On the other hand, being unduly open about the results of an exercise may be inappropriate, for instance if it has revealed deficiencies in laws or policies. It is better to rectify such deficiencies first.

The first two arguments can be met by constructing crisis exercises appropriately.

Fears of leaks to the general public can be handled by being open about exercises.

MoUs in crisis management – uses and limitations

An instrument that has become much frequent in recent years, in certain cases with the aim of facilitating crisis management, is MoUs between countries and between authorities. Not least in view of the aforementioned scepticism about crisis exercises, many countries consider instead that MoUs are one of the most important instruments in preparations for future crises. In the Riksbank's opinion, however, MoUs and crisis exercis-

MoUs between authorities and between countries have become much more frequent in recent years.

es are not so much alternatives as complements. One purpose of many crisis exercises has been to test the implementation of existing MoUs. How can an MoU be expected to function in practice? Conversely, weaknesses detected during crisis exercises have led to the modification of MoUs. So there is a clear two-way link between MoUs for crisis management and crisis exercises.

By itself, the drafting of MoUs has prompted authorities and even legislators to remove unnecessary obstacles to cooperation and information-sharing.

Numerous bilateral MoUs on cooperation have been concluded, mainly between supervisors in one or more countries. They regulate cooperation and the exchange of information in a crisis situation. The value of these MoUs is indisputable. They make it easier for authorities to comply with legal provisions for sharing confidential information under certain conditions and they exert pressure on authorities and their staff to be more open when the law permits this. The existence of an MoU saves precious time in a crisis. Moreover, just drafting MoUs has prompted authorities and, in certain cases, even legislators to remove unnecessary obstacles to cooperation and information-sharing. Although many MoUs simply reproduce existing rules, this does at least establish a minimum level from which improvements are often made in practice.

A notable limitation of MoUs is that they can seldom be sufficiently precise and comprehensive.

A notable limitation of MoUs is, however, that they can seldom be sufficiently precise and comprehensive. This mainly has to do with the difficulties in foreseeing the nature of every situation in which an MoU may need to be invoked but another reason is that, for various reasons, the parties to an MoU do not want their undertakings to be entirely explicit. Many MoUs are best described as undertakings to *demonstrate good intentions* without being legally binding and leaving room for interpretation. But some countries, including Sweden, have gone further than the MoUs expressly prescribe, for instance in sharing information.

In the case of inter-country MoUs, differences in institutional structures may restrict cooperation and information-sharing.

In the case of bilateral and multilateral MoUs between countries, an additional restriction on cooperation and information-sharing may come from differences in institutional structures. For a central bank with a supervisory function it may, for example, be easier to obtain information directly from another country's supervisor. For central banks that are not supervisors, however, the MoUs between EU countries' authorities prescribe that such information is normally to travel between two countries' supervisors before being passed on to the central bank. While such a strict arrangement can serve to spell out functions and responsibilities, it can also delay crisis management.⁸

A general limitation of MoUs is that their guidelines tend to be formulated as principles and only occasionally as more precise courses of

⁸ For this reason, there is an emergency clause in ECB MoUs that entitles a central bank without a supervisory function to communicate directly with another country's supervisor and vice versa in an acute crisis.

action. This applies to policy commitments, for example, as well as to which of a country's authorities is responsible for coordination when an institution with cross-border establishments is in a crisis.

The Riksbank sees the numerous MoUs that have been concluded to date as a considerable step forward in crisis prevention and management but there is room for improvements in the form of more specific provisions, for instance. Crisis exercises can promote that.

Results of the Riksbank's work on crisis exercises

As this article indicates, the Riksbank has made considerable efforts to create scenarios for financial crisis exercises, carry them out and discuss the outcomes.⁹ What has the Bank gained from this – to what extent is it now better equipped to cope with a crisis?

An efficient crisis organisation. The result that is probably most important is that the Riksbank now has a well thought-out and coordinated crisis organisation with participants who know their roles and can perform them without delay in the event of a financial crisis. As a result of lessons from crisis exercises, this organisation and its tasks have been modified by degrees to make it more efficient. One example is the expansion of the communication function and its integration with the organisation's crisis managers. Another example is that people used to be assigned in advance to the tasks of analysing information and preparing material for decisions as instructed by the crisis managers; in the light of the exercises, it is now considered more appropriate to heighten flexibility and enable the managers to have the support of any of those experts at the Riksbank who specialise in the particular form of a crisis.

Amendments to laws, policies and procedures. (i) The exercise in which Nordic central banks and supervisors participated revealed potential problems for coordination due to certain discrepancies between the countries' laws and decision-making processes. This applied, for example, to how bank solvency is to be assessed and whether the assets and liabilities of a banking group are to be treated on a consolidated basis or whether a country in which a subsidiary is located is entitled and perhaps obliged to protect its depositors even though this heightens the risk of destabilising the group as a whole. (ii) The joint exercise involving the fifteen EU countries disclosed differences in laws and practices that can impede efficient crisis management. It also pointed to the possibility of further improvements and additions to the current multilateral MoUs on cooperation in

⁹ The Riksbank also arranges similar exercises for so-called conventional crises such as a fire at the Bank's head office.

crisis management. (iii) At the national level it can be mentioned that experience from crisis exercises have led to changes in the procedures in RIX, the Riksbank's system for large-value payments. Another outcome of the exercises is that the interpretation of the Riksbank Act as regards the emergency liquidity function has been reviewed.

Better handling of information. (i) The Nordic and European as well as the national crisis exercises have shown that additional information is required for crisis management. (ii) The crisis exercises have given rise to new solutions whereby the outside world's need of continuous information about the Riksbank's analyses, plans and decisions in a crisis can be met in a balanced manner. (iii) The information in the crisis manual has been developed in the light of the crisis exercises, making the manual all the more useful as an aid.

Better cooperation between countries and authorities. (i) The joint exercises by the Riksbank and Finansinspektionen, besides developing personal contacts, have led to a better understanding of the other authority's work and needs, for instance of information, under normal conditions as well as during a crisis. This was taken into consideration when drafting the MoU on cooperation between the two authorities. (ii) The conclusions from the joint Nordic exercise have been further discussed in a group for cooperation between the Nordic central banks. A corresponding group for the Nordic banking supervisors has likewise discussed issues to do with the management of problems in banks with a presence in more than one Nordic country.

Developing individual competence. The crisis exercises have served as *eye-openers* for the participants. Staff members whose work normally focuses on policy issues and analyses are obliged to make major, concrete decisions on the basis of imperfect information and strong time pressure. Specialists in law, communications and other non-financial matters gain a realistic insight into how, during an ongoing crisis, their general approach would have to be adapted to the particular conditions that apply in the financial sector. In many instances, participants in exercises have had impulses which have benefited their daily work.

In conclusion, the Riksbank considers that crisis exercises are a serviceable method for enhancing readiness for a possible future crisis. National exercises are a good first step but as more and increasingly large financial institutions extend their operations across national borders, the importance of bilateral and multilateral exercises is growing.

Appendix: A description of different forms of exercise

The following is a brief description of how a crisis exercise is “created” and organised.

GENERAL POINTS

All experience indicates that the structure of crisis exercises should be fairly straightforward. An exercise lasting a few hours does not give the participants time to penetrate unduly complicated or wide-ranging matters. A better arrangement is to spread the issues over a number of consecutive exercises. Neither should an exercise require the participants to absorb a lot of statistics and other information, such as a bank’s financial statements; they would then have to devote too much time to secondary matters instead of focusing on overriding solutions. Limiting the extent of an exercise is bound up with the desirability of limiting its duration. Many of the participants have crucial posts in the central bank or some other authority and the time they can devote to exercises is restricted. At the same time, it is important that the participants in an exercise include those who would be engaged in a *real-life crisis*. Stand-ins are acceptable, however, in certain exercises, partly so they can practise this role (one cannot count on all the regular officials being available at short notice to handle an acute financial crisis).

The feasibility of a longer exercise during which the participants are continuously exposed to many different physical and mental strains such as a lack of sleep, food and drink (an exercise lasting, say, 48 hours, which is quite probable in connection with a major crisis) is contingent on getting the intended participants to set aside time for this. A major purpose of such an exercise would be to test the participants’ stamina and ability to make decisions under severe conditions. No such exercise has been arranged in the Riksbank.

The result of an exercise depends to a high degree on the ability of the “producer and actors” to create a realistic atmosphere and on whether the participants are willing to *join in* (the construction of exercises is considered below). The Riksbank has found that creating exercises with high verisimilitude is not difficult and that the participants then *live their parts* convincingly (in practice, this amounts to being oneself, albeit in a fictitious situation).

It is often an advantage if the crisis scenario concerns a fictitious bank in a notional country. The discussion can then be freer because the participants will not feel that their analysis is bound by an existing state of

All experience indicates that the structure of crisis exercises should be fairly straightforward.

The result of an exercise depends to a high degree on the realism of its atmosphere.

affairs. But sometimes it may be appropriate to arrange an exercise around a real-life bank in one or more specified countries to test how the authorities would act in a particular situation. In the joint exercise for Nordic central banks and banking supervisors (see above), the scenario concerned Nordea.

The two most common forms of crisis exercise are described below. The choice of form in a particular case depends on the focus of the exercise as well as on organisational factors such as the size and composition of the group of participants.

A PRACTICAL EXERCISE IN REAL TIME

When the primary purpose is to exercise functions, the nature of the notional crisis can be fairly straightforward.

A small group of people is appointed to compose a scenario and produce the exercise. As the primary purpose is often to exercise functions, the nature of the notional crisis is usually fairly straightforward. A typical example is unforeseen events – such as a large faulty speculation or fraud in a bank or the failure of a major counterparty – in one or more financial institutions that have repercussions via the payment system or the inter-bank market. The events are of such an order that the overall stability of the financial system may be in danger.

The participants usually have little or no advance information.

The participants usually know little or nothing in advance apart from being told to turn up at a given place and time and to set aside time (usually one working day) for an exercise. When they have assembled, the producer informs them about the conditions for the exercise. This can be done both orally and by distributing press notices, financial statements and other documents. An exercise's financial statements may be fictitious but can also be those of real-life financial institutions, modified as required for the scenario. The course of events is then played out gradually over a number of hours, as might happen in real life. This is arranged by feeding the participants with new material, for example about how the fictitious crisis is developing, via telephones, telefax, email, simulated press notices and news bulletins. The inputs are adapted to how the participants have acted in the light of earlier information, for instance whether or not they have made certain decisions.

The producer is located in a different room from the participants and has a number of actors¹⁰ at his disposal to represent public figures – bank directors, representatives of authorities, politicians, journalists and the general public. Contacts with these figures can be initiated both by the actors in accordance with the manuscript and by participants when one of

¹⁰ Normally other staff members of the involved authorities, preferably those having some personal insight into the roles they are given to act.

them wishes to talk to people in the *outside world* to influence events or obtain additional information. Subject to the given framework, the actors are allowed to improvise their contacts with participants, not least in situations that involve negotiations. The participants may be all in the same room or spread over several rooms. Their work is usually directed by a managerial group that assigns tasks to various specialist functions, such as communications and financial or legal analysis.

An important feature of exercises is the strong time pressure associated with the management of many crises. It must be clear from the scenario at an early stage that the participants need to reach some form of consensus or decision by a given time. Time pressure is accentuated by repeatedly feeding in new information or changing the conditions in some other way. A number of the Riksbank's exercises have been rounded off with simulated press conferences at which the participants have had to account for their decisions and motivate them to people with a background in journalism.

Evaluations are an important component. A preliminary evaluation is made immediately after the exercise while impressions are still fresh. Matters considered include issues and deficiencies that have been identified during the exercise and require further investigation. In the following weeks there is a more thorough assessment that results in a written report. The report includes criticism of the exercise as such with a view to improving the construction of future exercises. The evaluations are facilitated by appointing a particular person to keep a *log* of the exercise that records all significant events, deliberations and decisions.

A real-time exercise is a particularly suitable form for practising cooperation, logistics, communications and analytical work under time pressure.

AN ANALYTICAL EXERCISE

The analytical form differs from the practical mainly in the actual course of the exercise. During the analytical exercise there are no or just a few inputs; virtually all the information is provided, orally or in writing, on a single or only a few occasions during the day. Moreover, the participants may receive certain basic information, such as a financial statement, before the day of the exercise. The primary purpose of an analytical exercise is to practise the analysis of a crisis problem and reach a decision. Such exercises achieve an important result when they help to identify ambiguities and deficiencies in laws, rules, procedures and/or MoUs. The analytical form of exercise is suitable for more gradual crises, while the

An important feature of exercises is the strong time pressure associated with the management of many crises.

A preliminary evaluation immediately after the exercise is followed by a more thorough assessment in the following weeks.

The analytical form of exercise is suitable for more gradual crises, while the practical form in real time is more appropriate for crises that proceed rapidly.

practical form in real time is more appropriate for crises that proceed rapidly.

In an analytical exercise all the participants are located as a rule in the same room. However, a large group can be broken down into smaller groups that all discuss the same issues and then reconvene once or several times to compare their discussions and conclusions.

Evaluations are made, just as in a practical real-time exercise, immediately afterwards as well as more thoroughly later.

Even in an analytical arrangement, the scenario is usually escalated a number of times (in the course of a day there is generally time for three stages), depending on how the group has argued and decided in the light of earlier information. Evaluations are made, just as in a practical real-time exercise, immediately afterwards as well as more thoroughly later.

■ Payment system efficiency and pro-competitive regulation

BY MATS A. BERGMAN

Associate professor, Department of Economics, Göteborg University and Uppsala University (mats.bergman@nek.uu.se)

Effective competition guarantees that prices are set at such a level that efficiency is promoted (resulting in so-called allocative efficiency), but in markets characterised by large returns to scale and strong network effects, it may be too costly to have more than one firm operating. In such markets, known as natural monopolies, technical efficiency is best achieved by a single firm. More generally, a given market may be too small to support enough firms to guarantee effective competition. This creates a dilemma: if the market is monopolised, market power and monopoly pricing will result in allocative inefficiencies, while if several firms are active, there will be technical inefficiencies (or positive network effects will not be fully exploited). In many natural monopolies, regulators have sought to resolve this dilemma by introducing pro-competitive regulation. This article discusses the merits of introducing regulations in the payment-system markets.

The article is based on a paper presented at a workshop on Central Bank Efficiency organized by Sveriges Riksbank on May 23–24, 2003.

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Why is telecom infrastructure regulated, but not payment infrastructure?

The payment-system industry and the telecom industry are two examples of industries characterised by large returns to scale and strong network effects. In the telecom industry, the above dilemma has been resolved by regulation. But why do we see so little pro-competitive regulation of bank-owned payment systems? In particular, although Sveriges Riksbank is responsible for the efficiency of the payment system, this responsibility is not reflected in Swedish law. Would it not be possible to promote efficiency and to achieve consumer benefits by instigating a legal requirement that the owners of payment infrastructure must provide access to competitors and new entrants – just as the incumbent telecom operators are required to provide non-discriminatory access to their networks?

Two examples of industries characterised by large returns to scale and strong network effects are the payment-system industry and the telecom industry.

Here, three possible answers to these questions are considered. Firstly, competition in the provision of payment infrastructure services is arguably greater than in the provision of telecom infrastructure services. While telecom services typically have been national monopolies, payment services have been provided by a competitive industry. Secondly, payment infrastructure is often jointly owned by several banks, while important parts of the telecom infrastructure are still owned by the former telecom monopolies. Thirdly, it is possible that the general competition law is sufficient to guarantee fair competition in the payment-system market.

Competition is a means of achieving efficiency – within a payment system, or in any market.

Before going deeper into these three issues, however, it is necessary to consider why pro-competitive regulation of infrastructural services is sometimes required. Competition is a means of achieving efficiency – within a payment system, or in any market. Competition gives the producers incentives to be efficient and it ensures the buyers in the market a price that is not too high. If competition is lacking, production will often be less efficient and prices will tend to be higher. In industries where access to infrastructural services is important, a lack of competition in the provision of infrastructural services can propagate into subsequent stages of the production chain. This is known as the bottleneck problem.

There is sometimes a trade-off between, on the one hand, cooperation and returns to scale, and, on the other, competition.

However, as noted above, technical efficiency sometimes requires large-scale production and standardisation. Hence, there is sometimes a trade-off between, on the one hand, cooperation and returns to scale and, on the other, competition. In addition, a conflict can exist between the incentives for short-run and long-run competition. Maximum short-run competition sometimes comes at the expense of reduced incentives for long-run competition. This can also be phrased as a choice between competition *in* the market and competition *for* the market. Short-run competition (competition in the market) can for example be maximized by implementing favourable conditions for access to other parties' infrastructures or by denying patent rights. However, this reduces the incentives for investments and, hence, reduces long-run competition (competition for the market).

Historically, there have often been competing providers of payment system services as well as competing infrastructures.

Historically, there have often been competing providers of payment system services as well as competing infrastructures. The Swedish postal giro system (Postgirot), for instance, has competed with the banks' giro system (Bankgirot) and there are a number of competing international payment card systems, such as Visa, Mastercard and American Express. Presently, however, there appears to be a trend towards larger scale in payment systems and integration of the systems.¹ Some examples are the consolidation of ATM (Automated Teller Machine) networks, the integra-

¹ Guibourg (2001).

tion of previously non-compatible card payment systems and domestic and international integration of giro systems. Furthermore, there is likely to be a process of standardisation of internet-based payment systems.

Possibly, these trends will eventually result in national or even regional monopolies. This suggests that an analysis of the possible benefits of pro-competitive regulation of payment systems is warranted. Experience, as well as theory, tells us that the regulations should be in place *before* private firms undertake significant investments in new infrastructure and *before* government-owned infrastructure is privatised.

Furthermore, there have already been controversies over access to existing payment infrastructures. In many cases, the concerns have centred on the level of the interchange fee (see below for a discussion of this concept). This has been the case for card payments and for ATM transactions. There have also been controversies over the level of the fixed costs and the entry costs for small banks and new entrants in systems for card payment and ATM transactions, for national giro transactions and for clearing and settlement institutions.² There is a clear parallel, at least superficially, with the telecom industry, where many observers have pointed to high interconnection charges³ as a cause of the lack of genuine competition.

An analysis of the possible benefits of pro-competitive regulation of payment systems is warranted.

There have already been controversies over access to existing payment infrastructures.

Giro payments, card payments and ATM transactions

Giro payments can be made without the payer and the payee meeting, but the payer needs to know the payee's giro number. A card payment is typically made in situations when the payer and the payee meet in person, but it can also be made at a distance, if the payee knows the payer's card number. In both cases, the payer's bank makes a withdrawal from the payer's account and sends information to the payee's bank, which, in turn, credits the payee's account. Both types of transaction require an agreement between the banks on a standard for the exchange of information. In principle, each bank could communicate directly with all other banks. In practice, central clearing houses typically process the transaction information and, i.e., calculate the net amounts that each bank owes every other bank. The net amounts are settled once or a few times every day. Settlements are made by transferring the net amounts between the banks' accounts in the central bank. The clearing houses and other critical assets, such as trade marks, are often jointly owned by the banks. If it is not regulated, the access price will be determined by the owners of the systems (i.e., the owners of the clearing houses and the trade marks).

² See, e.g., the EU Commission's press release IP/01/462, March 31, "Commission Raises Competition Concerns about Behaviour of Clearstream Banking AG". Clearstream is the German clearing and settlement institution. Preliminary, it has been found to have abused its dominant position by discriminating Euroclear.

³ The fee a telecom operator charges other operators for terminating or originating a call in its own network.

ATM (Automated Teller Machine) transactions have much in common with card payments, but instead of crediting a merchant's account, the money is made available in cash. After a cash withdrawal, the cardholder's bank makes a withdrawal from the account that corresponds to the card and pays to the ATM-owning bank, through a clearing institution. In "foreign" ATM transactions, the banks' customers use other banks' terminals; typically the cardholder's bank has to compensate the bank that owns the terminal (in addition to transferring the amount withdrawn).

Clearing and settlement institutions, e.g., VPC in Sweden, are also used for financial assets, such as equities and fixed-income instruments. Trade in electronically registered financial assets results in two transactions that must be cleared and settled: one for the payment and one for the asset that change hands. While the (net) payments are eventually settled in the central bank, the transfer of asset ownership is typically both cleared and settled in a clearing and settlement institution dedicated to financial assets.

The next section discusses scale economies and competition as sources of efficiency in payment services and in general. This is followed by an introduction of the bottleneck problem pertinent to infrastructural industries, as well as the traditional solutions to this problem. After that I focus on possible anti-competitive concerns in payment services, and continue by discussing the role of the general competition law in this industry.

The tentative conclusion of this article is that there *is* a role for pro-competitive (access) regulation of payment services, just as for telecom services. However, there are important differences between the telecom and the payment industries. A regulatory framework that is appropriate for the former cannot be expected to be appropriate for the latter without significant modifications. Such modifications, in turn, require a careful analysis of the particularities of the payment-system industry – and its interaction with the banking industry at large.

The tentative conclusion of this article is that there is a role for pro-competitive regulation of payment services, just as for telecom services.

Scale economies versus benefit of competition

When there are increasing returns to scale, one sometimes has to compromise between two means for achieving efficiency: large-scale production and competition. This is likely to be true for payment services, as there is strong evidence of this industry being characterised by significant returns to scale, both from the supply (or cost) side and from the demand side. The latter is due to the network effects that exist in payment services. Furthermore, as discussed above, there are indications that the scale of operations is increasing in payment systems, suggesting that the balance of benefits from competition and from large scale may be shifting.

When there are increasing returns to scale, one sometimes has to compromise between two means for achieving efficiency: large-scale production and competition.

THE BENEFIT OF SCALE

There are a number of reasons why there should, in general, be increasing returns to scale in production. Some fixed costs (e.g., management and R&D) may not need to follow the scale of production. Increased scale may allow a shift towards more efficient technology (typically a more automated technology, with relatively higher fixed costs and lower variable costs).⁴ A higher level of production will allow employees to become more specialised and will allow individuals and firms to move along the so-called learning curve. Finally, so-called economies of massed reserves will allow firms to economise on production equipment, as random breakdowns or idiosyncratic fluctuations in demand and supply will have less impact. However, these sources of scale economies will eventually peter out, and diseconomies will set in, such as increasing managerial costs due to the complexity of the operation, agency problems and, in many industries, transportation costs.⁵

There are a number of reasons why there should be increasing returns to scale in production.

Most studies have found that returns to scale in general banking are relatively modest. Wheelock & Wilson (2001), for example, in a study on US banks, found significant returns to scale only for banks with total assets below US \$ 300–500 million (approximately equivalent to the assets of some new entrant in the Swedish banking market, such as IKANO bank and ICA Banken, or a medium-sized savings bank, such as Sparbanken Skaraborg). In addition, statistically insignificant point estimates suggested that positive returns to scale existed up to perhaps US \$1 billion in assets.⁶ Lindquist (2003) criticises the methodology used in most previous studies and finds positive returns to scale also for large banks, in particular for deposits. She also finds that returns to scale increase when electronic payment services increase.

Most studies have found that returns to scale in general banking are relatively modest.

Returns to scale appear to be stronger in payment systems than in other banking services. Humphrey et al. (2003) find scale economies of 0.2 in a European cross-country study, implying that costs increase by 2 per cent when volumes rise 10 per cent. Similarly, although not directly relevant for Sweden, Bauer reports average scale economies of 0.7–0.8 for cheque-processing offices, which, however, appear to be exhausted for the largest US offices.⁷ Bauer & Ferrier (1996) report scale economies of approximately 0.5 for automated clearing houses. In contrast, Felgran (1986) found that scale economies were insignificant for ATM networks with more than 1,000 service points.

Returns to scale appear to be stronger in payment systems than in other banking services.

In conclusion, there appear to be strong economies of scale in the

⁴ Cf. the so-called two-thirds rule, shown to apply for many chemical and metallurgical processes.

⁵ See Tirole (1988) section 1.2 and Scherer & Ross (1990) chapter 4.

⁶ See Wheelock & Wilson (2001) for further references.

⁷ Quoted from Bergendahl et al. (2002).

production of payment services, suggesting that cooperation between banks should be allowed.

NETWORK BENEFITS

In addition to returns to scale from the supply (or cost) side, payment systems are characterised by returns to scale from the demand side.

In addition to returns to scale from the supply (or cost) side, payment systems are characterised by returns to scale from the demand side. These are referred to as network effects.⁸ Network effects represent a special case of positive externalities. When an additional user connects to the network, this increases the utility for other connected users. The network effects can be direct, as in telephone networks or in giro-payment systems and other types of ACHs (Automated Clearing Houses).⁹ They can also be indirect, as in payment-card systems and in the markets for computer software and hardware. If more consumers choose a particular payment card (e.g., Visa or a certain ATM card) or a particular type of office computer, there will be an incentive for more merchants to accept the payment card, more ATMs will be installed or there will be a larger supply of compatible software, respectively.¹⁰

In network markets, competition between networks must be distinguished from competition within systems.

In network markets, competition *between* networks must be distinguished from competition *within* systems. Examples of *inter*-network competition (competition between firms using different networks) are PC computers versus Apple computers and American Express credit cards versus Visa versus Mastercard. Examples of *intra*-network competition (competition between firms that use the same network) are competition between various PC producers; competition between banks offering to process Visa transactions for merchants; and competition between commercial banks that all provide giro solutions based on the Bankgiro. Note also that the distinction between intra-network competition and inter-network competition is not absolute, as there is often a degree of compatibility even between supposedly non-compatible systems. For example, the same EFTPOS (Electronic Funds Transfer Point Of Sale) terminals, i.e., terminals used for card payments in ordinary stores, can be used for cards from several networks. Similarly, customers can make giro payments from a bank account through the Bankgiro to a Postgiro account.

Guibourg (2001) surveys the existing literature on network effects in ATM and ACH markets and provides an empirical study of network effects in the EFTPOS market. The general conclusion is that strong net-

⁸ See also Guibourg (1998) for a general discussion of network effects.

⁹ Electronic interbank networks used to process transactions.

¹⁰ With a higher level of demand, producers can benefit from returns to scale in production, offer more variety and offer higher service levels or a denser distribution network. A prerequisite for this to occur is that consumers choose compatible products.

work effects and large returns to scale dominate competition effects, in the sense that adoption rates are higher in markets with few competing networks – in practice often a single network – although there is normally *intra*-network competition. Guibourg reports that in 1999, the number of transactions per capita was ten times higher in countries with a single compatible EFTPOS network than in countries with two or more incompatible networks. In addition, growth in the number of transactions per capita increased dramatically in countries where incompatible systems merged into a single compatible system. There appears to be less support for the existence of strong economies of scale in production, as the average number of proprietary (although often compatible) systems increased from three in 1988 to over seven in 1999. In addition, the three smallest countries in the sample are among the four countries with the highest number of transactions per capita, while the three largest countries are among the four with the lowest number of transactions per capita.

The above discussion suggests that network effects may be an even more important motive for allowing cooperation between banks in payment systems.

THE BENEFIT OF COMPETITION

Just as fundamental as economies of scale, are the benefits of competition. When competition is lacking, one or a few firms will possess market power, which has four main adverse consequences. Firstly, it will transfer welfare from consumers to producers.¹¹ Secondly, as the price rises above the competitive level, demand will fall below the optimal level – i.e., there will be allocative inefficiencies. Thirdly, low competitive pressure is generally believed to result in sub-optimal effort and X-inefficiencies (i.e., weak cost control will result in unduly high costs). Fourthly, the existence of a monopoly profit may trigger socially costly lobbying for the favoured position, as well as other types of rent-seeking behaviour. Although regulation can mitigate problems of the first and second type, there is a substantial risk that it will not properly address problems of the third and fourth types. Moreover, regulation introduces new problems, such as regulatory risks (the risk that investment incentives et cetera will be reduced because the regulator may be tempted to exploit the regulated firm once the latter has taken the investment cost) and the direct costs of regulation.¹²

The general conclusion is that strong network effects and large returns to scale dominate competition effects.

When competition is lacking, one or a few firms will possess market power, which has four main adverse consequences.

¹¹ Although, strictly speaking, this will only reduce welfare if consumer surplus is valued more highly than producer profit, welfare transfers from consumers to producers are normally considered to be negative.

¹² See Bergman (2002).

Firms have a strategic interest in overstating economies of scale and downplaying the benefits of competition.

Firms have a strategic interest in overstating economies of scale and downplaying the benefits of competition. This is because having fewer competitors is typically beneficial for the industry and negative for consumers, while economies of scale will tend to benefit both categories. Hence, it is tempting to appeal to economies of scale even in situations where the true rationale is a desire to reduce competition.

Some observers argue that the introduction of competition normally gives rise to cost savings and price reductions in the 25–75 per cent range (Winston (1998) and a number of OECD studies, referred to in Gonce & Nicoletti (2000)). However, based on an extensive review of the empirical literature on deregulation, Bergman (2002) concludes that savings in the 5–10 per cent range are more realistic.¹³ He draws a similar conclusion in the section where studies of banking deregulation are surveyed.

CONCLUSIONS

Possibly, returns to scale from the demand side are more important than those from the supply side; thus standardisation and consolidation of payment systems should be encouraged.

It appears that returns to scale are important in the payment industry. Possibly, returns to scale from the demand side (network effects) are more important than returns to scale from the supply side (traditional scale economies). This suggests that standardisation and consolidation of payment systems should be encouraged. On the other hand, we are not eager to relinquish the benefits of competition. Possibly, a policy that encourages consolidation and standardisation of payment systems and simultaneously stimulates competition between service providers, is an optimal compromise. Note, however, that such a development would make the payment industry (and the banking industry at large) more similar to industries such as telecom and electricity, relative to what has previously been the case. This, in turn, suggests that bottleneck problems in the payment and retail banking industry may become a more pressing concern in the future. The bottleneck problem will be discussed more thoroughly in the next section.

Returning to the motivating questions, raised in the beginning of this article, and the first of the proposed answers, it appears that although there are grounds for claiming that up to now competition in the provision of infrastructural services has been stronger for payments than for telecom, this will not necessarily be true in the future. While a trend towards consolidation in payment infrastructure may be discernable, it is clearly the case that competition in the provision of telecom infrastructure

¹³ The large effect of deregulation found in some studies appears to stem from two types of shortcomings in the empirical research design. One is that a falling trend in costs and prices that existed even before the deregulation is not accounted for (e.g., in telecom and rail freight). The other is that short observation periods are used to estimate changes in the rate of productivity growth – and that these estimates are used to extrapolate deregulation gains far beyond the period of observation.

is becoming more intense, as the number of parallel mobile telephony networks increases.

The bottleneck problem – and possible remedies

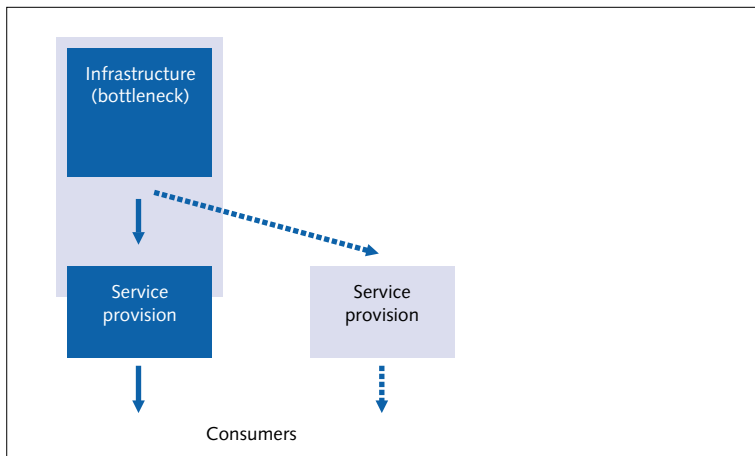
Many industries, in particular network industries, have a vertical production structure. In one (or a few) stages, competition would be non-viable – or at least inefficient. In other stages, competition *is* viable. For example, although it would be inefficient to build more than one electricity network, it is entirely reasonable to allow numerous firms to generate electricity.¹⁴ Various regulatory methods are used to exploit returns to scale in the network stage, while preventing the network owner from exploiting its market power in the potentially competitive stage. Before reviewing these methods, however, the bottleneck problem as such will be addressed.

THE FUNDAMENTAL BOTTLENECK PROBLEM

The typical situation in a bottleneck industry (or network industry) is illustrated in Figure 1. To emphasise the point, it is assumed that only one firm can be active in the upstream infrastructure market, the bottleneck, while several firms can be active in the downstream market, the market for service provision. For example, the main activity in the upstream market can be to establish and maintain a local telecom network or a payment system. Here, these activities are assumed to be natural monopolies. The

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Figure 1. The bottleneck problem



¹⁴ The electricity industry is an example of an industry with two distinct vertical stages where competition is non-viable: (local) distribution and (long-distance) transmission of electric energy. At the same time, electricity generation and retail electricity sales are (potentially) competitive.

downstream market can then be the telecom services market or retail banking, respectively.

Control over the bottleneck stage will be associated with market power in that stage of production, which, in itself, gives rise to negative consequences of the type discussed above. In addition, control over the bottleneck can give rise to market power and lack of competition also in the potentially competitive downstream market.

The non-viability of competition in the bottleneck stage can result from economies of scale in production or in consumption.

The non-viability of competition in the bottleneck stage can be a result of economies of scale in production (which is typically the case for physical networks, like telecom, electricity and rail) or in consumption, i.e., network effects. In the latter case, network effects may be so strong that “tipping” will occur: as soon as one network gains an upper hand, all users will find it optimal to adopt the technology or products associated with that network.¹⁵ Examples of such tipping are the processes that led the video system VHS to dominate over BetaMax and almost has made Microsoft the monopoly provider of operating systems for personal computers.

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Although duplication of the bottleneck is not desirable because large scale economies or strong network effects, the creation of a monopoly will, if unchecked, normally result in welfare losses due to market power. The firm that controls the bottleneck is in a good position to extract the industry-monopoly profit. This can be achieved either by completely excluding competitors from access to the essential infrastructure, or by charging such a high price for infrastructural services that the monopoly profit for the industry as a whole accrues in the infrastructural stage alone.

In order to overcome these problems, various policies have been used in network industries. These policies can be divided into two broad categories – regulatory measures and structural measures – which can be employed in combination or separately.¹⁶

REGULATORY MEASURES

The traditional Swedish and European response to the bottleneck problem has been government ownership.

The traditional Swedish and European response to the bottleneck problem has been government ownership. Postal services, telecom and rail services, for example, have been national monopolies in most EU countries. In banking, this method has been used less frequently. Note, however, that central banks perform some functions that can be seen as bottleneck services. One example is the settlement function, which enables banks to

¹⁵ Besen & Farrell (1994).

¹⁶ Bergman (2002, 2003).

make net payments to one another.¹⁷ Another example is control of the physical supply of notes and coins and the right to seigniorage.¹⁸

In the US, the preferred response to the bottleneck problem used to be regulation of consumer prices. In contrast to the situation in Europe, production was mainly in the hands of private firms. This method has been used for some industries also in Europe – among them the taxi market. The interest rate regulation previously used in banking was also a form of consumer-price regulation, although it was not introduced in response to a bottleneck problem.

Instead of regulating consumer prices, it is possible to regulate the bottleneck price only (the price of the infrastructural service), i.e., access (price) regulation. If competition is viable in the non-bottleneck stages of production, access regulation should suffice to ensure effective competition.

Internationally and across many industries, there has been a move towards “deregulation”. Typically, market entry has been liberalised. In the US, firms have been given greater freedom over prices, as the consumer-price regulations have been lifted or eased. In Europe, however, price regulations have often been *introduced* during deregulation. This is because the government monopolies were often unregulated in a formal sense. In the early deregulations in Britain, privatisation was often accompanied by the introduction of consumer-price regulations. Later on and in other countries, there has been a tendency towards increased reliance on access regulation. This tendency is particularly pronounced in telecom. In banking, on the other hand, deregulation of entry and of consumer prices has seldom been followed by access regulation.

This general pattern is reflected in Sweden, where Sveriges Riksbank is responsible for system efficiency (as well as stability) in the financial markets, but there is no sector-specific regulation that corresponds to this responsibility. Instead, the Riksbank relies on moral suasion and on its ability to influence the legislator and the Swedish Financial Supervisory Authority, which is responsible for the soundness of individual institution. This is in contrast to the situation in, e.g., Australia and Norway, where the central banks have more explicit regulatory powers (Andersson et al. (2001)).

The central banks of the developed countries, including the Riksbank, have agreed on a set of guidelines that aim to foster safety and efficiency in payment systems, the so-called Core Principles for Systemically

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¹⁷ The Swedish settlement system is called RIX.

¹⁸ Sveriges Riksbank handles notes and coins through Pengar i Sverige AB, a wholly-owned subsidiary.

Important Payment Systems.¹⁹ In particular, Principle IX calls for fair and non-discriminatory access to such systems. However, unless they are enacted by a national legislator, these recommendations have no formal legal status.

STRUCTURAL MEASURES

Vertical and horizontal separations have been proposed as structural measures for addressing the bottleneck problem.

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Vertical and horizontal separations have been proposed as structural measures for addressing the bottleneck problem. Vertical separation disconnects ownership of the bottleneck from ownership of downstream (competitive) activities. The advantage is that the owner will have no incentives to favour one of the downstream operators. In contrast, an entity that is vertically integrated and faces competition downstream will often have an incentive to provide inferior infrastructural services, or price the services excessively high. The disadvantages of vertical separation are that vertical synergies cannot be fully exploited and that the problem of market power is not resolved. The latter implies that vertical separation must typically be combined with price regulation or government ownership.

Horizontal separation means that one large bottleneck monopoly is divided into several smaller bottleneck monopolies.

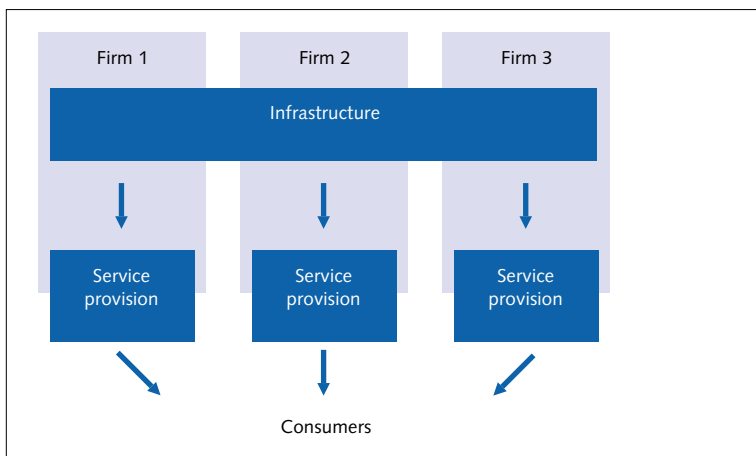
Horizontal separation means that one large bottleneck monopoly is divided into several smaller bottleneck monopolies. Typically, these small monopolies operate in distinct geographical areas. A horizontal separation will not in itself resolve the bottleneck problem. However, dividing one national bottleneck between several regional bottleneck operators can provide more information and may allow benchmarking between the operators. Hence, horizontal separation, as well as vertical separation, may facilitate regulation.

In banking infrastructural clubs appear to be the preferred institution.

In banking, neither vertical nor horizontal separation has been used very often (again, the central banks and their functions are the main exceptions). Instead, a third structural measure – infrastructural clubs – appears to be the preferred institution. An infrastructural club is an arrangement wherein firms that compete horizontally own the essential infrastructure jointly (see Figure 2). Examples are the Visa and Mastercard systems, national giro systems like Bankgirot, and ATM networks. Examples from other industries are the airlines' computer reservation systems (CRSs) for air tickets, taxi switches and, sometimes, joint ownership of mobile-telephony infrastructure.

¹⁹ BIS (2001). Two core-principles evaluations of Swedish payment systems are presently available at the Riksbank's website, www.riksbank.se, under "Financial stability" and "Payment systems".

Figure 2. Infrastructural clubs



Infrastructural clubs provide some prospects of self-regulation. The owners/customers have a common interest in holding costs and prices down, while the firms may have strong incentives to compete for customers in the downstream market (e.g., retail-banking services). On the other hand, the common ownership of the infrastructure can conceivably be used to coordinate pricing in the downstream market and there is a risk that large (incumbent) firms will not allow small (entrant) firms to join the clubs. In addition, conflicting views between the owners may increase transaction costs, which in turn may reduce efficiency and give rise to excessive inertia (lack of innovations). The possible anti-competitive consequences of infrastructural clubs will be explored in the next section.

Infrastructural clubs provide some prospects of self-regulation.

CONCLUSIONS

The second proposed reason, mentioned in the introduction, for regulating the banking and the payment industries less strictly than the telecom industry is that infrastructural clubs are common in the former, but less common in the latter. The above discussion suggests that this argument has some merits. However, joint ownership of a single infrastructure does not resolve all problems. Potentially, the bottleneck structure of most payment systems may still have anti-competitive consequences.

Anti-competitive concerns in payment systems

Four different types of anti-competitive concerns may be relevant for infrastructural clubs and for jointly-owned payment systems.

Above, it was argued that infrastructural clubs to some extent can be expected to achieve efficiency without regulatory intervention, but it was also pointed out that self-regulation will not eliminate all the risks of anti-competitive effects. This section will discuss four different types of anti-competitive concerns (or mechanisms) that may be relevant for infrastructural clubs in general and for jointly-owned payment systems in particular. The four mechanisms are:

- Coordination of downstream behaviour through a high vertical fee for infrastructural services. Monopoly profits can be generated in the bottleneck and redistributed to the owners.
- Coordination of downstream behaviour through high horizontal (multilateral) fees. This can generate monopoly profits in potentially competitive market segments (service provision).
- Discrimination against small and joining members of the infrastructural clubs. This may be in the interest of large firms that are in control of the clubs, but will be detrimental to efficiency.
- Facilitation of collusion through joint operation of assets. Information sharing and the creation of legal “links” (jointly-owned assets) between the firms may align their interests.

COORDINATION THROUGH VERTICAL FEES

Firms that jointly own an infrastructural club can use the club's fee structure strategically, in order to achieve super-competitive profits.

A number of firms that jointly own an infrastructural club can use the club's fee structure strategically, in order to achieve super-competitive profits. In particular, if the owners agree to pay monopoly prices for the services provided by the club, the outcome will be the same as if the infrastructure were controlled by an independent monopolist. This is so, since the owners, who relies on the services provided by the club, would experience higher marginal costs while a monopoly profit would accumulate in the club. This profit could subsequently be distributed to the owners. However, if the profit is distributed in proportion to each owner's production, the firms will realise that their true marginal cost of using the infrastructure is not the nominal fee, but the nominal fee minus the average profit margin. Hence, if the firms wish to use this mechanism to restrict competition, the profit that accrues in the club must be distributed between the firms in fixed proportions.²⁰

²⁰ An analogous effect has been identified in the context of patent pools; see Priest (1977).

As an example, assume that the fees paid to Bankgirot were to be set at such an elevated level that the banks would earn no profit in the downstream market. This would, potentially, give Bankgirot a handsome profit, which could then be divided between the owners, i.e., the banks themselves. In effect, this would give the banks a mechanism that allows them to earn monopoly profits, even though they compete in the downstream market.

In practice, Bankgirot's fee structure follows the cost-plus principle and it is unlikely that the fees could be raised to the monopoly level, for a number of reasons. A drastic price increase, to the benefit of the owner banks, would probably violate competition law (see below). In addition, individual banks are not solely dependent on Bankgirot for giro services and they have some ability to shift the consumers' demand towards other payment solutions. Hence, an individual bank would have incentives to buy fewer services from Bankgirot, than the collective of owner banks would prefer. In fact, although the possibility cannot be ruled out, there are no strong indications that huge profits are generated within the banking market's infrastructural clubs as such.

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DISCRIMINATION AND THE RISK OF COLLUSION

The main concern in Sweden has been that fees are set in such a way that new entrants and small firms are discriminated against. This could, for example, be achieved by giving steep discounts to banks that use large quantities of the infrastructural services, by having new banks pay high entry fees or by having all banks pay high annual fixed fees.

However, there have been concerns that fees may be set so that new entrant and other small firms are discriminated.

Joint ownership of infrastructure necessitates contacts between competing banks. It is often believed that if such contacts become too intimate, there is a risk of this facilitating collusion.

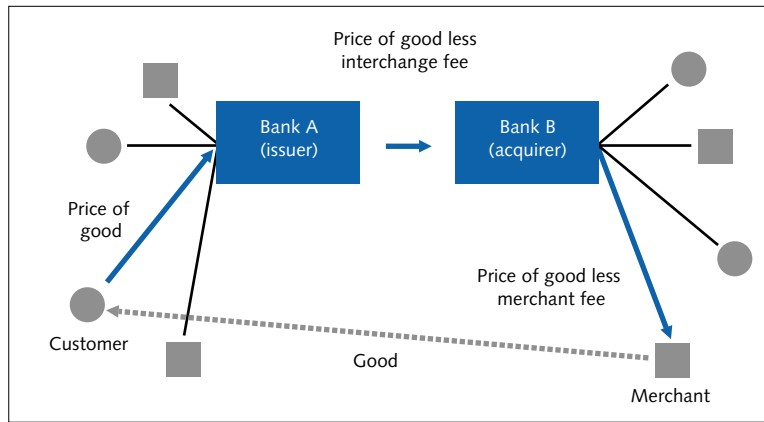
These two mechanisms are not explored further here, but we will return to the issue of discrimination in the next section, when Swedish applications of competition law to payment systems are discussed.

MULTILATERAL INTERCHANGE FEES

At the international level, the competition authorities' main concerns with regard to payment systems have centred on the level and structure of the multilateral interchange fees. The concern has been that *horizontal fees* between banks that compete in providing payment services have been fixed at unduly high levels. Such horizontal fees are known as interchange fees. Figure 3 illustrates the role of these fees in the context of a card payment. (Interchange fees are also used for, e.g., ATM transactions and auto-giro payments.)

Internationally, the main concerns have centred on the level and structure of the multilateral interchange fees.

Figure 3. Interchange fees



In the figure, the holder of a card from Bank A buys from a merchant whose card transactions are acquired (collected and processed) by Bank B. Thus, for this transaction, Bank A is the “issuer” and Bank B is the “acquirer”. The issuer deducts an amount corresponding to the purchase price from the cardholder’s account (assuming a debit-card transaction). This amount, less the interchange fee, is transferred from the issuer to the acquirer. The acquirer, in turn, transfers the purchase price less the merchant fee to the merchant’s account. These payments are illustrated by the bold unbroken arrows.

In most countries, the bulk of the cost of card payment systems is borne by the merchants, through the merchant fee paid to the acquiring bank. The merchant fee is paid in the opposite direction to the right-most arrow in Figure 3. In practice, the fee is not paid separately. Instead, a fraction of the price of the good sold by the merchant is withheld by the acquiring bank. The interchange fee redistributes parts of the merchant-fee payment to the issuing bank. Again, the fee is paid in the opposite direction to one of the bold arrows in the figure – in this case the arrow between the two banks. The issuer charges the customer the full price of the good, withholds a fraction of that price and pays the rest to the acquirer (which, in turn, pays the merchant).

Often, banks are both issuers and acquirers. Depending on which customer buys from which merchant, either of the banks can be the acquirer, the issuer, both acquirer and issuer – or not involved at all.

The merchant fees are set by the banks individually, but the interchange fee is determined multilaterally. Since the interchange fee constitutes a relatively large fraction of the marginal cost of an acquisition – approximately 80 per cent (see below) – the level of the interchange fee influences the level of the merchant fee. It follows that the interchange

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fee can be used to coordinate the behaviour of acquirers, by giving the banks incentives to set higher merchant fees. The result is similar to what can be achieved by setting a high *vertical fee* for infrastructural services, as discussed above. Furthermore, there is no need to think about how the resulting profits should be redistributed, since the payments go directly to other banks.

It may be thought that a multilateral interchange fee is an effective instrument for coordination and for achieving super-competitive profits. However, a high interchange fee will create incentives to compete for incoming fees, i.e., to compete for cardholding customers. This competition is likely to result in lower annual fees and lower per-transaction fees charged to cardholders than would otherwise be the case.²¹ In other words, the super-normal profit that results from higher merchant fees will be competed away on the issuing side of the market.

In an interesting recent paper, Rochet & Tirole (2002) analyse the welfare consequences of a multilateral interchange fee (a MIF). The basic intuition of their model is the one presented above: even if the MIF can be used to achieve super-competitive profits on one side of the market, (most of) this profit will be competed away on the other side. However, this phenomenon does not guarantee that a MIF is innocuous – even if the banks do not earn higher-than-normal profits, it may still be the case that the MIF distorts the pricing away from the socially optimal price structure and, hence, reduces welfare.

The most important result of Rochet & Tirole's paper is that in a two-sided network market, such as the payment-card market, it is in general *not* optimal to set prices on each side of the market equal to the marginal costs incurred on that side. On the contrary, it is normally optimal to let one side of the market subsidize the other side, in order to reap the full benefits of positive network externalities. However, the authors also show that the banks *may* set the MIF too high, if the authorities do not impose a ceiling.²² The EU Commission's policy vis-à-vis MIFs will be discussed below.

Even if the MIF can be used to achieve super-competitive profits on one side of the market, this profit will be competed away on the other side of the market.

In a two-sided network market, such as the payment-card market, it is in general not optimal to set prices on each side of the market equal to the marginal costs incurred on that side.

²¹ It follows that high multilateral interchange fees will be particularly attractive for firms that cannot compete for customers that generate incoming fees. Assuming that the firms only sell to domestic customers, this will be the case for international agreements on multilateral interchange fees (or corresponding fees in other industries, which go under other names). Examples are (fees corresponding to) interchange fees for international payments, international telephone calls and international mail delivery. For the latter, see the EU Commission's cases concerning the REIMS I and II agreements. The Commission's cases concerning international card payments will be discussed below.

²² Similar results have been shown to hold in the context of telecom infrastructure. High interconnection fees (corresponding to interchange fees) raise the marginal cost of providing a telephone call, which in turn gives the operators incentives to increase the per-minute price of phone calls. On the other hand, high interconnection fees raise the profit of the terminating operator, giving them incentives to compete for customers who receive incoming calls. For example, the operators can set low monthly fees, subsidise handsets or offer subsidies for receiving incoming calls. See Laffont et al. (1988a, b) and Laffont & Tirole (2000). See Rochet & Tirole (2003) for a general analysis of two-sided markets. Schmalensee (2002) provides a complementary analysis of card-payment systems.

The role of competition law in payment-system markets

In most jurisdictions competition law is based on three main prohibitions.

In most jurisdictions, including those of the EU, USA, Sweden and the other Nordic countries, competition law is based on three main prohibitions. Firstly, agreements between firms that reduce competition (notably cartels) are prohibited. Secondly, firms are not allowed to merge, if the merger will confer sufficient market power to significantly impede competition. Thirdly, a “dominant” firm (a firm with significant market power) is not allowed to abuse its dominant position.²³

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The first two of these prohibitions can be seen as a system for weighing (and protecting) the benefits of competition against the benefits of large scale and of cooperation. Firms are often allowed to cooperate, but are not allowed to enter into agreements that restrain competition unreasonably. In principle, the benefits of cooperation are weighed against cooperation’s anti-competitive effects, although the weighing is not always done on a case-by-case basis.²⁴ Similarly, firms can merge unhindered by the law – unless the post-merger market share is too large – as low-market-share mergers are presumed to be beneficial, or at least harmless.

The third limits the freedom of large firms in some respects, in order to preserve competition on the market or in order to protect the consumers.

The third main prohibition of competition law, that against abuse of dominance, limits the freedom of large firms in some respects, in order to preserve competition on the market or in order to protect the consumers. For example, dominant firms are not allowed to discriminate other firms and there are restrictions on their pricing and on their freedom to use rebate schemes. A special aspect of this prohibition is the “essential facilities doctrine”. Under this doctrine, a dominant firm may sometimes be required to provide access to its infrastructure (or other “essential” facilities) at non-discriminatory prices.²⁵

Sweden has voluntarily chosen to make the domestic competition law almost identical to EU’s rules.

EU’s competition rules are applicable within the member states in the event of an appreciable effect, actual or potential, on cross-border trade. This means that domestic and EU-wide competition rules are often applicable simultaneously. Sweden has voluntarily chosen to make the domestic competition law almost identical to EU’s rules. In addition, European legal practice has confirmed that the member states’ courts and competition authorities cannot take decisions that directly conflict with EU’s competition rules. As of 1 May 2004, the member states’ freedom to uphold

²³ The closest US correspondence is “monopolization”.

²⁴ To simplify application of the law, there are “white lists”, “black lists” and “group exemptions”. In the US, black-listed behaviour is said to be prohibited “per se”.

²⁵ See Guibourg (1998) and the Swedish Competition Authority (1999) for analyses of this doctrine, with applications to payment systems.

national competition rules that are not aligned with EU's rules will be further reduced.²⁶

In Sweden and elsewhere, competition law and its prohibition against anti-competitive agreements have been applied to payment systems. Within the financial industry, the merger regulation has most often been applied to bank mergers, rather than to mergers directly between firms providing infrastructural services.²⁷ In the following, however, I will focus on cases that have concerned the prohibition against anti-competitive agreements.

SWEDISH CASE LAW

In a sequence of cases, the Swedish Competition Authority evaluated the banks' cooperations concerning infrastructure for payment cards, ATMs and giro payments.²⁸ The Authority's analysis in these cases focused on the possible discrimination of small or entrant banks. There was a concern that the payment systems employed pricing schemes that were handicapping the smaller players in the market. For example, relatively high discounts were given to banks with a large number of transactions per year. In other instances, banks with few transactions had to pay surcharges; part of the payment systems' costs were covered through fixed annual fees, there were entry fees and in a series of cases concerning the jointly owned credit-information agency *Upplysningscentralen*, there was mention of the possibility that large profits might be accumulated and subsequently distributed to the owners of *Upplysningscentralen*.²⁹ Effectively, this gave non-owners a higher price.

One specific case dealt with the CEKAB, a jointly-owned processor of electronic card-based payment transactions; ATM transactions as well as EFTPOS transactions.³⁰ CEKAB is 97 per cent owned by three of the four largest Swedish banks. The Competition Authority maintained that CEKAB's fee structure was discriminatory vis-à-vis smaller banks, which to a large extent were dependent on it. However, the Market Court found that on three grounds, the fee structure was acceptable.³¹ Firstly, the fees were cost based. Secondly, the fees did not have an appreciable effect.

Systems for card payments, ATM transactions and giro transactions have been evaluated under the Swedish competition law.

²⁶ The merger rules do not have to be harmonised, except in the sense that all mergers above a certain threshold are handled by the EU Commission.

²⁷ An interesting merger case, which concerned payments systems, is the Swedish case *Svenska Giro*, case No. 159/2001, the Swedish Competition Authority.

²⁸ See, e.g., case No. 1128/97, *FöreningsSparbanken AB (publ.) et al.* (1999-10-29), concerning the Bankgiro and case No. 12/1999, *ABN Amro Bank N.V. et al.* (1999-05-19), concerning "Dataclearingen", a jointly-owned clearing institution.

²⁹ See cases No. 1124/93, 386/96, 861/97 and 851/2002, which granted UC individual exemptions.

³⁰ Swedish Competition Authority, case No. 605/1998.

³¹ Case No. 1999:12, A 16/98, 1999-05-04.

Thirdly, commercially motivated discounting to a firm's largest customers may be acceptable, even in the absence of a cost justification.

Competition law requires jointly-owned infrastructural enterprises to grant small rivals access at non-discriminatory conditions.

After the Competition Authority lost the *Cekab* case in court, competition law has not been used very actively in order to facilitate small and entrant banks' access to payment systems in Sweden. However, it appears safe to conclude that in principle, competition law requires jointly-owned infrastructural enterprises to grant small rivals access at non-discriminatory conditions.³² Similarly, it is likely that if the competition law had not existed the small banks would have been offered worse access terms.

EU CASE LAW

The prohibition against anti-competitive agreements has been used to challenge the rules of Visa and Mastercard.

On the European level, the prohibition against anti-competitive agreements has been used to challenge the rules of the international bank cooperatives Visa and Mastercard. In particular, Visa's so-called no-discrimination and honour-all-card clauses have been challenged, as has the level of Visa's interchange fee as such.

Visa International has adopted a no-discrimination clause that prevents merchants from surcharging card users.

Visa International has adopted a rule that require individual member banks to respect the no-discrimination clause in the banks' agreements with individual merchants. The no-discrimination clause, in turn, ensures that customers paying with cards are not surcharged, relative to customers paying cash. The European version of the clause prohibits any price differentials between cash and card payments. The US version of the clause only prohibits *surcharges* to card-paying customers; rebates to customers paying cash are accepted.³³

In a decision by the EU Commission in 2001, the no-discrimination clause was cleared on the European level.

Prior to the EU Commission's decision concerning the no-discrimination clause, the Swedish and the Dutch national competition authorities had prohibited its application for domestic transactions in their respective jurisdictions.³⁴ However, in a decision taken in 2001 by the EU Commission,³⁵ the no-discrimination clause was given negative clearance on the European level. As a result, the Swedish and Dutch competition authorities will probably have to reverse their previous decisions.

One of the Commission's arguments for accepting the clause was the observation that relatively few merchants (5–10 per cent) used the option of surcharging in Sweden and the Netherlands; another argument was the direct benefit cardholders get from knowing they will not be surcharged when paying with the card. The main argument for not accepting the

³² See Wetter et al. (2002) p. 226.

³³ Rochet & Tirole (2002). Hence, the US rule is known as the "no-surcharge rule".

³⁴ Visa International only requires that the individual banks enforce the no-discrimination clause if the competent national authorities do not prohibit its application.

³⁵ Commission Decision of 9 August 2001, L 293/24, OJ 10.11.2001 (2001/782/EC).

clause was that it reduces the merchants' set of options, which, in turn, may weaken their bargaining position vis-à-vis the banks. With the clause in force, a merchant must either accept the card and not surcharge, or not accept the card at all. Without the clause, the merchants would have a third option: to accept the card, but surcharge the customer. This could exert pressure on the interchange fee.

Visa has also adopted the honour-all-cards clause, which obliges a merchant that accepts, e.g., a Visa direct-debit card to also accept Visa deferred-debit cards and Visa credit cards. This is so, despite of the fact that the merchant's fee can vary between cards of different types.³⁶ The Commission's argument for accepting this clause was that in its absence, customers could not be certain that a merchant would accept their card, even though the merchant purported to accept Visa cards. That, in turn, would endanger the universal acceptance of the system as a whole. In the US, merchants instigated a class action that focused on the honour-all-cards rule.³⁷ Note also that the honour-all-cards issue is related to the no-discrimination issue: if merchants were willing to accept direct-debit cards, but not credit cards, they could levy a large (or prohibitive) surcharge on customers that use the latter. Furthermore, it appears that much or all of the merchants' opposition would disappear if they could simply pass on the merchant fee to the final customers. They would then have no reason to opt for prohibitively high surcharges.³⁸

In a follow-up decision in 2002, the EU Commission gave a five-year individual exemption to the multilateral interchange fee (the MIF).³⁹ EuroCommerce, a retail, wholesale and international trade organisation, had complained that the MIF in fact amounted to horizontal price fixing, i.e., a cartel between the member banks. The fee was set by Visa EU Region and was applicable as the default interchange fee for cross-border transactions and, when no domestic default fee had been set, as the default interchange fee also for national transactions. Despite the MIF, every pair of banks was free to set another fee bilaterally. Since the introduction of the MIF in 1974, it had gradually increased.

The EU Commission found that while the MIF restricted competition

In a follow-up decision in 2002, the EU Commission gave a five-year individual exemption to the multilateral interchange fee.

³⁶ The 2001 Decision, at 68.

³⁷ In the US, the merchants complained that the interchange fee was *the same* for off-line debit cards and for credit cards. In a settlement, reached 1 May 2003, Visa and Mastercard agreed to pay US \$2 billion and \$1 billion, respectively, to the merchants. Furthermore, they promised to lower their fees substantially and to eliminate the honour-all-cards clause. See Balto (2000, 2003).

³⁸ In addition, the 2001 Decision dealt with rules that restricted cross-border issuing and acquiring, with territorial licensing and with the no-acquiring-without-issuing rule. The Commission imposed a partial liberalisation of cross-border activities, but it accepted the no-acquiring-without-issuing rule.

³⁹ Commission Decision of 24 July 2002, L 318/17, OJ 22.11.2002 (2002/914/EC). This means that the multilateral interchange fee was permitted for five years. After that, the Visa would in theory have to re-apply for exemption. However, since the system of individual exemptions is being abolished, Visa will in practice not have to apply again. On the other hand, after the five-year-period, the Commission can itself initiate an investigation into the system and, at least in theory, prohibit the system or require modifications.

The EU Commission found that the MIF restricted competition but that it potentially could be beneficial for consumers.

it also contributed to the development of the Visa system and, therefore, potentially could be beneficial for consumers. The Commission recognised the network aspects of the Visa system: cardholders benefit from a high number of merchants accepting the card, while merchants benefit from a high number of cardholders. However, both cardholders and merchants prefer that the other party bear the cost. Cardholders prefer a high MIF, while merchants want a low MIF. The Commission identified maximum efficiency of the system with maximum size of the network, and argued that this would be achieved if each category of user paid a cost equal to that category's average marginal utility.⁴⁰

The Commission argued that some objective criteria must be used to prevent the MIF from being set at a super-optimal level.

However, as marginal utilities are difficult to measure, an "objective benchmark" (see below) for the system's cost would be an acceptable proxy for the marginal utility. Such a principle would ensure that each category got a "fair share" of the benefits provided by the system. From the Commission's analysis, it is clear that it perceived a risk of the MIF being set too high. However, it recognised that in order to reap the full benefits of the Visa system a default MIF would have to be established at *some* level. In the absence of a MIF, there would be two possible outcomes. The first and more likely would be that the issuer had to charge the cardholder all of its costs. This would imply a drastic rebalancing of the fee structure, since currently the MIF constitutes approximately 80 per cent of acquirers' costs. If the acquirers were to stop contributing to the issuers, cardholders' fees would increase significantly. This increase would result in sub-optimal usage of the system, since, from a welfare perspective, cardholder fees would be too high and merchant fees would be too low. The second possible outcome would be bilaterally determined interchange fees. However, this would only be feasible in small national systems; Visa EU Region has 5,000 members. Hence, the Commission found that a higher-than-zero MIF was conducive to maximum efficiency. Although the Commission did not try to pin down the exact optimal level, it argued that some objective criteria must be used to prevent the MIF from being set at a super-optimal level.

In order to obtain exemption from the competition rules, Visa agreed to lower the volume-weighted MIF for debit-card transactions by more than 50 per cent, to EUR 0.28, and to keep the MIF at that level for at least five years. In addition, Visa agreed to lower the average MIF applicable to credit and deferred-debit card transactions from approximately 0.85 per cent in 2002 to 0.7 per cent in 2007. Finally, Visa undertook to set the MIF at a level that corresponded to the sum of three cost components, the "objective benchmark". The three components were the cost

⁴⁰ This is a sufficient, but not a necessary condition. See Rochet & Tirole (2002).

of processing transactions, the cost of the free funding period for cardholders and the cost of providing merchants with a “payment guarantee”. In order to verify that the MIF reflected these costs, Visa undertook to have accountancy firms make cost studies at regular intervals, and to present these to the Commission.

CONCLUSIONS

The above examples show that competition law can be quite effective in promoting competition in payment systems, suggesting that there is less need for sector-specific regulations than there would be in the absence of such legislation. The strength of competition law is that, in principle, it can be applied to all types of anti-competitive behaviour. Hence, there is no need to foresee all possible means through which one or a few large firms can curb competition.

Compared to sector-specific (pro-competitive) regulation it has, however, certain disadvantages. In general, it imposes less strict behavioural limitations than can be achieved with sector-specific regulations. It will prevent dominant firms (or combinations of firms) from discriminating excessively against smaller rivals, but it may allow a certain degree of price differentiation. It can impose access to natural-monopoly infrastructure (“essential facilities”), but the access price will typically be above average costs.⁴¹

The third of the three proposed reasons for regulating payment infrastructure less than telecom infrastructure was that the general competition rules are sufficient to guarantee effective competition in the markets for payment services. While it is certainly true that the existence of competition law has played a part in promoting competition in payment services, it is also true that the competition laws apply to other network industries as well. However, the payment industry appears to differ systematically from many other network industries in one important respect, namely its greater dependence on infrastructural clubs. Since such clubs often rely on multilateral agreements, this means that the prohibition against anti-competitive agreements is applicable. In contrast, only the prohibition against abuse of dominance applies directly to single owners of infrastructure. Since the former prohibition is stricter than the latter, the competition authorities can impose more stringent pro-competitive conditions on infrastructural clubs than on infrastructure under single ownership.

The strength of competition law is that, in principle, it can be applied to all types of anti-competitive behaviour.

Compared to sector-specific regulation it has, however, certain disadvantages.

⁴¹ As an illustrative example, the Swedish Competition Authority was able to reduce the incumbent telecom operator's (Telia's) interconnection fee from SEK 0.35 to SEK 0.215 for single-segment (local) access. Later on, regulatory decisions based on the telecom legislation reduced the fee to SEK 0.069.

Discussion and conclusions

In industries where access to infrastructure is essential, a useful distinction is the one between competition for the market and in the market.

In the payment-system industry, the regulatory initiatives have primarily been based on general competition rules.

In industries where access to infrastructure is essential, a useful distinction is the one between competition *for* the market and competition *in* the market. Competition for the market means that firms compete by establishing rival infrastructures; competition in the market means that they compete within one or a few infrastructural systems, each of which is used by several competing firms. Clearly, maximising competition *for* the market by forcing individual banks to set up proprietary non-compatible payment systems is not likely to be conducive to efficiency. However, if privately owned and operated payment systems are left unregulated, maximal efficiency from competition *within* the market will not automatically follow.

The general competition rules constitute one important safeguard against anti-competitive behaviour. However, in some industries these rules have been deemed insufficient for the purpose of protecting the interest of consumers. In such industries, access regulation complements the competition rules. The telecom industry is perhaps the industry that has been subject to the strictest set of regulations. In this industry, the main regulatory tool has been the telecom analogy to the interchange fee – the interconnection fee. In the payment-system industry, the regulatory initiatives have primarily been based on general competition rules.⁴²

As discussed above, a possible explanation for this divergence is that the two industries have different histories. The telecom industry has, in most countries, been a state-controlled monopoly, while banking has been a competitive or oligopolistic industry. Furthermore, while a national telecom network is often owned by a single firm, payment systems are typically infrastructural clubs. From a regulatory point-of-view, infrastructural clubs have two main advantages. Firstly, they are to some extent self-regulating, since none of the owners want to be discriminated against or want costs to be too high. Secondly, the general competition rules are more effective against infrastructural clubs than against single owners of bottleneck infrastructure, since in addition to the prohibition against abuse of dominance, the prohibition against anti-competitive agreements can be applied. On the other hand, the mobile-telephony industry has

⁴² An interesting exception is the EU Commission's recent regulation of the *consumer* price of international payments. According to Regulation 2560/2001, the cost of international euro-denominated payment transactions within the Union should be the same as that of intranational payments. Perhaps even more interesting is the Australian legislation concerning payment systems. On its homepage, the Australian central bank writes that "[t]he Payments System Board (PSB) of the Reserve Bank oversees the payments system in Australia. The PSB is responsible for promoting the safety and efficiency of the payments system in Australia. Through the Payment Systems (Regulation) Act 1998 (PSRA), and the Payment Systems and Netting Act 1998 the Reserve Bank has one of the clearest and strongest mandates in the world to oversee the operation of the payments system."

evolved into an oligopolistic industry, where networks sometimes are jointly owned by several firms.

A possible regulatory strategy is to use competition law as a “first-line treatment”. Sector-specific regulation will then be considered only if competition law cannot resolve the problem. Probably more incidentally than by design, this strategy has been used in some of Sweden’s domestic deregulations.⁴³ However, at least when privatisation of a bottleneck is considered or when massive investments in new technologies are expected, it is likely to be less costly to implement a sector-specific regulation *before* the privatisation or the investments, respectively.

Theoretical analyses of the mobile telecom and the payment card industries suggest that there is a tendency for a multilateral interchange fee to be set too high. On the other hand, this tendency may not be very strong and it may not be relevant in all circumstances. From a more practical perspective, an important aspect appears to be the need for new entrants to be able to use existing payment systems on reasonable terms.

Despite the differences between telecom and payment services, the perceived success of the telecom regulation suggests that there may be a role for access regulation also in the payment-system industry. At this point, it would be premature to say that such a regulation *should* be introduced, but certainly there are good reasons for the authorities concerned to follow developments carefully and regularly evaluate whether the market is able to handle the bottleneck-access problem successfully. A possible regulatory initiative would be to introduce a “weak” access regulation, similar to the early Swedish telecom regulation. The 1993 Telecom Act required access prices to be cost based. The regulatory authority was given the role of mediator between conflicting parties, but in the end, it had no power to determine access prices. Such a solution would be in line with the tradition of moral suasion in the relations between banks, central banks and bank regulators. It would also be in line with one of the conclusions drawn in the Core Principles report referred to above: that although statute-based systems and non-statutory approaches can both be appropriate solutions, “[t]he potential benefits of a statute-based approach to oversight [...] deserve serious consideration in countries newly establishing or significantly revising the oversight role and related policies”.⁴⁴

Finally, however, it seems appropriate to re-iterate Laffont & Tirole’s (2000) warning against drawing analogies between different network markets:

A possible regulatory strategy is to use competition law as a “first-line treatment”.

The perceived success of the telecom regulation suggests that there may be a role for access regulation also in the payment-system industry.

⁴³ Bergman (2002).

⁴⁴ BIS (2001) at 4.3.1.

Before imposing regulations, a careful analysis of what incentives such a regulation would introduce is strongly recommended.

'One should be careful, though, before importing lessons drawn from one industry into another, since networks can differ substantially.'⁴⁵

Before imposing regulations, a careful analysis of what incentives such a regulation would introduce is strongly recommended. It is also worth recollecting the trade-off between, on the one hand, short-run competition and, on the other hand, the incentives for investments and long-run competition. Excessively strict regulations would clearly restrict the incentives to invest and to engage in facilities-based competition.

⁴⁵ Page 181. It appears that the same warning can be applied to a specific theoretical model of one network industry.

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■ Is “wage drift” a problem?

BY EVA UDDÉN SONNEGÅRD

The author works in the Monetary Policy Department.

The Swedish debate on wage formation has often focused on wage drift as an inflationary mechanism. The traditional explanation for wage drift is that wage agreements have failed to mirror the prevailing state of demand for different groups in the labour market and thereby necessitated subsequent wage adjustments via market forces. During the 1990s, collective wage negotiations have tended towards a growing element of local wage formation. In the central government sector there are solely local agreements for all employees. As the separate outcome of local agreements cannot be identified in the wage statistics, this tendency has altered the content of the component that previously represented wage drift. This article outlines a framework for an analysis of wage changes apart from those in the agreements. These additional wage changes, referred to in the statistics as the residual, comprise local wage formation, traditional wage drift and structural effects. From the analysis it is concluded that a decomposition of wage increases into those from agreements and other increases is not particularly meaningful, at least for forecasting purposes. Neither is it particularly relevant for a policy organisation, for example the Riksbank, to focus on the residual. The pertinent factor for the Riksbank is aggregate wage costs as an item in the assessment of inflationary pressure.

I want to thank mediators Rune Larson, Benne Lantz and Claes Stråth for fruitful discussions that inspired this article. I am also indebted to Christina Euren, Åke Kämpe and Maj Nordin from the National Mediation Office, as well as Kristian Söderholm from Statistics Sweden for illuminating statistical material. I have received valuable views from Villy Bergström, Hans Dellmo, Per Jansson and Sara Tägtström but am myself entirely responsible for the analysis and the opinions expressed in the article.

When debating wage formation, economists continually come back to the central role of *wage drift*. Even when the labour market organisations conclude wage settlements in line with a favourable macroeconomic development, future wage drift is still an uncertain factor. Among economists, “wage drift” is an established concept for “wage changes that differ from the agreements”.

Wage drift has attracted a great deal of attention for a number of reasons. One is the need to forecast wages as accurately as possible. A common wage-forecasting method starts from the existing wage settlements in the labour market and then estimates the likely size of future wage drift. In the ideal case, the settlements, which often apply for the next couple of years, provide information that renders the wage forecasts

“Wage drift” is an established concept for “wage changes that differ from the agreements”.

Wage drift is highlighted for the need to forecast wages and because it may be inflationary.

less uncertain. Another reason for highlighting wage drift is that it can fuel inflation. The traditional explanation of wage drift is that wage agreements have failed to mirror the prevailing state of demand for different groups in the labour market and thereby necessitated subsequent wage adjustments. The negotiated wage increases, for example, have been based on a distributional profile that was desirable for other reasons than implied by the market. That was the case, for instance, in the 1960s and 1970s, when the policy of wage solidarity was interpreted as calling for narrower wage spreads.¹

The concept of wage drift has changed, above all in the 1990s.

A complication when analysing wage drift is that the content of this concept has changed, above all in the 1990s, on account of institutional conditions in the labour market. It is therefore necessary to understand the changes that have occurred in the bargaining process and their consequences for the concept of wage drift.

In this article I discuss the relevance of the concept of wage drift. I begin with an account of how wage drift arises and how it is measured in the statistics. A macro model for wage drift is then presented and shows that the historical relationships fail to predict wage drift with much accuracy in the late 1990s. Then I account for the institutional conditions in the wage formation process and outline a framework for analysing wage formation with particular reference to the *residual component* (or what economists usually call wage drift). Local wage formation and more traditional wage drift are discussed. Finally I consider the importance of the residual for forecasting and its likely inflationary effects. It can be noted that for inflationary pressure it is the development of aggregate wage costs that is relevant rather than whether the wage increases come from collective settlements or some other mechanism. In an appendix I make a more in-depth analysis of how various structural changes in the labour force have affected sectoral wage trends.

What is wage drift?

All wage changes apart from settlements are usually referred to as wage drift but this item is actually a statistical residual and its content changes over time.

The labour market in Sweden is characterised by fairly regular rounds of wage bargaining. Negotiated wage increases can be computed from the settlements the social partners have concluded. These agreements are known in advance and their duration is often around two years. As a rule, however, wage outcomes differ from the negotiated wage increases. All registered wage changes apart from those arising from collective bargain-

¹ The basic idea behind the policy of wage solidarity was equal pay for equal work regardless of whether or not the individual enterprise could carry the resultant wage costs. Unprofitable firms closed and structural adjustment accelerated. In time, however, the wage solidarity policy came to be interpreted as equal pay for "everyone" regardless of job differences. See e.g. Flam (1987).

ing are usually referred to as wage drift but this item is actually a statistical residual and its content changes over time.

The traditional explanation for the occurrence of wage drift is that wage settlements do not mirror the prevailing conditions in particular labour markets and that wages are subsequently adjusted via these market forces. Negotiated wage increases are liable to differ from market wages for a number of reasons. One explanation starts from the institutional conditions that prevailed in Sweden in the 1960s and 1970s, when the central wage settlements, for example between the Trade Union Confederation (LO) and the Employers' Confederation (SAF), often contained an explicit distributional profile that tended to deviate from what would have been the result if market forces had played a larger part in wage setting. Another explanation is that settlements apply to the future, often the coming two years, and therefore have to be based on uncertain economic forecasts. To the extent that demand conditions deviate from the assessment behind the negotiated settlements, subsequent wage adjustments may be called for in the form of wage drift.

A mechanism that has featured prominently in the debate on wage formation is the tendency for different groups in the labour market to feel that the settlements have treated them unfairly, so that they subsequently require compensation irrespective of whether these requirements are supported by prevailing demand. Wages may then be adjusted if the required compensation is warranted by higher demand. If not, the negotiators in the next round of wage bargaining may try to obtain compensation for these groups via various earnings guarantees. In this way, the notion of compensation is liable to generate a spiral of wage increases in that different groups with deteriorating relative wage levels call for compensation either in negotiated settlements or from individual employers. This mechanism was particularly evident as a result of the LO collective's drive for low-wage earners in the 1960s and 1970s. Nominal wage increases of around 10 per cent were not uncommon in that period.

The economic explanations for wage drift make it desirable to have reasonably exact measurements of both the negotiated wage increases (after the wage negotiations have been finalised for each workplace) and the size of subsequent wage adjustments (the size of wage drift for individual employees). Even if this ideal decomposition of wage increases were feasible, there would still be a residual component consisting of, for example, changes in the composition of the labour force by age, occupation and education, job reclassification, changes in piece-rate systems and various measurement errors.

The traditional explanation for wage drift is that negotiated wages are subsequently adjusted via market forces.

Wage drift unfortunately cannot be analysed separately as a variable determined by demand.

Wage drift unfortunately cannot be analysed separately as a variable determined by demand apart from the agreements. Local settlements are not official, which means that the negotiated wage increases do *not* include wage increases arising from local bargaining. The negotiated wage increases are based instead on wage settlements at union level.² These settlements are reported as a processed version of the official (short-term) wage statistics under the heading Agreements.³ Other wage increases are assigned to the statistical residual, the size of which accordingly depends on the accuracy with which the negotiated wage increases are measured.⁴ A matter of importance for the measurement of the negotiated wage increases is how the union settlements are specified. Changes in the negotiating process accordingly complicate comparisons over time. Compared with earlier decades, the stabilisation policy environment in which collective bargaining takes place is radically different today.

How is wage drift explained in economic models?

Empirical studies on Swedish data show that the augmented Phillips curve has given a relatively good explanation of blue-collar wage drift in manufacturing.

Empirical studies on Swedish data show that the augmented Phillips curve has given a relatively good explanation of blue-collar wage drift in manufacturing. In such a model, wage drift is determined essentially by inflation expectations and demand pressure in the labour market. In an analysis of whether altered institutional conditions had affected the process of wage formation, Friberg and Uddén Sonnégård found no clear-cut evidence of such an effect.⁵ The historical relationships were weak and failed to predict wage drift in recent years with much accuracy. According to the empirical estimations, in the late 1990s wage drift should have been higher than was actually the case.⁶ An updated version of the study, using data up to the end of 2002, clearly shows that the model overestimates wage increases on top of settlements (see Figure 1). As measured in the short-term wage statistics, wage drift in the period 2000–02 was considerably lower than indicated by the forecast based on the empirical estimations.

This prompts the conclusions that inflation expectations and the

² Note that in the Swedish debate on wage formation, industry settlements are called central settlements. Up to the mid 1980s, agreements were concluded centrally between, for example, LO and SAF; today, settlements are reached at industry level or locally in the individual firm.

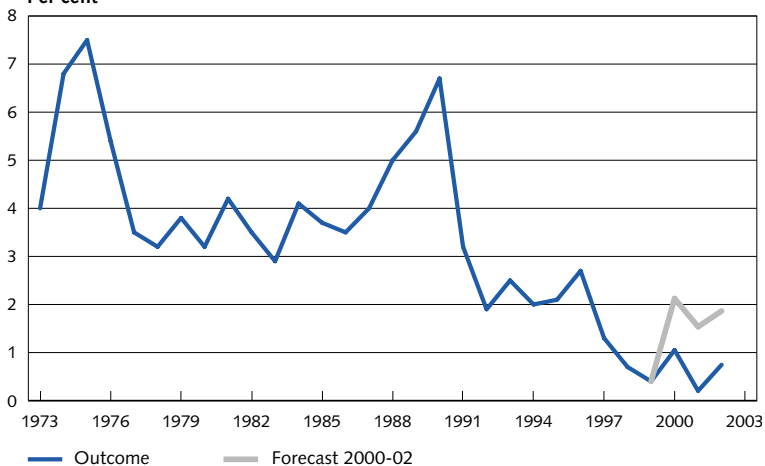
³ The calculations are done in the National Mediation Office, a government agency that is responsible for the wage statistics; these figures are recorded under the heading Agreements, enclosed in quotation marks to indicate that they are estimates.

⁴ For a discussion of negotiated wage increases and the residual, see Eurén (1998).

⁵ See Friberg & Uddén Sonnégård (2001).

⁶ The empirical estimations on the period 1973–97 also gave higher wage drift than the outcomes for both 1998 and 1999. See Friberg & Uddén Sonnégård (2001), page 68.

Figure 1. Wage increases on top of central and industry agreements, blue-collar workers in manufacturing; outcome and forecast
Per cent



Note. The forecast is based on estimations of the period 1973-99.

Sources: Statistics Sweden, National Mediation Office and the author's calculations in accordance with the model in Friberg & Uddén Sonnegård (2001).

labour market situation cannot explain wage drift to the same extent as earlier⁷ and that the changes in institutional conditions for wage formation have mainly affected the decomposition of aggregate wage increases into negotiated increases and wage drift.

Institutional conditions in the labour market

Since 1993 wage bargaining rounds have been conducted in the context of a stabilisation policy regime that focuses on a balanced budget and price stability. Monetary policy in this regime entails raising the interest rate and curbing demand if future inflationary pressure is calculated to be unduly strong. With a credible monetary policy, the social partners will then negotiate knowing that excessively large increments to wage costs will lead to increased unemployment and not to higher inflation.⁸ Initially, however, inflation expectations in the labour market were above the 2 per cent target, which indicates that monetary policy credibility took some time to achieve in the new regime. The 1995 wage bargaining round is commonly cited as an example of wage formation in disarray. In the period 1995-97, annual wage growth in the total economy averaged almost

Since 1993 wage bargaining rounds have been conducted in the context of a stabilisation policy regime for a balanced budget and price stability.

⁷ Recursive estimations, breakpoint tests and dummy variables provided some support for this conclusion, though the results were mixed. See Friberg & Uddén Sonnegård (2001) for further details.

⁸ There is some empirical evidence that a monetary policy with a credible inflation target promotes wage restraint. For a discussion, see Calmfors & Uddén Sonnegård (2001).

The 1997 Industrial Agreement marked the beginning of a new form of collaboration in wage bargaining.

5 per cent. Towards the end of 1996, inflation expectations in the labour market had declined to 2 per cent.

In the run-up to the 1998 round of wage negotiations the social partners in the industrial sector concluded what is known as the Agreement on Industrial Development and Wage Formation, which included rules for negotiating procedures in this sector. This marked the beginning of a new form of collaboration in wage bargaining. In connection with the Agreement, assessments were made of the available scope for labour costs, given that inflation remained low and increased employment would be feasible. The aim was that with settlements at an early date, the sector exposed to foreign competition would establish a frame for agreements in other contractual areas and that the negotiated wage increases in the exposed sector would function as a benchmark or norm. For the settlement period 1998–2000 the annual aggregate wage rise for the total economy averaged about 3.5 per cent, which was considerably below the outcome of the previous bargaining round. The negotiations in the 2001 bargaining round followed much the same procedures as in 1998. In the first two settlement years, 2001–02, the annual rate of wage increases in the total economy was just below 4 per cent. To date in 2003 wages have risen little more than 3 per cent but a higher outcome is foreseen when more local agreements have been concluded. The bargaining round that has just been initiated and will be conducted in 2004 is expected to follow the same model as the previous two.

The greatest change has occurred in the public sector, where the whole of the central government sector is now covered solely by local settlements.

Even since the central negotiations between LO and SAF ceased in the early 1980s, the private sector employers have aimed to make wage bargaining increasingly decentralised. The element of local wage formation grew in the 1990s, particularly for white-collar employees. But the greatest change has occurred in the public sector, where the whole of the central government sector, for example, is now covered by various forms of purely local settlement.⁹ The degree of local wage formation in the private as well as the public sector is shown in Table 1. The most common form of private sector settlement consists of a central frame agreement, concluded at industry level, including a wage kitty to be distributed in the local negotiations, sometimes with some form of individual guarantee (item 5 in the table). A form that is becoming more widespread and is already predominant in the central government sector, is a settlement that specifies the room for wage increases as a cut-off or default level; the settlement becomes binding if the local negotiators fail to reach an agreement (item 3 in the table).

⁹ A detailed account in Swedish of the bargaining rounds and wage formation will be found in the annual reports from the National Mediation Office for 2001 and 2002 (with summaries in English).

TABLE 1. CONSTRUCTION OF AGREEMENTS IN THE PRIVATE, CENTRAL GOVERNMENT AND LOCAL GOVERNMENT SECTORS PER CENT OF EMPLOYEES COVERED

Agreement model	Private sector	Central government sector	Municipal and county council sector*
1. Local wage formation, no centrally-determined wage scope	7	32	28
2. Local wage formation, wage scope regulated by cut-off	5		
3. Local wage formation, wage scope regulated by cut-off, supplemented by some form of individual guarantee or general wage increase	8	68	
4. Wage kitty, no individual guarantee	7		24
5. Wage kitty with individual guarantee or regulated by cut-off	45		48
6. General wage increases and wage kitty	18		
7. General wage increases	10		

* The individual guarantee has been dropped in the Municipal Workers' Union's new agreement, which means that 72 per cent of local government employees now have type 4 agreements.

Source: Annual report from the National Mediation Office, "The 2002 bargaining round and wage formation" in Swedish.

The agreements with the largest element of local wage formation have been concluded by the unions that organise university-trained professionals. The central agreement (at industry level) that was concluded for this group in the latest bargaining round was non-numerical, that is, no figure was specified either for the wage kitty or for the cut-off (item 1 in the table). In the local government sector, solely local settlements were reached for university-trained professionals, teachers and doctors, while central negotiations at industry level continued to be of major importance for other employees. To sum up, wage settlements based solely on local wage formation apply in a fifth of the private sector, a third of the local government sector and the whole of the central government (items 1–3 in the table).

Wage settlements based solely on local wage formation apply in a fifth of the private sector, a third of the local government sector and the whole of the central government sector.

A framework for analysing wage formation

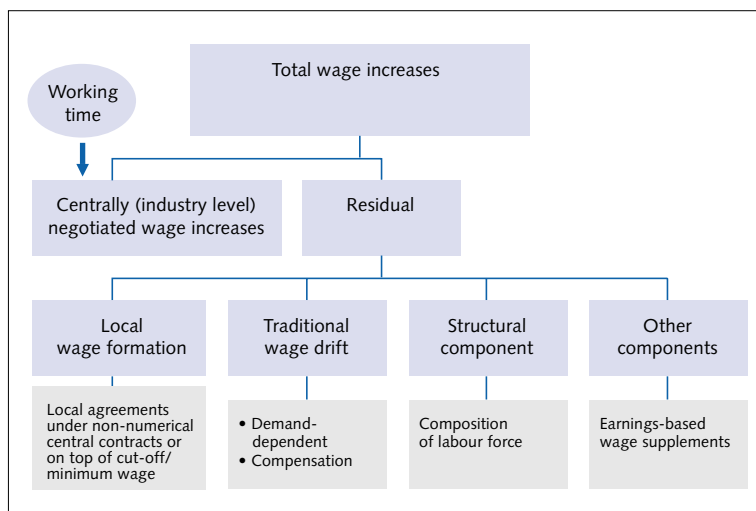
A framework for analysing aggregate wage increases with particular reference to the residual component is presented in Chart 1.¹⁰ The centrally negotiated wage increases are derived from existing industry settlements and can be found in the processed version of the short-term wage statis-

¹⁰ The analysis was made in conjunction with a wage formation project at the National Mediation Office in 2002; the present author directed the project and also presented the framework to the social partners at an extended seminar.

tics under the heading Agreements. They include the estimated cost of any shortening of working hours. In the event of a non-numerical central (industry) settlement, the negotiated wage increase is set at zero. If the settlement specifies a cut-off for the scope for wage increases, this is taken to represent the negotiated wage increase in the calculations.¹¹ Other wage increases are assigned to the residual.

As local settlements are not shown separately in the wage statistics, the residual consists primarily of all wage increases that are settled locally on top of a cut-off or a minimum wage. These wage increases are presented as *local wage formation*. The part of wage drift that is determined by demand and the part that represents compensation for wage increases elsewhere make up the component *traditional wage drift*. The third item in the residual, the *structural component*, has to do with statistical problems of aggregation. Finally there is a *miscellaneous* component, consisting for example of bonuses and other variable supplements. Unfortunately the official wage statistics do not measure performance-based supplements, so the miscellaneous component has to be estimated from other statistical sources.¹²

Chart 1. Framework for analysing wage formation – components of the residual item



¹¹ A more detailed explanation of the calculations is available in Swedish on the website (www.mi.se) of the National Mediation Office.

¹² The wage bill calculations for the national accounts include all taxable benefits, including wage supplements based on performance.

Local wage formation is not a new component; wage increases that cannot be identified in sectoral agreements have always been assigned to a residual whether or not they represented local settlements or individual adjustments. However, local wage formation probably constituted a growing share of the residual in the 1990s, when local settlements that did not simply implement sectoral agreements seemed to have become increasingly common.

A larger element of local wage formation presumably implies that the importance of *traditional wage drift* is now diminishing. It is reasonable to suppose that the local assessments of market demand and supply are more reliable than those connected with central negotiations. The need for subsequent wage adjustments may then be smaller than in earlier periods.

Demands for compensation, previously a common feature of wage formation, seem to have been incorporated more in the regular wage negotiations instead of resulting in subsequent adjustments. It is conceivable that the new era – with the Industrial Agreement and other agreements on negotiating procedures – has led to less of the competitive “follow-the-leader” behaviour that resulted in wage spirals. However, it is hard to draw any definite conclusions about this. When the Municipal Workers’ Union cancelled the third year of its wage settlement in October 2002, the argument was that the development of its members’ wages had been excessively weak in relation to other groups.¹³ The initial bid from LO in the run-up to the 2004 negotiations includes initiatives designed to improve the relative position of certain low-wage groups. The same applies to the Union of Clerical and Technical Employees in Industry (SIF) and the Association of Graduate Engineers (CF). This shows that relative wage development is continuing to be an important factor in wage negotiations.

In the central government sector, the agreements are non-numerical for as much as 32 per cent of employees. As the wage statistics are based on sectoral agreements, the whole of the wage increase for these employees is therefore assigned to the residual. That partly explains the growing size of the residual in the central government sector in the second half of the 1990s (see Figure 2). In recent years the residual has also grown in the local government sector, where it is primarily highly trained health care personnel in the county councils that have solely local wage agreements.

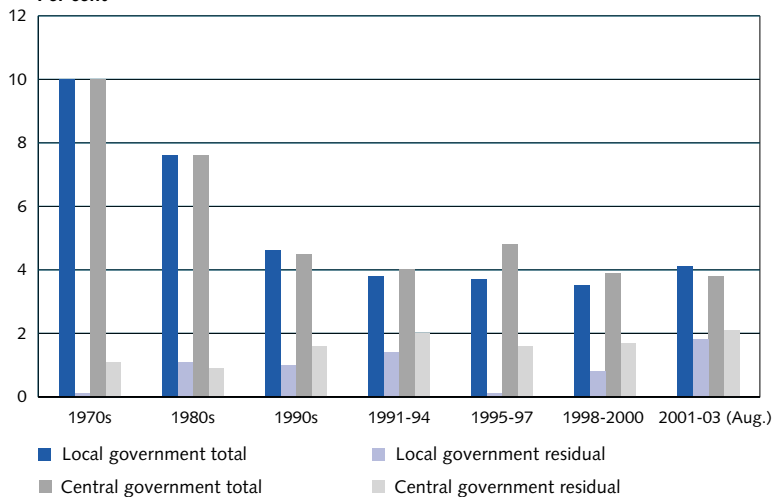
Local wage formation probably made up a growing share of the residual in the 1990s, when local settlements became increasingly common.

A larger element of local wage formation presumably implies a diminishing importance of traditional wage drift.

The new era – with the Industrial Agreement and other agreements on negotiating procedures – may have led to less of the competitive “follow-the-leader” behaviour.

¹³ See Sveriges Riksbank (2002).

Figure 2. Average wage increases in central and local government sectors
Per cent

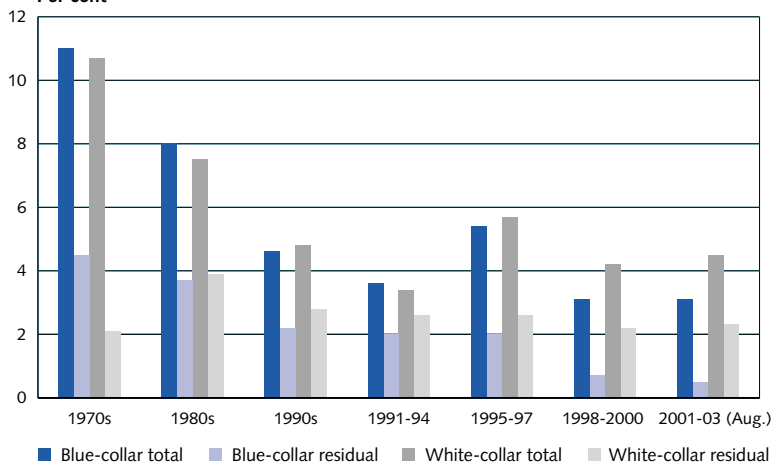


Source: National Mediation Office.

Historical comparisons of the residual are likely to be fairly consistent for blue-collar workers in manufacturing.

In the private sector, local agreements of various types apply to only a fifth of employees. They are mainly white-collar groups; the blue-collar agreements tend to be more traditional, with wage scope and individual guarantees. This helps to explain why the residual's share of wage increases is larger for white-collar than for blue-collar workers in manufacturing (see Figure 3). Thus, historical comparisons of the residual are likely to be fairly consistent for blue-collar workers in manufacturing but less relevant for white-collar workers there and not even feasible in the central government sector.

Figure 3. Average wage increases, blue- and white-collar workers in manufacturing
Per cent



Source: National Mediation Office.

Finally, there is the residual's *structural component*, which has to do with wage increases being recorded as the average for a particular group or sector of the labour market at a given time. It follows that the rate of wage increases is affected by changes in the composition of the labour force. Such compositional effects probably became increasingly important in the 1990s. The cost crisis and the international economic slowdown early in that decade led to a marked weakening of the labour market. It is reasonable to suppose that labour shedding by firms then focused in the first place on employees who were comparatively young, had less occupational experience, less education and lower wages than others. By itself, the altered composition of labour forces accordingly raised the average wage for the remaining employees. It could be expected that when demand started to recover and firms began to recruit again, the structural component would be negative, at least if former employees were reinstated.

The structural component of the residual comes from changes in the composition of the labour force.

In practice, however, this does not seem to have happened at all widely. When demand picked up in the second half of the 1990s, the recruited labour was more skilled than before. This resulted in an even higher average wage rise that did not necessarily include sizeable individual wage increases. It should be noted, however, that at the same time the structural changes presumably affected productivity growth. Evaluations of the two most recent wage bargaining rounds in manufacturing show that in the period 1999–2002 the structural component of the residual was positive and averaged about 0.3 percentage points a year, which is almost a quarter of the residual.¹⁴ This is mainly explained by a growing proportion of white-collar employees in manufacturing.

The average wage rise became even higher without necessarily giving sizeable individual wage increases.

The size of the structural changes in the labour market is analysed in an appendix to this article. I have calculated the structural component from Statistics Sweden's wage structure statistics, which adjust the rate of monthly wage increases for changes in distributions by sex, age and education as well as for sector shifts. A weighted aggregate for the total economy shows that in the period 1992–2001 the monthly wage level rose at an average annual rate of about 4.2 per cent and that almost a tenth of this (about 0.4 percentage points a year) came from demographic changes, changes in educational levels and sectoral shifts.

One explanation for the structural component of the residual lies in cyclical factors – firms adjust their labour force to changes in business activity. Another explanation concerns economic changes of a more structural nature. One factor behind the rising level of education throughout the 1990s may be that technical developments require labour that is more

The residual's structural component has to do with cyclical factors as well as changes in economic structures.

¹⁴ See Industrins Ekonomiska Råd (2003).

highly trained than before. The structural component is also affected by a redistribution of labour forces between sectors. If a sector grows, its average monthly wage will weigh more heavily in the aggregate. When the transformation of State Railways (SJ) into a central government company involved a reclassification from the public to the private sector, the rate of wage increases rose in both sectors (see Appendix).

The residual in the central government sector – an application of the analytical framework

The residual's various components cannot be identified in the available wage statistics for the total labour market.

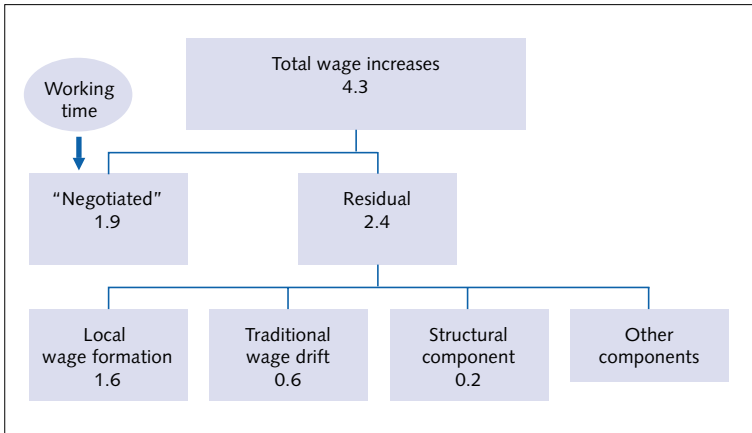
The residual's various components cannot be identified in the available wage statistics for the total labour market. The social partners do have access to statistics that can illustrate current wage formation but there is a lack of comprehensive official statistics. This makes it difficult to set numbers to the components in the analytical framework.¹⁵ Statistics from the National Mediation Office (MI) and from the Agency for Government Employers (AGV) have therefore been used to provide an indication of how the framework can be applied. Wage outcomes for the most recent settlement year are reported annually by AGV.¹⁶ Note, however, that it is in the central government sector that local wage formation predominates. It may still be of interest to include negotiated wage increases in the analytical framework as long as MI publishes statistics on settlements. The figure has been calculated as an average of the wage increases that are entered under Agreements in the processed wage statistics for the period September 2001 to September 2002. The wage increases negotiated at union level then average 1.9 per cent, even though the figure is zero for almost a third of the employers and is expressed as a cut-off for the remainder. The statistics accordingly give a rather unrealistic picture of wage formation specifically in the central government sector; the distinction between agreements and residuals has become increasingly pointless.

AGV's account of wage developments has the big advantage that the wage increases are adjusted for structural changes. This makes it possible to compute the structural component in the analytical framework. The account also includes an item called "Other wage developments", with a figure of 0.6 percentage points for the period considered here; this can be said to correspond to traditional wage drift in the framework. Finally, the item local wage formation can be obtained residually. The size of the various components for the central government sector is shown in Chart 2.

¹⁵ The framework was applied to manufacturing in the latest report from the Economic Council for Industry, see Industrins Ekonomiska Råd (2003b).

¹⁶ See Arbetsgivarverket (2003).

Chart 2. Framework for analysing wage formation – the central government sector
Per cent



Sources: National Mediation Office, Agency for Government Employers and author's calculations.

The point of this example is that it illustrates the growing importance of local wage formation. Almost half of the wage increases in the central government sector turn out to be a result of local agreements. While the central government sector is currently an extreme case, there is also a growing element of local wage formation in other labour markets.

While the central government sector is currently an extreme case, there is also a growing element of local wage formation in other labour markets.

What is the residual's significance for forecasters?

Wage forecasts are often made by starting from the wage agreements in the labour market and then estimating wage drift. This means that wage settlements can be an important input in forecasting work provided they are statistically meaningful. Non-numerical or so-called zero agreements are of no assistance as a foundation for forecasts. Agreements specifying a minimum wage or a cut-off level can provide some indication of what the local settlements will give. Finally, agreements with general wage increases can be expected to serve as a starting point for forecasting wages that is fairly acceptable or at least as acceptable as in a historical perspective.

However, good institutional knowledge of wage agreements is needed if wage increases are to be calculated and evaluated from them. It is also necessary to forecast the residual and its components. And even if the local negotiations have been completed, obtaining and successfully using statistics on the local outcomes may be a problem or even impossible for the forecaster. These outcomes then have to be forecast, presumably on the basis of an assessment of demand in different sectors and

Good institutional knowledge of wage agreements is needed if wage increases are to be calculated and evaluated from them.

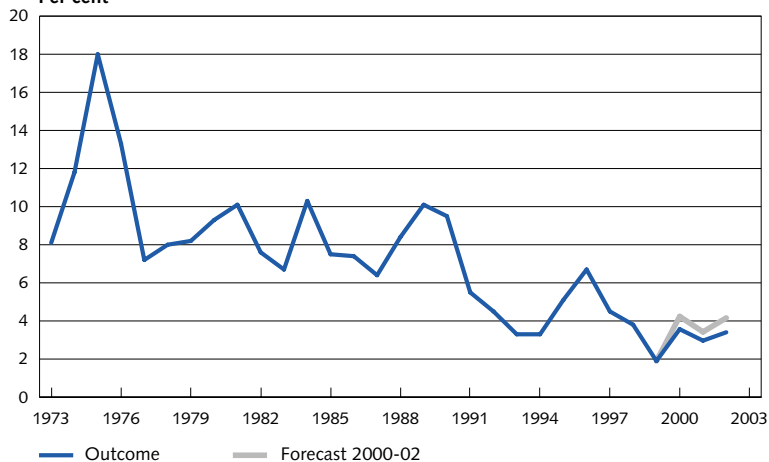
One approach is to forecast wages directly at an aggregate level.

regions. The conceivable development of traditional wage drift must also be gauged. Finally, the forecaster has to estimate the size of the structural component. So a forecaster has to go through many stages to arrive at a reasonably fair assessment with this method.

An alternative approach is to construct a wage forecast directly at an aggregate level, that is, to forecast the development of total wage increases. This approach has the advantage that the size of wage drift – the size of the residual – does not have to be determined separately. Considering how institutional conditions in the labour market have changed in recent years and the wide variety of wage agreements that are being used, it seems less meaningful to discuss forecasts in terms of negotiated wage increases and wage drift.

One possibility is to use formalised models that estimate the rate of total wage increases. An example is the model in the study by Friberg and Uddén Sonnégård (2001). The Phillips curve model explained total wage development better than wage drift. The slowing of the rate of wage increases in manufacturing in the 1990s was essentially explained by the low inflation expectations and the weak labour market. A forecast for the period 2000–02 shows that the model is able to reproduce the variations in the rate of wage increases but somewhat exaggerates the increases throughout the forecast period (see Figure 4).

Figure 4. Total wage increases, blue-collar workers in manufacturing; outcome and forecast
Per cent



Note. The forecast is based on estimations of the period 1973-99.

Sources: Statistics Sweden, National Mediation Office and the author's calculations in accordance with the model in Friberg & Uddén Sonnégård (2001).

Of course there are contexts where it may be both natural and desirable to decompose wage increases into negotiated and other components without this necessarily being the case for forecasts. Relevant examples are the evaluation of wage bargaining rounds and the discussion of what the social partners have achieved in a particular round. In such cases it may be important to be able to calculate the size of the negotiated wage increases. The analysis of this is preferably done together with the social partners in that they have the best statistical material. A problem in this connection is that a fairly exact analysis cannot be made until very late in the negotiating process, when the local settlements have also been concluded.

If it is the final result of wage formation that matters rather than individual components of the process, the issue of whether wage increases come from agreements or from some other mechanism is less relevant. In the Riksbank's analysis, the focus is on total wage costs, since these are ultimately most important for the development of inflation. That is not meant to imply that negotiating rounds are unimportant. They play a central part in the labour market and can give early signals about future wage formation. Still, the signals are less valuable when wage bargaining contains a considerable element of local wage formation. In the macro-economic context, however, wage developments are primarily explained by inflation expectations and the state of demand. Assessments of these variables are then important inputs in the work of forecasting wages.

Does the residual drive inflation?

In conclusion, the question of whether wage drift constitutes a problem can now be answered. First we can note that changes in the content of this concept render historical comparisons problematical. Moreover, a discussion of inflationary impulses from wage drift, the residual, seems less pertinent today than in, say, the 1960s and 1970s. So even in the context of inflation, it is the development of total wage costs that is relevant rather than wage drift or the residual separated from the negotiated wage increases.

Recent wage formation, with a plethora of union agreements and local settlements, results in a more variegated pattern of wage developments than was possible with the earlier central agreements for large groups of employees. So presumably the assessments of demand and supply in different sectors and regions should be more reliable than the earlier central assessments. To this extent there should therefore now be less need for subsequent wage adjustments. On the other hand, the agreements in recent years have had longer durations (generally three

A decomposition of wage increases into negotiated and other components is natural in some contexts; one is the evaluation of bargaining rounds.

In the Riksbank's analysis, for example, the focus is on total wage costs, since these are ultimately most important for the development of inflation.

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The assessments of demand and supply in different sectors and regions should be more reliable than the earlier central assessments.

years), which no doubt means more uncertainty about the economic situation towards the end of the contractual period. If economic developments turn out to be more favourable than was foreseen when the agreements were concluded, this may entail increased demand pressure and additional wage increases on top of the local settlements. Expressed in terms of the analytical framework, this means that the effects on inflation from the demand-determined component of traditional wage drift are not self-evident and may be either larger or smaller than in the past.

One form of wage increase that is very liable to be inflationary is the compensatory type.

One form of wage increase that is very liable to be inflationary is the compensatory type. This is particularly the case if groups with low productivity manage to raise their wages to make up for higher wage increases to other groups with higher productivity. However, it is hard to see how low-productive groups could achieve such demands in the interval between bargaining rounds without support in the wage negotiations. Such demands for compensation are therefore probably taken into account in the locally negotiated wage increases and not, as suggested in the analytical framework, in traditional wage drift.¹⁷

To sum up, in the new wage formation process there are tendencies towards both higher and lower inflationary pressure.

To sum up, in the new wage formation process, with only local agreements for a large proportion of employees, there are tendencies towards both higher and lower inflationary pressure. The residual, which measures wage changes apart from wage settlements, may play some part in this context but its importance presumably declined in the 1990s.

¹⁷ In a report based on questionnaire responses from personnel managers at 885 workplaces, half of the interviewed managers considered that employees perform less well if they are dissatisfied with their pay, making it rational for firms to comply with demands for wage increase. See Agell & Benmarken (2002).

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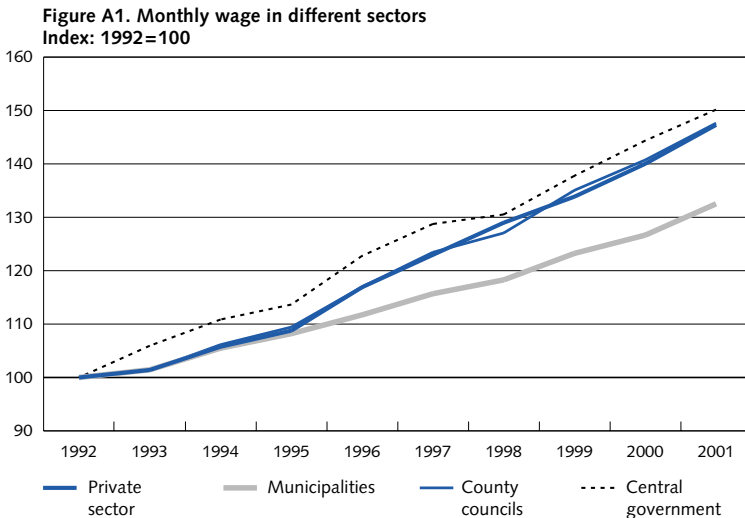
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Appendix: How large are the structural changes in the labour market?

The structural component is influenced by a number of factors: distributions by sex, age and education as well as sectoral shifts. As women are generally paid less than men, a growing proportion of female employees in a sector will tend to lower the average wage level. The same may apply if youth employment grows. In certain sectors, though, the higher level of education among young people may motivate higher pay. In general, an increased proportion of employees with a higher education in a sector implies a higher average wage. Finally, shifts between sectors may affect the average for the total economy.

The size of the structural sector can be gauged by using Statistics Sweden's wage structure statistics, which are based on individuals and measure average monthly pay for employees in municipalities, county councils, the central government and the private sector.¹ They also show the monthly pay for different groups, sorted for example by sex, age and education. This means that the average monthly wages can be adjusted for changes in the composition of the labour force.² The statistics for the period 1992–2001 have been used here.³



Sources: Statistics Sweden (wage structure statistics) and the author's calculations.

¹ The surveys are carried out in September on behalf of Statistics Sweden by the social partners. They are universal among municipalities, county councils and the central government sector, while a representative sample of firms is used for the private sector.

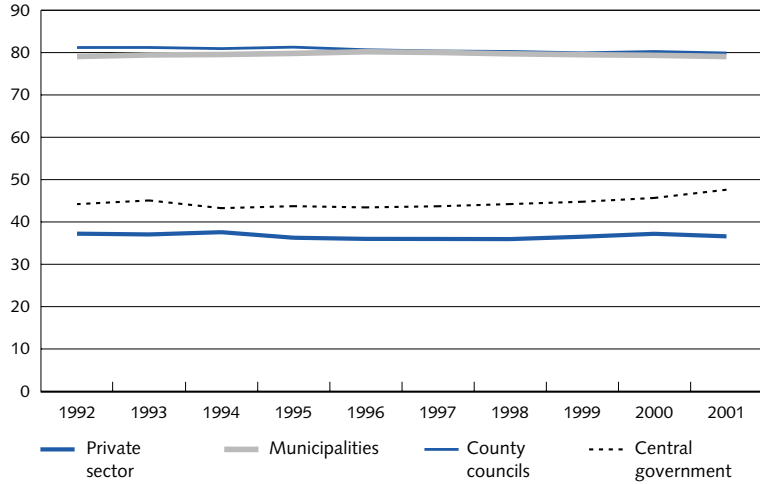
² Like all statistics, the wage structure statistics have shortcomings. Changes in measurement methods, for example, have resulted in a number of breaks in the series.

³ The material has been processed by the author. A weighted combination of white- and blue-collar employees has been used for the private sector. The series have been linked up between 2000 and 2001 on account of a reclassification of educational levels.

Looking first at the development of monthly wages with no allowance for the structural changes, it will be seen that the rate of increase has been highest, almost 5 per cent a year, in the central government sector and lowest, just over 3 per cent, in the local government sector (see Figure A1).

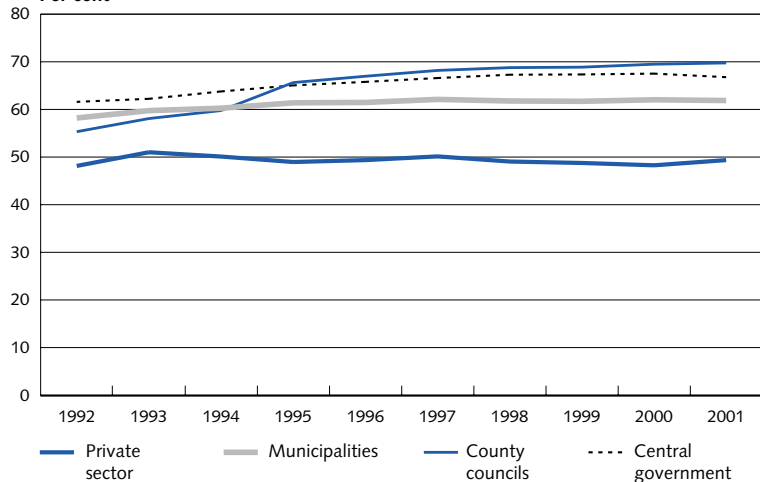
The proportions of women in the different sectors have all been fairly constant throughout this period. The proportion in municipalities and county councils has been twice as high as in the central government sector, while the private sector has the lowest proportion (see Figure A2).

Figure A2. Proportion of women in different sectors
Per cent



Source: Statistics Sweden (wage structure statistics).

Figure A3. Proportion of middle-aged and elderly employees (40-64 years) in different sectors
Per cent

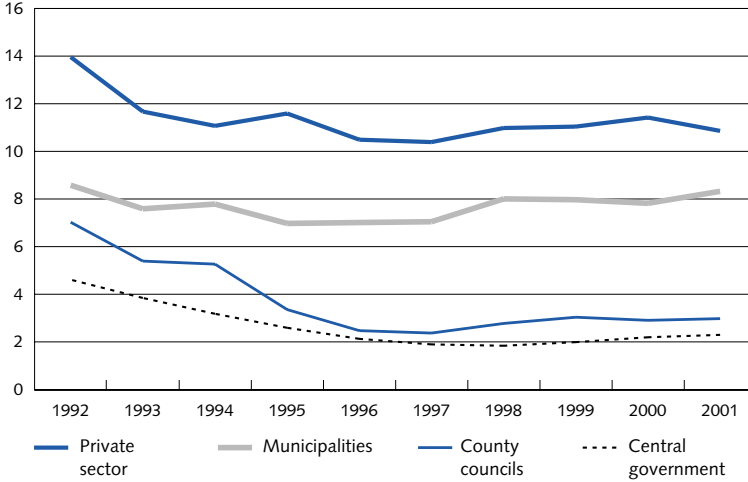


Source: Statistics Sweden (wage structure statistics).

Neither have the distributions by age changed dramatically, at least in the second half of the 1990s. The proportions of elderly and middle-aged employees have been virtually constant since 1995 (see Figure A3). For youth, on the other hand, the economic slowdown in the early 1990s led to a reduced proportion (see Figure A4). In the municipalities the proportion of youth in 2001 had more or less returned to the level in 1992.

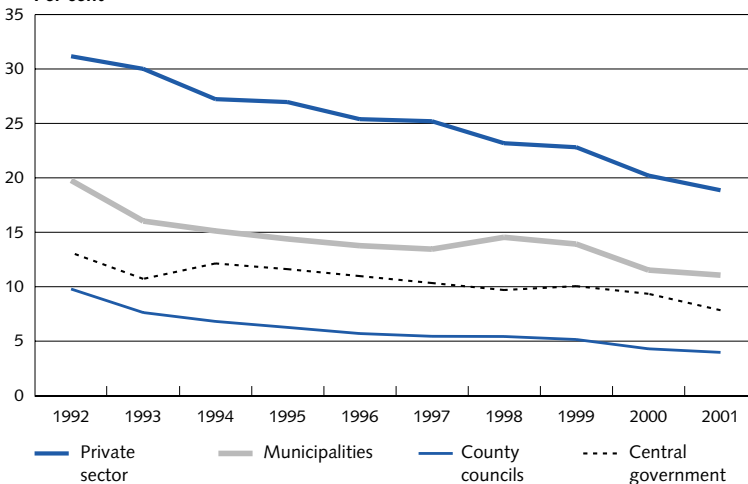
It is instead in levels of education that the major structural changes occurred in this period. The proportion with less than an upper secondary education has decreased dramatically in every sector and has even halved

Figure A4. Proportion of young employees (18-24 years) in different sectors
Per cent



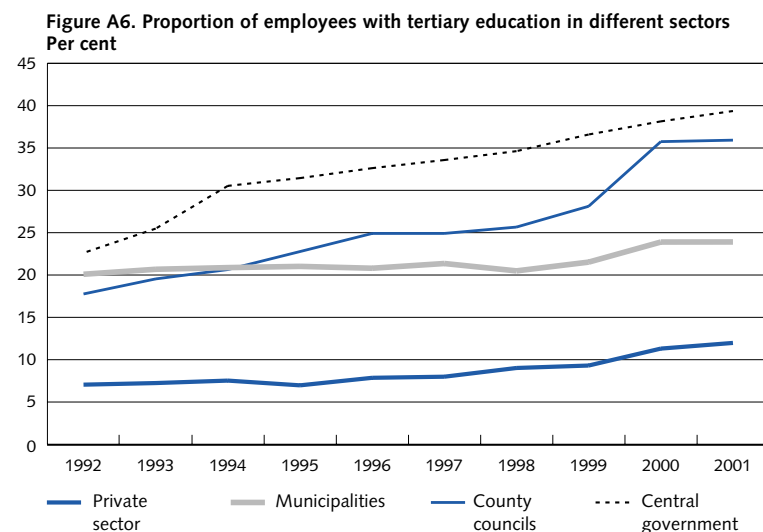
Source: Statistics Sweden (wage structure statistics).

Figure A5. Proportion of employees with less than an upper secondary education in different sectors
Per cent



Source: Statistics Sweden (wage structure statistics).

in the municipal and county council sectors (see Figure A5). This has been accompanied by almost a doubling of the proportion with tertiary education in the county council sector, the central government sector and the private sector, with a considerably less marked increase in the municipal sector (see Figure A6).



Note. The calculations are based on at least three years of tertiary education up to end 1999 and on at least two years from 2000 onwards; the two series have been linked together.

Sources: Statistics Sweden (wage structure statistics) and the author's calculations.

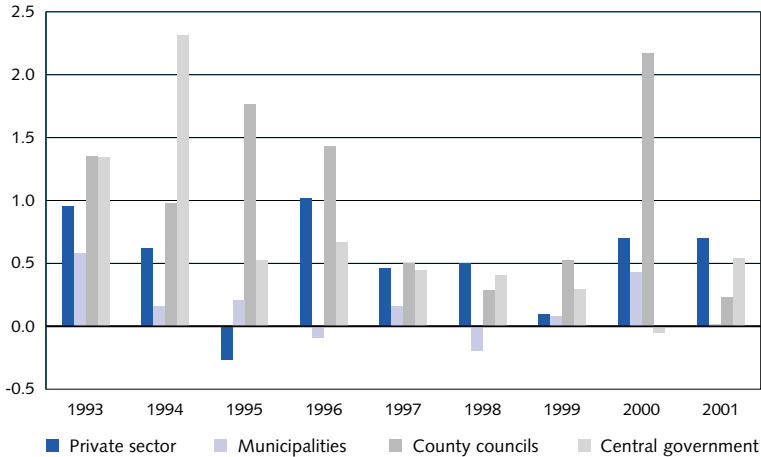
Thus it is primarily the labour force's level of education that changed in the second half of the 1990s. As wage levels are generally higher for well-educated labour, a part of the high rates of wage increases in, for example, the central government sector can be attributed to a rising level of education.

How do the structural changes affect the rate of wage increases?

Statistics Sweden also calculates the extent to which the wage level is affected by the combined changes in the distributions by sex, age and education. The results show that in the period 1992–2001 the structural component was largest in the county council and central government sectors, averaging 1 and 0.7 per cent a year, accompanied by an average of 0.5 per cent in the private sector and the smallest effect, 0.2 per cent a year, in the municipal sector (see Figure A7).

The structural component has mostly been positive, so the actual average rate of increase in monthly wages has been higher than would

Figure A7. Structural component: sex-, age- and education-dependent monthly wage rise
Per cent



Note. The average for the private sector has been calculated by weighting the rates of increase for blue-collar workers and white-collar workers according to their respective share of employment.

Sources: Statistics Sweden (wage structure statistics) and the author's calculations.

have been the case with a constant composition of the labour force. Here are some observations. The structural component was negative in the private sector in 1995, when employment turned upwards again and, for example, the recruitment of youth with a lower wage tended to hold average wage increases down. In the county council sector the structural component was high in some periods; the transfer of employees with a low education to municipalities in connection with health-care reforms left the county councils with a higher educational level.⁴ In 2000, when the educational level of nurses was upgraded in connection with a statistical revision, the structural component was over 2 per cent. In the central government sector the structural component was 0.6 per cent in 2001, when the State Railways (SJ) with a low wage level were transformed into a central government company and accordingly transferred statistically to the private sector.⁵ But as SJ's wage level was high for the private sector, this raised the average wage level there. In the total private sector, the structural component in 2001 was as much as 0.7 per cent.

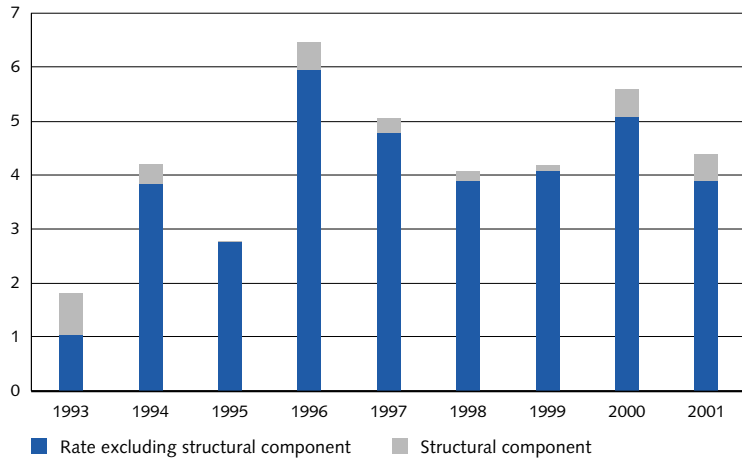
The size of the structural component is of some significance for wage developments. It may vary considerably over the years and is subject to

⁴ See Calmfors & Richardson (2003).

⁵ This calculation agrees with figures from the Agency for Government Employers (AGV). From September 2000 to September 2001 the average fixed wage in the central government sector rose 3 per cent; adjusted for the statistical reclassification of SJ, the increase amounted to 2.4 per cent, see Arbetsgivarverket (2002), page 9.

various errors of measurement. But as an average over a longer period it does provide an indication of how wage developments have been affected by structural changes. A weighted combination of the sectors shows that from 1992 to 2001 the monthly wage level in the total economy rose at an average annual rate of about 4.2 per cent. The structural changes explain about a tenth of this rate, that is, in the period studied the structural component was equivalent to about 0.4 percentage points a year (see Figure A8). In conclusion it should be noted that the structural changes in the labour force should presumably be mirrored in the development of productivity.

Figure A8. Monthly wage rise and its structural component in the total economy
Per cent



Sources: Statistics Sweden (wage structure statistics) and the author's calculations.

■ Notices

Commemorative coin on occasion of 30th anniversary of King Carl XVI Gustaf's accession to the throne

The Riksbank issued two commemorative coins on the occasion of the 30th anniversary of King Carl XVI Gustaf's accession to the throne; a 200-krona coin in silver and a 2,000-krona coin in gold. The coins were issued in a limited edition of 40,000 for the silver coins and 2,000 for the gold coins. The prices of the coins were set at SEK 250 and SEK 2,500 respectively.

The obverse side of both coins contains a portrait of King Carl XVI Gustaf in profile with the legend "CARL XVI GUSTAF" above and "KING OF SWEDEN FOR 30 YEARS" below. The reverse sides of the coins portray the greater national coat of arms under the royal crown with the legend above of the King's motto "FOR SWEDEN • WITH THE TIMES" and the legend below of "200 KRONOR" and "2,000 KRONOR" respectively.

The artist is Ernst Nordin, who is a renowned artist in the fields of coins, medallions and sculpture. The coin was minted by Nordic Coin AB Svenska myntverket in Eskilstuna. Further information and pictures of the coins are available on the Riksbank's website www.riksbank.se.

Swedish portfolio holdings 2002

On 11 November 2003, the Riksbank presented the result of its annual survey of Swedish portfolio holdings of foreign shares and debt securities. The survey shows that Swedish investors owned foreign portfolio assets corresponding to a market value of SEK 1,289 billion at the end of 2002, which was approximately SEK 250 billion less than at the end of 2001. Just over 60 per cent of these assets were invested in foreign shares and mutual fund units and the remainder in foreign debt securities. The large decline in portfolio assets was mainly due to falling stock markets around the world. A stronger krona exchange rate in 2002 also contributed to the decline in value.

The complete report can be downloaded from the Riksbank's website www.riksbank.se under Statistics/Balance of payments/Surveys.

■ Monetary policy calendar

- 1999-01-04** The *reference* (official discount) *rate* is confirmed by the Riksbank at 1.5 per cent as of 5 January 1999.
- 02-12 The *fixed repo rate* is lowered by the Riksbank to 3.15 per cent as of 17 February 1999. The Riksbank also lowers its *deposit* and *lending rates*, in each case by 0.5 percentage points. The deposit rate is set at 2.75 per cent and the lending rate at 4.25 per cent. The decision takes effect on 17 February 1999.
- 03-25 The *fixed repo rate* is lowered by the Riksbank from 3.15 per cent to 2.90 per cent as of 31 March 1999.
- 04-01 The *reference* (official discount) *rate* is confirmed by the Riksbank at 1.0 per cent as of 6 April 1999.
- 07-01 The *reference* (official discount) *rate* is confirmed by the Riksbank at 1.0 per cent (unchanged).
- 10-01 The *reference* (official discount) *rate* is confirmed by the Riksbank at 1.5 per cent as of 4 October 1999.
- 11-11 The *repo rate* is increased by the Riksbank from 2.90 per cent to 3.25 as of 17 November 1999.
- 2000-01-03** The *reference* (official discount) *rate* is confirmed by the Riksbank at 2.0 per cent as of 4 January 2000.
- 02-03 The *repo rate* is increased by the Riksbank from 3.25 per cent to 3.75 as of 9 February 2000.
- 04-03 The *reference* (official discount) *rate* is confirmed by the Riksbank at 2.5 per cent as of 4 April 2000.
- 12-07 The *repo rate* is increased by the Riksbank from 3.75 per cent to 4.0 per cent as of 13 December 2000. The Riksbank also increases its *deposit* and *lending rates* in each case by 0,5 percentage points. The deposit rate is set at 3.25 per cent and the lending rate at 4.75 per cent. The decision takes effect on 13 December 2000.
- 2001-07-05** The *repo rate* is increased by the Riksbank from 4.0 per cent to 4.25 per cent as of 11 July 2001. The Riksbank also increases its *deposit* and *lending rates* in each case by 0.25 percentage points. The deposit rate is set at 3.5 per cent and the lending rate at 5.0 per cent. The decision takes effect on 11 July 2001.

- 09-17 The *repo rate* is lowered by the Riksbank from 4.25 per cent to 3.75 per cent as of 19 September 2001. The Riksbank also lowers its *deposit* and *lending rates* in each case by 0.50 percentage points. The *deposit rate* is set at 3.0 per cent and the *lending rate* at 4.5 per cent. The decision takes effect on 19 September 2001.
- 2002-03-18** The *repo rate* is increased by the Riksbank from 3.75 per cent to 4.0 per cent as of 20 March 2002. The *deposit rate* is accordingly adjusted to 3.25 per cent and the *lending rate* to 4.75 per cent.
- 04-25 The *repo rate* is increased by the Riksbank from 4.0 per cent to 4.25 per cent as of 2 May 2002. The *deposit rate* is accordingly adjusted to 3.5 per cent and the *lending rate* to 5.0 per cent.
- 06-28 The *reference rate* is confirmed by the Riksbank at 4,5 per cent for the period 1 July 2002 to 31 December 2002.
- 11-15 The *repo rate* is lowered by the Riksbank from 4.25 per cent to 4.0 per cent as of 20 November 2002. The *deposit rate* is accordingly set at 3.25 per cent and the *lending rate* to 4.75 per cent.
- 12-05 The *repo rate* is lowered by the Riksbank from 4.0 per cent to 3.75 per cent as of 11 December 2002. The *deposit rate* is accordingly set at 3.0 per cent and the *lending rate* to 4.5 per cent.
- 2003-01-01**
- 03-17 The Riksbank decides to lower the *repo rate* from 3.75 per cent to 3.50 per cent, to apply from 19 March 2003. Furthermore, the Riksbank decides that the *deposit* and *lending rates* shall be adjusted to 2.75 per cent and 4.25 per cent respectively.
- 06-05 The Riksbank decides to lower the *repo rate* from 3.50 per cent to 3.00 per cent, to apply from 11 June 2003. Furthermore, the Riksbank decides that the *deposit* and *lending rates* shall be adjusted to 2.25 per cent and 3.75 per cent respectively.
- 07-04 The Riksbank decides to lower the *repo rate* from 3.0 per cent to 2.75 per cent, to apply from 9 July 2003. Furthermore, the Riksbank decides that the *deposit* and *lending rates* shall be adjusted to 2.00 per cent and 3.50 per cent respectively.

■ Statistical appendix

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Aktuell statistik från Riksbanken redovisas även på Internet (www.riksbank.se). Tidpunkter för publicering av statistik över Riksbankens balansräkning och valutareserv samt finansmarknads- och betalningsbalansstatistik tillkännages på Internationella valutafondens, IMF, webbplats (dsbb.imf.org). Publiceringstidpunkter kan även erhållas från Information Riksbanken.

1 Riksbank's assets and liabilities

ASSETS. PERIOD-END STOCK FIGURES. SEK MILLION

		Gold	Lending to banks	Fixed assets	Other	Total
2002	Jan	17 436	59 249	153 172	3 008	232 865
	Feb	17 436	56 564	154 218	3 266	231 484
	March	17 436	55 400	157 307	1 749	231 892
	April	17 436	53 522	151 943	3 902	226 803
	May	17 436	35 455	165 959	2 881	221 731
	June	17 436	21 635	161 820	2 233	203 124
	July	17 436	21 631	159 602	2 381	201 050
	Aug	17 436	23 176	163 286	2 360	206 258
	Sept	17 436	22 393	157 865	2 280	199 974
	Oct	17 436	22 233	157 437	2 234	199 340
	Nov	17 436	23 582	157 993	2 369	201 380
	Dec	17 436	30 714	159 791	2 806	210 747
2003	Jan	18 210	22 849	153 407	11 021	205 488
	Feb	18 210	23 405	155 029	6 759	203 403
	March	18 210	22 619	151 184	11 678	203 691
	April	18 210	23 276	156 777	3 306	201 569
	May	18 210	15 938	157 470	7 006	198 624
	June	18 210	15 674	159 341	2 259	195 484
	July	18 210	15 601	158 042	1 723	193 576
	Aug	18 210	17 186	161 861	3 642	200 899
	Sept	18 210	15 206	161 340	2 444	197 200
	Oct	18 210	14 971	163 016	1 198	197 395
	Nov	18 210	15 669	165 571	3 901	203 351

LIABILITIES. PERIOD-END STOCK FIGURES. SEK MILLION

		Notes and coins in circulation	Capital liabilities	Debts to monetary policy counterparties	Debts in foreign currency	Other	Total
2002	Jan	98 571	70 890	402	10 203	52 799	232 865
	Feb	97 395	70 890	89	11 090	52 020	231 484
	March	98 790	70 890	59	10 991	51 162	231 892
	April	97 023	70 890	525	7 823	50 542	226 803
	May	97 140	82 943	204	9 666	31 778	221 731
	June	97 931	62 943	52	9 640	32 558	203 124
	July	96 728	62 943	413	8 085	32 881	201 050
	Aug	98 367	62 943	133	10 450	34 365	206 258
	Sept	97 648	62 943	79	4 699	34 605	199 974
	Oct	97 411	62 943	117	3 675	35 194	199 340
	Nov	99 061	62 943	17	3 673	35 686	201 380
	Dec	107 439	62 943	87	3 664	36 614	210 747
2003	Jan	99 614	62 943	58	3 674	39 199	205 488
	Feb	100 475	62 943	33	3 327	36 625	203 403
	March	99 701	62 943	33	3 300	37 714	203 691
	April	100 318	62 943	98	4 135	34 075	201 569
	May	100 483	50 556	22	3 323	44 240	198 624
	Juni	100 142	50 556	123	4 173	40 490	195 484
	Juli	100 055	50 556	100	2 939	39 926	193 576
	Aug	101 644	50 556	69	7 247	41 383	200 899
	Sept	100 136	50 556	89	4 933	41 486	197 200
	Oct	99 987	50 556	58	6 483	40 311	197 395
	Nov	100 779	50 556	18	7 416	44 582	203 351

2 Money supply

END-OF-MONTH STOCK

		SEK million		Percentage 12-month change		
		M0	M3	MO	M3	
2000	Jan	82 276	949 834	Jan	10.2	8.5
	Feb	81 072	951 449	Feb	9.0	8.9
	March	81 105	944 846	March	8.0	8.1
	April	81 606	966 643	April	8.4	9.5
	May	81 866	984 906	May	7.3	10.7
	June	81 399	953 349	June	6.9	5.9
	July	81 370	944 491	July	6.0	5.7
	Aug	82 232	949 502	Aug	5.7	4.3
	Sept	82 947	966 556	Sept	6.0	4.9
	Oct	82 758	970 565	Oct	4.5	2.0
	Nov	84 004	975 144	Nov	4.4	4.1
	Dec	88 881	974 091	Dec	2.0	2.8
2001	Jan	84 327	960 545	Jan	2.5	1.1
	Feb	84 282	947 276	Feb	4.0	-0.4
	March	85 188	969 559	March	5.0	2.6
	April	86 379	975 366	April	5.8	0.9
	May	86 711	983 764	May	5.9	-0.1
	June	87 288	1 012 094	June	7.2	6.2
	July	86 705	977 812	July	6.6	3.5
	Aug	87 693	985 811	Aug	6.6	3.8
	Sept	87 892	1 008 439	Sept	6.0	4.3
	Oct	88 809	1 022 639	Oct	7.3	5.4
	Nov	89 947	1 039 646	Nov	7.1	6.6
	Dec	96 743	1 038 972	Dec	8.8	6.7
2002	Jan	89 737	1 031 807	Jan	6.4	7.4
	Feb	88 950	1 014 905	Feb	5.5	7.1
	March	89 998	1 033 020	March	5.6	6.5
	April	88 666	1 049 030	April	2.6	7.6
	May	88 818	1 025 757	May	2.4	4.3
	June	89 383	1 053 910	June	2.4	4.1
	July	88 631	1 037 162	July	2.2	6.1
	Aug	89 945	1 051 986	Aug	2.6	6.7
	Sept	89 567	1 061 341	Sept	1.9	5.2
	Oct	89 461	1 051 867	Oct	0.7	2.9
	Nov	90 465	1 068 389	Nov	0.6	2.8
	Dec	95 866	1 086 057	Dec	-0.9	4.5
2003	Jan	90 122	1 085 994	Jan	0.4	5.3
	Feb	90 505	1 072 732	Feb	2.9	5.7
	March	91 966	1 092 435	March	2.2	5.8
	April	92 334	1 095 256	April	4.1	4.4
	May	92 346	1 097 622	May	4.0	7.0
	June	92 296	1 106 661	June	3.3	5.0
	July	91 608	1 090 284	July	3.4	5.1
	Aug	93 324	1 109 725	Aug	3.8	5.5
	Sept	92 451	1 113 021	Sept	3.2	4.9
	Oct	92 364	1 114 967	Oct	3.2	6.0

3 Interest rates set by the Riksbank

PER CENT

	Date of announcement	Repo rate	Deposit rate	Lending rate	Period	Reference rate ¹
2000	02-04	3.75			2002:2 half-year	4.50
	12-07	4.00	3.25	4.75	2003:1 half-year	4.00
2001	07-06	4.25	3.50	5.00	2003:2 half-year	3.00
	09-17	3.75	3.00	4.50		
2002	03-19	4.00	3.25	4.75		
	04-26	4.25	3.50	5.00		
	11-15	4.00	3.25	4.75		
	12-05	3.75	3.00	4.50		
2003	03-18	3.50	2.75	4.25		
	06-05	3.00	2.25	3.75		
	07-04	2.75	2.00	3.50		

¹ 1 July 2002 the official discount rate was replaced by a reference rate, which is set by the Riksbank at the end of June and the end of December.

4 Capital market interest rates

EFFECTIVE ANNUALIZED RATES FOR ASKED PRICE. MONTHLY AVERAGE. PER CENT

		Bonds issued by:					
		Central Government				Housing institutions	
		3 years	5 years	7 years	9-10 years	2 years	5 years
2002	Jan	4.53	5.01	5.17	5.27	4.71	5.40
	Feb	4.76	5.18	5.28	5.36	4.94	5.57
	March	5.05	5.46	5.55	5.63	5.22	5.83
	April	5.10	5.46	5.56	5.69	5.28	5.85
	May	5.10	5.45	5.56	5.69	5.25	5.85
	June	4.94	5.27	5.39	5.52	5.09	5.65
	July	4.73	5.06	5.20	5.37	5.08	5.45
	Aug	4.52	4.83	4.96	5.13	4.86	5.21
	Sept	4.42	4.62	4.77	4.97	4.69	5.03
	Oct	4.29	4.62	4.80	5.07	4.52	5.07
	Nov	4.15	4.54	4.75	5.05	4.36	4.96
	Dec	3.99	4.39	4.59	4.89	4.16	4.79
2003	Jan	3.79	4.23	4.36	4.70	3.99	4.54
	Feb	3.56	3.97	4.11	4.47	3.77	4.27
	March	3.53	4.03	4.17	4.57	3.86	4.34
	April	3.59	4.17	4.30	4.72	3.93	4.57
	May	3.25	3.77	3.90	4.37	3.56	4.16
	June	2.97	3.53	3.79	4.20	3.11	3.80
	July	3.22	3.85	4.20	4.51	3.21	4.06
	Aug	3.58	4.18	4.45	4.70	3.55	4.42
	Sept	3.54	4.18	4.48	4.73	3.50	4.42
	Oct	3.62	4.31	4.60	4.85	3.53	4.54
	Nov	3.76	4.45	4.74	4.98	3.58	4.67

5 Overnight and money market interest rates

MONTHLY AVERAGE. PER CENT

		Repo rate	Interbank rate	SSVX ¹			Company certificates	
				3 months	6 months	12 months	3 months	6 months
2000	Jan	3.25	3.35	3.57	3.86		3.77	4.05
	Feb	3.61	3.71	3.90	4.22		4.11	4.43
	March	3.75	3.85	4.06	4.29	4.74	4.27	4.53
	April	3.75	3.85	3.99	4.16		4.21	4.45
	May	3.75	3.85	3.96	4.09	4.57	4.21	4.43
	June	3.75	3.85	3.94	4.04	4.56	4.15	4.44
	July	3.75	3.85	4.03	4.21		4.31	4.66
	Aug	3.75	3.85	4.00	4.21	4.59	4.23	4.50
	Sept	3.75	3.85	3.94	4.04	4.51	4.14	4.36
	Oct	3.75	3.85	3.99	4.09		4.15	4.31
	Nov	3.75	3.85	4.00	4.09	4.50	4.14	4.26
	Dec	3.89	3.99	4.07	4.22	4.37	4.19	4.38
2001	Jan	4.00	4.10	4.07	4.12		4.17	4.26
	Feb	4.00	4.10	4.01	4.07		4.14	4.23
	March	4.00	4.10	4.06	4.02	4.11	4.24	4.23
	April	4.00	4.10	3.94	3.98	4.01	4.12	4.11
	May	4.00	4.10	4.01	4.06	4.28	4.16	4.20
	June	4.00	4.10	4.17	4.27	4.48	4.39	4.46
	July	4.17	4.27	4.31	4.42		4.50	4.58
	Aug	4.25	4.35	4.28	4.31	4.37	4.45	4.48
	Sept	4.05	4.15	4.01	4.06	4.15	4.18	4.22
	Oct	3.75	3.85	3.70	3.72		3.90	3.91
	Nov	3.75	3.85	3.71	3.74	3.91	3.89	3.87
	Dec	3.75	3.85	3.71	3.76	3.97	3.96	3.96
2002	Jan	3.75	3.85	3.74	3.81		3.94	3.97
	Feb	3.75	3.85	3.87	3.99		4.01	4.14
	March	3.84	3.94	4.09	4.29	4.64	4.27	4.43
	April	4.00	4.10	4.25	4.41		4.52	4.69
	May	4.25	4.35	4.29	4.48	4.79	4.64	4.79
	June	4.25	4.35	4.28	4.42	4.71	4.88	5.00
	July	4.25	4.35	4.26	4.37		4.89	4.95
	Aug	4.25	4.35	4.19	4.29	4.43	4.83	4.87
	Sept	4.25	4.35	4.17	4.21	4.29	4.82	4.84
	Oct	4.25	4.35	4.07		4.14	4.67	4.64
	Nov	4.15	4.25	3.91	3.84	3.93	4.20	4.19
	Dec	3.85	3.95	3.66	3.68	3.77	3.97	3.95
2003	Jan	3.75	3.85	3.65			3.90	3.88
	Feb	3.75	3.85	3.61	3.40	3.55	3.85	3.79
	March	3.64	3.74	3.40	3.36	3.35	3.64	3.57
	April	3.50	3.60	3.42			3.62	3.59
	May	3.50	3.60	3.18	2.96		3.43	3.37
	June	3.16	3.26	2.81	2.71	2.61	3.03	2.94
	July	2.82	2.92	2.68			2.87	2.82
	Aug	2.75	2.85	2.71	2.81		2.88	2.90
	Sept	2.75	2.85	2.71	2.73	2.91	2.88	2.92
	Oct	2.75	2.85	2.73			2.89	2.93
	Nov	2.75	2.85	2.72	2.74		2.88	2.93

¹ Treasury bills.

6 Treasury bill and selected international rates

MONTHLY AVERAGE. PER CENT

		3-months deposits				6-months deposits			
		USD	EUR	GBP	SSVX ¹	USD	EUR	GBP	SSVX ¹
2000	Jan	5.93	3.28	6.00	3.57	6.14	3.50	6.25	3.86
	Feb	5.99	3.47	6.09	3.90	6.24	3.67	6.27	4.22
	March	6.12	3.70	6.10	4.06	6.34	3.89	6.29	4.29
	April	6.24	3.88	6.16	3.99	6.48	4.02	6.32	4.16
	May	6.66	4.29	6.16	3.96	6.93	4.48	6.31	4.09
	June	6.70	4.43	6.09	3.94	6.87	4.61	6.20	4.04
	July	6.63	4.52	6.05	4.03	6.83	4.76	6.16	4.21
	Aug	6.59	4.72	6.08	4.00	6.74	4.95	6.20	4.21
	Sept	6.58	4.78	6.05	3.94	6.67	4.96	6.15	4.04
	Oct	6.65	4.98	6.01	3.99	6.63	5.04	6.12	4.09
	Nov	6.64	5.03	5.95	4.00	6.61	5.06	5.97	4.09
	Dec	6.41	4.85	5.83	4.07	6.26	4.85	5.80	4.22
2001	Jan	5.62	4.71	5.69	4.07	5.47	4.62	5.59	4.12
	Feb	5.25	4.70	5.61	4.01	5.11	4.61	5.53	4.07
	March	4.87	4.64	5.41	4.06	4.72	4.51	5.31	4.02
	April	4.53	4.64	5.25	3.94	4.40	4.53	5.14	3.99
	May	3.99	4.58	5.09	4.01	3.99	4.50	5.07	4.06
	June	3.74	4.40	5.10	4.17	3.74	4.28	5.18	4.27
	July	3.66	4.41	5.11	4.31	3.69	4.33	5.18	4.41
	Aug	3.48	4.30	4.87	4.28	3.49	4.17	4.88	4.35
	Sept	2.92	3.91	4.56	4.01	2.89	3.78	4.49	4.06
	Oct	2.31	3.54	4.27	3.70	2.25	3.39	4.25	3.72
	Nov	2.01	3.32	3.88	3.71	2.02	3.20	3.86	3.74
	Dec	1.84	3.27	3.94	3.71	1.90	3.19	3.96	3.76
2002	Jan	1.74	3.28	3.94	3.74	1.85	3.28	4.04	3.81
	Feb	1.81	3.30	3.94	3.87	1.94	3.33	4.08	3.99
	March	1.91	3.34	4.03	4.09	2.15	3.45	4.23	4.29
	April	1.87	3.39	4.06	4.25	2.11	3.47	4.26	4.41
	May	1.82	3.40	4.05	4.29	2.01	3.56	4.26	4.48
	June	1.79	3.41	4.06	4.28	1.93	3.52	4.27	4.42
	July	1.76	3.34	3.94	4.26	1.82	3.40	4.07	4.37
	Aug	1.69	3.28	3.90	4.19	1.69	3.31	3.91	4.29
	Sept	1.73	3.24	3.88	4.17	1.71	3.18	3.89	4.21
	Oct	1.71	3.20	3.88	4.07	1.67	3.08	3.87	
	Nov	1.39	3.07	3.88	3.91	1.40	2.96	3.89	3.84
	Dec	1.33	2.86	3.92	3.66	1.34	2.81	3.92	3.68
2003	Jan	1.27	2.76	3.88	3.65	1.29	2.69	3.87	
	Feb	1.25	2.63	3.65	3.61	1.25	2.51	3.59	3.40
	March	1.19	2.47	3.56	3.40	1.17	2.39	3.50	3.36
	April	1.22	2.48	3.54	3.42	1.20	2.41	3.48	
	May	1.20	2.35	3.53	3.18	1.16	2.25	3.49	2.96
	June	1.03	2.09	3.55	2.81	1.00	2.02	3.48	2.71
	July	1.04	2.08	3.38	2.68	1.05	2.04	3.37	
	Aug	1.05	2.09	3.43	2.71	1.11	2.12	3.52	2.81
	Sept	1.06	2.09	3.60	2.71	1.10	2.12	3.70	2.73
	Oct	1.08	2.09	3.72	2.73	1.12	2.12	3.87	
	Nov	1.08	2.10	3.88	2.72	1.17	2.17	4.07	2.74

¹ Treasury bills.

7 Krona exchange rate: TCW index and selected exchange rates

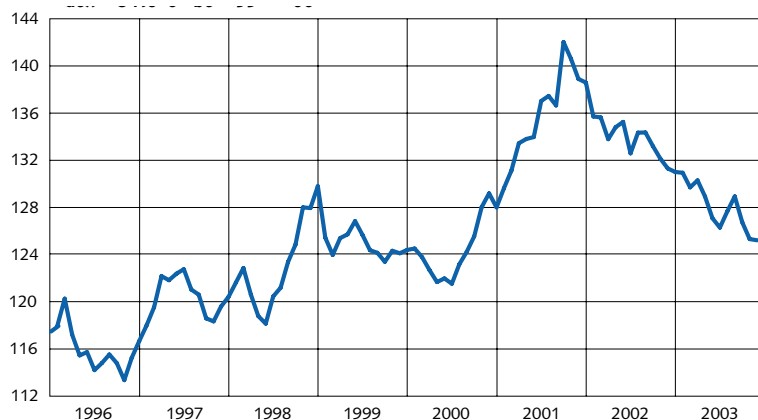
MONTHLY AVERAGE

		SEK					
		TCW index	USD	EUR	GBP	CHF	JPY
2000	Jan	124.5383	8.4725	8.5956	13.8900	5.3370	0.0807
	Feb	123.8107	8.6462	8.5112	13.8519	5.2965	0.0791
	March	122.7089	8.6946	8.3950	13.7382	5.2317	0.0816
	April	121.6993	8.7208	8.2700	13.8088	5.2545	0.0828
	May	122.0044	9.0894	8.2388	13.7098	5.2930	0.0841
	June	121.5567	8.7433	8.3118	13.1997	5.3268	0.0824
	July	123.2005	8.9346	8.4080	13.4783	5.4206	0.0828
	Aug	124.2636	9.2702	8.3962	13.8107	5.4137	0.0858
	Sept	125.5703	9.6569	8.4121	13.8431	5.4968	0.0905
	Oct	128.0479	9.9618	8.5266	14.4711	5.6348	0.0919
	Nov	129.2156	10.0780	8.6271	14.3730	5.6705	0.0925
	Dec	128.0290	9.6607	8.6629	14.1196	5.7238	0.0862
2001	Jan	129.6612	9.4669	8.8963	14.0052	5.8170	0.0811
	Feb	131.1553	9.7350	8.9736	14.1555	5.8438	0.0838
	March	133.4701	10.0316	9.1254	14.4988	5.9416	0.0828
	April	133.8280	10.1987	9.1103	14.6320	5.9593	0.0824
	May	133.9895	10.3333	9.0536	14.7412	5.9019	0.0848
	June	137.0501	10.7753	9.2010	15.0876	6.0421	0.0882
	July	137.4779	10.7666	9.2557	15.2105	6.1150	0.0864
	Aug	136.6723	10.3343	9.3036	14.8466	6.1433	0.0851
	Sept	142.0389	10.6089	9.6670	15.5179	6.4799	0.0894
	Oct	140.6226	10.5630	9.5798	15.3446	6.4725	0.0871
	Nov	138.9180	10.5965	9.4131	15.2278	6.4196	0.0866
	Dec	138.6116	10.5594	9.4436	15.2024	6.4006	0.0832
2002	Jan	135.7390	10.4398	9.2292	14.9642	6.2594	0.0788
	Feb	135.6543	10.5603	9.1869	15.0223	6.2179	0.0791
	March	133.8096	10.3396	9.0600	14.7064	6.1690	0.0789
	April	134.8265	10.3105	9.1331	14.8742	6.2300	0.0788
	May	135.2764	10.0519	9.2236	14.6763	6.3300	0.0796
	June	132.6093	9.5591	9.1190	14.1612	6.1959	0.0774
	July	134.3652	9.3400	9.2705	14.5199	6.3380	0.0791
	Aug	134.3777	9.4641	9.2524	14.5486	6.3235	0.0795
	Sept	133.2278	9.3504	9.1735	14.5449	6.2617	0.0775
	Oct	132.1625	9.2793	9.1053	14.4489	6.2156	0.0749
	Nov	131.3311	9.0655	9.0785	14.2485	6.1869	0.0746
	Dec	131.0292	8.9458	9.0931	14.1771	6.1861	0.0732
2003	Jan	130.9609	8.6386	9.1775	13.9590	6.2767	0.0727
	Feb	129.7272	8.4930	9.1499	13.6813	6.2358	0.0711
	March	130.3167	8.5298	9.2221	13.5031	6.2777	0.0720
	April	128.9566	8.4370	9.1585	13.2756	6.1248	0.0704
	May	127.1076	7.9229	9.1541	12.8520	6.0426	0.0676
	June	126.3154	7.8108	9.1149	12.9638	5.9211	0.0660
	July	127.6987	8.0807	9.1945	13.1295	5.9417	0.0681
	Aug	128.9600	8.2825	9.2350	13.2074	5.9957	0.0697
	Sept	126.7679	8.0861	9.0693	13.0143	5.8616	0.0703
	Oct	125.3358	7.6966	9.0099	12.9077	5.8195	0.0703
	Nov	125.2370	7.6831	8.9908	12.9783	5.7642	0.0703

Note. The base for the TCW index is 18 November 1992. TCW (Total Competitiveness Weights) is a way of measuring the value of the krona against a basket of other currencies. TWC is based on average aggregate flows of processed goods for 21 countries. The weights include exports and imports as well as "third country" effects.

8 Nominell effective TCW exchange rate

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Note. TCW (Total Competitiveness Weights) is a way of measuring the value of the krona against a basket of other currencies. TCW is based on average aggregate flows of processed goods for 21 countries. The weights include exports and imports as well as "third country" effects.

9 Forward net position on the foreign-exchange market with authorized currency dealers

REPORTING PERIOD. SEK MILLION

		Non-bank public		Banks abroad	The Riksbank	Total
		Resident (1)	Non-resident (2)	Net (3)	Net (4)	
2002	Jan	-380 368	-29 553	229 071	-5 753	-186 603
	Feb	-378 895	-20 566	197 130	-4 226	-206 557
	March	-364 779	-14 558	170 705	-3 144	-211 776
	April	-357 495	-23 805	173 232	0	-208 068
	May	-359 267	-20 295	192 173	0	-187 389
	June	-360 494	-10 409	194 312	0	-176 591
	July	-358 252	-10 076	136 339	0	-231 989
	Aug	-313 551	-13 862	153 001	-5 161	-179 573
	Sept	-360 149	- 5 411	160 670	-5 143	-210 033
	Oct	-342 143	- 5 719	216 218	-4 924	-136 568
	Nov	-348 617	-2 260	228 042	-5 089	-127 924
	Dec	-368 834	-5 810	209 273	-5 215	-170 586
2003	Jan	-325 302	2 280	221 587	-8 275	-109 710
	Feb	-321 149	6 386	231 208	-5 113	- 88 668
	March	-327 225	5 877	205 840	-5 112	-120 620
	April	-365 842	18 728	231 999	-5 113	-120 228
	May	-360 584	19 146	250 712	-5 064	- 95 790
	June	-351 974	25 664	197 708	-5 108	-133 710
	July	-341 819	17 016	205 349	-5 091	-124 545
	Aug	-359 475	11 041	156 955	-5 129	-196 608

Note. A positive position indicates that purchases of foreign currencies exceed sales. A negative position indicates that sales of foreign currencies exceed purchases.

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