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Using international sound practices as a basis for banking reforms

Stefan Ingves and Göran Lind

Many countries have already completed or are today in a transition from a thoroughly regulated financial system to one based on market principles. In the article, the authors describe some of the international sound practices that should be the foundation for financial reforms, in particular in the banking sector. The authors also discuss successful as well as some less successful experiences of countries in reforming their banking systems.

Background to this article

In Toledo, Spain, in November 2006, the IMF together with the Banco d'España arranged a seminar primarily for central bank governors from Northern Africa and the Middle East. At the seminar also governors from other countries participated as speakers and discussants. There were two topics on the agenda: Central bank reform, and Banking system reform. On both issues, the speakers and the other participants sought to identify a framework of generally agreed sound international practices and how to modify and apply them in the specific circumstances of individual countries.

The Riksbank governor, Stefan Ingves, made a presentation on the topic of banking reform. He referred mainly to experiences from his earlier work at the IMF, rather than to developments in Sweden. Hence, the presentation reflected practices which have proven to function well, or in some cases not very well, in many countries of different structures and levels of development.

The presentation was drafted jointly with Göran Lind, Advisor to the Riksbank's Executive Board. Mr. Lind has conducted a large number of assessments of different countries' approaches to banking regulation and supervision and could thus supplement Mr. Ingves' own experiences on global practices.

The following article is based on the presentation at the seminar. However, it has been adapted to the format and audience of an article.

Introduction

Many of the arguments and recommendations in the article are of a general nature and do not refer to banks only. For instance, a favourable economic environment, adequate legislation, good accounting and auditing standards etcetera, are necessary conditions for economic developments in general and not only for banks. That said, the article will argue that several of these general prerequisites are especially important for the establishment of a sound framework for banks.

It is a widely held belief, e.g. in academic literature, that "banks are special". Banks perform certain activities which are, as a combination, not open to other institutions. Banks transform short-term deposits into long-term lending; banks play a dominant role in conducting payment services, and banks assume and transform various kinds of risks. All these functions are vital to society. These unique roles of banks make them candidates for potential protection from society, for example in the form of depositor protection schemes, or liquidity assistance from the central bank. The roles also motivate special regulations for banks.

But banks are intrinsically vulnerable just because of those activities. A loss of confidence in a bank may lead to a rapid outflow of deposits, a so called bank run. Since a bank's assets generally are not equally liquid, it may suffer problems in meeting its obligations which might ultimately end in the closure of the bank. A small bank failure is a problem mostly for its owners and a limited group of counterparts, but the failure of a large bank or several large banks may have wider repercussions, threatening the stability of the financial system. As has been experienced in many countries, also in Sweden, major bank failures can lead to large losses for society as a whole. Society has sometimes tried to reduce the negative effects of bank crises, for instance by spending tax-payers' money to rescue problem banks or by providing financial support to facilitate mergers or other solutions. Many countries have implemented depositor insurance systems, whereby small and medium-large depositors will get reimbursed from the insurance system should the bank fail.

Based on painful experiences of bank failures in many countries and over many centuries, and the ensuing costs to society, a framework of regulations and supervision of banks has been established with the aim to reduce the risk of bank problems and financial stability disturbances. This framework develops over time, reflecting new theories but also the general development in banking activities and instruments. The following sections will discuss the present framework more in detail, but as a fundamental rule, the rules for banks should only be different from those of other companies insofar as this is needed to protect banks against

their intrinsic vulnerabilities. For instance, banks may have to hold more liquidity, and maintain a higher degree of solvency, i.e. equity capital in relation to assets and liabilities, because they are more susceptible to volatility in the economic climate.

There are several objectives for banking regulation. In addition to the one mentioned above, which refers to the maintenance of financial stability there are also the objectives of consumer and counterparty protection.

The case for reforming a banking system and how to do it

Experiences from banking systems in many countries show that a top-down approach where the authorities dictate the structure and details of a banking system will generally not function well. The authorities in some countries prescribed, for example, an excessively restricted banking system which was not be able to fully support the economy or they tried to micro-manage the banks which made them less efficient. Some countries on the other hand opened their banking sectors on excessively liberal terms which led to the over-establishment of banks and ensuing problems and losses. Hence, the issue of banking reform should rather be approached by discussing how the authorities should establish a framework which promotes the spontaneous growth of a sound banking system.

This article will discuss a number of components which are necessary in a modern banking system to make it efficient, while at the same time flexible to accommodate developments and resilient to promote financial stability. In addition to issues about the banks themselves, we will discuss the underlying preconditions for banking, the legislative and regulatory framework, the supervisory agency and its work, and also the need to supplement the banking system by other financial institutions and markets. There is no single blueprint for banking reform, and our observations come from experiences in many countries, including our own.

Numerous assessments of country practices, conducted by the International Monetary Fund (IMF) and World Bank but also of many other parties provide examples of shortcomings in the preconditions for banking, in the regulation and supervision of banking and in the conduct of banking activities. As a minimum, these shortcomings have led to inefficiencies in providing a broad range of financial services to society. They have also led to higher costs and in many cases to bank problems and even systemic crises. An obvious conclusion is that banking reforms which do away with the flaws are worthwhile for all parties and countries. The cause for banking reforms is strengthened by current develop-

ments in banking, which includes a spread of cross-border institutions and activities but also new instruments and methods to handle risks in banking. Such developments generally increase efficiency and stability in banking, but need to be carefully regulated and supervised because they also contain inherent vulnerabilities and risks.

Before considering the truly bank-specific issues such as the conduct of banks, their regulation and supervision, we need to discuss the necessary backdrop to an efficient banking system, and indeed, an efficient financial system as a whole.

Preconditions

The overarching aim of this article is to provide a blueprint of global practices for creating a modern and sound banking system. But experience has clearly shown that such a system can not be developed and maintained unless all the necessary prerequisites are in place. As explained in the introduction to this article, a society's economic progress in general, and the development of a modern banking sector in particular, is dependent on the existence of conducive external factors, often called preconditions.

The preconditions include macro economic stability, an adequate legislative framework and a well functioning judicial system. There should also be adequate rules for accounting and auditing, a well developed infrastructure for the payment system and a financial safety net. Only under such an overarching set of good preconditions will the banks develop favourably.

In most cases, it is not within the mandate of the bank regulatory authorities to affect the preconditions. Economic developments follow other determinants, and many of the institutional preconditions depend on legislation or decisions by other decision-makers. Nonetheless, since the preconditions are such important factors for ensuring a sound and well functioning banking system, the state of the preconditions must always be considered by those responsible for the banking sector reform. They must inform the decision-makers of the deficiencies in prevailing preconditions, for instance weaknesses in legislation, and press for adequate measures to be taken such as laws to be passed or institutional arrangements to be undertaken. Awaiting the implementation of such measures, the authorities should try to compensate for the present shortcomings. For instance, if the general accounting rules are seen as too lenient for banks, banks might be required to present parallel reports based on bank-appropriate accounting rules.

The description below of the major preconditions should be read in this perspective: Which general shortcomings in the external factors have in many cases lead to bank problems in various countries and how could they be counteracted?

- Macro economic volatility is harmful to banks, partly because of its effects on banks' counterparts but also due to the intrinsic character of bank operations. Periods of rapid credit growth in an upswing may be followed by a recession leading to problems for many companies. Bankruptcies could then increase leading to high credit losses in banks. High inflation, particularly if unpredictable, will disguise the underlying profitability of a loan project and could lead to an erroneous credit decision being taken by a bank. Also, bank loans extended in foreign currencies could lead to losses if the local currency depreciates when the borrower who earns his money in the local currency runs into difficulties to repay his loan. This is more dangerous in a situation of a fixed exchange rate since the depreciation could be more sudden and deep. Not least Swedish banks suffered from this during the banking and exchange rate crisis in the 1990s.

- In order to ensure credit discipline, there must be transparent legislation as well as court proceedings that are predictable and reasonably fast. If a bank cannot rely on seizing the collateral given for a non-performing loan it will be reluctant to provide future loans against similar collateral. Of course, the laws and the courts should also protect the depositors and borrowers from any abuse from the banks such as unfair contract terms.

- In countries where the accounting and auditing rules are weak, or where the accounting and auditing firms are inadequate, various financial problems may occur. Banks will not be able to rely on the financial statements when assessing their borrowers' creditworthiness. Nor can the depositors and other creditors to banks rely on the banks' own financial statements. The public authorities must compensate for these weaknesses by implementing additional rules. For instance, the supervisors may need to require stricter rules for provisioning against loan losses, or to set a higher minimum level for bank capital.

- An important function of the banking system is to facilitate payments between various agents in society. This is based on the fact that bank accounts provide the basis for all payments except cash payments. Most payments are executed through the payments system infrastructure, such as the systems for large value payments, cheque clearing, securities settlement systems, stock markets, other exchanges and so on. These systems must be efficient and they must also be secure. If not, there is a risk that problems in one part of the financial system will spread to other parts, including to the banks.

- Many countries have neglected the need for an adequate financial safety net. The safety net includes limited but explicit depositor protection which has to be supported by the necessary legislation, institutions and procedures to conduct an orderly management, resolution or winding-up of problem banks. When bank weaknesses are identified in a country lacking a proper safety net, various problems may occur. The authorities will be reluctant to take adequate and timely remedial action since there are no clear guidelines and since they are afraid of the consequences from non-protected depositors and from other counterparts to the banks. The authorities may instead extend excessive financial support to the problem bank through the central bank for instance in the form of exceptional liquidity assistance which is sometimes abused to cover solvency problems, or through the fiscal budget. Occasionally, even failing banks' owners have received public financial support to continue the operations of the defunct bank. The overwhelming evidence from experiences in different countries and situations is that letting problem banks continue to operate without taking adequate action simply means that the problems will increase over time and they may in the end result in a systemic and very expensive crisis.

To sum up on the preconditions, these must be taken seriously into account when reforming a banking system. Shortcomings must be dealt with in the appropriate ways, such as through legislation. While waiting for the preconditions to improve, the authorities and the banks must compensate for the shortcomings.

Having achieved an environment in which banks can thrive, the next issue is which general framework that should be established in order to promote a suitable mix of bank structures – by organisation, activities, ownership and other ingredients.

International experiences of approaches to the banking sector

As already stated, the authors do not believe that the authorities can create an efficient banking system "by decree". However, there is a natural demand for good banking services in all countries and if the authorities and policy-makers set up a reasonable framework for banking there will be applications to open new banks or for existing banks to change their structures, activities or mode of operations.

In achieving an efficient banking system, the authorities are faced by a number of questions:

1. Is there an optimal number of banks or is this question irrelevant? In modernising a banking system the ideal situation is to arrive at a

"reasonable number" of banks – not too few but not too many. The number itself is not relevant, but an overbanked financial sector tends to be inefficient and unprofitable, whereas too few banks may lead to an oligopoly situation. In many countries the lifting of the old and restrictive regulations lead to an influx of a large number of mostly small "family-owned" banks but many of these tend to have overoptimistic plans for their activities and are closed rather soon leading to consolidation of the banking sector. As a result, some depositors and other counterparties suffer losses from dealing with these banks. Are such events necessary steps in the development or could they be avoided? In our view, some countries after scrapping their old regulations became ultra-liberals and provided licenses for banking on too lenient grounds. The authorities did not properly evaluate the prospects for the banks to conduct profitable business in a competitive environment and they set the requirement for basic minimum capital far too low. But doing the opposite is not the correct way forward either – namely, to let the authorities decide how many banks there ought to be and then allot a fixed number of licenses. This would certainly lead to distortions and oligopolies. Owners must decide for themselves if a new bank should be opened but the authorities should guide them by setting an appropriately high bar of regulatory prudential requirements, including for minimum capital. The first instance of ensuring that a bank will be able to meet the regulatory requirements is when the application for a bank license is processed by the authorities.

2. What then should be included in the banking license application? The content of the license application procedure is very important. Here the authorities have an opportunity to prevent bad apples from entering the barrel, the financial system. The authorities must check that both owners and managers are "fit and proper", which means competent and not criminal. The requirement regarding skills is of course higher if they want to run complex banking activities. It is not necessary that each Board member knows every bank activity himself but between them the Board should be competent on all issues. We should remember that Nick Leeson at Barings Bank all too easily convinced his Board that he could run a highly profitable derivatives trading operation without any risk to the bank!

The license application also includes an assessment that the organisation and structure of the bank group does not hinder the effective supervision of the group. This provision dates back to the collapse of the BCCI bank in the early 1990s. The bank's owners had created a structure for their group with the clear intention of making full insight by the supervisors in different countries more difficult. For instance, the main activities and risk-taking did not take place in the country where the main office and thus the main supervisor were located.

3. Should local owners be preferred or should you allow foreign owners freely, being open to the possibility that the foreign banks become dominant in a system? Believing in free markets we strongly advocate the latter. The prime aim should be to have a banking system which provides the best services to society, whether locally owned or foreign owned. Like in many other countries banks could also benefit from the influence of the foreign banks if they have more advanced systems or methods.

On the other hand, one should not be too lenient toward foreign applicants to set up or buy into existing local banks – we have seen many countries being too trusting toward foreign owners. These should be submitted to the same scrutiny as local applicants. The scrutiny should include a test of the origin of the money used to found (or buy) the bank. Obviously only known owners should be accepted and thus no beneficial owners who are hidden behind the veils of companies established on some offshore jurisdiction. And when speaking about foreign owners: When banks operating in a country have foreign parents the host country supervises must ensure that the home supervisor practices consolidated supervision which includes the entities in the host country. If this is not the case, the application for a license should be declined.

4. Who should be allowed to own banks in addition to individual persons and financial institutions; should non-financial institutions be allowed and could there be holding companies? The global standard-setters are open to such forms of ownership, but only on the condition that legislation and regulation provide the powers for effective consolidated supervision and transparency of such structures, including the parent company and any non-banks and non-financial companies in the group structure. A further condition is that the bank group can be protected from the risks emanating from the non-bank and non-financial owners, such as through ring-fencing. In our experience, non-financial ownerships have often caused problems for banks and the supervisors must monitor such relationships closely. This applies in particular to so called "pocket banks" which are dominated both in ownership and activities by the needs of the parent company or major owners.

A related issue is whether countries should allow "financial conglomerates" mixing banks, securities companies and insurance companies in the same groups. In line with our earlier views on a flexible financial system our opinion is that such structures should be allowed, provided of course that the laws and regulations allow for effective consolidated supervision of the whole financial conglomerate. The present development toward a blurring of the boundaries between the activities of different financial institutions makes it reasonable to allow financial conglomerates.

Broad groups conducting different activities may also be better able to diversify their risks and could thus be more resilient against financial shocks.

5. Should banks have a widely spread or a concentrated ownership? Country experiences give no clear indications on this issue. Both alternatives have their advantages and disadvantages. A broad ownership may better protect the interests of the minority shareholders, but if financial problems occur the majority owners have stronger incentives to provide capital injections. The governance of a bank is sometimes promoted by having strong owners, but there are also examples of strong owners misusing the bank for their personal purposes. All in all, countries should be open to different forms of ownership but monitor them closely.

Another ownership issue is whether there are reasons for retaining state-owned banks. An argument sometimes voiced is that they promote competition and provide services for certain parts of the population which are of little commercial interest to the other banks. The Basel Committee's core principles accept state-owned banks as long as they are run and regulated on equal terms with other banks. But experiences from many countries clearly indicate that countries do best by avoiding having state-owned banks. Simply put: The government is not a good owner and manager of banks since the bank will come "too close to the politicians". There is always a temptation for the government and parliament to use state-owned banks to provide what mistakenly looks like cheap services to the people. But there will be hidden costs for such services, not least in the form of disrupting competition in the banking sector. The government could certainly provide certain subsidized services if it so wishes, but the costs should be transparent. For instance, the government could pay the existing banking network on a commercial basis to provide such services.

6. Should different forms of banks, such as commercial banks, savings banks, credit unions, development banks and micro-finance institutions be allowed? Our view is clearly affirmative. Competition is best served by having a range of bank ownership structures such as shareholding, mutual ownership, non-profit organisations, etcetera. But having said this, experience has shown that some countries have established certain less appropriate practices which might be called "compartmentalization". This happens when the legislation prescribes unnecessary and ineffective borderlines between the allowed activities of defined banking categories. Usually, the intention is to ensure limited competition and high profits for the various categories. Such restrictions are in effect a subsidy to a certain category of banks and they are harmful to the consumers and to the overall economy. The rule-of-thumb should be that any bank should be allowed to conduct any of the generally regulated

bank activities if it can prove that it possesses adequate competencies, systems and resources.

7. Should there be one set of prudential rules for all institutions conducting bank-like activities or should there be differentiation? For instance, could there be "light-touch regulations"[1] for small and non-complex institutions such as micro-finance, local credit unions or exchange houses? There is no obvious answer to this issue. On the one hand you want to create a fair level-playing field for all bank activities which call for equal treatment. But on the other hand there is no necessity to burden small institutions with the elaborate regulations intended for large and complex banks. There must be a reasonable relation between the amount of regulation and its cost to the institutions. Consequently, there is a case for lighter regulation of small and non-complex institutions, but there must always be adequate regulation to ensure discipline also for those. Even when a small institution fails it causes disruptions and a loss of confidence in banks in general.

This issue should also be seen against the multiple objectives of bank regulation. The objective of promoting financial system stability is primarily applicable to the large banks, whereas the objective of consumer and counterparty protection is applicable to all banks, also the small non-systemic ones. This division could argue for some differences in regulation or in the application of regulation.

8. Going one step further – how to set the boundaries between banks and other financial institutions? In my opinion, it is very important to safeguard the general public's confidence around the concept of a bank and it must be protected by a clear definition of a bank and what it is allowed to do. In Sweden, the definition is based on the combination of a bank receiving deposits and being active in the payments system. However, a more common definition of a bank focuses on the combination of receiving deposits from the general public and granting of credits to borrowers using these funds. In accordance with international practice, this combined activity should be a privilege of banks. Other institutions may issue deposit-like instruments in high amounts and not directed to the small savers. To highlight their different characters, such instruments should not be protected by any depositor guarantee scheme. But apart from the "true" deposits, most bank activities might also be open to other financial institutions and vice versa. For instance, insurance companies should be allowed to sell savings products and banks could sell securities.

[1] This isue is related to the issue on risk-based supervision, which is discussed in the section on supervision. However, it is quite possible to apply the same regulations for different types of banks, while applying risk-based supervision, that is to spend less supervisory resources on the less significant categories.

Other parts of the financial system

The title of this article talks about "banking reforms". However, an efficient and stable financial system cannot be founded only on banks. The risks of disruption to the overall economy from a break-down of the banking system are much greater if the banks are dominant than when there also exists a range of other financial institutions and markets. Hence, the development of other financial market participants should be facilitated, such as insurance and pension companies, securities trading companies, fund management companies etcetera as well as the creation of efficiently functioning markets in various equities and securities. Such diversification will also increase competition and lead to better services at lower prices. Diversified domestic markets also act as a kind of insurance in bad times – if there are problem in one part, another part may compensate by providing similar functions.

Neither should we forget the importance of the financial infrastructure, including payments and settlements systems, exchanges, custodians, etcetera. These provide the necessary "greasing" of the financial system and perform very important roles. Weaknesses in the infrastructure may lead to serious problems, so the infrastructure must be monitored as closely as the banks.

Sound international practices in bank regulation

In the introduction to this article, the arguments for considering banks "special" and thus for enacting and applying bank regulation and supervision were presented. Banks will operate most efficiently when regulation and supervision is limited and transparent, intended to protect society against major incidents and costs but allowing banks to conduct and develop their business as flexibly as possible.

When assessing whether specific regulations are warranted we should evaluate them against the basic objectives for bank regulation. The first objective is to prevent or at least to reduce the incidence and costs of financial system stability disturbances. The second objective is to protect depositors and other counterparts to banks, "consumer protection". A third objective of regulation is to set out a framework to promote fair competition between banks, but also between banks and other financial institutions and markets. An often implicit, but sometimes even explicit, goal of regulation is to promote the efficient operations of the banking system, notwithstanding that many regulations themselves have the negative side-effect of reducing efficiency.

Let us first describe two types of regulations which still exist in many countries although experiences clearly show their shortcomings.

Only profitable banks will remain stable in the long run. The old-fashioned type of regulation forcing banks to do business on other than market-oriented terms reduced efficiency and led, in many countries, to acute bank problems. If a government wants to subsidize certain activities, such as banking for people in remote geographical locations, mortgage lending on favourable terms, or lending to important borrowers or projects, the costs for this should be transparent and show up as a part of the fiscal budget. Such activities should not be conducted by directives from the government to the banks.

Another type of regulation which is becoming increasingly obsolete and inefficient is when the authorities try to micro-manage the behaviour of the banks by setting upper or lower limits on fees, deposit rates, lending rates, and credit expansion. The situation in the economy changes so rapidly that the authorities will never be able to catch up and detailed actions could become more harmful than helpful.

Instead, a market-oriented approach to regulation is to be preferred. Such regulation will not obstruct developments in banking while at the same time it prevents banks from behaving in a way that might harm customers or themselves, other institutions or markets, or society as a whole. The new Basel II framework for capital requirements on banks could be seen as an example of market-oriented regulation. Under Basel II, banks may assume risks as long as they can prove to the supervisor that they have adequate capital to back up those risks. The banks must also have the necessary governance structures to ensure that they have the capability to identify, manage and control all major risks.

The Basel II framework maintains a balance between "carrots and sticks" mixing responsibility and flexibility for banks on the one hand with strong monitoring by authorities and the general public on the other. It lets the banks do their business as long as they manage and control it well, but if there are shortcomings in the banks' handling then Basel II provides strong powers to the supervisor to intervene at an early stage to rectify the problems.

Whenever feasible a functional approach to regulation is to be preferred to an institutional approach. This implies that financial instruments or activities which perform similar functions are regulated in the same way, whether the service provider is a bank or another type of financial institution. Such treatment ensures fair competition and facilitates the development of an open financial system. An institutional approach implies that there is different legislation for different categories of financial institutions, also in the cases where they perform similar services. This may sometimes be necessary, but should be avoided since it may limit market competition and development.

There is also a choice to be made between principles-based and rules-based regulation. In the first approach, general principles are provided such as "banks must make loss provisions for non-performing loans in relation to the expected recoveries of their loan claims". The authorities may then interpret this flexibly and take measures against a bank when they see fit. Rules-based regulation is more precise and states, for instance in some detail how large provisions a bank must set aside in individual cases, e.g. based on the length of the payment delay. There is no one-way answer whether to choose a principles-based or a rules-based approach. The choice depends to some extent on the country's legal traditions. Financial regulation in Sweden mixes the two approaches, setting the broad principles in the legislation and delegating to the authorities to formulate the more precise and detailed rules and guidelines. This approach also fits well with the fact that the financial sector is developing fast. It is quicker to change secondary regulations than itself.

When regulating financial activities, it is useful to apply an analysis of the costs and benefits to society. There is sometimes a tendency by the authorities to try to solve all problems by more regulation. It is true that we could regulate away all the risks in the banking sector – but such excessive regulation would seriously hamper economic development. There must be a balance. Thus for each regulation we introduce we must also conduct a fair analysis of its costs, also non-financial, as well as its benefits, also non-financial. This is not an easy task and will often not lead to clear answers, partly since in most cases there are no explicitly measurable indicators, but the process of conducting the cost/benefit analysis will in itself help you in your decision.

Supervision

As we did above for regulation, we should first set out the basic objectives of supervision and then relate the application of practical supervision to these objectives.

A main objective of bank supervision is to identify potential or actual weaknesses or problems in banks. When such are identified, supervisors shall apply timely and appropriate measures to deal with the issue. Supervisors shall also ensure that banks comply with all relevant laws and other regulations and should sanction non-compliance.

To fulfil the objectives, the supervisory agency and its work must be structured in an efficient way. At least four broad fields of prerequisites for efficient supervision can be discerned. They have to do with operational independence including legal protection, resources and staff, supervisory powers, and the process of conducting supervision.

First. The supervisory authority must have operational independence from the financial industry as well as from politicians. These must not interfere in the operational decisions of the supervisors, e.g. to take remedial measures or to close banks. Such decisions must be taken on purely prudential grounds. The supervisors are responsible for their actions and could be criticized afterwards, e.g. in parliament hearings, but they must be able to perform their operational duties independently. The bank, its owners and management should be able to sue the supervisors for malpractice and they may receive compensatory payments. However, this should not stop an action started by the supervisor to deal with a presumed problem in the bank, in particular if the problem is acute and there is an obvious risk that it could get worse if immediate corrective measures are not taken.

As a part of independence, the supervisory management and staff must have reasonable protection should they be sued for their bona fide decisions taken as supervisors. In some countries the supervisors are harassed by frivolous lawsuits by bank owners, managers or other parties. Even if the supervisor is in the end acquitted from any guilt, the process may take years. During this time the supervisor will be severely hampered in performing her job having to concentrate on legal defence. Such lawsuits will also reduce the willingness of other supervisors to take necessary supervisory decisions, since they are themselves afraid of being sued.

A defence is to take all major supervisory decisions in a collegiate fashion at the top level. In these cases only the agency can be sued as an institution. Nevertheless, should individual supervisors be sued, they must be provided assistance in the court proceedings, such as legal counsel and protection against any costs. Of course, if the supervisor is finally found guilty and not to have acted in good faith, the supervisory agency should reclaim any outlays.

The second issue on effective supervision is that the supervisors must have a sufficiently large and skilled staff with satisfactory resources. With too few, or not adequately skilled supervisors, bank problems may not be detected early enough which may lead to major crises. With too many supervisors interventions in the banks might become excessive, thus interfering in banks' daily business. Supervisors should never act in a way which implies that they assume responsibility for the banks' ongoing activities, so called supervisory capture.

The third supervisory issue is that the supervisors must have a broad range of powers at their disposal to address different banking problems. This range should include limited measures such as requesting changes in the bank's management or requesting improvements in risk manage-

ment or control management. Also more far-reaching measures should be available such as stopping or restricting certain payments or activities, or the ultimate measures, to withdraw the banking license or to liquidate the bank. Preferably, some of these powers should be "pro-active" so the supervisor is allowed to act even before a problem becomes acute, for instance when the capital ratio is declining but has not yet reached the minimum level.

As a fourth issue, the supervisors must have a well defined, integrated and documented work process for the conduct of supervision. Since a few years there is a strong development towards what is known as risk-based supervision although a globally agreed definition of this concept is still lacking. Under risk-based supervision the supervisory authority focuses its main resources to monitor the major risks. With this approach, the priority is on the larger banks but also on banks with more risky activities and on banks which have shown to be weaker or more vulnerable than the others. A risk-based approach also means that the supervisor focuses on collecting information from banks about those activities or operations where there might be material risks. Since risk-based supervision does not encompass equally detailed scrutiny of all risks and of all banks it is important to check the corporate governance of the banks, including the control mechanisms. Provided that the board and management is of good quality, that there is a good balance between the board and the managers and staff, and that the control functions such as the internal audit do a good job, the supervisor can to some extent rely on their reports.

In summary, risk-based supervision generally leads to less intervention in banks as long as they are well run. Of course, this does not mean that some banks will never be supervised – all banks must provide their periodic supervisory and financial reports and they will also receive onsite visits, although some banks less frequently than others. But we should be aware that risk-based supervision also brings its own risks, namely that some minor banks may run into problems which are not detected in time – depositors and other counterparts may suffer losses.

Apart from risk-based supervision, an efficient supervisory process also includes a documented structure of approaches to collect and analyse information and to use this as a basis for taking action. The main approaches are offsite monitoring, onsite examinations and ongoing contacts with the bank. Offsite monitoring implies analysing regulatory and financial reports from banks, from their internal and external auditors, and from external media. Onsite examination is used to ensure that the bank actually operates as they report and to gain further insights into the bank's governance, plans and activities. In line with the risk-based

approach assessors no longer examine all transactions and documents but rather at a sample of those, including the more important ones. In addition to offsite and onsite, modern supervision includes closer, more frequent and less formal contacts between supervisors and banks. These contacts take place on different levels – on the top level of boards and managements but also on various mid-levels and staff levels. Sometimes also the owners are contacted. The aim of the contacts is to "know your bank" meaning that the supervisors should assess how the bank operates, and if the bank managements and owners are competent and honest. Contacts, onsite and offsite supervision should be integrated so that the onsite supervisor benefits from the know-ledge gained from the offsite monitoring, the contacts and vice versa. A good way to achieve this is to establish groups of supervisors composed of offsite as well as onsite staff who are responsible for the supervision of a specific banking group.

Conclusion

During the last twenty years, many countries have embarked on reforms of the banking and financial services industry. Such reforms have provided obvious benefits in the form of a better functioning financial sector that supports economic growth and financial stability.

Old-fashioned regulations and supervision leading to reduced efficiency have in most cases been terminated. Some regulation and supervision need to be retained, amended or even introduced but these should be in more flexible and market-oriented forms than earlier. The balance between costs and benefits of reforms must be secured, as well as the balance between the objectives of financial stability and efficiency. The goals of each country's regulation and supervision should be explicit and objective, and may include overall financial stability as well as consumer protection. The regulation should promote a wide range of banks and other financial institutions to conduct their activities on a level playing field. The degree of regulation and supervision should be commensurate to the size, nature and complexity of banks' activities as well as to the potential negative side-effects for banks' counterparts, including society as a whole.

The role of academics in monetary policy: a study of Swedish inflation targeting[1]

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The way in which monetary policy is conducted has changed considerably in recent decades. The process can be divided into two phases. The first involved changes in the general formation of policy (a change of regime), whereby low and stable inflation was given higher priority than before and central banks were made more independent. The second phase involves changes that in various respects have resulted in further developments of the new regime. Starting from experience of the Swedish inflation-targeting regime, this article describes the role academic research has played for the way in which monetary policy is currently formed. The article also presents a picture of the interplay between researchers and practitioners in the course of this process of change.

1. Introduction

In general terms, monetary policy can be said to be represented by a central bank's instrumental-rate decisions with a view to influencing aggregate demand and the rate of price increases in the economy. The way in which monetary policy is conducted has changed considerably in recent decades. The clearest difference from earlier periods is that policy now focuses to a greater extent on keeping *inflation low and stable*.

A consistent focus on price stability had admittedly existed earlier in a few countries, for example Germany. A broader application of this approach began with the realignment in the United States around 1980. Later, the tendency spread to other countries and in many cases, starting with New Zealand in 1990, it included the introduction of an *explicit numerical target* for inflation.

The results of the changes in monetary policy have been generally favourable. In addition to lower and less variable rates of price increases,

[1] This article draws to a great extent on a paper by the same authors called "Monetary policy and academics: a study of Swedish inflation targeting", forthcoming in Shani et al (2007). We are grateful to Malin Adolfson, Mårten Löf, and the editorial team of the Handbook of Collaborative Management Research for valuable comments and Johanna Stenkula von Rosen for editorial assistance.

many observers consider that the revised policy has contributed to the more stable economic development in general that has prevailed in many countries in the past ten to twenty years (see e.g. Bernanke, 2004, and Summers, 2005). In the light of the positive outcome in the period with low, stable inflation, today price stability is increasingly seen both as a goal in its own right and as a means of attaining other macroeconomic goals (see Bernanke, 2006).

This article has two main aims:

- The first aim is to shed light on the *role* played by academic research in the current formulation of monetary policy and thereby indirectly in the favourable economic development.
- The other aim is to depict the *interplay* between academics and practitioners, an interplay that has facilitated, perhaps even been a prerequisite for, the transmission of research results to central banks.

The first topic has already been mapped relatively clearly but here we strive for a picture that is more detailed than usual. Less has been done on the other topic, probably because economists have traditionally not been particularly interested in the specific processes whereby research is spread to and applied in practical domains.[2] Moreover, in disciplines that do focus on such processes, monetary policy is not a matter that has attracted much attention.

We believe that an account of the interplay between academics and central banks as regards the development of monetary policy may be more widely relevant, partly because the experience that has been gained can also be pertinent in other policy fields. There is, for example, the way in which monetary policy has been delegated and "depoliticised" and how the interplay with the world of research has assisted in the development of policy and in making it more understandable and generally accepted. Other policy fields also stand to learn from the prompt way in which new research findings have been utilised in the production of analyses and material for making decisions.

The article is arranged as follows. As a background to the subsequent discussion, section 2 presents a brief *historical survey* that describes both the problems which led to the introduction of an inflation-targeting policy in Sweden in the early 1990s and economic developments since then. In section 3, various *research findings* are discussed that have contributed to the development of Sweden's inflation-targeting monetary policy and an attempt is made to assess the ways in which contacts with the academics have been important. Section 4 describes the

[2] Two exceptions that to some extent deal with this issue are Blinder (2004) and King (2005).

forms for the *interplay between researchers and practitioners* that have facilitated the application of research findings in the practical domain. Effects in the other direction – practical policy's influence on academic research – are also considered to some extent.

2. A retrospect

In the early 1990s Sweden experienced a profound economic crisis. There were a number of specific causes but speaking more generally, the crisis can be seen as a dramatic finale to almost two decades of problems with stabilisation policy.

In the 1970s and '80s, policy in Sweden had for various reasons tended to be unduly expansionary and this had generated an environment that made it difficult to keep price and wage increases at a reasonable level. Thus, the policy regime with a fixed exchange rate did not serve, as had been intended, to keep inflation in line with the rate among Sweden's main trading partners. Instead, the development of prices and wages repeatedly undermined the fixed exchange rate. These costs crises were temporarily resolved by devaluing the currency, the Swedish krona, but this did not do away with the underlying problem – the excessively rapid upward trend in domestic prices and wages.

In this way the economy came to be characterised by "devaluation cycles" in which sudden "stops" alternated with powerful "goes". When yet another cost crisis meant that the fixed exchange rate finally had to be abandoned in November 1992 – after resolute but fruitless efforts to defend the krona and break the negative trend – it was clear that fairly drastic measures were needed to put the Swedish economy on a sounder footing.

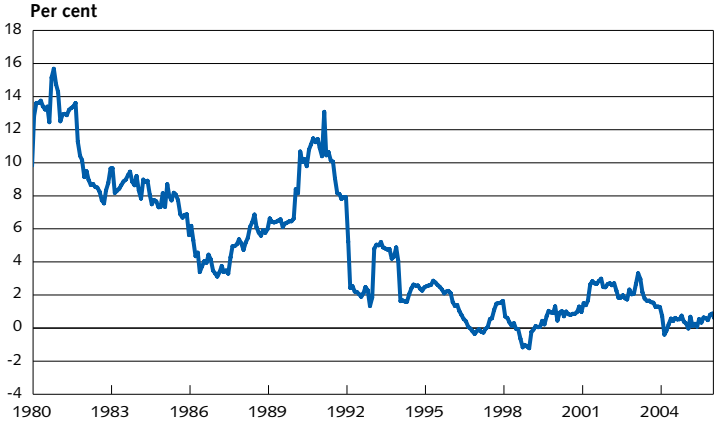
The solution was a *shift in the stabilisation policy regime,* involving a fundamental reformulation of the tasks assigned to monetary and fiscal policy. Having previously been unduly expansionary and a factor behind the rapid inflation, fiscal policy would now be required to ensure long-term stability and sustainability in the public finances. Monetary policy in turn was assigned a considerably more central role than before. With a flexible exchange rate, monetary policy's primary function would be to act more directly to keep the rate of inflation low and stable, in the first place by using the interest rate to influence aggregate demand.

Monetary policy's assignment was interpreted by the Riksbank as being to keep the annual change in the consumer price index (CPI) at 2 per cent as of 1995. In this way, when the inflation target was announced in 1993 Sweden became one of the first countries to introduce

an *inflation-targeting policy*.[3] Since then, this approach to monetary-policy has become increasingly popular and is now applied by more than twenty central banks around the world (see e.g. Berg, 2005).

Considering how the Swedish economy has developed under the inflation-targeting regime, it seems reasonable to conclude that this approach has worked well. Inflation has been low and considerably more stable than before (see Chart 1). Moreover, economic growth has fluctuated less and been stronger than in the 1970s and '80s. Employment has not developed as favourably, though the situation today is better than in the mid 1990s, shortly after the crisis. Moreover, the combination of the earlier devaluation policy and an ultimately unsustainable expansion of public sector employment is commonly considered to have simply postponed the need to tackle the Swedish economy's employment problems (see e.g. Lindbeck, 2003).

Chart 1. Inflation in Sweden 1980-2005
Per cent



Note. Inflation is measured as the twelve-month change in the consumer price index (CPI).

Source: Statistics Sweden.

3. Important contributions from research

The realignment of monetary policy in Sweden can be seen as an item in a broader international process. The change to a new policy regime occurred later in Sweden than in many other countries and under more dramatic circumstances. But once it had happened, Sweden was an early starter in deciding to focus policy on an explicit inflation target as well as in moving towards a high degree of openness and clarity in policy.[4]

[3] The early countries include New Zealand (1990), Chile (where a gradual lowering of inflation began in 1990 with the aid of annual inflation targets), Canada (1991), Israel (1991), the United Kingdom (1992), and Australia (1993). An interesting point in this context is that a price-stability target for monetary policy had actually been implemented briefly in Sweden in the 1930s, when decision-makers had been inspired by contacts with academics, in the first place through the work of the Swedish economist Knut Wicksell (see Berg and Jonung, 1999).

[4] See Eijffinger and Geraats (2006) for a study of how transparency has been developed in central banks. The study ranks Sveriges Riksbank as one of the world's most open central banks.

The following account has been structured by dividing the process of change into two phases. The first concerns changes directly connected with the *regime shift,* in Sweden's case with the transition from a fixed exchange rate to an inflation target and an independent central bank. The second phase concerns changes whereby the *new regime has been developed* in various respects. The review accordingly deals with insights and contributions from academic research that have influenced the regime shift as such (sub-section 3.1) and the subsequent development of the regime (sub-section 3.2).

3.1 The regime shift to an inflation target and an independent central bank

PRIORITY FOR LOW AND STABLE INFLATION

Academic researchers have put forward a number of theories about why inflation in many countries was so high in the 1970s and, in some cases, in the 1980s as well. A common feature of these theories is the basic premise that economic policy at the time was unduly expansionary and that a more restrictive policy would have been required to keep inflation low and stable. However, the theories differ in what they see as the reasons *why* policy was too expansionary. Simplifying somewhat, they can be said to start from the notion that the expansionary line had to do either with excessive optimism about the possibility of influencing real economic developments, that is, output and unemployment ("*output optimism*"), or with excessive pessimism about the possibility of controlling inflation ("*inflation pessimism*").[5] The research has tended to concentrate on conditions in the United States but the hypotheses are also applicable to many other countries.

One hypothesis is that economic policy decision-makers counted on the existence of a long-term trade-off between the real economy and inflation (see e.g. Taylor, 1992). This notion stems from a study by Phillips (1958) on UK data over many decades. It was assumed that the negative slope of the so-called *Phillips curve* implied that economic policy decision-makers could choose between different combinations of inflation and unemployment. It was believed that an expansionary policy could lead to lastingly higher output and employment, albeit at the price of higher inflation.[6]

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[5] This view is found in e.g., Bernanke (2004).

[6] Another hypothesis, which to some extent can also be said to focus on "output optimism", is that inflation (in the United States) was high because the economy's underlying potential growth rate was overestimated over long periods. Monetary policy was therefore more expansionary than was intended; see e.g. Orphanides (2002). This hypothesis, unlike those outlined in the text, does not envisage that the decision-makers' "model" was fundamentally wrong, simply that an error was made in the assessment of the economys' unutilised resources.

However, theoretical work in the late 1960s indicated that this notion did not allow for the fact that a systematically expansionary policy would also influence inflation expectations of households and firms (see e.g. Phelps, 1967, and Friedman, 1968). One reason why a rapid price rise can boost employment is that real wages fall, enabling employers to use more labour. But this effect depends on the inflation expectations of wage-earners being at fault initially. In time, wage demands will be adapted to the higher rate of price increases so that real wages are restored, whereupon employment and unemployment return to their earlier levels (often referred to as natural levels) while the higher inflation persists.

Today it is generally accepted that the long-term levels of output and employment are determined by factors that monetary policy cannot influence directly, such as the rate of technological development and how well markets function. This insight has had a major impact on how the approach to monetary policy has changed in recent decades.

An alternative hypothesis as to why policy was unduly expansionary is that decision-makers underestimated the role played by the level of demand in generating the higher inflation.[7] Statements by central bank representatives and politicians suggest that it was commonly believed that the high inflation was more or less exclusively due to specific non-monetary factors such as high increases in labour costs and rising costs for oil and other raw materials. This seems to have been accompanied by the view that inflation was relatively insusceptible to changes in demand and thereby, for instance, to monetary policy. This "inflation pessimism" meant that monetary policy decision-makers virtually abdicated from their role as inflation fighters. Hence, the well-known statement by Milton Freidman that "inflation is always and everywhere a monetary phenomenon" was not fully acknowledged at that time.

Academic research had accordingly generated valuable insights that were already circulating when the earlier way of conducting stabilisation policy failed to work in the 1970s and a search began for alternative approaches. One fundamental insight was that monetary policy is *incapable of permanently* influencing output and employment; another was that inflation is basically a monetary phenomenon, so that monetary policy *is capable* of steering inflation in the somewhat longer run.

[7] See Nelson (2005) for an analysis of this hypothesis about "monetary policy neglect" in the United States and the United Kingdom.

The promotion of low and stable inflation to be monetary policy's overriding objective has been accompanied by greater central bank independence vis-à-vis the political system. Arguments for a change in this direction were provided by research into the problem of economic policy's *time inconsistency* (see Kydland and Prescott, 1977, and Barro and Gordon, 1983). This research drew attention to the fact that keeping inflation down can be hard on account of difficulties in making binding commitments. The basic problem is that economic policy decision-makers' motives for the short run may conflict with a long-term ambition for low inflation. It will then not be easy to convince economic agents that policy will be maintained, that is, consistent over time (hence the term time inconsistency).

Suppose the government declares that inflation will be held at a low level in the future and that at first economic agents believe this will be the case. Inflation expectations in the economy will then adjust to this low rate of inflation. When this has happened, however, the decision-makers may be tempted to depart from the long-term ambition for low inflation. A temporary reduction of unemployment, for example, achieved by stimulating the economy and allowing inflation to move up, may be perceived as politically worthwhile, even though the benefits do not last. As inflation is low initially, moreover, the costs of a higher rate will not be considered all that serious. It is not hard to see that such a policy can be particularly tempting in certain situations, for instance in the run-up to an election.

However, as economic agents are aware that economic policy decision-makers can be tempted in this way, their inflation expectations will be geared from the start to this fact rather than to the low inflation that was aimed for initially. In this situation, the best option from the government's point of view will be to implement an accommodating policy, which means that the high inflation expectations will be fulfilled. The end result is a level of inflation above the low level initially declared – an inflation bias – without this leading to higher output or employment.[8]

This seems to be a fairly good description of what happened in Sweden in the 1970s and '80s. The recurrent assurances that inflation would be held down were simply not seen as credible. As a result, employers and employees did not perceive high wage increases as all that serious – they counted on a devaluation of the exchange rate if employment was

[8] The problem of time inconsistency can accordingly be seen as a further explanation, in addition to those discussed above, for the high inflation. Interpreted in this way, the problem is a variant of "output optimism", though without the assumption that decision-makers believe that output can be stimulated permanently.

endangered. One can say that there was a lack of sufficiently convincing arrangements in support of the ambitions that evidently existed to keep inflation down.

In the new regime in Sweden from the early 1990s, the responsibility for maintaining price stability was specifically assigned to the Riksbank. In the 1970s and '80s, with a fixed exchange rate that prevented monetary policy from being used to influence demand, it had not been clear where this responsibility rested. It was not until 1999 that the independent status of Sweden's central bank was confirmed in law but in practice, monetary policy was able to strive for price stability with a considerable degree of independence right from the start. This was probably an important reason why inflation expectations were adapted relatively quickly to the official inflation target. Economic agents evidently reckoned that a central bank with a clear target for inflation would not implement the same kind of accommodating policy as before the change of regime.

It is, after all, rather natural that the temptation to implement an excessively expansionary policy will be resisted more readily by a central bank than by a government that continually has to make decisions under pressure from important groups in the electorate. When this temptation has been removed, economic agents will count on inflation being kept low, which means that the inflation bias also disappears.

The influence from academic research on the decision on the Riksbank's independence is hard to gauge exactly. The change that came in the early 1990s was crucially bound up with the international context of which Sweden was a part – central bank independence was becoming the norm – together with the acute domestic crisis that restricted the freedom of action in economic policy. When the law that formally established the Riksbank's independence eventually was amended in 1999, there was a direct link to Sweden's undertakings vis-à-vis the European Union. But academic research was naturally an underlying factor in all these phases. Moreover, the problem of time inconsistency in economic policy received comparatively much attention in the Swedish debate in the early 1990s.

3.2 Subsequent development of the regime

THE MONETARY POLICY STRATEGY

The decision to introduce an inflation target and the Riksbank's high degree of practical independence by no means put an end to the discussion of monetary policy. Given the assignment to an independent central bank to focus on price stability, a good deal of work remained to be

done on the details of the monetary policy strategy.[9] In this context, the academic contribution mainly concerned formal analyses that helped to systematise and discipline ideas about the best way of conducting an inflation-targeting policy.

It was evident that many decision-makers right from the introduction of inflation targeting realised that policy ought to be conducted in a "flexible" manner. A one-sided focus on the inflation target could entail unnecessarily large fluctuations in output and employment. Despite this insight, many central bankers have tended to be cautious in their accounts of how an inflation-targeting policy takes output and employment into consideration. The well-known American economist Stanley Fischer, a former deputy head of the International Monetary Fund and currently governor of Israel's central bank, put it like this:

"Central bankers have a tendency to say that price stability should be the only goal of monetary policy, and to shrink from the point that monetary policy also affects output in the short run. That is not hard to understand, for explicit recognition of the powers of countercyclical monetary policy encourages political pressures to use that policy, with the attendant risk that inflation will rise. But it is also problematic and destructive of credibility to deny the obvious, as well as to undertake countercyclical policies while denying doing so." (Fischer, 1996, p. 26.)[10]

In the early years with the new regime, many central banks, not least the Riksbank, focused particularly strongly on inflation in their rhetoric. In the light of high and variable inflation, it was considered important to make it clear that stabilising inflation was the priority and to convince everyone that this was policy's overriding objective. In many cases, this rhetorical focus continued even when the inflation target started to gain credibility. This had to do in part with a concern that changing the focus all too quickly could lead to policy being regarded as erratic and changeable.

To illustrate how the Riksbank has gradually modified its description of the inflation-targeting policy, statements at different times can be compared with the implications from a theoretical model for an optimal inflation-targeting policy. For the comparisons presented here we have used a model by Lars Svensson (Svensson, 1997) that is simple but still serves to convey the basic principles.

[9] We use the term monetary policy strategy to denote how policy is conducted by a central bank within the framework of an inflation-targeting regime.

[10] See also Faust and Henderson (2004) for a similar argument.

At a very general level and simplifying somewhat, Svensson's model is made up of relationships that describe how the economy functions and indicate what the central bank ought to do.[11] Monetary policy is assumed to be a matter of minimising the following loss function:

$$L = (\pi - \pi^*)^2 + \gamma(y - y^*)^2, \qquad (1)$$

where γ measures the importance attached to stabilising output, y, in relation to stabilising inflation, π ($\gamma = 1$ denotes equal importance). The inflation target is represented by π^* and the long-term sustainable level of output by y^*. The equation implies that the central bank attains perfect target fulfilment when $\pi = \pi^*$ and $y = y^*$ (i.e., when $L = 0$).[12]

In more realistic models, it is assumed that the central bank aims to minimise (1) not just over a particular period but from today and forever. The central bank then has to tackle the problem of minimising the discounted sum of (1), summed from today to an infinite future. As future outcomes are not available, what this amounts to is that the central bank aims to minimise the *expected* discounted sum of (1). In simple terms, the optimal policy is then derived by solving this optimisation problem given the other relationships that describe how the economy functions.[13]

In the model, monetary policy is assumed to be capable (via the instrumental rate) of influencing aggregate demand (y above) in the next period. The duration of a period is not self-evident but is often assumed to be one year. Changes in demand lead in turn to changes in inflation in the following period. So in this model monetary policy is assumed to act with a time lag of two periods (years) before an interest rate adjustment has an impact on inflation. Note that the model's time lag is a consequence of how the economy functions and does *not* imply that for some reason the central bank postpones it response to deviations from the inflation target (π deviates from π^*). This means that no matter how much the central bank chooses to adjust the interest rate after a shock, it *cannot* restore inflation to the targeted level sooner than in two years time.[14]

The assumed behaviour in accordance with (1) clarifies that the central bank is not solely concerned with the development of inflation but also attaches some weight to real economic factors (as long as γ is not

[11] Our discussion closely resembles that in Apel et al. (1999). A more digestible and reader-friendly account of the model will be found in Svensson (1998).

[12] The assumed behaviour in accordance with equation (1) (or very similar variants) has a long tradition in monetary policy analyses (see e.g. Kydland and Prescott, 1977, Barro and Gordon, 1983, and Rogoff, 1985).

[13] The solution for the interest rate is sometimes called a monetary policy reaction function. If this function, instead of being based on an explicit optimisation, is just postulated, it is sometimes known as a simple rule. The best-known simple rule is the so-called Taylor rule (Taylor, 1993).

[14] This simplified assumption is perhaps slightly unrealistic but is not crucial for the points of principle we want to make here. What matters is not that the time lag is exactly two years but that there is a certain interval during which a monetary policy measure has no (appreciable) impact on inflation.

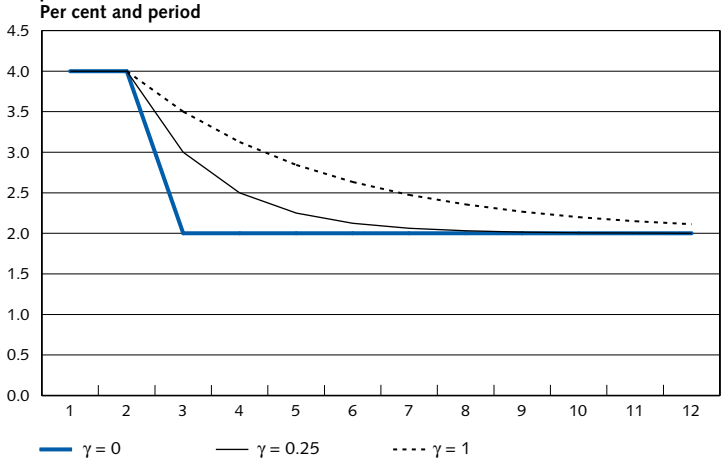
zero). At times, the goal of stabilising inflation (around π^*) may conflict with the goal of stabilising output (around y^*). If inflation suddenly increases, the central bank will want to counter this so that the discrepancy between π and π^* in equation (1) is reduced. This it does by raising the interest rate so that y falls below y^*.[15] However, the sooner the central bank wants to curb inflation (reduce the discrepancy between π and π^*), the more it has to tighten the interest rate at the cost of impairing the stability of output (an increased difference between y and y^*). It has been shown that in this situation there is an *optimal trade-off* in the sense that the central bank raises the interest rate just sufficiently for the deviation of y from y^* to relate in a particular way to the deviation of π from π^* (for details see Svensson, 1997). Exactly how the deviation of y from y^* should relate to that of π from π^* depends on the model's parameters, of which one is the weight the central bank attaches to stabilising output relative to stabilising inflation (γ).

Chart 2 illustrates how the central bank's optimal trade-off is affected by its *stabilisation policy preferences* (values of the parameter γ). The economy is in equilibrium initially, so that inflation is on the target (assumed here to be 2 per cent). For some reason inflation then suffers a shock and jumps up to 4 per cent. The central bank observes this and reacts with an interest rate increase. But as it takes time (two years) for this increase to affect inflation, the latter's rate continues to be 4 per cent for the next two years. What happens after that depends on the central bank's stabilisation policy preferences. If the bank considers that variations in output are not particularly serious (γ is comparatively low, in this example 0.25), inflation returns to the target fairly quickly (which means that when the central bank observes the inflation shock, it raises the interest rate fairly markedly). On the other hand, if the central bank is more averse to real economic fluctuations (γ is higher, in this example 1.0), it takes longer for inflation to fall back because the bank raises the interest rate more cautiously so as not to generate an unduly large deviation of y from y^*.

Briefly, then, a monetary policy that is derived from the assumed behaviour (1) will involve arriving at a trade-off between the goals of stabilising inflation and output, respectively. The optimal trade-off depends on how the economy functions and on the central bank's preference for tackling deviations in inflation relative to deviations in output. In this model, it can also be shown that the shock's magnitude matters for the speed of adjustment of inflation back to target.

[15] The situation we consider here is a permanent inflation shock, so that in order to eliminate the discrepancy between π and π^* the central bank is obliged to act.

Chart 2. Basic outline of inflation's adjustment with alternative stabilisation policy preferences
Per cent and period



Source: Own calculations based on Svensson (1997).

The model can also be used to illustrate the consequences of a monetary policy that focuses *solely* on keeping inflation stable. This corresponds to the case where $\gamma = 0$.[16] The thick solid curve in Chart 2 shows that in this case monetary policy concentrates on returning inflation to the target as quickly as possible (after exactly two years here).

How, then, do the Riksbank's descriptions of its inflation-targeting policy on various occasions tally with this model? As mentioned earlier, the bank's rhetorical focus on inflation was notably strong in the early years. The following excerpt from a speech in 1994 illustrates the early emphasis:

"If inflation deviates from the target, policy has to be designed to bring it back to a level which is in keeping with the objective of price stability. The time schedule for this is governed by the substantial lag before effects of monetary measures materialize. The interval before the full effect of a change in the instrumental interest rates shows up is commonly estimated to be between one and two years. … [P]olicy should be constructed so that forecast inflation one to two years ahead … is 2 per cent." (Bäckström, 1994, p. 6.)

This statement can be said to imply that in the event of a deviation, inflation is to be brought back on target as soon as possible. There is no mention of circumstances that might warrant a more protracted adjustment. In the model, this corresponds to a monetary policy with the restriction that $\gamma = 0$. In this case the central bank, as indicated above, invariably aims to have inflation in line with the target as quickly as it can and the size of the shock is of no importance.

[16] In the research literature, the cases with $\gamma = 0$ and $\gamma > 0$ are sometimes respectively called "strict" and "flexible" inflation targeting (see e.g. Svensson, 1997).

However, it was not all that long before the argument started to shift. The following description comes from a speech two years later, in 1996:

"[In] the construction of monetary policy, the development of production is an implicit consideration. … Excessively strong growth is liable to generate rising inflation, bringing this above the inflation target. That calls for a tighter monetary stance. Conversely, weaker growth [brings] … inflation down below the target, which by the same token warrants an expansionary monetary stance. This illustrates how, with an inflation target, monetary policy serves to smooth unduly large fluctuations in economic growth … ." (Bäckström, 1996, p. 4.)

In contrast to the preceding description, this underscores a need to stabilise real economic developments. However, the cited case is one where an interest rate adjustment automatically stabilises both inflation and demand and does not require an active trade-off between these objectives. In terms of our model, one cannot tell whether $\gamma = 0$ or $\gamma > 0$, though the reference to a need of real economic stabilisation does implicitly indicate that $\gamma > 0$.

One year later, the considerations behind monetary policy were formulated as follows:

"The inability of monetary policy to affect long-term employment and the fact that it should focus on maintaining price stability does not mean that its capacity to condition production and employment in the short run cannot sometimes be used for stabilising activity. Monetary policy can contribute to an economic recovery in so far as this is feasible without jeopardising price stability." (Heikensten, 1997, p. 5.)

Further steps were taken in 1999, when the Riksbank's Executive Board came into being and endorsed a clarification of how Swedish monetary policy is conducted. This clarification included a specification of various situations in which it might *not* be pertinent to adjust inflation to the target as quickly as possible after a shock:

"Monetary policy acts with a considerable time lag, with the largest effect on inflation in the interval of 1 to 2 years. … Monetary policy is normally conducted so as to be on target … one to two years ahead. Departures from this general rule may be warranted for two reasons. One is that the CPI can be pushed upwards or downwards in the relevant time perspective by one or more factors that are not considered to affect inflation more permanently. … The other reason for departing from the rule can be that a quick return to the target in the event of a sizeable deviation can sometimes be costly for the real economy." (Heikensten, 1999, pp. 8 and 16.)

This description of policy makes it clear that stabilising inflation could be at odds with stabilising real economic activity. Here, then, the ambition to stabilise the real economy is of direct importance for the formulation of monetary policy. In terms of our model one can say that the Riksbank describes a monetary policy characterised by a *time varying* value of γ; this parameter can "normally" be virtually zero but a positive value can sometimes "be warranted" (when inflation changes temporarily or there are sizeable shocks).[17]

In the following years, much of the discussion of monetary policy concerned the extent to which policy should be flexible and related to economic issues that then occurred. One such issue was how to deal with changes on the supply side of the economy that were likely to have a downward effect on inflation that was only transitory. Another was whether policy ought to take the development of asset prices into consideration (equity prices around the turn of the century and later on house prices). Published speeches indicate that the Riksbank's view was that a flexible policy was needed, i.e. there could be grounds for departing from the inflation target. The crucial reason for adopting this view was the risks involved and how they were evaluated.[18]

The next step was taken in 2006 when the Riksbank presented a further clarification of its monetary policy strategy, which it described as follows:

"Monetary policy is normally focused on achieving the inflation target within two years. … The two-year horizon can be interpreted as a restriction as to how much consideration can normally be given to real economic developments, a restriction which – like the specified inflation target – the Riksbank has imposed on itself to make the target of maintaining price stability credible. In certain circumstances, deviations from the inflation target can be so large that it is reasonable to allow inflation to return to the target beyond the normal two-year horizon, provided this does not undermine confidence in monetary policy. … The pace at which it is desirable to bring inflation back to target after a deviation depends on the disturbances the economy has been affected by." (*Monetary policy in Sweden*, pp. 13 and 14.)

A comparison with the earlier formulations about the need to consider the real economy and the principles embodied in our simple model makes two points. The first is that the Riksbank now considers that targeting inflation in the two-year perspective means *per se* that γ

[17] The clarification in 1999 meant that the Riksbank went further than most other central banks in its ambition to specify its strategy for monetary policy. One reason was that the (independent) Riksbank wanted to facilitate Parliament's evaluation of monetary policy and exaction of accountability.

[18] See e.g. Heikensten (2000, 2001).

is positive. There can still be a case for varying γ over time but its normal value is positive and there are "certain circumstances" that can call for an increased value. The other point is the *explicit explanation* as to why the theory's recommendations are not followed fully in practice: the Riksbank has *chosen* to adopt the two-year horizon as a "restriction" so as not to jeopardise the inflation target's credibility. This restriction does not occur in the theoretical model (where the optimal target horizon varies) for the simple reason that the model has no cause to worry about the policy's credibility (which is invariably taken for granted).

To sum up, since the inflation target was introduced in the early 1990s the Riksbank has gradually moved towards describing its monetary policy as a trade-off between stabilising inflation and the real economy, respectively.[19] This tendency has by no means been confined to Sweden. Virtually every country with an inflation target has followed a similar path from a strong focus on the target to a more open discussion about taking real economic developments into account.

Of course this does not mean that inflation-targeting theory is now indistinguishable from practice. Practical applications may depart from theory for a number of reasons. A notable example is that practice does not fully apply the theoretical models' *continuous* trade-off between different goals of stabilisation policy. All inflation-targeting central banks still employ some kind of target horizon for the attainment of their inflation target under normal circumstances.[20] This is presumably connected with the risk that the inflation target would otherwise be perceived to be too vague and, in a worst-case scenario, perhaps no longer even fulfil its function as a "nominal anchor".

TRANSPARENCY AND COMMUNICATION

"The received wisdom in central banking then was: Say as little as possible, and say it cryptically. But attitudes toward transparency have changed dramatically since then, and central banks around the world have opened up." (Blinder, 2006, p. 12.)

[19] An early account of this is found in Heikensten and Vredin (1998). They write: "We believe that the greater awareness among economists and politicians that inflation-targeting policy should be 'flexible' rather than 'strict' has helped to make monetary policy and an independent central bank more acceptable. Central banks have traditionally tended to deny that in practice monetary policy decisions are to some extent influenced by other considerations than long-term price stability. An effort is made to create an impression that low inflation is their sole concern. Like Fischer [(1996)], we believe that this strategy is unwise. It is rather the case that an open discussion about trade-offs of this kind can strengthen policy's credibility" (Heikensten and Vredin, 1998, p. 580.)

[20] Today, the central banks that are commonly considered to adhere most closely to the theoretical models for an optimal inflation-targeting policy are those in Norway and New Zealand. But even they do not described monetary policy as a completely continuous trade-off between the stability of inflation and output, respectively. Like the Riksbank, for example, they both start from a certain horizon for the normal fulfilment of the inflation target (see Berg, 2005).

There are a number of reasons why central banks have become considerably more open in recent decades and paid so much attention to the issue of communication. Virtually all public institutions have cause to be clear about how they function, the results they achieve and how much they cost. In a democracy, voters need this information to form an opinion about whether resources should be increased or reduced and, ultimately, whether the activity is necessary at all. This has always been the case for central banks but in Sweden's case it has become increasingly important for two reasons in particular. With the change to a flexible exchange rate, monetary policy decisions have a continuous and more direct impact on households and firms. This has made the central bank's operations a matter of wider concern and focused attention on it in the public debate. Moreover, the increased independence entails, as in many other countries, a greater need make monetary policy generally understood, accepted and legitimate. If the grounds for a central bank's actions are not understandable and broadly accepted, there is a risk of its *legitimacy* being undermined.

Another reason why clear communication with the outside world is important is that it can help to make policy *credible.* When the Riksbank presented the basis for its policy more clearly and began to publish its forecasts and other decision-making material, this made it easier not only to exact accountability but also for economic agents to follow what was happening continuously and be sure that decisions really did aim to fulfil the declared target and were not influenced by improper influences. In other words, clear communication served as a short-cut to credibility. This aspect of the need for transparency and communication was probably particularly important at a time when a new, low-inflation regime was being established.

A third argument in favour of central bank transparency and clarity is that the more understandable and predictable policy becomes, the less risk will there be of unnecessary economic shocks. Economic theory holds that interest rates for different maturities are interconnected, so that expectations of short-term interest rates (over which a central bank exerts almost perfect direct control) are important for the prevailing levels of long-term interest rates (over which a central bank exerts no direct control). It follows that by influencing expectations about short-term rates, a central bank can also indirectly affect longer-term rates. A greater influence on the entire range of interest rates (the so-called yield curve) obviously makes *monetary policy more powerful.*[21] Michael Woodford, a

[21] This actually applies not only to interest rates for longer maturities but also to other financial prices that are influenced by expectations, e.g. exchange rates and equity prices. However, this merely underscores that by influencing expectations a central bank can render monetary policy more powerful.

leading researcher in the field of monetary policy, has formulated this as follows:

"Insofar as the significance of current developments for future policy are clear to the private sector, markets can to a large extent 'do the central bank's work for it,' in that the actual changes in overnight rates required to achieve the desired changes in incentives can be much more modest when expected future rates move as well." (Woodford, 2005, p. 4.)

When the Riksbank started publishing numerical forecasts in the second half of the 1990s, the underlying assumption was that the instrumental rate would be unchanged in the forecast period. This approach was chosen by most of the few central banks that published forecasts at all in those days. The aim was to present forecasts and discuss potential risks in order to provide a solid basis for assessing the future path of interest rates. The fact that the bank's decision-makers endorsed the forecasts gave the aim greater force.

The approach the Riksbank adopted worked satisfactorily on the whole as far as communication was concerned. The assumption of a constant instrumental rate was pedagogic in that the forecasts spoke straightforwardly about the need for monetary policy action. If inflation was forecast to rise above the target, for instance, this indicated that an increase in the instrumental rate was called for and vice versa if the forecast was below the target.

However, the approach also posed problems that had to do with the fact that assuming a constant instrumental rate over a comparatively long period is not particularly realistic. Forecasts based on this assumption will hardly be credible at times when it is reasonable to suppose that over a longer period the instrumental rate will need to be raised or lowered. It also means, of course, that the forecasts will subsequently be difficult to evaluate.

In 2005 the Riksbank chose to base its forecasts on a more realistic assumption about future monetary policy, namely that the instrumental rate would follow market expectations. By then the inflation-targeting policy was firmly established and similar changes had already been made by the central banks in Norway and the United Kingdom.

Besides providing better conditions for making credible forecasts, the assumption that the interest rate will follow market expectations facilitates the central bank's communication of future monetary policy. Even if the market's expectations fail to coincide exactly with those of the central bank, by describing the extent to which this is the case the central bank can indirectly communicate information about its own expectations.[22]

Clarity about future monetary policy might be further enhanced by a central bank basing forecasts directly on its own interest rate expectations and publishing these, instead of making a detour via market expectations. This is, in fact, what the Riksbank has chosen to do from the beginning of 2007.[23] This is the approach that most academic researchers now recommend.[24] Many central bankers have been less enthusiastic to date, though they have recently become more interested in looking further into this matter.

One objection has been that with this method, central banks would "stick their necks out". It may be asked whether they are better informed about the economy than other observers. And what would the public reaction be if what actually happens were to differ markedly from the declared intention (because forecasts are uncertain and interest rate expectations are therefore revised over time)? That might be particularly serious if the deviations entailed substantial costs for economic agents. The Riksbank's view is however that the uncertain nature of assessments is now widely understood, as is the circumstance that new information is liable to entail appreciable changes in the conditions for monetary-policy decisions.

Another difficulty in this context is that today, in many central banks, including the Riksbank, decisions are made by a committee (executive board). This form of decision-making introduces the problem of arriving at interest rate expectations which represent the opinion of a group (as a consensus or a majority).[25]

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[22] In an interesting paper, Faust and Leeper (2005) show that drawing conclusions about a central bank's own interest rate expectations (and expectations about macroeconomic developments) is difficult if one has to rely solely on information about the bank's conditional forecasts (forecasts based, for example, on the market's interest rate expectations). As a rule, these forecasts do not provide sufficient information for conclusions about the central bank's own plans for monetary policy. That is why it is so important in such cases that the central bank conveys its view on the market's expectations.

[23] The Reserve Bank of New Zealand has used its own interest rate expectations for some time and today such expectations are also used by the central banks in Norway, the Czech Republic, and Colombia (Berg, 2005).

[24] See e.g. Faust and Leeper (2005), Svensson (2005), Woodford (2005), Blinder (2006), and Rudebusch and Williams (2006). Note, however, that not all scholars agree about this; for two exceptions, see e.g. Mishkin (2004) and Cukierman (2005).

[25] The fact that for more and more central banks, increased independence has been combined with arrangements for decision-making by a board or committee has in practice influenced the degree of transparency. The changes have been accompanied by the publication, in the form of minutes and speeches, of more information about the underlying deliberations. The ways in which this has influenced decisions and the effects on the legitimacy, credibility and clarity of policy have not yet been elucidated at all extensively by research.

The development toward more openness has had to do with a combination of changes in society in general – the rapid growth of financial markets and increased attention from media, for instance – and more specific factors such as greater central bank independence in many countries and, in Sweden, the move to a flexible exchange rate. The contribution from academics has mostly been to provide an impetus by stressing the value of transparency, clarity, and making policy assessable and accountable. For the Riksbank, matters such as these were frequently on the agenda in the second half of the 1990s when policy makers met their academic advisors (see section 4 for further details). Vivid discussions turned established practices inside out and demonstrated shortcomings in the methods that were being employed.

THE BASIS FOR MONETARY POLICY DECISIONS

A sound strategy and functional communication do not suffice to ensure that monetary policy contributes to a favourable macroeconomic outcome. This also calls for high quality in the analyses underlying the interest rate decisions. At the Riksbank, by far the most important part of the analytical work has been to produce forecasts of inflation as well as of factors, primarily real economic developments, that to a high degree steer inflation and can in themselves influence decisions.

In the past five years the empirical characteristics and forecasting potential of large macro models have undergone an almost revolutionary development.[26] Much progress has also been made with models that focus more directly on data regularity and have less of a basis in economic theory (time-series models). Various factors have contributed here, not least that powerful computers can perform highly advanced and time-consuming calculations and that macro models are now constructed to a greater extent on the basis of relevant theories about the behaviour of households and firms (micro foundation).[27]

Work on the assessment of macroeconomic development has been a part of the Riksbank's activities for a long time. With a fixed exchange rate, however, there was less need of detailed and developed forecasts. Still, this work was already being reinforced at the beginning of the 1990s and when the fixed exchange rate had to be abandoned and the inflation target was introduced, it gained weight in the internal organisation.

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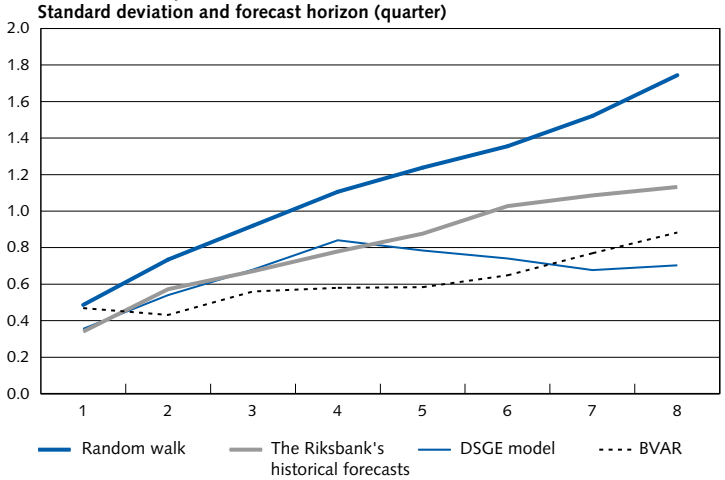
[26] In the research literature these models are labelled DSGE, which stands for Dynamic Stochastic General Equilibrium; they are based to a high degree on economic theory. See Sims (2002) for a discussion of developments in this field.

[27] Rebelo (2005) and Chari and Kehoe (2006) consider some of the research that has been important for achieving these micro foundations. This development can be said to stem from the well-known criticism by the American economist Robert Lucas (Lucas, 1976). In simple terms, he showed that unduly aggregated models (without micro foundations) were liable to produce misleading results concerning the consequences of economic policy.

The more traditional forecasting work (expert assessments unaided by models) was supplemented with efforts to produce a larger macro model and develop time-series models. The work on a macro model started from a version produced in the Bank of Canada that was judged to be applicable to conditions in Sweden. The model was used for a number of simulations but for various reasons it was never of much importance for forecasting. The time-series models were employed quite a lot in forecasting in the latter part of the 1990s.

In recent years the work of acquiring new and more appropriate forecasting instruments has had growing priority at the Riksbank. This has involved the recruitment of highly competent staff and led to the renewal and updating of the forecasting models to meet the requirements discussed above. An entirely new macro DSGE-type model has been installed; its basic structure relies on existing models developed by researchers in the United States and Europe but the Riksbank has managed to make a number of innovations. These include adapting the model's relationships and mechanisms to the fact that, compared with the US economy and the euro area, Sweden is much more dependent on the rest of the world, as well as the estimation method that are used to determine the values of the model's parameters.[28] Work has also been stepped up on the development and introduction of new, more modern time-series models.[29]

Chart 3. Accuracy of inflation forecasts from a selection of models
Standard deviation and forecast horizon (quarter)



Note. All the forecasts are produced in real time. i.e. using only the data that was available at the time of the forecast.

Source: The Riksbank.

[28] The model and its characteristics are documented in the Riksbank's Working Paper series; see Adolfson, Andersson, Lindé, Villani and Vredin (2005), Adolfson, Laséen, Lindé and Villani (2005a, 2005b) and Adolfson, Lindé and Villani (2005).

[29] See the box "GDP indicators" in Inflation Report 2005:3, pp. 35–39, for an account of the time-series models the Riksbank is using at present.

As mentioned above, the empirical characteristics of the new models (macro as well as time series) are considerably superior to those of their predecessors. Chart 3 presents an example of an evaluation of inflation forecasts (from one to eight quarters ahead) with some of the Riksbank's new models. The accuracy of the forecasts is measured as the standard deviation of the forecasting error.[30] The smaller the standard deviation, the more accurate the forecast (a perfect forecast that never errs at all has a standard deviation of zero).

The chart shows forecasts obtained with four alternatives: a random walk (the forecast is always the same as the outcome in the initial position), the Riksbank's historical forecasts (as published in the Inflation Report), a time-series model (here the forecasts with a Bayesian VAR model, BVAR[31]), and the Riksbank's new DSGE-type macro model.

First we can note that both the Riksbank's historical forecasts and the forecasts with the two model-based alternatives (BVAR and DSGE) are consistently more accurate than the random walk. It should be pointed out here that although the method is very simple, a random-walk forecast often proves hard to beat in evaluations of this kind. It will also be seen that the two model-based alternatives are at least as accurate as the Riksbank's historical forecasts in the Inflation Report. This suggests that there were times in the past when access to model forecasts of this type could have improved the Riksbank's predictions.[32] Another point is that the forecasts with the time-series model (BVAR) are superior to those with the macro model (DSGE) over the first six quarters but the latter is more accurate after that.[33] It is remarkable that a large macro model performs as well as this compared with an alternative that has been explicitly tailored to make accurate forecasts.

This general review prompts the conclusion that research in recent years, aiming at the further development of various empirical models, has clearly contributed to an improvement in conditions for producing sound forecasts and thereby ultimately to a monetary policy that functions properly. In the Riksbank's case, the research has been channelled both by the usual routes (publications, seminars and so on) and through

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[30] It is actually the root mean-squared error of the forecasts that is shown; this equals the standard deviation of the forecasting error if the forecasts are expected value accurate (if the mean of the forecasting errors is zero).

[31] VAR, which stands for Vector Auto Regression, denotes a type of time-series model that was introduced in economic research in the early 1970s by the American economist and statistician Chris Sims (see Sims, 1972). Today, VAR models are taught in almost every basic university course in applied macro analysis. BVAR, which stands for Bayesian Vector Auto Regression, is a VAR model where the parameters are estimated with a particular statistical technique (for an introduction to this technique, see e.g. Robertson and Tallman, 1999).

[32] The comparison is complicated by the fact that the Riksbank's historical forecasts are conditioned by the assumption that the instrumental rate is unchanged (see the discussion in the preceding section).

[33] That time-series models produce good forecasts mainly for the short run is in keeping with research in this field, see e.g. Robertson and Tallman (1999), Stock and Watson (2002), Wright (2003) and Hansson et al. (2005).

contacts between Bank economists and researchers that were established to a large extent as a result of the Research Department (see section 4 for further details). Models are inevitably simplifications and cannot take all the relevant information into account but they do facilitate forecasting and help to make it structured and comprehensible. The latter applies in particular to forecasts from macro models because, unlike those from time-series models, they can be interpreted in terms of economic theory.

4. The interplay of academics and practitioners

In the preceding section we considered how the design of monetary policy in Sweden (and other industrialised countries) has been influenced by various contributions from research. Much of what we discussed is familiar to central bank economists and academic researchers. As noted initially, there are fewer accounts of the interplay between researchers and practitioners that has facilitated, perhaps even been a prerequisite for, the transmission of the insights from academics to practical purposes. That is the topic of this section. There will also be some mention of influences in the other direction, from practice to research.

First, however, it should be borne in mind that some of the most notable changes in monetary policy have not resulted primarily from an interplay between academic researchers and central bank practitioners. Compared with a business enterprise, for example, a central bank is much more bound by *rules* imposed by the political system. The higher priority for price stability and the increased independence of central banks are examples of more general reassessments that have required decisions by governments and elected assemblies (see sub-section 3.1). While insights from academic research, together with practical experience, have no doubt been important for these reforms, their impact on practice has come via the political system and political decisions rather than in an (direct) interplay with central bank practitioners.[34]

There are, however, many other changes in monetary policy, above all in connection with the continuous development of day-to-day activities (see sub-section 3.2), where the consequences of this interplay have been more direct. The following account focuses on the forms for this interplay in Sweden in the period with an inflation target, that is, *after* the fundamental conditions for monetary policy had been established by the political system.

[34] Another matter is that conditions for monetary policy have changed markedly as a result of developments in the global economy in recent decades, perhaps above all the emergence of extensive global financial markets and the resultant massive cross-border capital flows.

4.1 Three types of interplay

To make it easier to follow the account, we have chosen to divide the forms for interplay between research and practitioners into three types:

- interaction
- formal collaboration
- internalisation

Interaction denotes the interplay of academic research and practice that occurs continuously in many fields and finds expression in an exchange of influences and ideas without involving more formal contacts and forms of collaboration.

Formal collaboration refers to contacts of various kinds between academic researchers and practitioners that are established in more organised forms. As with interaction, in formal collaboration there is still a dividing line between outsider academic researchers and insider organisational practitioners.

In the third type of interplay, referred to here as *internalisation*, central banks "internalise" the generation of knowledge, for instance by recruiting academic researchers to their own staff.

It should be emphasised that these types of interplay are not mutually exclusive. On the contrary, an effective practical application of research insights generated by *interaction* will be facilitated if a central bank has enhanced its competence through *internalisation,* not least if, as is increasingly common, the internalisation has included the central banks' decision-makers.

4.2 Examples from the Swedish inflation-targeting regime

INTERACTION

Through interaction, academic research gains inspiration and ideas from the practical side. Researchers then generate various types of insights and knowledge that can be used for the further development and improvement of practical activities. The process is completely informal and relies on voluntary initiatives.[35]

The theoretical foundation for targeting inflation came to a large extent from academic research, above all the emphasis that monetary policy's primary objective ought to be price stability and that central banks

[35] There is, of course, nothing new about this type of interplay. We have previously mentioned that in the 1930s monetary policy in Sweden was briefly focused on price stability, partly inspired by ideas from Knut Wicksell, active some decades earlier. Contacts with academics are a traditional feature of the central bank world, though in the post-war era this was not generally true of the Riksbank prior to the period considered here.

need to act independently of the political system. It seems, however, that the idea of focusing policy in practice on a numerical target for inflation took shape inside the central bank world.[36]

Once the inflation-targeting policy had been launched, however, academic researchers became very interested in the field and made important contributions to its development. Right from the start, this research was very much concerned with solving practical problems. Targeting inflation was a new phenomenon, with no "accepted practice" to go by, so central bank practitioners were interested in what research could show.

This is clearly illustrated by the research done by Lars Svensson (see sub-section 3.2). His close contacts with the Riksbank provided opportunities for discussions that benefited both parties: Svensson learned about the Riksbank's practical problems and his formal analyses helped to systematise and discipline the Riksbank's thinking.

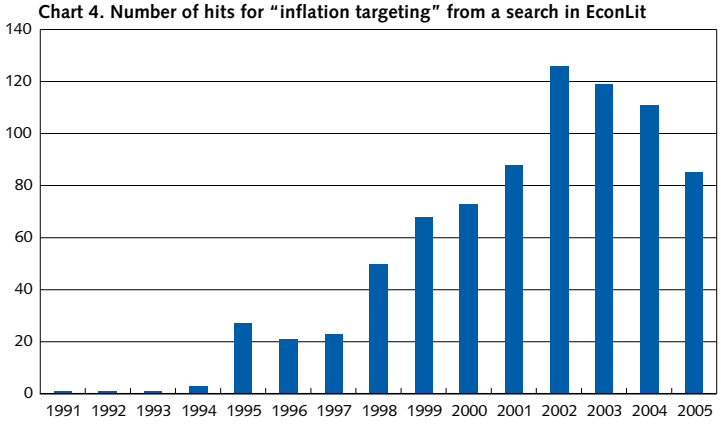
Research in this field has been extensive during the last 10–15 years and in the new regime with a flexible exchange rate the Riksbank has been able to utilise numerous contributions. Impulses also came via contacts with other central banks that had been working with a flexible exchange rate for some time, in the beginning in particular from the Bank of Canada.

As mentioned earlier, the traffic between research and practical monetary policy was not one-way – the influence was mutual. This is illustrated in Chart 4, which shows the time path for the number of hits for "inflation targeting" in one of the best-known data bases for scientific publications in economics. It was not until the mid 1990s – about five years after the initial introduction of inflation-targeting policy – that the subject began to attract more widespread interest in academic research. The first major international academic conference on inflation-targeting policy was held in Milan in 1994.[37] Academic interest grew rapidly, however, from the mid 1990s onwards.

[36] The decisive effort to introduce an explicit inflation target for monetary policy is said to have come from far-sighted officials in New Zealand's finance ministry and central bank. Sweden's relatively short-lived experiment with a price-stability goal in the 1930s was a thing of the past and can hardly have played a part – or even been known – when New Zealand decided to target inflation some 60 years later.

[37] The contributions to this conference are collected in Leiderman and Svensson (1995).

Chart 4. Number of hits for "inflation targeting" from a search in EconLit



Note. EconLit is the AEA's (American Economic Association's) electronic data base for scientific publications in economics.

Source: Own search in EconLit.

FORMAL COLLABORATION

The interplay of researchers and practitioners has not been confined to an informal exchange of ideas and influences. It has also found expression in various types of more established contacts, what we have chosen to call formal collaboration.

In formal collaboration one can say that in the generation of knowledge the Riksbank's primary role has been that of a commissioner and funder, accompanied in certain cases by the provision of personnel. Obviously, this is a different, more active role compared with interaction.

An example of formal collaboration is the system of scientific advisors the Riksbank introduced in 1990, when Lars Svensson, at that time professor at the Institute for International Economic Studies at Stockholm University, was attached to the Riksbank as an advisor in scientific matters. The introduction of inflation-targeting policy, of which there was still little practical experience, accentuated the Riksbank's need of academic support (see the section below on internalisation) and for that reason the Riksbank has since 1993 always had four or five scientific advisors, recruited from researchers abroad as well as in Sweden.[38]

The collaboration with scientific advisors was aided as the Riksbank adopted a more open attitude to the outside world. The publication of detailed material for decisions and an open public discussion, in speeches and other contexts, of problems confronting the bank opened up the possibility of a more detailed and in-depth dialogue with academics out-

[38] The Riksbank was not a pioneer in arrangements of this type. Similar solutions had already been found in Sweden in other policy fields, for instance labour market policy.

side the Riksbank. The discussions with advisors broadened in the latter part of the 1990s. Besides providing support for the bank's economists, topical policy issues were discussed with the decision-makers, drafts of speeches and reports were read and commented on, etc. The fact that a number of the senior officials had an academic background aided and stimulated the dialogue.

Another example of formal collaboration between researchers and practitioners is the conferences the Riksbank has arranged, often together with an academic institution. The first, Monetary Policy Rules, was held in 1998 together with the Institute for International Economic Studies at Stockholm University.[39] Since then, the Riksbank has arranged one or two conferences a year on subjects connected with monetary policy or financial economics. Examples are Inflation Targeting and Exchange Rate Fluctuations (1999), Asset Markets and Monetary Policy (2000), Central Bank Efficiency (2003), and Inflation Targeting: Implementation, Communication, and Efficiency (2005).

The conferences have regularly highlighted research that has practical applications for central banks. This is evident, for instance, from the concluding panels that have given researches and decision-makers an opportunity of discussing what the research findings have meant for policy. In this way, the conferences have promoted contacts and the dissemination of knowledge between these two worlds, elsewhere as well as in Sweden.

A third example is the Riksbank's occasional commissioning of external academic researchers to examine and elucidate a specific issue. Besides financing these projects, the Riksbank has often arranged for staff economists to participate in them. However, such commissions have not been particularly common. The only notable recent example is the collaboration with external researchers the Riksbank initiated in 2005 to broaden and deepen the analysis of the exchange rate's path and determinants.[40]

[39] The conference proceedings were published in a separate issue of Journal of Monetary Economics (Volume 43, No. 3, June 1999).

[40] Press release 28 November, 2005.

INTERNALISATION

One reason why external researchers have not been used more frequently to elucidate specific issues may be that the Riksbank has successively "internalised" the generation of knowledge and thereby gradually increased its own ability to undertake the necessary analyses. To understand what has driven this development, it may help to look briefly at how the change to a flexible exchange rate in November 1992 altered the conditions for monetary policy.

When the explicit target for inflation was introduced in the early 1990s, the demands on work at the Riksbank were very different from those that the fixed exchange rate had entailed. Under normal circumstances, the task of a central bank with a fixed exchange rate regime is rather simple and straightforward: the interest rate has to be set at such a level that currency inflows and outflows balance and the exchange rate is maintained.

Matters are different with a flexible exchange rate. The interest rate no longer has to defend a particular exchange rate relation. The central bank's monetary policy can concentrate instead, as the Riksbank has done since 1993, on steering inflation directly. Trying to hold inflation at a given level is, however, difficult because of the time lag before an interest rate adjustment affects inflation. The central bank has therefore to be able to produce forecasts of how inflation and other economic factors will develop in the future. The demands on the central bank's communication are also greater – policy must be explained to the outside world clearly and pedagogically.

It was therefore only natural that the change to a flexible exchange rate and an inflation-targeting policy triggered a more extensive reinforcement of the Riksbank's competence in economics or, as we have chosen to put, an internalisation of the generation of the knowledge. There are various ways of illustrating this.

A separate research department was set up in the Riksbank as of 1997 with the task of "developing methods for the analysis of issues of importance for the Riksbank's activities".[41] It was underscored that, besides producing research of good international standard internally, the new department should contribute to building a bridge between academics and practitioners. In this way, relevant findings could be channelled to the bank's activities and contacts could be established for purposes of, for example, making it easier to recruit qualified staff.[42]

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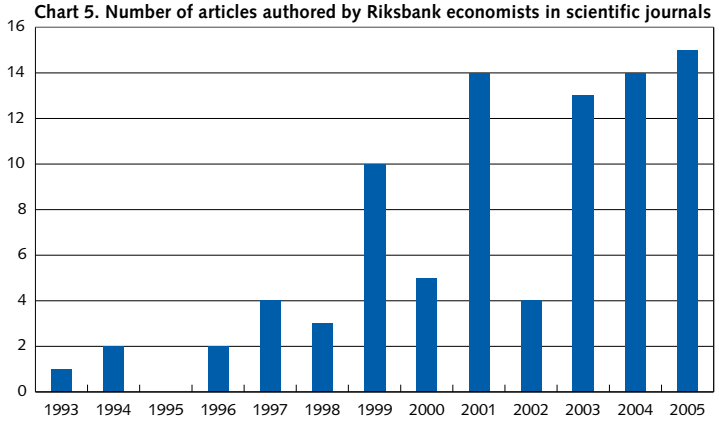
[41] Press release 5 December, 1996.

[42] These aims have to a large extent been achieved, see e.g. Jondeau and Pagès (2003) and St-Amant et al. (2005). The evaluation of Swedish monetary policy by Giavazzi och Mishkin (2006) also points out that the Riksbank is an organisation characterised by a high level of academic competence.

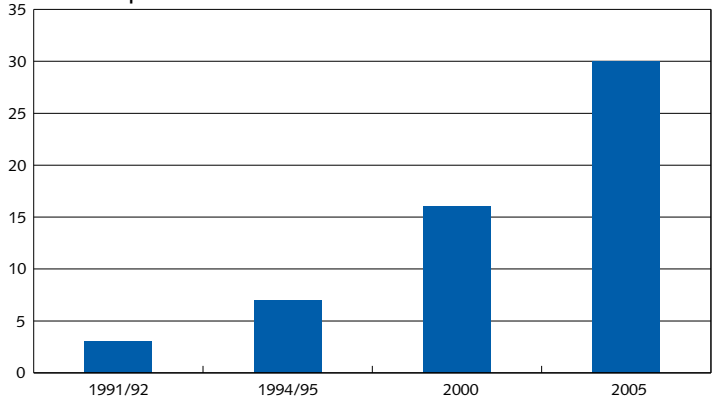
The "output" from internalisation can be measured by, for example, the number of articles written wholly or partly by Riksbank economists that have been accepted for publication in scientific journals. Chart 5 shows that in this respect, too, things have changed fairly dramatically in the past decade or so.

Chart 5. Number of articles authored by Riksbank economists in scientific journals



Source: The Riksbank.

Chart 6. Number of PhDs working in the Riksbank's monetary policy department at different points in time



Note. To make the bars commensurate with the present monetary policy department, adjustments have been made for reorganisations at the Riksbank.

Source: The Riksbank.

Another indicator of internalisation is the number of Riksbank employees who have a higher academic degree. Chart 6 shows how many economists with a doctor's degree were working in the monetary policy department on four occasions. In the early 1990s – before the change to a flexible exchange rate and an inflation-targeting policy – the number was rather small. During the 1990s it then rose rapidly. By 2005 the monetary policy department had 30 people with a doctor's degree – ten times the number in 1991/92. The pattern has been much the same in the other central policy unit, the financial stability department. The level of formal academic training has also risen among the policy-makers; since the new executive board was introduced in 1999, at least half of the members have held a PhD degree.

A similar process of internalisation has been in progress in many other central banks. Just as in Sweden, it has included analytical activities (Jondeau and Pagès, 2003, and St-Amant et al., 2005) as well as the policy-makers (Simmons, 2006). This process has been driven in general by the increased independence and transparency. In some countries the starting-point was the same as in Sweden, a changeover from a fixed to a flexible exchange rate, while others have a much longer academic tradition.

5. Summary and concluding comments

The way in which monetary policy is conducted has changed in recent decades. As regards policy's *general design*, two changes are particularly evident. One is that today, monetary policy in almost all countries is focused on attaining *low and stable inflation*. In many cases an explicit inflation target is used to demonstrate the commitment to price stability. Another change is that a growing number of central banks have been given a high degree of *independence* vis-à-vis the political system. These two changes in the general design of monetary policy are so far-reaching that they can be said to have resulted in a new regime.

Just what academic research has meant for this change of regime is, of course, difficult to tell. It is clear that research has generated insights that facilitated the fundamental reassessment that has been made. For the focus on low and stable inflation, there were the insights that monetary policy is not capable of permanently affecting output and employment and that inflation is basically a monetary phenomenon. From this it naturally followed that monetary policy's overriding objective should be price stability. For the greater independence of central banks, an important part was played by research into the problem of time inconsistency in economy policy. This research highlighted the fact that keeping infla-

tion low can be hard because of difficulties in making binding commitments. The problem could be greatly reduced by giving the central bank a clear mandate to conduct monetary policy independently. This type of fundamental reassessment of monetary policy naturally required political decisions and occurred more quickly in some countries than in others; but research did provide a firm foundation on which to base the new regime.

Given the new regime with independent central banks that focus on price stability, the way in which central banks work on monetary policy has also changed considerably. These changes have occurred in a number of important fields: how central banks perceive and describe their *monetary policy strategy* (how the interest rate is set), how they *communicate with the outside world*, and how they produce the *analyses on which interest rate decisions are based*. In all these respects we have attempted to present a picture, from the Riksbank's perspective, of the changes that have been made and how the course of events has been influenced by research.

As regards the monetary policy strategy, the contribution from research has mainly consisted in formal analyses, whereby thoughts about the best way of conducting an inflation-targeting policy have been disciplined and systematised. The academic analyses could not be ignored and kept central bankers on their toes. Today there is a broad consensus, among practitioners as well as academics, that inflation-targeting policy should be conducted "flexibly" and also communicated in this way.

Research has also clearly left its mark on central banks' external communication. The observation that policy needs to be assessable and accountable has underscored the need to make communication open and clear. It is partly thanks to the impetus from research in this field that there are good grounds for believing that the trend towards increased central bank clarity and transparency will continue.

Turning, finally, to the analyses on which interest rate decisions are based, much progress in recent years has been of specific importance for the practical formation of monetary policy. Researches have managed to develop new models with a better forecasting ability and theoretical underpinning, achievements that have been facilitated not least by the growing capacity of computers. That in turn has made it possible both to enhance the quality of central bank analyses and to make the analytical work more effective.

These changes have proceeded against the backdrop of an *interplay in various forms between practice and academic research* that has served as a driving force. One of the aims of this article has been to describe these forms of interplay. We found it appropriate to divide the forms into three types: interaction, formal collaboration, and internalisation.

The forms do not fit neatly into a chronological sequence but, simplifying somewhat, they can be said to match a pattern where central banks have moved from being an object for study and analysis by researchers (interaction), via a tendency to establish more formal links with the academic world (formal collaboration), to the internal "production" of academic research as an increasingly integrated component of the international research community (internalisation). A leading monetary policy researcher, Bennett McCallum, has commented on this integration as follows: "[I]n recent years there has been a large amount of interaction between central bank and academic analysts, so that today … one would be hard-pressed to tell, for many research papers, whether a particular one had been written by members of one group or the other." (McCallum, 1998, p. 12.)

We would like to conclude with some thoughts that our survey mentions only in passing or not at all. One interesting question is *why* academic research has happened to exert so much influence in the field of monetary policy. One hypothesis is that in recent decades stabilisation policy has been in what might be called a formative phase. When the Keynesian approach began to look shaky in the 1970s, a need arose to find new solutions. It was then only natural that the problem featured prominently in research and that practitioners and politicians were receptive to the insights research could provide. As we noted, academic research also played an important part in reaching the consensus that was ultimately achieved and which led to fundamental institutional changes. It is a striking fact that academics, not just in Sweden but internationally, were also engaged in questions associated with policy in the 1930s. That period, too, can be seen as a formative phase after the earlier regime had broken down.

Another explanation for the strong academic influence could have to do with the move to monetary policy independence and the clear focus on price stability. That has made it easier to "depoliticise" the issues and turn monetary policy into more of a technical matter. Perhaps that has made the analysis of issues more manageable than is the case in other policy fields. Moreover, the change, as in Sweden's case, from a fixed to a flexible exchange rate has called for a more elaborated analysis. Academic research has no doubt also been stimulated by the basic monetary policy issues in different countries being fairly similar.[43]

[43] An aspect of the interplay between academics and central banks that we have not considered at any length here is the importance of international contacts. Such contacts have a time-honoured tradition in the central bank world, as can be seen, for example, from the regular meetings and seminars under the auspices of the Bank for International Settlements (BIS) and the International Monetary Fund (IMF) and from the extensive joint training programmes.

It is also of interest to consider the lessons which the developments in connection with monetary policy may have for other policy fields. In our opinion, the combination of making an institution accountable for attaining a particular objective, guaranteeing independence in the performance of the task, and evaluating goal fulfilment should be applicable to the implementation of many more public activities than is presently the case. Much of the experience that has been acquired in the central bank world as regards distinct goals, public scrutiny, and accountability should be of value in this context.

A more independent status has heightened the importance of central banks being capable of motivating what they do and pointing to distinct results. But besides being democratically important by making it easier to exact accountability, openness has played a part in how activities have been developed. Continuously scrutinised, the Riksbank and other central banks have been obliged to strive for a leading position in every aspect of their activities. This has generated a strong need both to develop activities – by recruiting competent staff and not hesitating to adopt new methods and approaches as they arise in the academic world – and to undertake them effectively. It is not least against this background that we believe that other policy fields stand to benefit from a development that resembles what has happened in monetary policy.

References

Adolfson, M., M.K. Andersson, J. Lindé, M. Villani & A. Vredin, (2005), "Modern Forecasting Models in Action: Improving Macroeconomic Analyses at Central Banks", Sveriges Riksbank Working Paper Series, No. 188.

Adolfson, M., S. Laséen, J. Lindé & M. Villani, (2005a), "Bayesian Estimation of an Open Economy DSGE Model with Incomplete Pass-Through", Sveriges Riksbank Working Paper Series, No. 179.

Adolfson, M., S. Laséen, J. Lindé & M. Villani, (2005b), "Are Constant Interest Rate Forecasts Modest Interventions? Evidence from an Open Economy DSGE Model of the Euro Area", Sveriges Riksbank Working Paper Series, No. 180.

Adolfson, M., J. Lindé & M. Villani, (2005), "Forecasting Performance of an Open Economy Dynamic Stochastic General Equilibrium Model", Sveriges Riksbank Working Paper Series, No. 190.

Apel, M., M. Nessén, U. Söderström & A. Vredin, (1999), "Different Ways of Conducting Inflation Targeting – Theory and Practice", *Sveriges Riksbank Quarterly Review* 1999:4, 13–42.

Barro, R. & D. Gordon, (1983), "Rules, Discretion and Reputation in a Model of Monetary Policy", *Journal of Monetary Policy* 12, 101–122.

Berg, C., (2005), "Experience of Inflation Targeting in 20 Countries", *Sveriges Riksbank Economic Review* 2005:1, 20–47.

Berg, C. & L. Jonung, (1999), "Pioneering Price Level Targeting: The Swedish Experience 1931–1937", *Journal of Monetary Economics* 43, 525–552.

Bernanke, B.S., (2004), "The Great Moderation", address to the Eastern Economic Association, Washington, DC, 20 February.

Bernanke, B.S., (2006), "The Benefits of Price Stability", address to the Center for Economic Policy Studies and in connection with the 75th anniversary of the Woodrow Wilson School of Public and International Affairs, Princeton University, 24 February.

Blinder, A.S., (2004), The Quiet Revolution – Central Banking Goes Modern, Yale University Press.

Blinder, A.S., (2006), "Monetary Policy Today: Sixteen Questions and About Twelve Answers", paper presented at the Banco de España's conference on "Central Banks in the 21st Century", Madrid, 8–9 June.

Bäckström, U., (1994), "Monetary Policy and the Inflation Target", speech at the Stockholm Stock Exchange, 9 December.

Bäckström, U., (1996), "Price Stability Policy in Perspective", speech at Stora Räntedagen, 26 September.

Chari, V.V. & P.J. Kehoe, (2006), "Modern Macroeconomics in Practice: How Theory Is Shaping Policy", Research Department Staff Report 376, Federal Reserve Bank of Minneapolis.

Cukierman, A., (2005), "The Limits of Transparency", paper presented at a meeting of the American Economic Association (session "Monetary Policy Transparency and Effectiveness"), January.

Eijffinger, S.C.W. & P.M. Geraats, (2006), "How Transparent are Central Banks?", *European Journal of Political Economy* 22, 1–21.

Faust, J. & D. Henderson, (2004), "Is Inflation Targeting Best Practice Monetary Policy?", Federal Reserve Bank of St. Louis *Review* 86, No. 4, 117–144.

Faust, J. & E.M. Leeper, (2005), "Forecasts and Inflation Reports: An Evaluation", paper presented at Sveriges Riksbank's conference on "Inflation Targeting: Implementation, Communication, and Effectiveness", 10–12 June.

Fischer, S., (1996), "Why Are Central Banks Pursuing Long-Run Price Stability?", in *Achieving Price Stability*, A symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, 29–31 August, 7–34.

Friedman, M., (1968), "The Role of Monetary Policy", *American Economic Review* 58, 1–17.

Giavazzi, F. & F. Mishkin, (2006), "An Evaluation of Swedish Monetary Policy between 1995 and 2005", Reports from the Riksdag 2006/07:RFR 1.

Hansson, J., P. Jansson & M. Löf, (2005), "Business Survey Data: Do They Help in Forecasting GDP Growth?", *International Journal of Forecasting* 21, 377–389.

Heikensten, L., (1997), "Monetary Policy and the Swedish Economy", address at an event arranged by the Federation of Swedish County Councils and the Swedish Association of Local Authorities, 13 March.

Heikensten, L., (1999), "The Riksbank's Inflation Target – Clarification and Evaluation", *Sveriges Riksbank Quarterly Review* 1999:1, 5–17.

Heikensten, L., (2000), "Six Monetary Policy Issues", address to the Umeå School of Economics, 7 November.

Heikensten, L., (2001), "Concerning Clarity and Flexibility", address to the Centre for Business and Policy Studies (SNS), 9 May.

Heikensten, L. & Vredin, A., (1998), "Inflationsmålet och den svenska penningpolitiken – erfarenheter och problem" (The Inflation Target and Swedish Monetary Policy – Experiences and Problems), *Ekonomisk debatt* 8, 573–593.

Inflation Report, October 2005, Sveriges Riksbank (http://www.riksbank.com/pagefolders/21855/2005_3_eng.pdf).

Jondeau, E. & H. Pagès, (2003), "Benchmarking Research in European Central Banks", paper presented at Sveriges Riksbank' conference on "Central Bank Efficiency", 23–24 May.

King, M., (2005), "Practice Ahead of Theory", MAIS Lecture, City University, London, 17 May.

Kydland, F. & E. Prescott, (1977), "Rules Rather than Discretion: The Inconsistency of Optimal Plans", *Journal of Political Economy* 85, 473–491.

Leiderman, L. & L.E.O. Svensson (eds.), (1995), Inflation Targets, Centre for Economic Policy Research, London.

Lindbeck, A., (2003), "Stabiliseringspolitiken i teori och praktik" (Stabilisation Policy in Theory and Practice), in Persson, M. & E. Skult (eds.), *Tillämpad makroekonomi* (Applied Macro Economics), SNS Förlag.

Lucas, R.E., Jr., (1976), "Econometric Policy Evaluation: A Critique", in Brunner, K. & A.H. Meltzer (eds.), *The Phillips Curve and the Labor Market*, North-Holland.

McCallum, B.T., (1998), "Recent Developments in Monetary Policy Analysis: The Roles of Theory and Evidence", NBER Working Paper 7088.

Mishkin, F.S., (2004), "Can Central Bank Transparency Go Too Far?", NBER Working Paper 10829.

"Monetary Policy in Sweden", Sveriges Riksbank, 2007

Nelson, E., (2005), "The Great Inflation of the Seventies: What really Happened?", *Advances in Macroeconomics* 5, Issue 1, Article 3.

Orphanides, A., (2002), "Monetary Policy Rules and the Great Inflation", *American Economic Review*, Papers and Proceedings, 92(2), 115–120.

Phelps, E.S., (1967), "Phillips Curves, Expectations of Inflation, and Optimal Unemployment Over Time", *Economica* 34, 254–281.

Phillips, A.W., (1958), "The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861–1957", *Economica* 24, 283–299.

Press release 5 December 1996, Sveriges Riksbank (http://www.riksbank.com/upload/2606/NR43e.pdf).

Press release 28 November 2005, Sveriges Riksbank (http://www.riksbank.com/pagefolders/23011/nr72e.pdf).

Rebelo, S., (2005), "Real Business Cycle Models: Past, Present and Future", *Scandinavian Journal of Economics* 107, 217–238.

Robertson, J.C. och E.W. Tallman, (1999), "Vector Autoregressions: Forecasting and Reality", Federal Reserve Bank of Atlanta *Economic Review* 84, first quarter, 4–18.

Rogoff, K., (1985), "The Optimal Degree of Commitment to an Intermediate Monetary Target", *Quarterly Journal of Economics* 100, 1169–1189.

Rudebusch, G.D. & J.C. Williams, (2006), "Revealing the Secrets of the Temple: The Value of Publishing Interest Rate Projections", manuscript, Federal Reserve Bank of San Francisco.

Shani, A.B., S. A. Mohrman, W. Pasmore, B. Stymne & N. Adler (eds.), (2007), *Handbook of Collaborative Management Research*, SAGE Publications, forthcoming.

Simmons, B.A., (2006), "The Future of Central Bank Cooperation", BIS Working Paper No. 200.

Sims, C.A., (1972), "Money, Income, and Causality", *American Economic Review* 62, 540–552.

Sims, C.A., (2002), "The Role of Models and Probabilities in the Monetary Policy Process", *Brookings Papers on Economic Activity* 2:2002, 1–62.

St-Amant, P., G. Tkacz, A. Guérard-Langlois & L. Morel, (2005), "Quantity, Quality, and Relevance: Central Bank Research, 1990–2003", Working Paper 2005-37, Bank of Canada.

Stock, J.H. & M.W. Watson, (2002), "Macroeconomic Forecasting Using Diffusion Indexes", *Journal of Business and Economic Statistics* 20, 147–162.

Summers, P.M., (2005), "What Caused The Great Moderation? Some Cross-Country Evidence", Federal Reserve Bank of Kansas City *Economic Review*, third quarter, 5–32.

Svensson, L.E.O., (1997), "Inflation Forecast Targeting: Implementing and Monitoring Inflation Targets", *European Economic Review* 41, 1111–1146.

Svensson, L.E.O., (1998), "Inflationsmål i en öppen ekonomi: Strikt eller flexibelt?" (Inflation Target in an Open Economy: Strict or Flexible?), *Ekonomisk debatt* 26(6), 431–439.

Svensson, L.E.O., (2005), "Optimal Inflation Targeting: Further Developments of Inflation Targeting", paper presented at the Banco Central de Chile's conference on "Monetary Policy under Inflation Targeting", Santiago, 20–21 October.

Taylor, J.B., (1992), "The Great Inflation, the Great Deflation, and Policies for Future Price Stability", in Blundell-Wignall, A. (ed.), *Inflation, Disinflation and Monetary Policy*, Ambassador Press, Sydney, 9–34.

Taylor, J.B., (1993), "Discretion versus Policy Rules in Practice", *Carnegie-Rochester Series on Public Policy* 39, 195–214.

Woodford, M., (2005), "Central-Bank Communication and Policy Effectiveness", paper presented at Sveriges Riksbank's conference on "Inflation Targeting: Implementation, Communication, and Effectiveness", 10–12 June.

Wright, J., (2003), "Forecasting U.S. Inflation by Bayesian Model Averaging", International Finance Discussion Papers No. 780, Board of Governors of the Federal Reserve System.

Globalisation's effects on Sweden's labour market

Eleni Savvidou

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In the light of empirical research, this article looks at ways in which increased globalisation have affected Sweden's labour market. The effects on labour demand are of particular interest. Globalisation is discussed from three perspectives: foreign trade, capital mobility in terms of direct investment, and cross-border labour mobility. The results of the empirical survey indicate that globalisation has not yet had any sizeable effects on labour demand in Sweden.

Introduction

Factors behind the process of international integration (globalisation) have included a reduction in the barriers to foreign direct investments and the dismantling of trade barriers. Moreover, new technology has helped to reduce costs for transportation and communication. Globalisation has also been furthered by the participation in international trade of, for example, India, China and the new EU member states. The establishment of the European Community, with the free inner movement of goods, services and labour, has also contributed to greater integration in the region around Sweden.

Increased globalisation, above all in the form of expanding trade but also as corporate relocations, is one of the primary explanations for the rapid economic growth in many parts of the world. In many cases, relocating production is essential if companies are to survive and grow. Increased trade in turn has meant that workers and companies have been able to specialise in what they are relatively best at, accompanied by stiffer competition as markets become many times larger. These factors have exerted downward pressure on prices and stimulated growth in the countries concerned. The higher growth has generated improvements in welfare in the form of, for instance, better education, health care and housing.

Although globalisation's effects have been positive in many respects, the media and the public debate have tended to concentrate on the possible negative impact on the labour market. The apparent continuation of globalisation in recent years at a time of high unemployment has caused concern that the two may be closely interconnected. A fall in relative demand for low-skill labour is often seen in relation to this situation, which could also help to explain why the wage gap between low- and high-skill labour has widened in favour of the latter even though the latter has become more numerous in recent decades.

In the light of empirical research, this article analyses and discusses how globalisation has affected labour demand in Sweden through three channels: foreign trade, capital mobility in terms of direct investment, and cross-border labour mobility. Particular attention is paid to ways in which these channels could affect relative demand for low-skill labour. More specifically, I consider how employment in Sweden may have been affected by imports from low-wage countries and by Swedish direct investments in such countries and whether employment in low-wage countries has grown at the expense of employment in Sweden.

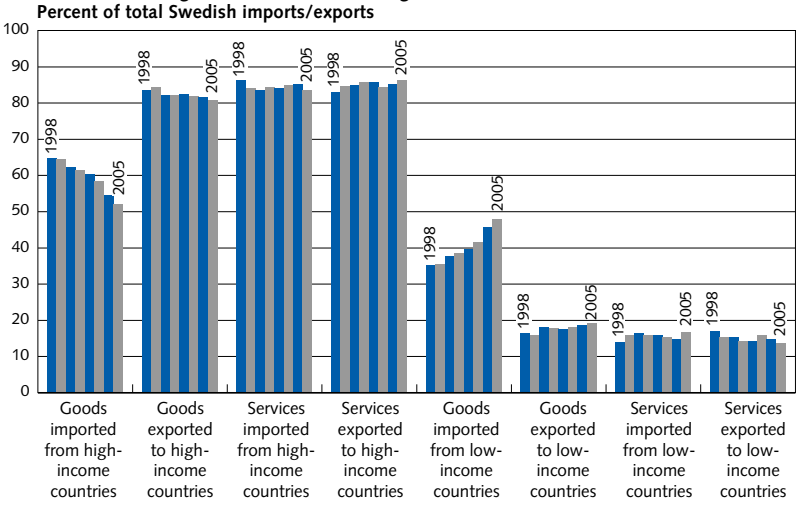
Trade in goods and services

The theoretical analysis of labour-market effects of trade commonly starts from the Heckscher-Ohlin approach. In simple terms, this approach envisages two countries, one developed and the other less developed, that both have a supply of two factors of production, in this case high-skill and low-skill labour.[1] These countries specialise in production and trade in accordance with their relative supplies of these two types of labour.[2] They import/export goods whose production requires a relatively large proportion of the production factor that is relatively scarce/abundant. In the country with a relatively abundant supply of qualified labour (Sweden is an instance of this), the relative price of goods whose production is skilled-labour intensive should rise, accompanied by a fall in relative demand for low-skill labour.

[1] The approach assumes perfect competition, constant returns to scale and shared technology.

[2] The decreased costs for trading and transportation should accentuate this pattern of trade. Note, however, that some assumptions behind the Heckscher-Ohlin approach do not hold in practice; one example is the existence of trade barriers. Neither do countries all have access to the same technology.

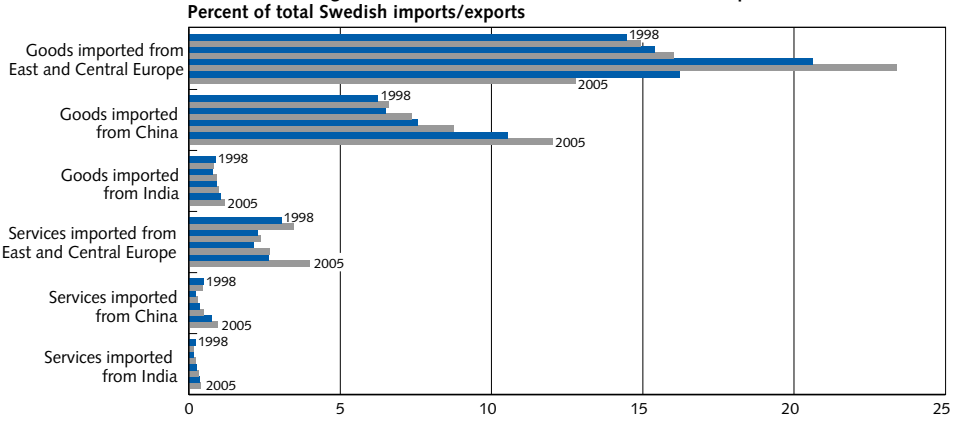
Chart 1. Trade in goods and services with high- and low-income countries
Percent of total Swedish imports/exports



Note. High-income countries are countries in Western Europe and North America as well as Japan, Australia and New Zealand (Ekholm, 2006). Imports of goods refer to the country of origin, exports to the country of destination.

Sources: Statistics Sweden and the Riksbank.

Chart 2. Trade in goods and services with Eastern and Central Europe, China and India
Percent of total Swedish imports/exports



Note. The data include trade in oil.

Sources: Statistics Sweden and the Riksbank.

From this it follows that increased imports from low-wage countries of goods and services whose production is intensive in terms of low-skill labour should lead to a contraction of the corresponding production in Sweden, where wages are considerably higher. That in turn should lead to decreased demand for low-skill labour in Sweden. Swedish firms should then focus instead on goods that are skilled-labour intensive to produce, whereupon demand for this category of labour should rise in Sweden.

Competition from low-wage countries has increased in that technical developments have made it easier to arrange transports from and communications with distant regions. This creates favourable conditions for trade with low-wage countries such as China, India and those in Eastern and Central Europe. Imports of consumer goods are facilitated and instead of producing intermediate goods themselves, Swedish firms can import them from low-wage countries. The latter is also valid to a certain extent for services. IT services, for example, are procured by Swedish firms from India and Poland.[3]

Swedish exports and imports have both been on an upward trend since the mid 1990s.[4] Trade is predominantly with high-income countries, for example the United Kingdom, United States and Japan (see Chart 1). Still, imports of goods from low-income countries have accounted for a growing share in the period 1995–2005. On the other hand, services trade with low-income countries does not seem to have changed much in the period 1998-2005 and still amounts to less than 20 per cent of total trade in services. Chart 1 also shows an upward trend for exports of goods to low-income countries. A possible explanation is an increased demand for imported goods in these countries.

How has trade in this period developed for the countries and regions that are often singled out in the debate, for instance Eastern and Central Europe, China and India? There has been little change in Indian exports to Sweden (see Chart 2). In the case of Swedish imports from Eastern and Central Europe, there were marked fluctuations during the period but the picture in 2005 was much the same as in 1995. In contrast to the marginal change in imports from India, Chinese exports of goods to Sweden rose about 7 per cent from 1995 to 2005.

[3] See Offshoring IT services: a Swedish perspective, A2006:008, Swedish Institute for Growth Policy Studies (ITPS).

[4] Source: Statistics Sweden.

Service imports show some increase from 1998 to 2005 from all the sources in Chart 2 but the changes are very small.

These data indicate that imports of goods from low-income countries have grown since 1995, particularly from China. Trade in services does not seem to have changed much in the period 1998–2005.

Even though trade with low-wage countries remains rather small compared with the share for high-wage countries, it could still affect relative demand for low-skill labour. Effects on labour demand from international trade in manufactured goods have been studied by, for example, Hansson (2000). The main issue was how the growing competition from low-wage countries has influenced relative demand for high-skill labour, defined in this case as at least a secondary education. The impact of the growing competition from low-wage countries was measured as the average annual change in imports from non-OECD countries, expressed as a percentage of consumption. This indicator is considered to mirror the fact that production of goods which is intensive in terms of low-skill labour tends to be located abroad by multinationals, which then import the resultant intermediate or finished products. According to Hansson (2000), it also covers cases where Swedish producers and consumers switch from a domestic to a foreign supplier of goods. The results point to a positive correlation between this indicator and relative demand for high-skill labour. However, of the increase in the share for high-skill labour, only 5 percentage points can be explained by the growing competition from low-wage countries. Moreover, most of this effect seems to come from parts of the textiles industry.

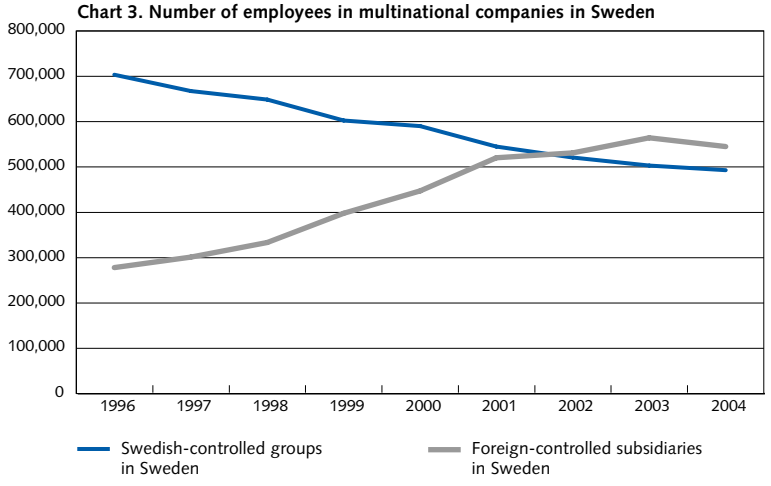
The issue of how increased competition from low-wage countries has affected employment in Sweden was addressed again in a subsequent study (Bandick and Hansson, 2005), using the same indicator as in Hansson (2000) and likewise focused on manufacturing. The results indicate that in the period 1986–2000 a growing import share from low-wage countries had positive effects on relative demand for high-skill labour and that, in contrast to Hansson (2000), the textiles industry was not mainly responsible for this. The findings suggest that of the increase in demand for high-skill labour in this period, 14 per cent can be "explained" by growing competition from low-wage countries.

Capital flows

Another channel for globalisation that affects the Swedish labour market is the capital flows that are generated when Swedish multinationals[5] set up subsidiaries abroad (outward direct investment) or when foreign enterprises[6] do the same in Sweden (inward direct investment).

Chart 3 presents employment in Sweden among Swedish multinationals and foreign-controlled subsidiaries. A decrease in the number employed in Swedish parent companies has been accompanied by an increased number in foreign-controlled subsidiaries. However, the combined level does not seem to have changed much because foreign-controlled subsidiaries have tended to take over persons who were previously employed by Swedish parent companies (Ekholm, 2006). This occurred when a number of major Swedish multinationals either merged with or were taken over by foreign multinationals around the turn of the millennium (Ekholm op cit).

Chart 3. Number of employees in multinational companies in Sweden



Source: Swedish Institute for Growth Policy Studies (ITPS).

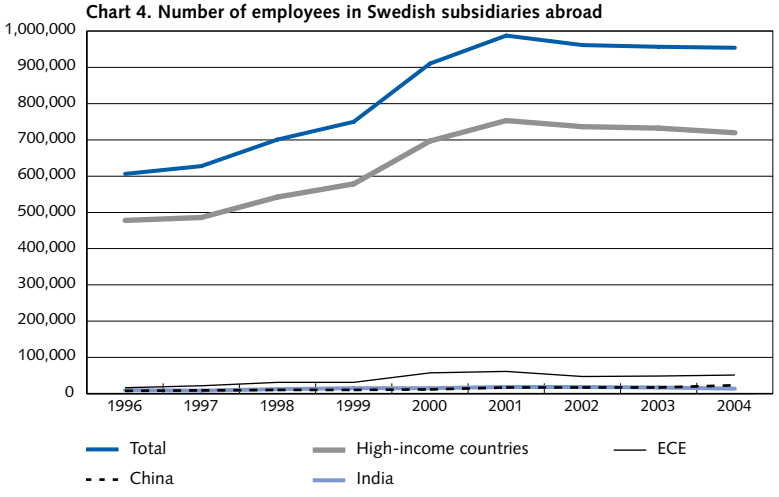
[5] Swedish-controlled groups with at least both one subsidiary and one employee abroad, in accordance with the definition in ITPS (2004a).

[6] A company is defined as foreign-controlled if a foreign owner holds more than half of the voting rights or if the company belongs to a group in Sweden with a foreign-controlled group parent company (ITPS, 2004b).

Employment in Swedish-controlled subsidiaries abroad also rose in the late 1990s and early 2000s.[7] Swedish multinationals choose to relocate production abroad so as to, for example, benefit from country differences in factor prices or gain direct access to the host country's market or technology.

A report from the Swedish Institute for Growth Policy Studies (ITPS, 2004c) found that the primary factors behind corporate decisions to locate major new investment abroad were stable laws and rules, and an expanding market. The wage level and low taxes in the countries in question appeared to be least important.[8] This agrees with the fact that most of the employees in the Swedish groups' subsidiaries are located in high-wage countries (see Chart 4). As shown in Chart 4, employment in Swedish subsidiaries in high-wage countries rose around the turn of the millennium. So did the number employed in low-wage countries, mainly in Eastern Europe. In 2004 those employed in low-wage countries amounted to less than 10 per cent of all employees in Swedish subsidiaries abroad but this did represent an increase of about 3 per cent since 1996.

Chart 4. Number of employees in Swedish subsidiaries abroad



Note. High-income countries are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Switzerland, UK and USA. Eastern and Central European (ECE) countries are Czech Republic, Poland, Russia and Slovakia.

Source: Swedish Institute for Growth Policy Studies (ITPS).

[7] See Chart 4.

[8] Note, however, that firms in business services and the food industry attached greater weight to the wage level in host countries and that one-third of those in the rest of manufacturing considered that the wage level was important.

It has been feared that Swedish companies have expanded abroad at the expense of production and jobs in Sweden. A particular concern is whether relative demand for low-skill labour in Sweden has decreased as Swedish companies choose to locate production in low-wage countries.

A number of studies have been presented on direct investment's effects on employment. The first in Sweden examined whether outward direct investment has affected exports from Sweden and thereby, indirectly, employment in Sweden. Exports of intermediate goods to Swedish subsidiaries abroad can add to Swedish exports but these exports may also be reduced if finished goods are produced abroad instead of in Sweden. Swedenborg et al. (1988) showed that outward direct investment has led to an increase in Swedish exports.[9] However, Svensson (1996) subsequently found a slightly negative relationship between outward direct investment and exports by Swedish multinationals; the main explanation was that exports of intermediate goods from parent companies in Sweden had been replaced to some extent by trade flows between Swedish subsidiaries abroad. In a more recent study of Swedish direct investment in the period 1965–94, Swedenborg (2001) concluded that the net effect of production abroad is presumably close to nil.

One problem with the studies mentioned above is that the determinants of corporate direct investment and exports are closely interrelated (Lipsey, 2002). It is the most successful enterprises that tend both to export and to relocate production abroad. Thus, these activities are decided simultaneously, so the results of analyses may be misleading.[10]

This problem can be avoided by looking instead at how direct investment affects employment directly. Braconier and Ekholm (2000) studied how Swedish multinationals' operations abroad affect employment in the parent company. More specifically, they examined how parent company employment is affected by wage movements in subsidiaries in high- and low-wage countries. In general, the results pointed to some substitution of employment between the parent company and subsidiaries in high-income countries but not in low-wage countries, where there was neither substitution nor complementary effects.

A possible objection to that study is that it considered effects on total employment. A different outcome might have been obtained if employment had been decomposed into high-skill and low-skill labour. One of the first studies to do just that was by Blomström, Fors and Lipsey

[9] Similar results were obtained by Lipsey et al. (2002), though they studied total Swedish exports and outward direct investment. Most of the effect came from a single industry.

[10] Swedenborg used a so-called 2SLS model in an attempt to allow for the possibility that outward direct investment and exports are decided simultaneously.

(1997) (referred to below as BFL), who analysed the period 1970–94. The results indicated that, for a given amount of production in Sweden, employment in the Swedish parent company was higher if production abroad was sizeable. This applied to production in both developed and less-developed countries but above all in the latter. BFL interpreted this as indicating that with sizeable production abroad, Swedish multinationals also need more personnel in Sweden for marketing, R&D and the management and supervision of entities abroad, for example.[11] However, an expansion of operations in subsidiaries does not seem to have affected the number of high-skill employees in the parent company after 1974[12], which, as BFL point out, goes against the earlier hypothesis that production abroad calls for support from and supervision by the parent company.[13] Still, BFL found some support for the hypothesis when the analysis was restricted to data on more and less developed countries.

Hansson (2004) noted that the method used by BFL (1997) has a number of drawbacks, in that it focuses on a particular observation at a certain date, making it difficult to follow the dynamic process over time.

In a study of direct investment's effects on Swedish manufacturing in the years 1990, 1993 and 1997, Hansson (2005) took employees' qualifications into account. He tackled the above-mentioned problems in BFL's (1997) study by using a cost function and also distinguished between vertical and horizontal multinationals because they differ as regards relative labour demand in Sweden. In vertical multinationals, the proportional use of factors of production varies between the stages of production. The parent company should then locate its subsidiaries to countries where factors that are used intensively in their stage of production are cheap (in this case less-skilled labour); that could lead to a fall in demand for that type of labour in Sweden. In horizontal multinationals, the proportional inputs of factors of production for particular goods or services are assumed to much the same in different countries and should therefore have no consequences for the relative demand for low-skill labour in Sweden. In their case, direct investment is driven instead by, for example, economies of scale and high costs for international trade.

Hansson assumed that the change in Swedish multinationals' employment in non-OECD/OECD countries can be taken as an indication of vertical/horizontal direct investment. His results suggest that Swedish direct investment in non-OECD countries in the 1990s (particularly after

[11] The same analysis for the United States indicated that, for a given parent company output, more production abroad entailed less employment in the parent company; this applied in particular to offshoring production to less developed countries.

[12] Prior to 1974, just a weak positive relationship was found between production abroad and employment in the Swedish parent company.

[13] These activities are performed as a rule by white-collar employees; blue-collar workers are considered to be less skilled.

1993) has contributed to the shift in demand from low-skill to high-skill labour in Sweden. A rough estimate is that 15 per cent of this shift can be "explained" by the change in the vertical multinationals' production abroad between 1990 and 1997. Moreover, Hansson found no signs that Swedish multinationals have transferred advanced production abroad and retained less advanced production in Sweden.[14] Hansson's results disagree to some extent with BFL's (1997), which suggest that the more a multinational produces abroad, the greater the need for (low-skill) workers in the Swedish parent company.

Ekholm and Hakkala (2005) studied whether jobs in Sweden have been replaced by jobs abroad as a result of the transfer of operations to low-wage countries (offshoring) in the period 1995–2000. They examined how labour demand in Sweden is affected by the amount of imported intermediate goods in relation to total output. This relationship was derived by extrapolating from input-output tables, which are available for 1995 and 2000. Labour qualifications were divided into three educational categories: basic, secondary and tertiary. A distinction was also made between geographical regions: Western Europe, Eastern and Central Europe, North America, and Asia. A problem in this context is that the relationship between imported intermediate goods and total output is not available from country data and has to be constructed instead for each geographical region with the aid of trade statistics.

Ekholm and Hakkala's (2005) results suggest that the transfer of production from Sweden to high-income countries has not affected labour demand in Sweden. On the other hand, offshoring as a whole and particularly to low-wage countries has diverted demand away from labour with a secondary education in favour of those with a tertiary education. The main driving force here seems to be the transfer of production from Sweden to Eastern and Central Europe. According to this study, Swedish offshoring to low-wage countries lowered demand for labour with a secondary education by about 7,000 persons between 1995 and 2000. However, this is equivalent to only 5 per cent of the increase in the number unemployed in this period. At the same time, the study suggests that from 1995 to 2000 demand for labour with a tertiary education rose by approximately 4,000 persons.

[14] Blomström and Kokko (2000) consider that the growth of outward direct investment is primarily due to a lack of high-skill labour in Sweden. They see this as a consequence of low wages for this category and of high-skill labour not being allowed to immigrate when it is in short supply in Sweden. Another reason they give is the policy of wage solidarity, whereby a wage rise for key personnel, who tend to be the most qualified, leads to wage increases for other groups as well, so that firms (in Sweden as well as abroad) find it cheaper to recruit qualified labour in countries that do not have this wage policy, even though skilled wages are higher there than in Sweden. It should be added that there is an arbitrary element in the approach used by these authors.

INWARD DIRECT INVESTMENT

Establishments in Sweden by foreign parent companies (inward direct investment)[15] can give rise to foreign influence and increased competition but also provide firms in Sweden with access to superior technology. The ways in which inward direct investment is liable to affect employment in Sweden are debatable. The new technology that becomes available through inward direct investment may be such that it benefits high-skill labour in particular at the expense of less-qualified categories, which can entail an increased relative demand for high-skill labour. If the inward direct investment is intended to benefit from existing technology in Sweden, employment in Sweden will probably not be affected because establishments in Sweden by foreign parent companies are unlikely to involve a change in the relative composition of factors of production. However, foreign establishments in Sweden can also entail a decreased relative demand for high-skill labour. According to Jonung (2002), foreign takeovers of Swedish firms can lead to some of the jobs in Sweden being transferred abroad because highly educated managerial staff and head-office personnel such as consultants, auditors and lawyers will be laid off. Moreover, Jonung argues that the relocation of a head office abroad increases the risk of research being transferred abroad and in time that can also affect other occupational groups.

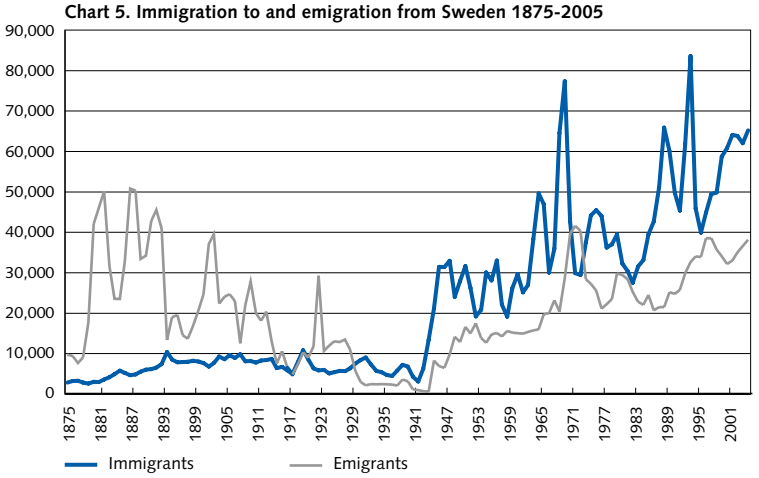
Bandick and Hansson (2005) studied how the relative demand for high-skill labour in Sweden has been affected by the growth of foreign ownership. Their data refer to Swedish manufacturing in the period 1986–2000 and a distinction is made between enterprises under foreign control and those that are Swedish and either multinational or not multinational. They found a tendency for the proportion of high-skill labour to rise in Swedish non-multinationals but not in Swedish multinationals that are taken over by foreign owners. In general, the results suggest that the increase in foreign ownership in the 1990s did not affect demand for high-skill labour in Sweden. The authors also found no grounds for fearing that foreign-controlled enterprises in Sweden will transfer R&D elsewhere; it seems, on the contrary, that these activities in Sweden have been stepped up after a foreign takeover of Swedish enterprises.

[15] This category includes new establishments as well as Swedish takeovers of foreign enterprises.

Labour mobility

Another aspect of globalisation is labour's free cross-country mobility. Up to around 1930, Sweden was a country with net emigration (see Chart 5). Since then, immigration has exceeded emigration in every year except 1972 and 1973. In the 1950s and 1960s most of the newcomers were labour immigrants; since the 1980s, immigration has been dominated by refugees and persons with family ties.[16] Labour market participation takes longer for the latter groups compared with labour immigrants, many of whom have a job waiting when they arrive.

Chart 5. Immigration to and emigration from Sweden 1875-2005



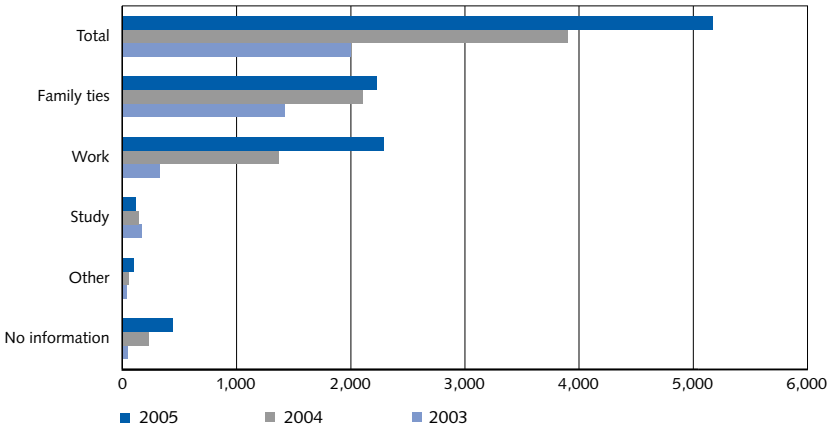
Note. Statistics Sweden defined an immigrant/emigrant as a person who has moved across a country's border with the intention of residing inside/outside Sweden for at least one year.

Source: Statistics Sweden.

The attitude of most countries to free labour mobility is protectionistic. Immigration to Sweden (and most other countries) is largely curtailed by specific restrictions. Sweden's EU membership entailed greater mobility for labour from other EU member states. After Sweden joined the EU in 1995, there was an increase in the number of residence permits for work,[17] though this group is still a minority of all immigrants. The number of residence permits granted for family ties also rose dramatically in the period 1994–2003.[18] The major enlargement of the European Union[19] in 2004, when Sweden chose not to implement transitional rules, led to an increased number of immigrants from the new EU member states (see

[16] See Nilsson (2004).
[17] Source: Statistics Sweden (2004)
[18] See Nilsson (2004).
[19] The ten new member states (EU10: Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia) increased the EU's total population by over 18 per cent.

Chart 6. Number of immigrants from EU10 2003-05 by grounds for residence



Note. Statistics Sweden requires that, to be registered as an immigrant, a person must intend to reside in Sweden for at least one year. In addition to the immigrants in the official statistics, a number of non-residents are in Sweden (temporarily or permanently) for seasonal work or without a permit.

Source: Statistics Sweden.

Chart 6).[20] The increase was most marked in the initial year and tended to slacken in 2005. The most common grounds for residence permits in Sweden in 2004 and 2005 were family ties and work (the increase for work was most notable).

It is not clear how increased immigration may affect employment in Sweden. Demand for goods and services would be stimulated in so far as the immigrants spend their earnings[21] and that can lead to increased labour demand. If demand for goods and services is stimulated most in high-income sectors, there should be an increase in demand for high-skill labour.

Increased immigration whereby Swedish labour is replaced by immigrants can entail a crowding-out effect, particularly in low-skill sectors if that is where most immigrants find work. Today, however, participation rates are lower for persons born abroad compared with those born in Sweden; whereas the level for foreign-born in the 1950s was 20 per cent higher than for Swedish-born, in 2000 it was 30 per cent lower (Ekberg and Hammarstedt, 2002). This mirrors the fact that the earlier labour immigration has been replaced by refugees and persons with family ties.

According to Ekberg and Andersson (1995), immigration does not affect Swedish labour's total employment. The crowding-out effect when

[20] In view of all the factors that influence immigration (e.g. language, geographic distance, and job opportunities in the host country), it was not self-evident that the enlargement would lead to a dramatic increase in immigration to Sweden.

[21] A major factor here is the planned duration of the immigrants' stay in Sweden; if the stay is intended to be short, the immigrants are likely to save a large share of their income or transfer most of it to relatives in their home country.

Swedish employees are replaced by immigrants is offset by the increased employment in sectors were Swedish and immigrant labour are complementary.

Summary

Globalisation's effect on the Swedish labour market is a matter that continues to be discussed, for instance as the system of international trade expands to include China, India and the latest EU member states. New fears and dismal scenarios have been aired in academic circles as well as in media, predicting lower real wages or increased unemployment, for example.[22]

In this article, globalisation's effects on Sweden's labour market and more specifically on Swedish employment have been discussed from three perspectives: international trade, capital mobility in the form of direct investment, and labour mobility. The discussion is based on the available research.

One conclusion from the survey is that effects of *international trade* on labour demand in Sweden appear to have been very slight to date. An increase in Swedish imports from low-wage countries of goods and services that require low-skill labour to produce should lead to decreased relative demand for this category of labour in Sweden. Swedish enterprises can concentrate instead on goods and services that require high-skill labour and that in turn should add to relative demand for such labour. The relevant empirical research suggests, however, that Swedish imports from low-wage countries have not led to an appreciable reduction of demand for low-skill labour in Sweden. It should be noted that none of the studies discussed above included the service sector, though, as mentioned earlier, there are indications of some increase in IT services, for example, from India and Poland. Another point is that trade in services does not appear to have changed much in the period 1998–2005 (see Chart 1) but the potential for future growth is considerable.[23]

As regards *capital mobility,* there are fears that outward direct investment can entail major job losses in Sweden. In particular, the relocation of production from Sweden to low-wage countries could involve a loss of relative demand for low-skill labour in Sweden. Moreover, transferring production from Sweden to high-income countries can affect demand for Swedish labour, depending on whether employees in the parent company and its subsidiaries are substitutable or complementary.

[22] Persson and Radetzki (2006).

[23] According to Hamilton (2006), trade barriers in the form of bureaucracy and discriminatory rules are impeding the growth of EU trade in services.

The empirical research does not provide a uniform picture of how employment in Swedish parent companies has been affected by their subsidiaries' production in high-income countries. Employment in parent companies and subsidiaries, respectively, is substitutable according to one study and complementary according to another. Neither does there appear to be any clear relationship between the parent companies' employees and those of subsidiaries in low-income countries. One study reported no such relationship and another found that parent company employees are complementary to employees in subsidiaries in low-income countries. There seems to be some evidence that for manufacturing, direct investment in low-income countries contributed to some shift in demand in Sweden from low-educated to high-educated labour between 1990 and 1997. There are also indications that the transfer of Swedish enterprises to Eastern and Central Europe in particular has diverted demand from labour with a secondary education in favour of a tertiary education.

It is not clear how inward direct investment is affecting labour demand in Sweden. Relative demand for high-skill labour could rise (if the inward direct investments involve technology that is particularly attuned to such labour) or fall (if the qualified jobs are transferred to the foreign parent company abroad). There may also be no effect on labour demand in Sweden if the inward direct investment aims to benefit from Swedish technology, so that the relative composition of factors of production is unchanged. The empirical research suggests that the increase in foreign-controlled enterprises in Sweden in the 1990s has not affected demand for high-skill labour.

The third channel through which globalisation may affect labour demand is labour mobility. As discussed above, however, it is not clear whether increased immigration would lead to increased labour demand (in that it stimulates demand for goods and services) as opposed to a crowding-out effect when Swedish labour is replaced by immigrants (presumably in low-income sectors in particular). These matters seem to have attracted less empirical research. The general survey of *labour mobility* indicates that immigration does not appear to have affected total employment in Sweden. Note, however, that the basis for this conclusion is a single study (the only one we could find) that was done some time ago. It should also be mentioned that since the 1980s immigration to Sweden has been dominated by refugees and persons with family ties, categories for whom it is relatively difficult to gain a footing in the labour market. In other words, to date it seems that, even since the latest EU enlargement, labour immigration makes up just a small proportion

of immigration to Sweden.[24] It is possible that, with increased life expectancy and as the large birth cohorts in the 1940s enter retirement, the future will see increased labour immigration to share the working population's maintenance burden.[25]

Generally speaking, the available studies do not warrant any definite conclusions about globalisation's future effects on the Swedish labour market. In the ongoing discussion it should be born in mind that Sweden has a long tradition of foreign trade, a high level of education, a reputation for re-training and a well-developed infrastructure. These and other factors suggest that Sweden should be well-equipped to cope with a continued increase in globalisation.

[24] This is the case even though, as shown in Chart 6, the EU enlargement led to a marked increase in the period 2003–05 in the number of persons from the new EU member states who obtained residence and work permits in Sweden.

[25] According to Nilsson (2002), whereas in 2002 there were two gainfully employed persons for each person in retirement, in thirty years' time two gainfully employed persons will need to maintain 1.4 retirees.

References

Bandick, R. and Hansson, P. (2005), Inward FDI and demand for skills in Sweden, FIEF Working Paper Series.

Blomström, M., Fors G. and Lipsey, R.E. (1997), Foreign direct investment and employment: home country experience in the United States and Sweden, *The Economic Journal,* 107:445, 1787-1797.

Blomström, M. and Kokko, A. (2000), Outward investment, employment and wages in Swedish multinationals, Working Paper Series in Economics and Finance 408, Stockholm School of Economics

Braconier, H. and Ekholm, K. (2000), Swedish multinationals and competition from high- and low-wage locations, *Review of International Economics* 8, 448-461.

Ekberg, J. (2004), Kan invandrare underlätta försörjningen av en åldrande befolkning? (Can immigrants help to maintain an aging population?), *Ekonomisk debatt*, 4.

Ekberg, J. and Andersson, L. (1995), Invandring, sysselsättning och ekonomiska effekter, Rapport till expertgruppen i offentlig ekonomi (Immigration, employment and economic effects. Report to the Expert Group on Public Finance), Finansdepartementet (ESO), Ds 1995:68.

Ekberg, J. and Hammarstedt, M. (2002), 20 år med allt sämre arbetsmarknadsintegrering för invandrare (Two decades of increasingly poor labour market integration for immigrants), *Ekonomisk debatt*, 30:4.

Ekholm, K. (2006), Ordning och reda om outsourcing (Putting outsourcing straight), SNS Förlag.

Ekholm K. and Hakkala, K. (2005), The effect of offshoring on labor demand: evidence from Sweden, IUI Working Paper 654, The Research Institute of Industrial Economics.

Hamilton, U. (2006), 85 exempel på protektionism (Eighty-five examples of protectionism), SNS-rapport.

Hansson, P. (2000), Relative demand for skills in Swedish manufacturing: Technology or trade?, *Review of International Economics*, 8, 533-555.

Hansson, P. (2004), Utländska direktinvesteringar och sysselsättning i *näringlivets internationalisering: effekter på sysselsättning, produktivitet och FoU* (Foreign direct investment and employment in the corporate sector's internationalisation: effects on employment, productivity and R&D), ITPS, Stockholm.

Hansson, P. (2005), Skill upgrading and production transfer within Swedish multinationals, *Scandinavian Journal of Economics*, 107:4, 673-692.

ITPS (2004a), Swedish controlled enterprise groups with subsidiaries abroad 2004, S2006:004.

ITPS (2004b), Foreign controlled enterprises 2004, S2005:006.

ITPS (2004c), Näringslivets internationalisering – Effekter på sysselsättning, produktivitet och FOU (The corporate sector's internationalisation – effects on employment, productivity and R&D), A2004:014.

Jonung, L. (2002), (ed.), *Vem ska äga Sverige?* (Who will own Sweden?), Stockholm, SNS förlag.

Lipsey, R. E. (2002), Home and host country effects of FDI, NBER Working Paper 9293.

Nilsson, Å. (2002), Arbetskraftsinvandring – En lösning på försörjnings bördan? (Labour immigration – a solution to the maintenance burden?), *Välfärdsbulletinen* 3, SCB.

Nilsson, Å. (2004), Efterkrigstidens invandring och utvandring (Postwar immigration and emigration), *Demografiska Rapporter* 5, SCB.

Persson, M. and Radetzki, M. (2006), Kina, Sverige och globalisering (China, Sweden and globalisation), *Ekonomisk Debatt* 1.

Svensson, R. (1996), Effects of overseas production on home country exports: evidence based on Swedish multinationals, *Weltwirtschaftliches Archiv*, 132:2, 304-29.

Swedenborg, B., Johansson-Grahn, G. and Kinnwall, M. (1988), Den svenska industrins utlandsinvesteringar 1960-1986 (Swedish manu facturing's investments abroad 1960–86), IUI, Stockholm.

Swedenborg, B. (2001), Determinants and effects of multinational growth. The Swedish case revisited. In Blomström, M. and Goldberg, L. (eds.) *Topics in empirical international economics. A festschrift in honor of Robert E. Lipsey*. NBER. Chicago: Chicago University Press.

The Riksbank's new indicator procedures

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In the context of forecasting and analysis, central banks around the world have become increasingly interested in the use of formal models, both structural macro models and time series models. The Riksbank uses both these types of model in forecasting work, together with traditional expert assessments. This article aims to describe the latter type of model. Besides reviewing alternative model procedures, it presents an evaluation of forecasts. The results suggest that the indicator approaches presented here can contribute to forecasts that are more precise than those which are obtainable with simpler model specifications.

1. Introduction

The forecasts in the Riksbank's *Monetary Policy Report* (*Inflation Report* prior to 2007) are derived from forecasts generated with a structural macro model, a variety of time series models and economists' judgements. The strength of a structural model, which presupposes the validity of a number of theoretical relationships, lies in its forecasts being easy to interpret.[1] However, possible differences between the theoretical relationships and correlations in data may weaken the model's forecasting ability for particular variables. The structural model's forecasts then need to be adjusted, which can be done with expert assessments or with the aid of alternative forecasts from time series models (indicator models), which are not so dependent on congruence between the variables and the theoretical relationships. Various evaluations suggest that time series models, which in principle simply extrapolate the patterns in historical data, are suitable above all for forecasts in the short term (see, for example, Galbraith and Tkacz, 2006). These models can thus be regarded as a complement to traditional assessment forecasts for short horizons. This article provides a relatively non-technical description of the indicator models that have been developed in the Riksbank's Monetary Policy Department in the past three years.

[1] Over the years, the Riksbank has used a number of macro models. For the model in current use, a general equilibrium model, see Adolfson et al. (2005a), and the box on pp. 32–37 in *Monetary Policy Report,* 2007:1, Sveriges Riksbank.

In recent years, scholars have presented statistical procedures for the systematic utilisation of the information in large amounts of data (see, for example, Stock and Watson, 2002, 2004, and Bernanke and Boivin, 2003). In the central bank world, procedures of this type are not yet particularly widespread. In addition to the Riksbank, notable practitioners are the Bank of England and the Bank of Canada. These central banks employ a wide variety of model approaches, ranging from simple univariate time series models to highly sophisticated multivariate non-linear models.[2] While a great many models are used, the procedures are easy to manage and highly automated (see, for example, Kapetanios et al., 2006).

The indicator procedures currently used by the Riksbank are presented in Section 2.[3] The forecasting performance of the various models is evaluated in the following section. The fourth section outlines an alternative use of indicator information. The final section summarises the article.

2. The Riksbank's statistical indicator models

This section presents some of the time series procedures the Riksbank employs to support the forecasting process. These procedures are mainly used for short-run forecasting (approximately one year ahead). The model on which the approaches described here are based is outlined first, followed by a brief account of the indicator models. The procedures presented here can be applied to monthly, quarterly and annual data. In the next main section, forecasting performance is evaluated on quarterly observations of GDP growth and underlying inflation (UND1X). The procedures are not designed solely for these variables; they are equally applicable to, for instance, external economic development or interest rates. Forecasts of monthly changes in the CPI are also included in the evaluation in the next section.

The procedures have been developed in the Riksbank's Monetary Policy Department and are programmed in Compaq Visual Fortran 6.0 and in Eviews 4.5. The programmes are fully automated and the labour input required for each forecasting round is extremely small. The procedures are developed continuously and used by the economists as support for short-run assessments.

[2] A univariate specification includes only one variable; multivariate models include more than one variable.
[3] Procedure stands for a systematic handling of a number of statistical models.

2.1 The vector autoregressive (VAR) model

Econometric models use correlations in data to describe relationships between different variables as well as between current and earlier (lagged) observations for one and the same variable. Relationships of the latter type are called autoregressive specifications. An autoregression (AR) can be written:

$$(1) \qquad y_t = \beta_0 + \beta_1 y_{t-1} + u_t ,$$

where y_t is the value of variable y in period t and u is a randomly distributed error term.[4] Equation (1) states that the value of y in period t is dependent on its value in the preceding period. This model is called a first-order autoregression, AR(1). An autoregression can be extended to be dependent on more distant observations and to capture variables' interdependence. The following specification denotes a simple extension of equation (1), where *y* is subject to the influence of another variable *x*:

$$(2) \qquad y_t = \beta_0^y + \beta_1^y y_{t-1} + \beta_2^y x_{t-1} + u_t^y .$$

The variable x can be modelled correspondingly:

$$(3) \qquad x_t = \beta_0^x + \beta_1^x y_{t-1} + \beta_2^x x_{t-1} + u_t^x .$$

Combining equations (2) and (3) into a system of equations results in a model where both *y* and *x* are dependent on their own and each other's earlier values. The specification is then called a vector autoregression (VAR).

2.2 Handling large amounts of data

Most of the procedures use a large quantity of time series. In that models cannot be estimated if they include too many variables (the number of observations must exceed the number of estimated parameters), the models have to be condensed.[5] This can be done by summarising the information in just a few common factors (see Section 2.5 below on VAR models with factors). Another way of handling large amounts of data is to estimate and combine numerous small models.

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[4] The model is estimated on the assumption that the series involved are stationary (that their means and variances are stable) and that the error term has a stochastic distribution with constant variance. Non-stationary series are modelled as rates of change, $\Delta y_t = y_t - y_{t-1}$, and equation (1) is then written: $\Delta y_t = \varphi_0 + \varphi_1 \Delta y_{t-1} + \eta_t$.

[5] The more the quantity of observations exceeds the number of estimated parameters, the greater the reliability of the estimations.

2.3 Classic VAR models

In the Riksbank's classic VAR procedure, a number of unique VAR models (combinations) are estimated from the given data set. These VAR models summarise correlations in the series that are included in the system in question; no other information is taken into account. One can then identify the model in the collection of estimated models that gives the best forecasts in terms of the historical forecast error, the average of all model forecasts or various trimmed means.[6] It is possible to condition the classic VAR procedure on known outcomes of certain indicator variables during the forecast period.

In an example below, models of the types represented by equations (2) and (3) are estimated to forecast GDP growth. Besides GDP, these models include another one to three variables.[7]

2.4 Bayesian VAR models

The notion underlying the Bayesian VAR models is likewise to employ numerous relatively small models in order to utilise the information in large data sets. Unlike the classic VAR models, subjective beliefs or experiences can be included in the Bayesian approach with the aid of priors.[8] In the case of equation system (2) and (3), this enables the analyst to exercise an opinion about the characteristics of the coefficients and the random terms, as well as (possibly) about how the models should be weighted when they are combined. The prior is then updated with information from data. The importance of each model in terms of the updated weights is taken into account when the model forecasts are weighted together. This procedure is known as Bayesian model averaging.[9]

2.5 VAR models with factors

Fluctuations in individual variables do not necessarily constitute signals that are relevant for aggregated economic activity. An alternative way of summarising the information in large data sets and simultaneously reducing variable-specific noise is to use statistical methods so that the part of the data-set's variation that is common to variables is summarised

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[6] The best model in this context is the one that is best according to a particular evaluation; it need not be best in the future. A trimmed mean can be a mean that excludes the quartile of models that generate the poorest forecasts.

[7] The data comprises GDP and another 108 variables. One can then create 108 different models that include GDP and one additional variable. Allowing for the modelling of three variables (GDP and another two variables) in the system results in 5778 unique models (combinations).

[8] Bayesian VAR models are described in Kadiyala and Karlsson (1997). A slightly modified version of Litterman's (1986) prior is used here, which means that stationary series are assumed to follow equation (1) with $\beta_1 = 0.9$ and non-stationary series (difference stationary) are assumed to follow $\Delta y_t = \varphi_0 + \eta_t$. In theory, an advantage with the Bayesian procedure is that much of the noise in the series is reduced. In the estimation, the prior is updated with information from data.

[9] For information on Bayesian model averaging see, for example, Koop (2003).

in one or a few statistical factors. Instead of generating and summarising forecasts from many different model combinations, the data set is first condensed into just a few factors that are then modelled together with the forecast variable in a VAR model (see above). The factor approach is described by Stock and Watson (2002).[10]

2.6 Models that incorporate early information

Models of the type represented by equation system (2) and (3) explain current outcomes solely in terms of earlier observations. However, indicator information is frequently available that is more recent than the latest observation of the forecast variable. One example is retail sales, which is known about a month before a new GDP outcome is presented. Another example is the forward-looking business tendency series from the Swedish National Institute of Economic Research. In the procedures described above, early information can be incorporated by conditioning the model forecasts on these early outcomes. Such information can be handled more directly by including a dependence between the main variable (y) and the indicator variable (x) at the same point in time. Equation (2) then takes the form:

$$y_t = \beta_3^y + \beta_4^y y_{t-1} + \beta_5^y x_t + \beta_6^y x_{t-1} + u_t^1. \quad (4)$$

Equation (4) accordingly consists of an autoregressive part (own lags of *y*) and a part that is dependent on the indicator variable. In order to extract the information from the indicator variable, the autoregressive component can be excluded, which gives:

$$y_t = \beta_7^y + \beta_8^y x_t + \beta_9^y x_{t-1} + u_t^2. \quad (5)$$

2.7 Component models for short-term inflation forecasts

There are components of the CPI for which information is available one or more months earlier than new inflation figures. Motor fuel prices, for instance, are available about a month in advance. Other examples are house mortgage interest rates and electricity prices. Handling the CPI's components separately can make it easier to include such specific information. In the component model, forecasts are generated for a number of CPI components with the aid of AR equations. In this example, the time series models for the various components are augmented with season dummies (D) in order to model what are often marked seasonal fluctuations that differ between the components (y^d).

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[10] Principal component analysis is used here to obtain static factors. The *j*:th estimated factor, based on *N* series, takes the form $\hat{f}_{j,t} = \hat{\lambda}_{j,1} x_{1,t} + \ldots + \hat{\lambda}_{j,N} x_{N,t}$, where the factor loadings $\hat{\lambda}_{j,i}$ denote the weight of variable *i* in the construction of the *j*:th factor.

(6) $$y_t^d = \beta_0^d + \sum_{i=1}^{p} \beta_i^d y_{t-i}^d + \sum_{s=1}^{1} \lambda_s^d D_{s,t} + u_t^d \cdot$$

If early specific information (x) is available that shows a strong correlation with a particular component, the equation is further extended:

(7) $$y_t^d = \beta_0^d + \sum_{i=1}^{p} \beta_i^d y_{t-i}^d + \delta^d x_t + \sum_{s=1}^{1} \lambda_s^d D_{s,t} + u_t^d \cdot$$

From equation (7) it will be seen that parts of the component model are based on the model that incorporates early data (see the preceding section). In the model specification that is evaluated below, forecasts are generated on eleven components of the CPI. Information about house mortgage rates, petrol prices and electricity prices is assumed to be known one month before the CPI outcome is published and is used as indicators for forecasting three CPI components in accordance with equation (7).[11] Forecasts of monthly changes in other CPI components are generated with equation (6). The forecasts are multiplied by the weight of each component to obtain a contribution to the monthly change in the total CPI. These contributions are then summed for each forecast horizon.

3. Forecasting performance

One way of establishing how well the various models perform *on average* is to evaluate forecasts by saving data for a particular period at the end of the sample and comparing the model's forecasts with that period's outcomes. Forecasts for each model are made for one to eight quarters ahead and for one to twelve months ahead. In the case of approaches that include more than one model, the mean of all the forecasts is calculated.[12] The estimation period is then lengthened by one observation and the exercise is repeated. This produces a set of forecasts for which one can estimate the average accuracy.[13] That is done by using the root mean

[11] Indices for interest rate expenditure, petroleum products and electricity prices. The respective indicators in this example are the mean of three short-term house mortgage rates, Statoil's prices for 95 octane petrol and a mean of three fixed electricity prices (Vattenfall, E.on and Fortum). In the evaluation of forecasts, the indicators for forecasts with a horizon more than one month ahead are assumed to be unchanged.

[12] The model that is best on every occasion is also evaluated in the boxes on pp. 35–39 in *Inflation Report* 2005:3 and pp. 56–60 in *Inflation Report* 2006:3. The results show that the forecasts with the best average performance are obtained by taking all the models into consideration (in the form of a mean) as opposed to consistently using the model that is *currently believed* to be best. As the procedure ranks all models according to their forecasting ability, one can, for example, calculated the mean of the best 50 per cent of the models. Various forms of trimming the set of model forecasts have been studied but the mean of all models generally gives a forecast performance that is stable over time and hard to beat.

[13] In a first step the models are estimated on data from 1991:3 up to 1998:4. From the collection of models, the mean of all model forecasts up to eight quarters ahead is calculated and these forecasts (from 1999:1 up to 2000:4) are saved. All models are then re-estimated on data from 1991:3 up to 1999:1 and the mean of all the new model forecasts up to eight quarters ahead is obtained. This procedure is repeated until the observations are exhausted (in the final step, the models are estimated up to 2006:2). The exercise generates 31 one-period forecasts (one quarter ahead), 30 two-period forecasts and so on. The measure of forecast precision is then derived from these forecasts and the corresponding outcomes.

square error (RMSE), which summarises the standard deviation in the forecast errors and their systematic deviation.[14] The lower the estimated RMSE, the better the forecasting ability. A forecast that is always correct has a zero RMSE.

In addition to RMSE, the forecasts' maximum useful horizon (the models' forecast memory) is considered. The calculation of memory draws on the fact that, for the type of models used here, the forecasts' RMSE approaches the series' standard deviation as the horizon is extended. A mathematical description of the relationship between RMSE and the standard deviation is presented in an appendix. RMSE for an inferior model may even exceed the variable's standard deviation. In this study, the model's memory is defined as the longest forecast horizon for which RMSE is less than the series' standard deviation.

RMSE indicates how well a forecasting method performs on average but the picture it conveys is by no means complete. More information can be derived from the forecasts by constructing a chart of the forecast errors over time. In this article, forecast errors are presented in this way for horizons of one month and one quarter ahead.

The models in use presuppose stationary series, i.e. the mean and variance are constant. Stationary series are modelled in levels, non-stationary in first log differences, which is an approximation to quarterly or monthly rates of change. In the evaluation, the forecasts are recalculated as annual percentage changes.

3.1 Evaluation of quarterly forecasts of GDP growth

This section presents an evaluation of the procedures' quarterly forecasts of annual percentage GDP growth in the period 1999:1 - 2006:3. The evaluation uses data comprising 108 indicator series (see Table 1). The results are given in Table 2. Besides the mean value forecasts from the indicator procedures described above, the table includes results from an autoregressive model (see equation (1)) and a random walk model.[15] In a random walk model, the most recent known outcome serves as the forecast for all horizons.

The results in Table 2 show that all the model approaches give forecasts that are more accurate than the random walk and that the various indicator procedures are more or less equally accurate. Their precision, measured as RMSE, is just under 0.4 percentage points for forecasts of

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[14] $RMSE(h) = \sqrt{\sum_{t=\tau_1}^{\tau_2} \left(y_{t+h} - y_{t+h}^{pred} \right)^2 / (\tau_2 - \tau_1 + 1)}$, where y_{t+h} is the outcome at time $t+h$ and y_{t+h}^{pred} is the forecast made at time t for time $t+h$; h is the forecast horizon.

[15] The autoregressive model is of the same type as equation (1) but the maximum lag can exceed one if there is a longer dependence in the data.

GDP growth one quarter ahead and approximately 0.7 percentage points two quarters ahead. So if the forecast errors are normally distributed, a forecast interval with a width of 1.6 percentage points will include the GDP outcome for the next quarter in 95 per cent of cases.[16] The evaluation also shows that the autoregression is only marginally inferior to the VAR procedure. The ability of autoregressions to compare relatively well with more sophisticated approaches is a familiar phenomenon in research. It has been demonstrated, for example, in two studies by Stock and Watson (2004, 2005).

While the magnitude of the indicator models' forecast error is appreciable, it is smaller than for corresponding forecasts with structural models. This is shown, for example, in Del Negro et al. (2005).[17] With the Riksbank's structural model, for instance, RMSE for the forecasts one quarter ahead is about 0.5 percentage points. The precision of the indicator models is much the same as that of the Riksbank's published forecasts from one to four quarters ahead.

In theory, RMSE should increase as the forecast horizon extends into the future; when the model ceases to contribute any information, RMSE should stabilise around the series' standard deviation. In the evaluation of the indicator models, the forecasts' RMSE largely coincides with GDP growth's standard deviation when the forecast horizon reaches approximately four quarters. Thus, time series and indicator models are mainly suitable for forecasting GDP growth in the short run, at most up to one year ahead.

Columns 7 and 8 in Table 2 show the precision of the forecasts with models that use early information. The performance of the models that utilise GDP growth's autoregressive dynamics is comparable with that of the other indicator procedures, while the models that rely solely on GDP growth's correlations with other variables perform less well. This indicates that the autoregressive component is important for obtaining the best possible forecast. Still, even models without an autoregressive component can be of (qualitative) interest in that they extract the information from the other variables.

An autoregression is consistently outperformed by the VAR models, as shown by the forecast error one quarter ahead in Chart 1. The difference between the forecast errors is greatest for 2005:3, when the

[16] Given a normal distribution, the 95 per cent confidence interval is derived from $y_{t+h}^{pred} \pm 1.96 \times 0.4$, where 0.4 = RMSE.

[17] A fair comparison between Swedish and US data really requires that the calculation of the standard deviations allows for the country difference in the variability of GDP growth (a variable that is more stable is, of course, easier to forecast). As GDP growth varies less on average in the USA than in Sweden, such a comparison strengthens the conclusion that time series and indicator models produce better forecasts than structural models.

large error for the AR forecast is due to GDP growth being unexpectedly strong. For the VAR models, which incorporate other information in addition to GDP, the forecast error is half as large. This shows that there are times when more sophisticated procedures can be of particular value.

3.2 Evaluation of quarterly forecasts of UND1X inflation

As in the evaluation above of forecasts of GDP growth, the procedures' ability to forecast UND1X is assessed with quarterly observations. The data is presented in Table 1. Here, too, the period for the evaluation is 1999:1–2006:3.

Table 2 shows that the different approaches have much the same precision, at least for short-term forecasts. RMSE is around 0.4 percentage points for UND1X forecasts one quarter ahead and approximately 0.5–0.6 for two quarters ahead. The accuracy of all the evaluated models is consistently superior to a random walk. Here, too, the forecasting precision of the sophisticated procedures for short-term horizons is slightly better than that of the autoregression.

Comparing RMSE for the UND1X forecasts with the series' standard deviation (which is just over 0.8) indicates that the procedures' forecast memory is three to four quarters, which implies that the indicator models are mainly appropriate for forecasting UND1X up to one year ahead.

Chart 2 presents forecasts of UND1X one quarter ahead from the VAR procedure and the autoregression. A rather dramatic increase in UND1X inflation occurred in 2001:2, partly because food prices fluctuated sharply and unexpectedly in connection with mad-cow and foot-and-mouth disease. The indicator models were incapable of capturing this increase and there was a large forecast error. Still, Chart 2 clearly shows that models which include information in addition to UND1X perform considerably better than an autoregression. This means that the indicators contained information that pointed to a rising rate of inflation. Research findings suggest that indicator information which is not captured by an autoregression can be particularly relevant under special circumstances (see Stock and Watson, 2004, 2005). The example in Chart 2 agrees with this.

Chart 2 also shows that indicator information improved the forecasts for 2003:1 and 2. Energy prices were unexpectedly high in the first quarter and fell back again in the second quarter. The forecasts with the VAR procedure were then notably better.

3.3 Evaluation of monthly forecasts of CPI inflation

The evaluation here compares the component model's (CM) forecasts with AR forecasts and average forecasts from bivariate classic VAR

models. In addition to CPI inflation, the data set for VAR models comprises monthly observations for 33 indicators (see Table 1). The evaluation period is January 2002 – November 2006 and the forecast horizon is one to twelve months ahead. Forecasting ability is evaluated with the aid of RMSE. The results in Table 3 show that all the model approaches produce forecasts that are more accurate than the random walk. The forecasts with the AR model are inferior to those with CM and the average for the bivariate VAR models. CM, which includes specific information, has the smallest forecast error up to eight months ahead; beyond that horizon, the VAR models produce the most accurate forecasts.

The large forecast errors for UND1X inflation in 2003 in Chart 2 also occur for CPI inflation at monthly intervals. For CM, which incorporates information about energy prices, the forecast errors in the early months of 2003 are close to zero (see Chart 3). The forecasts with the VAR procedure are also clearly better than those with a simple autoregression. The average of the VAR models' forecasts and the CM forecast also have a considerably smaller forecast error than the autoregression in the early part of 2004. The low CPI inflation at that time mirrored low prices for energy and food products, which the autoregression was incapable of forecasting. This shows, once again, that there are times when more sophisticated procedures can be highly useful.

4. A reverse application of economic indicator series

4.1 The procedure

The forecasts published in *Monetary Policy Report* are a complex function of various models and assessments, which makes it difficult to judge how they are likely to be affected by new indicator outcomes. One way of tackling this problem is to form an opinion of the indicator's likely outcome given the current forecast. A difference between the forecast and the outcome of the indicator series can then provide information as to the direction of the revision of the forecast variable. A simple approach to forming an opinion about the indicator variable, given a forecast for a main variable, involves utilising the historical relationship between the variables, which gives the following specification:

$$x_t = \alpha_0 + \alpha_1 x_{t-1} + \alpha_2 y_{t-1} + \beta y_t + u_t^x \,. \tag{8}$$

Equation (8) differs from equation (4) in that the latter is used for forecasting a main variable given an indicator variable and the former for forecasting the indicator variable given the main variable. Equation (8) accordingly represents a reverse application of indicator series in which

a forecast of y_{t+1} is used to forecast x_{t+1}. The Riksbank's procedure for such a reverse application is Bayesian and admits prior beliefs of the parameters in equation (8). In the main, the analyst exercises an opinion as to whether the contemporaneous relationship between the indicator variable and the main variable is positive or negative.

When a new indicator outcome becomes available, it is compared with the forecast of the same variable in accordance with equation (8). An outcome that is higher than the forecast (with β positive) is an indication that the forecast of y_{t+1} ought to have been higher. In the procedure, a plus sign (upward revision of the main variable) is then entered together with the probability of the upward revision (a probability above 50 per cent gives a plus sign and a probability below 50 per cent gives a minus sign, that is, a revision downwards). Applying this procedure to a number of indicator series gives a collection of tendencies for the direction of the revision and their attendant probabilities. One then has a succinct objective picture of the main variable's appropriate revision.

4.2 An example of a reverse application of indicator series

The outcome series for GDP growth in *Inflation Report* 2005:4 was the same as in the preceding *Report*. Meanwhile, the National Institute had published a quarterly business tendency survey. The reverse application suggested that the survey outcome was stronger than could be expected given the GDP forecast in *Inflation Report* 2005:3 and the historical relationship between GDP growth and the survey data series. The result of the reverse analysis is shown in Chart 4. A 95 per cent probability interval for an upward revision of the GDP forecast did not cover 0.5; this was interpreted as a strong qualitative signal from the quarterly survey in favour of an upward revision of the GDP forecast. In *Inflation Report* 2005:3, GDP growth was forecast to be 0.76 percent. In *Inflation Report* 2005:4 the forecast was revised upwards to 0.88 per cent, partly on the grounds of the reverse indicator analysis. The outcome, published later, was 0.95 per cent.

5. Summary

The results presented in this article illustrate the appreciable uncertainty associated with forecasts. They also suggest that on average, forecasts with the simple autoregressive model compare favourably with more sophisticated forecasting methods. It should be added, however, that there are periods in which the indicator procedures contributed to more precise forecasts compared with the autoregression. This is because the indicator models incorporate a large amount of information that is not contained in the series. This is a rather important limitation of the autoregression because in practice the occurrence of such periods cannot be foreseen.

But although time series models have proved useful as forecasting instruments, they are incapable of providing economic explanations for the driving forces behind the forecasts. Other models with a foundation in economic theory must therefore also be used so that the forecasts can be interpreted in economic terms. Moreover, an evaluation by Adolfson et al. (2005b) shows that forecasts with the Riksbank's structural model are comparatively good for the somewhat longer run.

So indicator models as well as structural models are important instruments for forecasts and analysis. At the same time, they are, of course, gross simplifications of reality. Consequently they are incapable of taking into consideration all the information that influences the economy. The model forecasts for both short-term and long-term horizons therefore need to be adjusted with the aid of economist's judgements.

References

Adolfson, M., S. Laséen, Lindé, J. & Villani, M. (2005a), Bayesian estimation of an open economy DSGE model with incomplete pass-through, Sveriges Riksbank Working Paper Series 179.

Adolfson, M., Andersson, M. K., Lindé, J., Villani, M. & Vredin, A. (2005b), Modern forecasting models in action: Improving analyses at central banks, Sveriges Riksbank Working Paper Series 188.

Andersson M. K., (2000), Do long-memory models have long memory?, *International Journal of Forecasting* 16, 121-124.

Bernanke, B. S. & Boivin, J. (2003), Monetary policy in a data-rich environment, *Journal of Monetary Economics* 50 (3), 525-546.

Del Negro, M., Schorfheide, F., Smets, F. & Wouters, R. (2005), On the fit and forecasting performance of new-Keynesian models, *European Central Bank Working Paper Series* 491.

Galbraith, J. & Tkacz, G. (2006), How far can we forecast?: Forecast content horizons for some important macroeconomic time series, *Department of Economics Working Paper* 13, McGill University.

Koop, G. (2003), Bayesian Econometrics, John Wiley and Sons.

Kadiyala, K. R. & Karlsson, S. (1997), Numerical aspects of Bayesian VAR-modelling", *Journal of Applied Econometrics*, 12, 99-132.

Kapetanios G., Labhard, V. & Price, S. (2006), Forecast combinations and the Bank of England's suite of statistical forecasting models, manuscript, Bank of England.

Litterman, R., (1986), Forecasting with Bayesian vector autoregressions: Five years of experience, *Journal of Business and Economic Statistics* 4, 25-37.

Stock, J. H. & Watson, M.W. (2002), Forecasting using principal components from a large number of predictors, *Journal of the American Statistical Association* 97:460, 1167-1179.

Stock, J. H. & M. W. Watson, (2004), Combination forecasts of output growth in a seven-country data set, *Journal of Forecasting* 23 (Issue 6), 405–430.

Stock, J. H. & Watson, M.W. (2005), An empirical comparison of methods for forecasting using many predictors, manuscript.

Sveriges Riksbank (2005), Box: GDP indicators, in *Inflation Report* 3.

Sveriges Riksbank (2006), Box: Inflation indicators, in *Inflation Report*:3.

Sveriges Riksbank (2007), Box: RAMSES – a tool for monetary policy analysis, *Monetary Policy Report* 1.

Wold, H., (1938), A Study in the Analysis of Stationary Time Series, Almqvist & Wicksell, Stockholm.

Appendix: Forecast memory and the relationship between RMSE and the series' standard deviation

This appendix shows how estimated RMSEs can be used to determine how far ahead the model is capable of forecasting. The maximum forecast horizon in practice is called the model's (forecast) memory.

A stationary autoregression can be written as an infinite sum of earlier random terms:

(A1) $$y_t = u_t + \psi_1 u_{t-1} + \psi_2 u_{t-2} + \ldots$$

Equation (A1) is called the process's 'moving average' or Wold representation. The coefficients ψ_j in equation (A1) are given as functions of the autoregressive coefficients (see Wold, 1938). For a first-order autoregression (see equation (1)), the coefficients in equation (A1) are given as $\psi_j = \beta_1^j$. If the variance for the random terms is constant and $\mathrm{var}\left(u_{t-j}\right) = \sigma^2$, where $j \geq 0$, and the various random terms are mutually independent over time, the variance for variable *y* can be written:

(A2) $$\mathrm{var}\left(y\right) = \sigma^2 + \psi_1^2\sigma^2 + \psi_2^2\sigma^2 + \ldots$$

The mean square error (MSE) can be split into two components: forecast error variance and bias.[18] An unbiased forecast has zero bias and MSE is then the forecast error variance.

Via equation (A1) the forecast one step ahead in time from the autoregression can be calculated from:

(A3) $$y_{t+1}^{forc} = \psi_1 u_t + \psi_2 u_{t-1} + \ldots$$

because future observations of the random term are set to zero (that is, the expected value). The forecast error is thus:

(A4) $$pf_{t+1} = y_{t+1} - y_{t+1}^{forc} = \underbrace{\left(u_{t+1} + \psi_1 u_t + \ldots\right)}_{y_{t+1}} - \underbrace{\left(\psi_1 u_t + \psi_2 u_{t-1} + \ldots\right)}_{y_{t+1}^{forc}} = u_{t+1}\,.$$

[18] $MSE(h) = \mathrm{var}\left(y_{t+h} - y_{t+h}^{forc}\right) + bias^2\left(y_{t+h} - y_{t+h}^{forc}\right)$, where bias is the mean forecast error.

For a forecast error two steps ahead in time we have:

$$\text{(A5)}\qquad \begin{aligned} pf_{t+2} &= y_{t+2} - y_{t+2}^{forc} = \underbrace{\left(u_{t+2} + \psi_1 u_{t+1} + \psi_2 u_t + \ldots\right)}_{y_{t+2}} - \underbrace{\left(\psi_2 u_t + \ldots\right)}_{y_{t+2}^{forc}} \\ &= u_{t+2} + \psi_1 u_{t+1}. \end{aligned}$$

MSE for forecasts one, two and *h* steps ahead in time can now be calculated via the forecast error variances:

$$\text{(A6)}\qquad \begin{aligned} MSE(1) &= \text{var}(pf_{t+1}) = \text{var}(u_{t+1}) = \sigma^2 \\ MSE(2) &= \text{var}(pf_{t+2}) = \text{var}(u_{t+2} + \psi_1 u_{t+1}) = \sigma^2 + \psi_1^2 \sigma^2 \\ MSE(h) &= \text{var}(pf_{t+h}) = \text{var}(u_{t+2} + \psi_1 u_{t+1} + \ldots + \psi_h u_{t+h}) \\ &= \sigma^2 + \psi_1^2 \sigma^2 + \ldots + \psi_h^2 \sigma^2. \end{aligned}$$

Equation (A6) shows that as the forecast horizon *h* extends, MSE approaches the variance according to equation (A2). In practice, MSE will be very close to the variance even for considerably shorter horizons because the coefficients ψ_j will decrease at a rapid geometric rate. With the aid of the AR(1) model in accordance with equation (1), this will be evident if ψ_j is replaced by β_1^j, where $\beta_1^j < 1$ for stationary series. From the root of MSE and the variance it will be seen that RMSE moves towards the series' standard deviation.

In practice, the uncertainty in the estimates of the AR coefficients means that there is also uncertainty in the estimation of ψ_j. As a result, MSE according to equation (A6) can coincide with the variance according to (A2) even for short forecast horizons.

In this article, a model's memory is defined as the longest horizon for which the forecasts' RMSE is less than the series' standard deviation in the evaluation period. For a description of forecast memory, see Andersson (2000).

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Tables

Table 1. Indicators

Data period		
1991:3-2006:3		**1993:1-2006:11**
GDP growth (quarterly)	**UND1X (quarterly)**	**KPI (monthly)**
11 real economy	11 real economy	4 real economy
11 labour market	11 labour market	5 labour market
12 price changes	12 price changes	9 price changes
13 financial economy	13 financial economy	13 financial economy
9 rest of the world	9 rest of the world	3 rest of the world
53 Business tendency data	32 Business tendency data	
109 all told	88 all told	34 all told

Note.: The data sets above include the variable to be forecast.
Source: The Riksbank.

Table 2. Evaluation of GDP and UND1X forecasts from 1999:1 to 2006:3.
Root of the mean square error (RMSE)

Horizon	Indicator procedures					Early information	
(quarter)	VAR	BVAR	FACTOR	AR	RW	With AR	Without AR
GDP							
1	0.37	0.39	0.39	0.42	0.72	0.41	0,54
2	0.70	0.70	0.68	0.73	1.14		
3	1.05	1.10	1.03	1.09	1.52		
4	1.41	1.51	1.41	1.49	1.80		
5	1.45	1.59	1.45	1.50	1.86		
6	1.43	1.59	1.45	1.48	1.86		
7	1.29	1.46	1.33	1.36	1.82		
8	1.20	1.35	1.24	1.31	1.87		
Standard deviation		1.41					
UND1X							
1	0.39	0.39	0.40	0.43	0.54		
2	0.54	0.55	0.59	0.57	0.74		
3	0.67	0.71	0.74	0.69	0.90		
4	0.81	0.89	0.95	0.84	1.06		
5	0.84	0.90	0.98	0.86	1.08		
6	0.85	0.92	1.01	0.85	1.10		
7	0.85	0.94	1.03	0.85	1.13		
8	0.85	0.97	0.97	0.85	1.25		
Standard deviation		0.85					

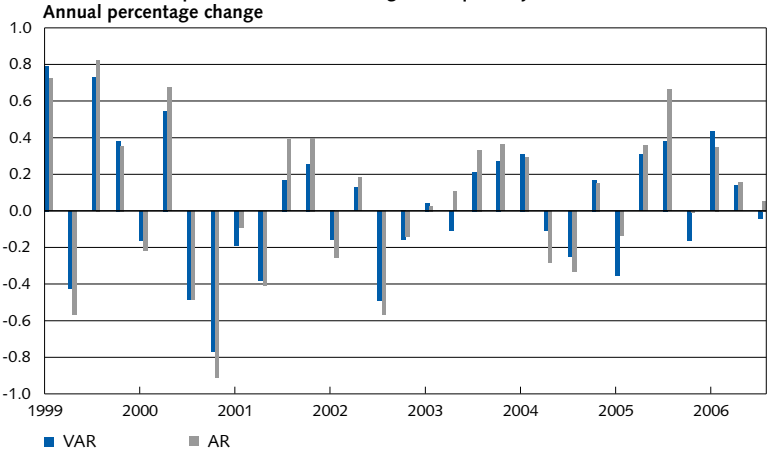
Note. The RMSEs represent the precision of the mean of all the forecasts in the approach in question; AR is an autoregression, RW is a random walk forecast. The standard deviation is calculated on the annual percentage change in a variable during the evaluation period 1999:1–2006:3. RMSE is calculated from forecasts and outcomes of annual percentage changes.
Source: The Riksbank.

Table 3. Evaluation of CPI forecasts from 2002:1 to 2006:11.
Root of the mean square error (RMSE)

Horizon (month)	AR	VAR	CM	RW
CPI				
1	0.33	0.28	0.18	0,35
2	0.49	0.37	0.31	0,50
3	0.60	0.46	0.42	0,60
4	0.64	0.52	0.50	0,65
5	0.71	0.58	0.55	0,73
6	0.77	0.58	0.58	0,78
7	0.81	0.64	0.63	0,83
8	0.85	0.71	0.69	0,87
9	0.88	0.75	0.75	0,90
10	0.93	0.77	0.79	0,94
11	0.98	0.78	0.83	1,01
12	1.06	0.80	0.88	1,09
Standard deviation		0.86		

Note. The RMSEs for CM refer to the component model approach. See also the note to Table 1.
Source: The Riksbank.

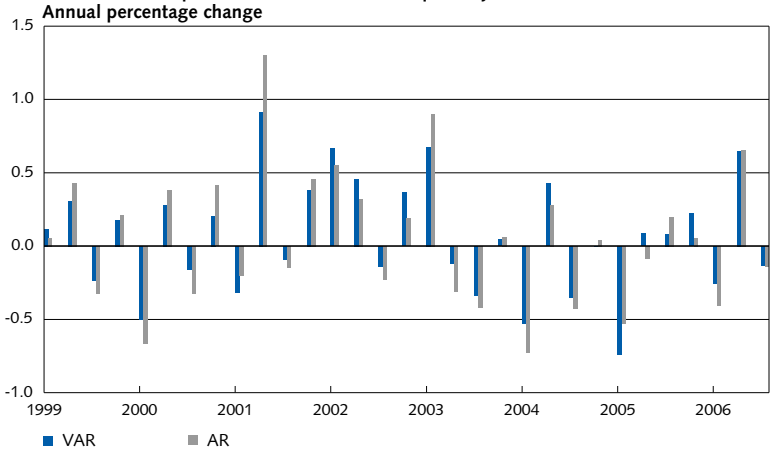
Chart 1. One-step forecast error for GDP growth, quarterly data from 1999:1 to 2006:3
Annual percentage change



Note. The chart shows the forecast error (outcome less forecast) one quarter ahead for the mean value of VAR models and for an autoregression.

Source: The Riksbank.

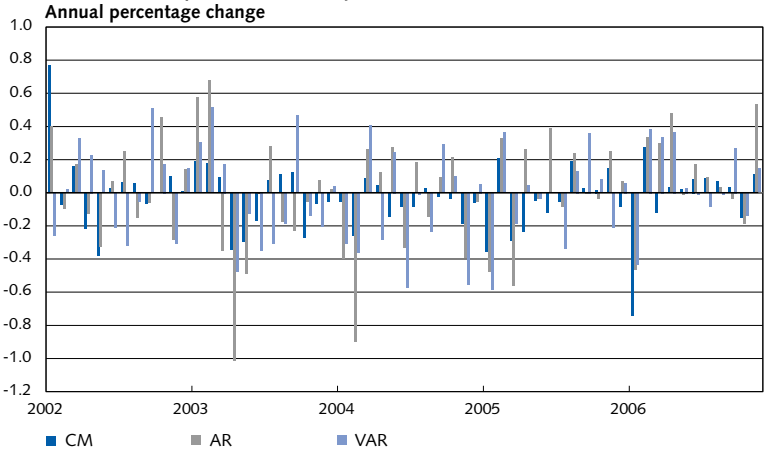
Chart 2. One-step forecast error for UND1X, quarterly data from 1999:1 to 2006:3
Annual percentage change



Note. See the note to Chart 1.

Source: The Riksbank.

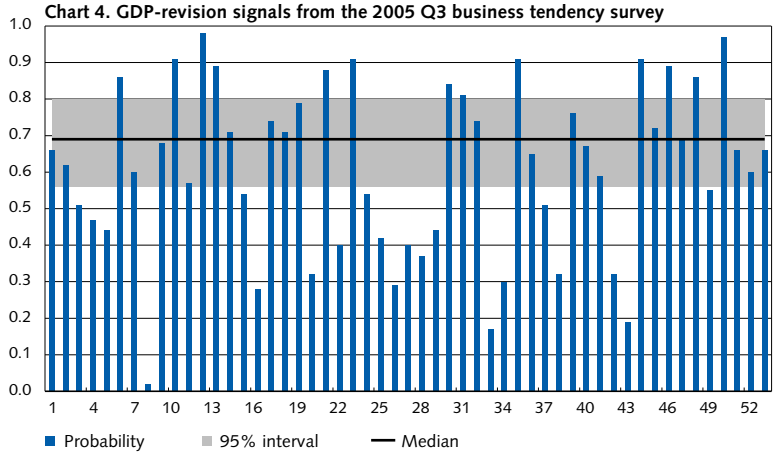
Chart 3. One-step forecasts, monthly data from 2002:1 to 2006:11
Annual percentage change



Note. CM refer to the component model approach. See the note to Chart 1.

Source: The Riksbank.

Chart 4. GDP-revision signals from the 2005 Q3 business tendency survey



Note. The bars denote the probability of an upward revision of the GDP-growth forecast in Inflation Report 2005:3 for each of the 53 business tendency series. The black line is the median probability of an upward revision according to the data set and the grey band represents the 95 per cent probability interval for an upward revision of the GDP forecast.

Source: The Riksbank.

The Executive Board's consultation response regarding the report "An Evaluation of Swedish Monetary Policy between 1995 and 2005 (2006/07:RFR1) (060-1070-06/07)

Summary: The Executive Board agrees with most of the recommendations in the report; these are in line with the current developments in monetary policy. The Executive Board does not agree that persistent overshooting or undershooting of the inflation target should be compensated by a subsequent deliberate undershooting or overshooting of the corresponding amount. Nor does it agree that the inflation target should be defined in terms of a price index other than the CPI. This comment concludes with a discussion of monetary policy in recent years.

1 Introduction

The Riksbank has been invited to present its views on the report "An Evaluation of Swedish Monetary Policy between 1995 and 2005" (2006/07 RFR1). The Riksbank is presenting two separate consultation responses, one from the General Council of the Riksbank and one from the Executive Board of the Riksbank. This response concerns the questions that fall within the Executive Board's sphere of activity. The General Council will at the same time issue a consultation response regarding the issues that belong to its sphere of activity.

The Executive Board's comments cover certain introductory general view and comments on the recommendations numbered 1-7 in the final chapter, and also some of the questions raised by the authors of the report in earlier chapters. This response is divided up as follows. Section 2 provides some general views on the evaluation. Sections 3 and 4 provide the Executive Board's stance with regard to the recommendations and suggestions regarding the conduct of monetary policy, and the reasons for this stance. Section 5 contains a discussion of the reasoning in the report on the fact that inflation has been below target in recent years.

2 General views

The evaluators' general assessment is that the Riksbank compares favourably with the best central banks in the world. The evaluators have also found in their analysis that in some areas there is scope for improvement

in the Riksbank's working methods. The evaluation concludes with six recommendations on conducting monetary policy (section 5.1) and three recommendations on governance of monetary policy (section 5.2). In addition to these concluding recommendations, the evaluation contains a number of less radical suggestions.

The Executive Board of the Riksbank is positive to most of the recommendations and suggestions stated. In several cases, steps have already been taken along the route advocated in the report. With regard to some parts of the analysis, the Executive Board's conclusions differ in some aspects from those drawn in the report.

The Executive Board observes that a large part of the report is comprised of a discussion of principle regarding what research has to say about the best method of conducting monetary policy and regarding the general monetary policy regime in Sweden. Only a small part is devoted to the monetary policy decisions made by the Riksbank and the macro economic developments to which they are linked.

The Executive Board notes in this context that the report provides clear support for the principles behind the monetary policy regime. The section that reports the conclusions of economic research as to how monetary policy should best be conducted (Chapter 2) highlights a number of principles as being of central importance. These are currently the guiding principles behind Swedish monetary policy:

- Price stability should be the overall long-term objective for monetary policy
- Monetary policy should have a specific inflation target
- The inflation target should be between 1 and 3 per cent
- The central bank should have the possibility to set the policy rate to attain the price stability target without interference from the government
- Openness and clarity are important
- Greater emphasis should be placed on forecasts for inflation and production than on intermediary targets such as money supply or exchange rate
- Monetary policy should be aimed at stabilising fluctuations in both inflation and production/employment (the inflation-targeting policy should be flexible), but no explicit target should be set for production or employment
- Monetary policy should not be governed by any mechanical rule of action

The main reasoning of the evaluation provides an important contribution, not least because it is expressed in a clear manner and contains a number of suggestions the Riksbank finds good reason to analyse more closely.

3 The report's recommendations

Recommendation 1: The Riksbank should more clearly explain that flexibility in its inflation targeting regime implies that the conduct of monetary policy should try to reduce both inflation and employment (output) fluctuations.

The Executive Board is positive to this recommendation, but at the same time wishes to underline that significant steps have already been taken in the direction proposed by the evaluators.

The Riksbank's strategy is, and has long been, to conduct a flexible inflation-targeting policy that gives consideration to both inflation and the real economy. This is done by the policy normally aiming to attain the inflation target within two years. Under certain circumstances, consideration to developments in the real economy may justify allowing longer time to attain the target. In the long term, there is no trade-off between inflation on the one side and production and employment on the other. It is in the short-term and medium-term that an inflation-targeting policy can contribute to smoothing cyclical fluctuations in production and employment.

The Riksbank has earlier noted the need to emphasise and explain this part of the monetary policy strategy. In May 2006 the Riksbank published the document "Monetary Policy in Sweden". This aimed to provide a description of the goal and strategy of the Riksbank's monetary policy. The clarification published in 1999 was also partly motivated by an endeavour to clarify that focussing solely on the inflation target in the short term is undesirable, as it could give rise to substantial fluctuations in the real economy. A large share of the Executive Board members' speeches over the years have also made it clear that the Riksbank does not focus purely on inflation, but also gives consideration to the real economy.

It can be added that one of the advantages of the Riksbank now beginning to publish its own assessment of future interest rates (see recommendation 4 below) is that it puts stronger focus on the flexibility of our monetary policy. The choice of interest rate path then needs to be justified on the basis of its consequences for both inflation and the real economy.

One specific recommendation in the evaluation is that at the beginning of the Riksbank's Inflation Reports it should be made clear that the Riksbank conducts a policy aimed at reducing fluctuations in production and employment as well as inflation. The Riksbank has already begun to follow this recommendation. With effect from the second Inflation Report last year, which was published in June 2006, there was a description of the Riksbank's monetary policy strategy at the start of the report.

It was noted that consideration is given to inflation and to developments in the real economy.

Recommendation 2: The Riksbank should clarify that asset prices (housing prices, stock prices and exchange rates) are not independent targets for monetary policy.

The Executive Board is positive to this recommendation, but at the same time wishes to underline that steps have already been taken in the direction proposed by the evaluators.

The Executive Board agrees that monetary policy should not have targets for various asset prices. Monetary policy should be aimed at low inflation and stability in the real economy. This has been emphasised in a number of speeches by Executive Board members during 2006, and also in the document "Monetary Policy in Sweden".

The criticism expressed in the evaluation mainly concerns the Riksbank having been unclear in recent years as to the role played by house price developments for monetary policy. This criticism is partly justified. The fact that the reason for taking house price developments and indebtedness into account in interest rate decisions has essentially been to safeguard low inflation and stable real economic growth could have been expressed more clearly and at an earlier stage. Some of the misunderstandings that arose could probably have thereby been avoided.

However, the criticism in the evaluation concerns not only the fact that the Riksbank should be clearer that developments in house prices do not constitute an independent target for monetary policy; it also appears based in the fact that the evaluators have a slightly different view than the Riksbank of how house prices should affect monetary policy. The evaluators argue that monetary policy should react to a rapid price increase in the housing market only if the central bank's forecasts indicate that this price increase will lead to problems such as overheating and excessively high inflation. If this is not the case, the central bank should wait and see, but be prepared to quickly ease monetary policy if the housing market were to collapse and demand in the economy were to fall drastically.

The Executive Board agrees that there must be a readiness to act quickly in emergencies. But experiences show that low inflation does not exclude a rise in asset prices and indebtedness and that a rapid increase in house prices can entail risks that cannot be easily quantified and captured in conventional forecasts of the economy a couple of years ahead. This applies in particular if the house price increase is linked to a rapid increase in household borrowing, as in Sweden. If prices and the increase in borrowing were to some extent based on unrealistic expectations of how house prices and interest rates will develop in future, there is a risk

of a fairly substantial correction in expectations and prices further ahead. The consequences of such a correction could be that the economy developed weakly over a longer period of time, which would also have effects on inflation.

It may therefore be necessary to take these risks into account in monetary policy decisions in a different way than in the normal approach, where the forecasts for inflation and the real economy serve as the foundation. This can be done, for instance, by beginning a phase of interest rate increases slightly earlier than would otherwise have been the case. The purpose of such a policy is to contribute to a smoother adjustment process for house prices and indebtedness and thereby to a more stable development of inflation and the real economy. However, house prices have no independent significance for monetary policy beyond the prospects for these two variables.

The Executive Board also wishes to emphasise that the way the risks related to a rapid increase in indebtedness and rapid rises in house prices and other asset prices should be handled in monetary policy is a problem much debated by both central banks and academics. As yet, there is no consensus. At the same time, the Executive Board considers that the differences between the Riksbank's views and the evaluators' views should not be exaggerated. The approach the Riksbank has chosen has in practice only meant a fairly marginal change in the timing of our interest rate decisions.

One suggestion in the evaluation that is linked to recommendation 2 is that stress tests, that is, simulations of how the Riksbank should act if house prices or other important asset prices collapse, are the correct response to the concern over recent house price rises (p. 73). The Executive Board agrees that stress tests are a good means of analysing the consequences of shocks to the economy. Stress tests have been included in the Financial Stability Report with effect from the second report last year, which was published in December 2006. The work on developing the stress tests will continue.

Recommendation 3: Persistent undershooting of the inflation target suggests that monetary policy should lean towards more expansionary policy (while persistent overshooting should bias monetary policy to be relatively more contractionary).

The Executive Board does not agree with this recommendation, if it is to be interpreted to mean that persistent overshooting or undershooting of the inflation target should be compensated by a subsequent deliberate undershooting or overshooting of the corresponding amount.

The evaluation gives two arguments as to why such compensatory policy is desirable. The first is based on the assumption that deviations

from target may be a sign that the analysis and forecasting models used by the Riksbank tend to systematically over-estimate inflation. The Executive Board does not consider this to be an argument for changing the target, but for further development of the analysis. Trying to improve the assessments and to learn from the forecasting errors that have been made is a natural part of the monetary policy work.

The Riksbank's view, which appears to be shared by the evaluators, is that there have been reasonable explanations as to why inflation has periodically been below the target. The most recent episode was mainly due to the fact that productivity growth has been surprisingly high. As was also observed in the evaluation, this was something that most forecasters had missed and the errors in the inflation forecasts were thus difficult to avoid. (A more detailed discussion of the undershooting of the inflation target and the evaluation's analysis of this is given in section 5 below.)

The second argument is based on the idea that it would be beneficial to express the price stability target in terms of a path for the price level instead of in the form of a target for the inflation rate. With a target path for the price level, a deviation below the target path must be counteracted by higher inflation during a period of time to enable a return to the path the price level was following before the deviation. With an inflation target it is not necessary to counterbalance undershooting the target with a later overshooting of the target. The evaluation does not advocate a regular price level target, but a form of hybrid solution that would mean the Riksbank kept its inflation target but nevertheless compensated to some extent for the deviations that had arisen.

There is currently a discussion in academic circles and among central banks on the advantages and disadvantages of a price level or hybrid target. The Riksbank is following this discussion with great interest and observes that there is no consensus of opinion as to whether a price level target or an inflation target is preferable.

Furthermore, the Executive Board observes that the current system with an inflation target has worked well on the whole. Inflation has been low and relatively stable and the fluctuations in the real economy appear if anything to have been smaller than during earlier periods. Inflation expectations have also long been anchored around the inflation target.

The Executive Board does not share the evaluators' view that a changeover to a hybrid target would involve only a minor change in the current monetary policy strategy. The Board's assessment is that it would involve a much more significant change than those already made, for example, abandoning the assumption of an unchanged repo rate and the earlier simple policy rule. The fact that the Riksbank, which is also noted

in the evaluation, has had some difficulties in explaining to the general public what these limited changes in the monetary policy regime have meant, indicates that a changeover to a hybrid target would risk giving rise to pedagogical problems.

Recommendation 4: The Riksbank should provide more information on the future path of policy rates that are used in producing its forecasts of inflation and the economy, but should make clear the uncertainty surrounding such a path.

The recommendation specifically says that the Riksbank should base its forecasts on its own assessment of the future repo rate path instead of on market expectations, as before. It is also suggested in the evaluation (p. 35) that when the Riksbank publishes its own interest rate assumption, it should publish only an interval for the future path (a fan chart) rather than a specific interest rate path that the Bank considers most probable.

The Executive Board is positive to this recommendation to provide more information on the repo rate path the Bank considers to be the most probable. With effect from the first monetary policy report of this year, which was published in February 2007, the Bank also reports its own repo rate path. However, the Riksbank has chosen not to adopt the suggestion of publishing only an interval for the future repo rate path; it publishes both the interest rate path and also uncertainty bands around this path.

One advantage of publishing the Riksbank's own assessments of the development of the repo rate is that it will be clear to the economic agents which monetary policy the Riksbank considers to be reasonable in the future. Another advantage is that the forecasts for inflation and the real economy presented in the monetary policy reports will thus always be based on the interest rate development the Riksbank considers to be the most likely. This is not necessarily the case if the forecasts are instead based on the assumption that the repo rate will develop in line with market expectations, as the Riksbank's view and the market's view of what constitutes a reasonable development may sometimes differ.

The evaluators' primary reason for recommending that only an interval for the future interest rate path should be published appears to be that it would be clearer to the general public that the Riksbank had not committed itself to following any specific interest rate path. If this is not made clear, the general public could perceive it as a failure if the Riksbank were to deviate from the published path at a later stage. This could in turn result in a decline in confidence in monetary policy.

The Executive Board's assessment is that these fears are exaggerated. There is currently a broad understanding of the uncertainty inherent in

the assessments and of the fact that new information may be received that significantly changes the conditions for monetary policy. Furthermore, no serious credibility problems of the type feared by the evaluators appear to have arisen in New Zealand or Norway, where the central banks already publish their own interest rate paths.

Recommendation 5: The inflation target should be defined in terms of a price index that is not directly affected by the costs of housing.

In connection with this recommendation the evaluators propose that it would be best if Statistics Sweden were to change the definition of the consumer price index (CPI) in the way that has been done in other countries, such as the euro area, or if the Riksbank were to clarify that the inflation target is defined in the form of a measure that does not include interest rates and house prices (such as UND1X).

The Executive Board does not see any strong reasons to define the inflation target in terms of a price index other than the CPI. However, the Riksbank will consider giving the UND1X inflation measure a better and internationally more practicable name.

Inflation can be measured in many different ways. The main reason for choosing CPI as the target variable for monetary policy was that it is the broadest measure of consumer price developments and the one best recognised by the general public. It is published quickly, is not revised and in relation to other price indices it maintains a high quality.

CPI is affected to some extent by the Riksbank's own interest rate adjustments. This is an important reason why the policy has largely been guided by the UND1X inflation measure. It is above all the interest rate component in housing costs that affects CPI, while the impact of changes in house prices is relatively limited in Sweden.

The evaluators nevertheless consider that as the target is expressed in terms of CPI and CPI is discussed to a relatively large extent in the inflation reports, there is a risk of suspicions that monetary policy places too much emphasis on developments in CPI. The Executive Board does not share these concerns, as there is currently an understanding and acceptance that monetary policy has in practice been guided by UND1X, which does not contain the direct effect of the Riksbank's interest rate changes.

The choice of price index for stating the inflation target is a complicated issue, which is the subject of lively international debate. Different countries have chosen different solutions, although most countries define their inflation target in terms of CPI or a modified version of CPI. The question of how housing costs should be dealt with when calculating CPI has also long been debated internationally. In this case, too, the solutions vary from country to country and there is as yet no general consensus as

to which solution is best. Given this, the Executive Board does not wish to rule out the possibility that there may be reasons to define the inflation target in terms of an index other than CPI in the future.

Recommendation 6: There is no compelling reason to change the level of the inflation target from the 2% number. But further study of the appropriate level of the inflation target could be beneficial if it is conducted by technical experts.

The Executive Board agrees that there are no convincing reasons to change the level of the inflation target.

The decision in January 1993 to introduce an inflation target was made by the Riksbank, as was the decision to set the level at 2 per cent. The Government gradually came to support the inflation target. The evaluators consider that it would have been desirable for the Government to play a more active role at the time the target was set, but note at the same time that the Government currently takes sufficient ownership of the inflation-targeting regime.

The Riksbank has long worked to establish inflation expectations around the 2 per cent target and this has functioned well. The target level is also in line with what most other inflation targeting countries have chosen. It could be very costly to change a well-established inflation target that has been proved to work well, particularly in terms of increased uncertainty during a transition period and this should not be undertaken without very good reasons.

Recommendation 7: The dialogue between the Riksdag (the Swedish Parliament) and the Riksbank needs to be enhanced by separating the release of the Inflation Report from its discussion in the Finance Committee.

The Riksdag Committee on Finance has decided to change its routines in line with the recommendation in the evaluation. The hearing of the Riksbank Governor in connection with the first monetary policy report in 2007 therefore took place a week after the report was published. The Executive Board welcomes this new system.

4 Other questions

The evaluation also contains a number of other suggestions, in addition to the concluding recommendations. These suggestions are often closely related to one of the recommendations. Most of them have therefore already been discussed above. This section takes up a further question.

The evaluators write that the Riksbank should perhaps consider devoting more resources to the analysis of developments in the real economy, particularly in the area of productivity growth and the labour market (pp. 54-55).

The reason for this suggestion is the forecasting errors made by the Riksbank with regard to inflation in recent years. The evaluators' conclusion is that these forecasting errors would probably have been difficult to avoid, but they nevertheless consider that a greater investment in the analysis of the real economy may be justified. They also consider that this conclusion is supported by the fact that only 15 per cent of the reports in the Riksbank's Working Paper Series have dealt with the real economy and the labour market.

The Executive Board agrees that the analysis of the real economy is of central importance to monetary policy. The Riksbank has also increased its investments in the analysis of the real economy, not least due to the forecasting errors made earlier. This work has been reported, among other things, in articles in the Riksbank's journal and reports.

The Riksbank is constantly striving to improve its forecasts. One step in this work is to analyse what has gone wrong in the earlier assessments and to try to correct any deficiencies. The under-estimation of inflation over the past three years has led to an increase in the resources for analysing the real economy. For instance, the Bank has initiated a project aimed at improving understanding of the strong productivity growth in Sweden in recent years. In addition, Statistics Sweden has been asked to hasten the planned improvements in economic statistics to improve the statistical base for productivity calculations, among other things.

5 Undershooting the inflation target

The evaluators observe in the concluding Chapter 5 that inflation has "persistently undershot the Riksbank's target; this has been associated with a loss in output and higher unemployment" (p. 77).

The Executive Board agrees that, with hindsight, it would have been possible to cut the repo rate earlier and at a faster pace in the beginning of the 2000s, but also considers that this would probably have had relatively minor effects on production and unemployment. The Executive Board also notes that the evaluators' conclusion is not based on an in-depth analysis of the correlation between monetary policy and the real economy during the period in question.

With effect from 1995, when the inflation target began to apply, and up to 2005 the rate of increase in the consumer price index (CPI) was on average 1.3 per cent a year (1.1 per cent according to the new calculation

method introduced by Statistics Sweden in 2005). If one adjusts for the direct effects of changes in mortgage interest rates, taxes and subsidies, inflation (measured as UND1X) was on average 1.8 per cent a year. The deviations from the inflation target of 2 per cent have not been so large that confidence in the target has been lost. Inflation expectations have long been close to 2 per cent.

These figures can be set in relation to the fact that during the twenty years prior to the introduction of the inflation-targeting policy, inflation (measured in terms of CPI) amounted on average to 8.5 per cent a year. In this type of longer-term perspective it becomes clear that the purpose of the inflation targeting regime and the changes in the legislation – a low and stable inflation – have been achieved.

Over the past three years inflation has been significantly below the target. During the two years included in the evaluation, 2004 and 2005, CPI inflation was 0.5 per cent on average, while the corresponding figure for UND1X was 0.8 per cent.

At the beginning of 2002 it was not considered likely that inflation would be low in 2004, but in autumn 2002 the forecasts were changed and the interest rate was cut in November 2002. The first Inflation Report of 2003 contained a forecast for low inflation in 2004. This was mainly because the earlier rapid upturn in energy prices was expected to rebound. Inflation turned out even lower than expected and remained low in 2005.

One important reason for the low inflation rate is that productivity has risen rapidly, much quicker than the Riksbank and other forecasters had expected. This has meant that companies have been able to increase their production without raising prices or employing more labour at the same rate as they have done previously when growth has been rapid. The upswing in employment has therefore come at a later stage than normal in this most recent economic upturn. At the same time, import prices have long developed more weakly than expected.

The favourable supply conditions and the low inflation rate have made it possible for the Riksbank to cut the repo rate to an historically low level. In November 2002 the Bank began to cut the repo rate and up to June 2005 it was cut by 2.75 percentage points, down to 1.5 per cent. Monetary policy has accordingly been very expansionary in recent years.

With hindsight, it can be noted, which we have done in the Riksbank's own assessments, that the interest rate could have been cut more quickly. The Riksbank's calculations indicate that, for instance, that an interest rate half a percentage point lower during one year would have led to slightly higher inflation and slightly lower employment; in both cases corresponding to a couple of tenths of a percentage point. The un-

certainty in this type of calculation is substantial and it should be noted that in relation to the total number of unemployed the effects of a more expansionary monetary policy would have been fairly small.

The small effects on unemployment of more expansionary monetary policy should not be interpreted to mean that monetary policy's ability to influence inflation is very limited in the longer term. When structural changes in the economy lead to inflation being far from the target level, as has been the case during the past three years, it is reasonable to assume that a return to target will take time. The Riksbank normally acts with caution and makes interest rate adjustments gradually to avoid severe fluctuations in the economy. It is essential in these situations that inflation expectations a couple of years ahead are close to 2 per cent, which has indeed been the case. The inflation target can then fulfil its important function as nominal anchor when prices and wages are set and investment decisions are made.

On behalf of the Executive Board:

Stefan Ingves
Kerstin Alm

Taking part in the decision: Stefan Ingves (Chairman), Lars Nyberg, Kristina Persson, Irma Rosenberg, Eva Srejber, and Svante Öberg
Svante Öberg submitted the draft consultation response.

The General Council's consultation response to the report "An Evaluation of Swedish Monetary Policy between 1995 and 2005 (2006/07:RFR1) (060-1070-06/07)

Summary: The General Council of the Riksbank welcomes the very positive assessment of the Riksbank and its monetary policy, as well as the more critical views and suggestions for improvements in certain areas. The General Council wishes to emphasise in its oversight role the importance of the Riksbank's monetary policy work being carried out efficiently and with a high level of competence. The General Council notes that the reform which gave the Riksbank an independent position in 1999 has worked well and wishes to point out that the General Council would welcome the principles for the allocation of the Riksbank's profits being regulated by law.

The General Council agrees with the evaluators' recommendation that Government ministers, etc. should exercise some caution in the public debate on monetary policy, but does not agree with the recommendation that persons nominated to the Executive Board of the Riksbank should appear at hearings in Parliament before they are appointed.

The General Council proposes two changes in the law: that the mandate period for a member of the Executive Board should be five or six years and that the qualification period[1] for new members of the Executive Board should be changed from twelve months to nine months. The General Council does not consider that the number of members of the Executive Board should be changed, but agrees that it would be more efficient if the governance and management of the Riksbank as an organisation were entrusted to the Governor and one or two Deputy Governors.

1 Introduction

The Riksbank has been invited to present its views on the report "An Evaluation of Swedish Monetary Policy between 1995 and 2005" (2006/07 RFR1). The Riksbank is presenting two separate responses, one from the General Council of the Riksbank and one from the Executive Board of the Riksbank. This response concerns the questions that fall

[1] The period after the end of their employment when they may not take on a new assignment or position where their knowledge could harm the Riksbank if utilised, but they can receive a full salary without performing official duties.

within the General Council's sphere of activity. The Executive Board will at the same time issue a consultation response regarding the issues that belong to its sphere of activity. The General Council's comments cover certain introductory general views and comments on the recommendations numbered 8 and 9 in the final chapter, and also some of the questions raised by the authors of the report in earlier chapters.

2 General views

The General Council wishes to point out from the outset that it has been very valuable that an independent analysis of monetary policy during the period 1995-2005 could be carried out by two highly-qualified foreign economists.

The Riksbank's independent position makes it particularly important that the Riksbank's operations are evaluated as a basis for the Riksdag's and the general public's assessment of how the Bank has carried out its tasks. This applies in particular to monetary policy, which is an essential part of economic policy. The examination and assessment of monetary policy that was carried out thus plays an important role in strengthening confidence in the regime the Riksdag has chosen, with an independent Riksbank that carries out this part of economic policy.

In this context the General Council welcomes the very positive assessments in the report of the Riksbank and its monetary policy. The General Council notes that the authors begin the summary of their evaluation with the words "Our evaluation of monetary policy in Sweden indicates that the Riksbank compares favourably with the best central banks in the world and that monetary performance has greatly improved from what occurred prior to the adoption of inflation targeting under an independent central bank".

Further, the General Council considers that the report should provide a good basis for the continued discussion of how monetary policy can be developed. This is given that the evaluators observe that inflation in recent years "has persistently undershot the Riksbank's target; this has been associated with a loss in output and higher unemployment" and that "the Riksbank also has been somewhat less effective in clearly communicating its strategy for the conduct of monetary policy".

It is the General Council's responsibility to follow up activities in the Riksbank. The General Council can be regarded as a bridge between the independent Executive Board and the Riksdag, and thereby contributes to the Riksbank's position in society.

The Sveriges Riksbank Act gives the General Council a number of specific tasks. These include appointing the Governor and the members

of the Executive Board, establishing the Riksbank's Rules of Procedure and making proposals to the Riksdag regarding the allocation of the Riksbank's profits.

The General Council also has a controlling function. This function has not been specified in the preliminary work or by the Riksdag's Committee on Finance. The General Council has therefore sought to regulate the scope of its activities itself, taking into account the fact that the Executive Board must take independent responsibility for monetary policy, without taking instructions from outside.

Both the Executive Board's independence and the ban on giving instructions mean that there are limits to the extent to which the General Council can influence the Riksbank's monetary policy and general operations. This does not mean that the General Council is prevented from, for instance, following the Executive Board's monetary policy work and its monetary policy decision-making process. Within the scope of the controlling function the Chairman and Vice Chairman of the General Council regularly participate in the Executive Board's meetings and can thereby use their right to ask questions and to make comments for the purpose of carrying out the General Council's tasks as described earlier. The General Council also has the possibility to request that a member of the Executive Board present a report at the General Council meetings, and the General Council's auditors examine the Bank's activities within the scope of the General Council's sphere of responsibility. The members of the Executive Board normally attend the General Council meetings.

The General Council wishes to emphasise the importance of the Riksbank's monetary policy work being conducted efficiently and with a high level of competence and also observes with satisfaction that the evaluation shows that the preparations for the monetary policy decisions meet high requirements. The evaluators summarise their assessment by saying that the Riksbank's organisation is characterised by a high level of competence. In addition, it is noted that the Bank's employees include highly qualified economists who use the best economic and statistical methods available. The evaluators also find that the Executive Board uses the economists' analyses in a professional and efficient manner. The General Council notes in this context that the number of employees with postgraduate qualifications has more than doubled, from 20 persons in 2000 to 45 persons in 2006, which is a relatively high figure in an international comparison.

The General Council wants to provide general support, within the scope of its role, for what the Executive Board of the Riksbank states in its comments on the evaluation.

The General Council has noted the criticism expressed in the report with regard to the inflation forecasts, which are central foundations for the Executive Board's monetary policy decisions. The work on improving understanding of the real economy and in particular developments in productivity has already begun within the Riksbank and in consultation with Statistics Sweden. The General Council intends, within its own role, to devote additional attention to the Executive Board's work on following up the areas identified in the report as requiring improvement.

The General Council wishes to add that forecasts are uncertain and that it is not always possible to predict developments in the economy with a high level of accuracy. It is, of course, important that the forecasting work is conducted using the best possible methods, that lessons are learned from forecasting errors and that deviations between forecasts and outcomes are reduced as far as possible. It is interesting to note in this context that inflation has been significantly lower since the new monetary policy with an inflation target was introduced, that the fluctuations in inflation have declined substantially and that inflation expectations have stabilised around the inflation target. This indicates both that inflation can be predicted with less uncertainty than before and that monetary policy has had the intended purpose of stabilising price stability.

The General Council notes that during the period covered by the report, the reform giving the Riksbank an independent position was implemented, and that this reform has functioned well. The independence is considered to cover functional, institutional, personal and financial independence. Functional independence means that the central bank's primary objective is price stability. Institutional independence means that the decision-making body is independent of political bodies such as the Riksdag (parliament) and the Government. Personal independence means that the members of the Executive Board should be independent from different interests and able to make decisions independently without influence from other parties. This independence is safeguarded by the members having long periods in office and by the fact that they can only be forced to leave their positions under strictly limited circumstances. Financial independence means that the central bank can carry out its tasks without being dependent on subsidies from the Government.

The General Council would like to remind the Committee of its communication to the Riksdag with a proposal for the allocation of the Riksbank's profits for the financial year 2004. The General Council stated in this communication that it would welcome the principles for the allocation of the Riksbank's profits being regulated by law. In this context it can also be pointed out that both the European Commission and the ECB

consider that Swedish legislation contravenes the EC Treaty and the Statute of the ESCB on this point. The Government has appointed a special investigator, who will put forward proposals on this in spring 2007.

3 The report's recommendations

The General Council comments in this section on the recommendations numbered 8 and 9 in the concluding chapter.

Recommendation 8: A main venue for public debates on monetary policy is in the parliament.

The General Council agrees that the Riksdag is an important venue for public debates on monetary policy. The Riksbank is accountable to the Riksdag and the natural venue for a discussion of whether the Riksbank is carrying out the tasks delegated to it by the Riksdag.

However, the evaluators go further and even state the following: "An improved debate on monetary policy by the public and particular the parliament makes it less necessary for government officials to express their own views on monetary policy. While government officials have the right to speak on any issue they choose, the experience in many countries suggests that monetary policy and economic performance is enhanced when the government refrains from commenting on the stance of monetary policy."

In the opinion of the General Council, the decision to give the Riksbank independence in monetary policy issues entails a greater need for an all-round monetary policy debate, as the Riksbank holds a special position and is not followed up in the same way as other public agencies. At the same time, the scope for such a debate has expanded, as confidence in the Riksbank's ability to independently conduct monetary policy has strengthened considerably. Monetary policy must be examined and tolerate scrutiny. The evaluation made of Swedish monetary policy between 1995 and 2005 is a good example of one such scrutiny, which can serve as a good basis for further developing monetary policy.

However, the General Council wishes at the same time to point out, as do the evaluators, that members of the Government and others with political assignments and functions, which are important to economic policy, should exercise caution in the public debate on monetary policy. They should consider the effect their statements might have on the credibility of monetary policy. If the general public were to gain the impression that the decisions in the independent central bank could be influenced in one way or another, this could undermine confidence in the Riksbank's ability to carry out its tasks.

Recommendation 9: Individuals who are nominated to the Executive Board of the Riksbank should be asked to appear in parliamentary hearings before they are appointed.

The General Council does not agree with the evaluators' suggestion.

One of the General Council's most important tasks is to appoint the members of the Riksbank's Executive Board. The choice of Executive Board members is important, bearing in mind that these members together exercise considerable influence over the economy, an influence that they exercise independently in relation to political instances (including the Riksdag and its Committee on Finance, the Government and the politically-appointed General Council). Given this, and the strong protection a member of the Executive Board has against being dismissed from his or her post, it is essential that this General Council task is carried out properly.

The General Council is the body that can most easily determine what competence is needed in the Executive Board and which competence needs to be reinforced when a vacancy arises. The General Council is also the body that controls the Executive Board members' exercising of their duties and it thus has the background required to assess whether a further mandate period should be granted to a member whose mandate period is expiring. It would hardly be possible for the Riksdag Committee on Finance to gain similarly well-founded impressions through a hearing in parliament of a candidate's suitability for appointment to the Executive Board or for re-election for a further period.

4 Other questions

The General Council has also found reason to comment on certain questions raised by the evaluators not in the form of recommendations.

(1) The evaluators propose that the Executive Board members' period of appointment should be gradually returned to the original timetable, according to which one member's mandate expires each year.

The General Council observes that the original aim in 1999 was that one Executive Board member should be appointed each year on a rolling six-year schedule. It was predicted even then that this schedule could be disrupted, for instance, due to members leaving the Board before their term expired. To achieve a slightly better spread of the distribution of mandate period, the General Council proposes that a member could be appointed for a period of five or six years.

As the evaluators observe, the originally-intended rolling six-year schedule has been disrupted by members leaving before their term has expired. If the current Executive Board members stay until the end of

their mandate periods, one new member will be appointed from 1 May 2007, two members from 1 January 2009, and three members, including the Governor of the Riksbank, will be appointed from 1 January 2012. According to the evaluators, this could lead to a majority in the General Council at particular times having considerable influence over the composition of the Executive Board.

However, the method for correcting this proposed by the evaluators is not possible in accordance with EU regulations. The evaluators consider that the rolling schedule should be reintroduced by appointing the Executive Board members for shorter periods and that if members leave before their term expires in future, a successor should be appointed for the remainder of the mandate period. However, EU regulations stipulate that all members of a national central bank's decision-making body should be guaranteed an appointment of at least five years.

The General Council proposes instead that the law should be changed so that the mandate period for an Executive Board should be five or six years and that the General Council can within this framework afterwards arrange a better spread of the mandate periods. To enable such a spread the mandate periods should vary between the Executive Board members. With reference to EU regulations these periods must be at least five years. However, they should not be too long. The General Council's deliberations have resulted in the conclusion that the current mandate period of six years should form the upper limit.

(2) The evaluators propose that one or at most two deputy governors should assist the Governor in managing the Bank and that the other Executive Board members should not have any other responsibility than to take part in the monetary policy work at the Bank, for instance, discussions of interest rates and interest rate decisions and the communication of these discussions to the general public.

The General Council agrees that it would be more efficient if questions of governance and management of the Riksbank as an organisation were entrusted to the Governor and one or two deputy governors. It ought to be possible for the Executive Board to deal with this question internally, without requiring changes in legislation.

The report takes up the question of how the Executive Board members' tasks and responsibilities should be determined and allocated. Whether the collective decision-making model with six Executive Board members functions with regard to management and administration, etc. of the Bank is a question for discussion. The General Council's Audit Unit has also pointed out some problems with the current management model.

In this context it should be pointed out that the Riksbank's organisation has changed in recent years in order to deal with the type of problem highlighted by the evaluators. During 2005, new forms for management and governance of the Bank were introduced, with the purpose of clarifying the allocation of responsibilities between Executive Board members and heads of department and of attaining a more coherent management of the bank. However, as the evaluators point out, some problems still remain.

Given this, the Executive Board of the Riksbank has begun work on an overhaul of the current governance and management forms at the Riksbank. This work is aimed at finding solutions that will make the governance and management of the Bank's administration, etc. even more efficient within the framework allowed by the current Sveriges Riksbank Act, with six Executive Board members who all essentially share the overall responsibility for the Bank.

(3) The evaluators also consider that a reduction in the number of Executive Board members should be considered.

The General Council would like to point out that the question of the size of the Executive Board was raised in a proposal from the General Council to the Riksdag in 2000. The General Council then considered that there were reasons in favour of reviewing the size of the Executive Board. Reference was then made to the fact that the new management form with an Executive Board had become well-rooted in society and that the organisation of the Riksbank had been reduced. The Riksdag rejected the proposal, after the Committee on Finance opposed it. The General Council does not consider there are reasons for bringing up this question once again.

The evaluators take up the question of the size of the Executive Board from a particular point of view. According to the evaluators, there is reason to reduce the Executive Board to five or perhaps even four members if it proves difficult to recruit competent persons. However, the General Council does not consider there is any problem in recruiting competent persons to the Executive Board.

The question of the number of members should be regarded in a broader perspective than that applied by the evaluators. It should be discussed on the basis that the Riksbank's decision-making processes and decision-making body should be designed to offer the greatest possible efficiency and quality when carrying out monetary policy and the other questions the Executive Board deals with. These questions are of such importance that they justify the Executive Board having its current size.

(4) The evaluators consider that the statutory qualification period for a departing Executive Board member should also apply to political assignments.

The General Council opposes this suggestion.

According to the Sveriges Riksbank Act, Executive Board members who leave the Board have a qualification period of one year. During this period the member may not take up a seat on the board of a financial company. Nor may he or she hold a position or assignment that would have made this person unsuitable as a member of the Executive Board. However, the General Council can give their permission for the member to take up such a position.

When the provision regarding a qualification period was introduced in 1999, it was stated in the bill that the need to preserve the confidence of the general public meant that some sort of qualification period should be introduced. It was pointed out that the members of the Executive Board receive knowledge of issues of extreme importance to certain operations and that it could be perceived as generally objectionable if a member of the Executive Board could immediately transfer to a management position in another company.

However, the qualification period does not apply to political positions or assignments (member of the Riksdag, cabinet minister, employment in the Government Offices, political party offices). It was not considered necessary in the bill that a qualification period should be set for a transfer to a political position or assignment; these were thought to be of a nature that exempted them from the qualification period.

The evaluators consider that this exemption from the qualification period for political assignments risks affecting the Executive Board's independent status towards the Government, that is, the party that has the strongest motivation to try to influence monetary policy decisions. The General Council considers that it is important for all of those affected in any way to safeguard the independence and ensure that it is observed.

However, the General Council does not consider that the exemption for political positions or assignments should be removed. The ban on giving instructions that is expressed in the Instrument of Government and the ban on seeking or receiving instructions in the Sveriges Riksbank Act are aimed at the risks to which the evaluators draw attention. Furthermore, the interest that the democratic political system should be able to recruit representatives speaks against removing this exemption, for instance with regard to positions such as cabinet minister.

On the other hand, the General Council does consider that the qualification period should be changed from twelve months to nine months. The General Council has granted a shorter qualification period than

twelve months on a couple of occasions. On these occasions, the General Council has carefully examined how long the qualification period should be to avoid risks that the departing Executive Board member could make use of the special information he or she has obtained through their work at the Riksbank in a new employment. The General Council's experiences of these occasions are that it would be sufficient, in normal cases, to have a qualification period of nine months. If this new system is introduced, it should be applied to new appointments, to avoiding breaching the terms that applied when the current Executive Board members were appointed.

On behalf of the General Council:

Johan Gernandt
Maria Svalfors

Taking part in the decision: Johan Gernandt (Chairman), Leif Pagrotsky (Vice Chairman), Sinikka Bohlin, Peter Egardt, Susanne Eberstein, Bo Bernhardsson, Elizabeth Nyström, Anders Flanking, Karin Pilsäter, Kjell Nordström and Ebba Lindsö.

Johan Gernandt and Leif Pagrotsky submitted the draft consultation response.

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