

■ Cash-supply efficiency

BY SONJA DALTUNG AND MITHRA ERICSON

Sonja Daltung is adviser in the Research Department at the Riksbank, Mithra Ericson is economist at the Secretariat of the Executive Board and was prior to 1 October 2004 economist at the Cashier's Division.

Since the 1980s the structure of the cash supply in Sweden has changed in several respects. Early in 2004 the Riksbank gave a project group the task of drafting principles for the nature of the Riksbank's role in supplying cash and proposing how the Bank can influence other aspects of the cash market's efficiency. The authors of this article have participated in the project group and here they set out the principles for supplying cash on which the group's proposals are based.

The discussion in this article concerns how the supply of cash ought to be organised and the role of the Riksbank in an efficient cash supply. To assist readers who are not familiar with these matters, we begin by considering the role of cash as a means of payment. Then we outline the administration of cash that is needed in practice to enable cash to function in this respect. This is followed by a look at the recent changes in the structure of the cash supply. After that, the principles for achieving an efficient organisation of the cash supply are discussed and we conclude with an account of the Riksbank's recent decisions on these matters.

The role of cash in society

Cash is an umbrella term for bank notes and coins. The primary social role of both notes and coins is to function as generally accepted means of payment. Cash also serves as a store of value. Cash is of value mainly because it can be exchanged for other goods.¹ A bank note may therefore be worth much more than the paper of which it is made. Coins, on the other hand, have sometimes been worth less than the metal they are made of, with the result that they have been melted down for the sake of the metal.²

The role of cash in society is to facilitate transactions by functioning as a generally accepted means of payment.

¹ The exchange value of cash is time-dependent on the development of prices. Maintaining the value of money by promoting price stability is one of the Riksbank's primary functions.

² This happened, for example, in the 1970s and 1980s.

Various payment instruments have been developed so that they function as alternatives to cash.

The social benefits of generally accepted means of payment can hardly be overrated. Without them, transaction costs would be extremely high because it would then be necessary to arrange a multiple exchange of goods and services or spend a lot of time locating potential buyers. Over the years, various payment *instruments* have been developed so that they function as alternatives to cash as a *means* of payment. Examples of such instruments are giro transfers, various types of card, cheques and money orders. Credit cards, for instance, are an instrument for making payments with money or credit in an account. Payment instruments are also provided by non-financial companies; some retail companies issue cards that can be used when purchasing their products. To be universal, however, transactions via a payment instrument have to involve an intermediary. Various universal payment instruments are provided above all by banks – acting as an intermediary for payments is a time-honoured practice in commercial banking. Like other banking activities, general acceptance of a payment instrument issued by a bank presupposes confidence in the bank's ability to pay.

The amount of cash in circulation has been declining relative to GDP since the 1950s.

The development of various payment instruments has diminished the economic importance of cash. The number of transactions involving different types of card has grown, as shown in Figure 1. Since the 1950s, the amount of notes and coins in circulation has been declining relative to GDP; from about 10 per cent in 1950, it had fallen to about 4 per cent in 1990.

There is often talk of a "cashless society" and the notion that Sweden, like many other countries, is approaching that state. Today, notes and coins in circulation in Sweden have a total face value of about SEK 100 billion; but although there has been a falling trend relative to GDP, in recent years the level has been relatively stable (see Figure 2). Studies from other countries show similar trends, though cash levels do differ. While Sweden lags behind the other Nordic countries in the use of cards, we are ahead of many other countries in Europe.³

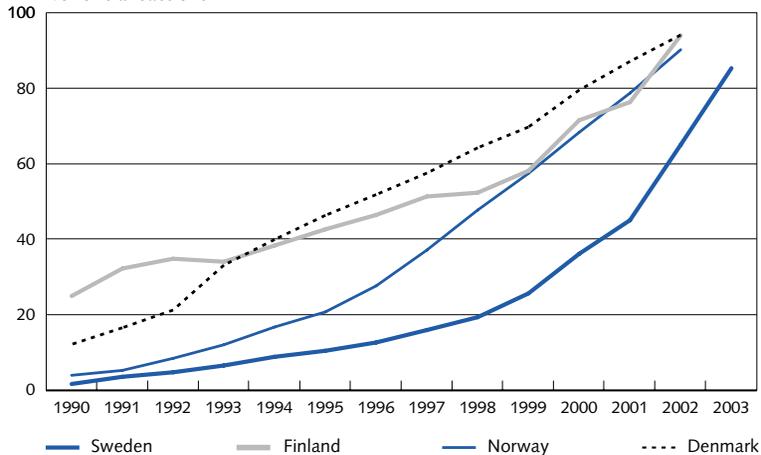
Cash is transactionally efficient in that payment is made by transferring it physically.

Banks clearly exert a considerable influence on the use of cash through the fees they charge for payment services. All else equal, the use of cash would probably decline if a charge were to be imposed on withdrawals via ATMs.⁴ However, different payment instruments are not perfect substitutes for the user. Cash is transactionally efficient in that payment is made by transferring it physically. Cash payments therefore do not require an intermediary. Payments via a payment instrument, on the

³ See Nyberg & Guibourg (2003).

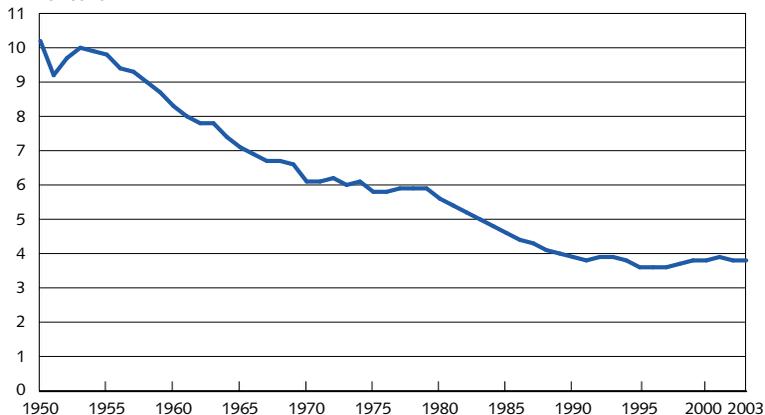
⁴ In a study by Temo in 2000 on behalf of the Riksbank, half of those interviewed using cards stated they would use cards to a greater extent if cash withdrawals were subject to a fee.

**Figure 1. Annual number of card payments per capita
No. of transactions**



Sources: ECB and Norges Bank.

**Figure 2. Value of notes and coins in circulation (M0) relative to GDP
Per cent**



Source: The Riksbank.

other hand, often require an intermediary for their completion and this introduces a time lag between initiation and completion.⁵ Moreover, the seller needs to be confident that payment will be made. So most payment instruments presuppose an efficient banking system. But cash does involve a greater risk of theft and that is particularly troublesome in the case of large transactions.

For users, an important characteristic of cash seems to be that, unlike payment instruments, it confers anonymity. For cash payments, in con-

⁵ For a description of payments with different types of instrument, see Sveriges Riksbank (2004).

For users, an important characteristic of cash seems to be the anonymity it confers.

trast to card payments, for example, neither the buyer nor the seller has to be registered. Studies have found that a large proportion of notes and coins in circulation is used for transactions in unregistered activities where those concerned want to be untraceable, for instance for tax reasons. In Sweden's case, a study estimated that between 45 and 65 per cent of the cash in circulation is used for such unregistered activities.⁶ A study in Norway gave a similar result.⁷

Administering cash in practice

The function of cash as a means of payment calls for large-scale physical handling.

From the supply side, a characteristic of cash is the large-scale physical handling that is needed if cash is to function as a means of payment: notes and coins must be produced, distributed, counted, sorted and stored. Instruments of payment can be said to be aimed at avoiding this physical handling. Their development has progressed from cheques, which also involve a good deal of physical handling, to electronic payments, which eliminate such handling altogether. A brief general description is given below of the apparatus that has been required up to now for cash to function as a means of payment.

The demand for bank notes and coins is predicted by the Riksbank, which also orders new notes and coins annually from the producers. The cash is then stored in several places in Sweden, pending demand from the banks. The latter's demand is determined in turn by the amount of cash that their customers, for example retailers and the general public, request.

Cash entails a cost to the user in the form of interest.

The continuous flow of cash between agents in society means that notes and coins have to be handled unceasingly. When cash changes hands, it has to be transported, checked, sorted and counted. The extent of this handling obviously depends on the amount of cash involved. Among other things, the flow of cash has to do with the reluctance of individuals and firms to hold unduly large amounts of cash. The risk of theft is one reason for this, another is that cash does not attract interest. For the same reasons, banks likewise prefer to avoid excessively large stocks of cash and therefore transfer a surplus to the Riksbank. It is only the banks that have accounts with the Riksbank and having such an account is a condition for borrowing cash from the Riksbank. A bank that collects cash from the Riksbank is debited on its Riksbank account, which then shows a reduced surplus or a deficit. The terms for these accounts also include a deposit and a borrowing rate. As in the case of individuals who withdraw money from their bank, when a bank collects cash from

⁶ See Andersson & Guibourg (2001).

⁷ See Humphrey, Kaloudis & Öwre (2000).

the Riksbank, it loses interest (or has to pay interest if its account shows a deficit).⁸ So cash entails a cost to the holder in the form of lost interest. Banks (and other firms) carry an interest cost for the cash on their balance sheets and households have an interest cost for the cash in their wallets. Consequently the banks aim for the cash they do not need to be returned to the Riksbank. When cash is delivered to the Riksbank, the banks' Riksbank accounts are credited, a procedure known as value-dating.

Value-dating requires that cash is actually delivered to one of the Riksbank's branches. Besides accepting cash and crediting the banks' accounts, these branches supply cash. The Riksbank's stock of cash is also stored there to enable the Bank to cope with market demand for cash.⁹

The branches also receive unfit notes that are to be destroyed. The Riksbank has laid down certain standards for the quality of bank notes, for example how torn and how soiled they can be and still be classified as fit for circulation. In general, the life of a note varies with its denomination; large denominations last longest, small denominations are subject to most wear and tear and have the shortest life. Notes classified as unfit are authenticated in a thorough and qualified inspection before being destroyed by the Riksbank. Approximately 90 million bank notes are destroyed annually. Coins last longer than notes; those that are worn out are also handed in to the branches and then transported to a facility for melting them down and recovering the metals.

Counterfeit notes are to be withdrawn from circulation as soon as they are detected. It is illegal for a person who detects a counterfeit note to use it; they have a liability to report it to the police.¹⁰ Notes are authenticated not only by the Riksbank prior to their destruction but also by other professional administrators of cash, for example banks, cash-in-transit (CiT) companies¹¹ and retailers. Counterfeit notes that are detected under the Riksbank's administration are likewise handed over to the police for investigation. Swedish currency is forged to a lesser extent than many other currencies. Some CiT companies use ink cartridges in security devices to discourage thieves; if an unauthorised person opens a container, the ink automatically discolours the notes. To support the concept of security dying and ensure that thieves cannot use notes that have been dyed, the Riksbank does not in principle redeem notes that are discoloured in this way.

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Unfit notes are thoroughly authenticated before being destroyed by the Riksbank.

Counterfeit notes are to be withdrawn from circulation as soon as they are detected.

⁸ In practice the banks lose/pay interest at the repo rate because their account balances are regulated by the Riksbank with so-called monetary policy repos, see Mitlid & Vesterlund (2001).

⁹ The notes in the Riksbank's stock are not included in the amount in circulation.

¹⁰ See Brottsbalk (the Swedish Criminal Code) (1962:700), Ch. 14, §§ 6, 9 and 10.

¹¹ This refers to companies that specialise in the transportation and administration of cash.

Cash administration up to August 2004

Cash is an ancient means of payment. Coins antedate notes in Sweden but an instrument in the form of an interest-free note for a specified amount of credit was issued by a private banker as early as the mid 17th century.¹² The Riksbank has issued bank notes since the early 18th century and has had the sole right to issue notes and coins valid in Sweden since the beginning of the 20th century.¹³ The supply of bank notes and coins in Sweden is also the Riksbank's responsibility.¹⁴

As we have seen, notes and coins have to be handled on a large scale if they are to function as a means of payment. Over the years, the parts played by the Riksbank and other agents in this administration have changed.

Prior to the 1980s the Riksbank had a branch office for the operational administration of cash in virtually every county.

Prior to the 1980s there was a Riksbank branch office for the operational administration of cash in virtually every county; these branches held the Riksbank's stock of cash, supplied banks with cash and received cash from them, value-dated, counted and examined cash for its quality and authenticity. During the 1980s the branch offices developed commercial activities related to their existing operations, for example sorting coins and counting retailers' daily takings. The commercial activities, which were intended to utilise surplus capacity at the branches and thereby enhance their efficiency, were performed for a fee; similar services were also provided by purely commercial agents in the market for cash.

The number of branches was reduced in the 1980s and 1990s.

Branch closures in the 1980s and 1990s meant that by 1993 the Riksbank had eleven branches in Sweden. This meant that there were fewer points where value-dating could be arranged.

In 1998 the Riksbank decided to corporatise the operational component of the cash supply; PSAB was formed.

In 1998 the Governing Board of the Riksbank decided that in order to enhance the efficiency of cash handling services and refine the Riksbank's role as an overseer, the operational component of the Cashiers' Department would be transferred to a subsidiary company.¹⁵ On behalf of the Riksbank, the new company, PSAB or Pengar i Sverige AB ("Money in Sweden Ltd"), performed such tasks as ensuring that notes and coins are available for further distribution at a number of places in Sweden, holding and value-dating the Riksbank's stock of notes and coins and examining their quality and authenticity. The company was also to develop the commercial operations in the market for cash. PSAB had 13 branch offices. The transfer of the practical operations to a company underscored the role of the Riksbank as an overseer in that in the field of cash supply the

¹² Johan Palmstruch in 1661; for further information, see www.riksbank.se.

¹³ See Sveriges Riksbank Act (1998:1385), Ch. 5, § 1.

¹⁴ See Sveriges Riksbank Act (1998:1385), Ch. 5, § 3.

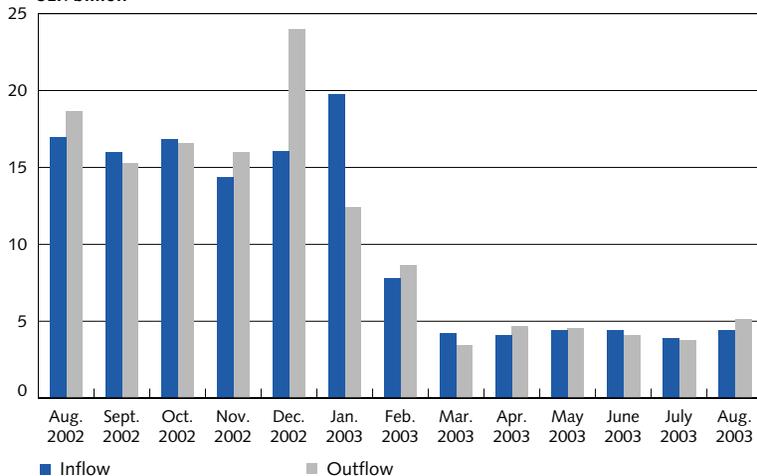
¹⁵ See also Sveriges Riksbank (2003).

Bank now focused on promoting a safe and efficient payments mechanism in more general terms. However, the destruction of banks notes was not transferred to the new company; it continued to be an operational function of the Riksbank.

Partly in the light of criticism from competitors of PSAB, in spring 2002 the Riksbank decided to separate PSAB's commercial operations from its work on behalf of the Riksbank. This process was initiated that autumn: the operations undertaken for the Riksbank – supplying new notes and coins, holding stocks of cash and examining and destroying unfit cash – were assigned to another subsidiary company, SKAB or Svensk Kontantförsörjning AB (“Swedish Cash Supply Ltd”), with premises at four locations in Sweden.¹⁶ SKAB had no competitive operations; it functioned solely as a supplier to and collector from private CIT companies and banks. By reducing the number of branch offices with a value-dating facility to four and adjusting the structure of fees for supplying and receiving cash in February 2003; the market's share of the responsibility for distribution increased and the recirculation of cash was stimulated. The flows of notes and coins to and from the Riksbank's stock in PSAB's/SKAB's offices are shown in Figure 3. Compared with the flows to and from PSAB's premises before the change in February 2003, the subsequent flows to and from SKAB's premises were clearly very much smaller. After the change, those concerned chose to handle cash in other ways than transporting it to and from SKAB.

In spring 2002 the Riksbank decided to separate PSAB's commercial operations from its work on behalf of the Riksbank.

Figure 3. In- and outflows to/from PSAB/SKAB 1 August 2002-31 August 2003
SEK billion



Source: The Riksbank.

¹⁶ Härnösand, Tumba, Mölndal and Malmö.

When SKAB was formed, the commercial operations were assigned to a subsidiary that ceased to operate in the summer of 2004.

When SKAB was formed, the commercial operations were assigned to a new Pengar i Sverige AB, known as PiS, which operated on the same footing as other CiT companies in the market. As the Riksbank had no reason to own a company that was entirely devoted to competitive operations, during 2003 the Bank began a search for a new owner. In the absence of a tenable agreement, however, PiS ceased to operate in the summer of 2004.

Private CiT companies have played an important role in cash administration, particularly since SKAB was set up.

Private CiT companies have played an important role in cash administration, particularly since SKAB was set up and the recirculation of cash began to grow. The banks purchased services to a greater extent from CiT companies, which besides transporting cash have centres for handling notes and coins. As the equipment for counting and checking notes and coins mechanically is advanced and expensive, there are economies of scale to be had by handling the cash from a number of banks at a single centre. Since SKAB came in place, it has been the CiT companies that in practice have received or collected the banks' surplus cash and carried out the mechanical operations of checking quality and authenticity, counting and packaging. A net surplus has then been transported onwards on the banks' behalf to SKAB for value-dating. The same procedure has applied to unfit notes earmarked for destruction. As SKAB only accepted notes that had been authenticated, sorted and packaged, these operations were performed by the private companies prior to delivery. The CiT companies have also collected any new cash the banks required.

The structure of the cash supply changed in other countries in the 1980s and 1990s.

In an international perspective, the traditional model for supplying cash is for the central bank to undertake cash management at a large number of branch offices. That is the case in many euro countries, for instance. During the 1980s and 1990s, however, a start was made in other countries on altering the structure of the cash supply. The reason has often been to heighten efficiency and/or concentrate on the core objectives of the central bank. In many cases the emphasis on core objectives has entailed efforts to disengage from practical cash management and make private agents more responsible for this. Some central banks have chosen to decentralise cash management by adopting a system of notes held in trust/order (Canada and the UK, for example), where notes are stored at private cash centres without charging interest. In other countries the central bank provides interest-free loans (Denmark, for example) or compensation for interest lost (Australia and New Zealand, for example) on the notes in private cash centres. The private agents are then responsible for the distribution of cash and retain ownership of it, at the same time as they avoid having to transport it to the central bank's premises for value-dating.

An efficient supply of cash

As outlined above, in recent decades the structure of the Swedish market for managing cash has changed a good deal. The changes have been driven by technology and the development of demand for cash, as well as by the Riksbank's altered appraisal of its role in the supply of cash.

Conducting a large variety of operations has a dissipating effect that is bad for efficiency.¹⁷ For a considerable time the Riksbank has therefore been working to concentrate on its primary objectives: maintaining price stability and promoting a safe and efficient payments system. The developments in the payments mechanism have enabled the Riksbank to disengage from the operational aspects and heighten the importance of its role as overseer of this field.

As the Riksbank's costs for parts of the cash management operations that have been discontinued were not covered in full, costs have shifted to other agents in the market for cash. That has given them an incentive to find solutions that cut costs, leading, for instance, to a more efficient circulation of notes. But cash now carries an interest cost to a greater extent in that there are fewer value-dating centres.

Cash-supply efficiency is dependent on the actions of everyone in the market for cash. The Riksbank sets the framework by its actions. The first step towards achieving an efficient cash supply is therefore to consider two matters of principle: what part is the Riksbank to play in supplying cash (that is, which cash-supply operations are to be undertaken by the Riksbank) and which costs should be carried by the Riksbank as a central bank? As the answers to these questions depend on the view of seignorage, that will be considered first.

Cash-supply efficiency is dependent on the actions of everyone in the market for cash.

VALUE-DATING AND SEIGNORAGE

In the present system, value-dating can be achieved only by actually delivering cash to the Riksbank and the Bank requires the cash to have been counted, sorted and authenticated prior to delivery. Thus, notes are transported to and from the Riksbank so that banks can value-date and thereby avoid losing interest without any processing.¹⁸ In other words, economic resources are spent on simply redistributing value between the Riksbank and the banks. Economic costs also arise from transport hold-ups. With fewer value-dating centres, the number of deliveries for this

In the present system, economic resources are spent on simply redistributing value between the Riksbank and the banks.

¹⁷ For an analysis of central bank efficiency, see Blix et al. (2003).

¹⁸ The Riksbank does check authenticity to some extent but accepts notes only if they have already been checked.

purpose has decreased but the distances involved are longer and the value of the loads has risen.

Minimising the resources that are used solely to redistribute value is economically desirable. But prohibiting value-dating in order to avoid deliveries that entail a real economic cost would be unreasonable. Banks should be entitled to use notes – given that these are valid means of payment – as payment for their loans from the Riksbank. Moreover, as explained below, the Riksbank has no cause to increase its interest income.

Seignorage has outweighed the Riksbank's costs for handling cash, so cash has not been subsidised.

In that central banks carry costs associated with the administration of cash, the notion that cash is a subsidised means of payment is not uncommon in the central bank world. However, it ignores the fact that cash also generates income for the central bank and thereby the State since holding cash amounts to providing the central bank with an interest-free loan. This is because notes and coins can be said to be debt instruments with an infinite lifetime issued by the central bank.¹⁹ The income the Riksbank has obtained by investing these interest-free loans (seignorage) has exceeded the Bank's costs for handling cash. So Swedish cash has not been subsidised.

In that notes do not yield interest, the central bank generates State revenue. It is conceivable that this particular way of generating revenue is relatively efficient but that is very hard to tell. Neither is it a matter for the Riksbank, whose function is to promote a safe and efficient payments system, not maximise or minimise seignorage with reference to an optimal tax structure. Moreover, compared with the level of interest rates, for instance, the structure of the cash-supply system is relatively unimportant for the amount of seignorage.²⁰

The use of cash can be distorted by taxes as well as subsidies.

On the other hand, the structure of the cash-supply system is of importance for the efficiency of the payment system. Subsidising cash would be liable to hamper the development of new, efficient means of payment. For payment system efficiency, however, it may be just as important that cash is not taxed because that might favour the use of means of payment that are untaxed but less efficient. The use of cash can be distorted by taxes as well as subsidies.²¹

As holders of cash cannot be identified, it would not be possible in

¹⁹ In the days of the gold standard, cash could be exchanged in the central bank for a certain amount of gold.

²⁰ The Riksbank is required to maintain price stability. In the simplest textbook approach it is sometimes held that the central bank influences inflation by controlling the amount of interest-free money in the economy; see Mitlid & Vesterlund (2001). In practice, however, this variable ($M0$) is of importance only as an indicator of future inflation. Neither does the Riksbank take seignorage into account in monetary policy decisions. Monetary policy can therefore be disregarded in the present context.

²¹ This depends, however, on who pockets the subsidies for cash-management costs and who pays the seignorage. As perfect competition does not hold in the market for cash management, not all the costs/income will be paid/pocketed by the users of cash. So it does not necessarily follow that an efficient payment system would result if cash were neither subsidised nor taxed by the State.

practice for the Riksbank to pay interest on cash in circulation. Neither is it feasible entirely to avoid burdening cash with an interest cost by allowing the banks to obtain cash without debiting their accounts in the Riksbank; that would make the banks' alternative cost unduly low and distort resource allocation in the economy. So anonymity, which is also one of cash's advantages, makes some form of taxation of cash unavoidable.

However, the interest cost for cash can be influenced via the Riksbank's loan terms and value-dating regulations. Today, banks can obtain interest-free intraday loans from the Riksbank and only pay interest on the cash they hold overnight. So if every household and firm were to deposit their cash in a bank overnight and every bank in turn were to transfer the cash to its Riksbank account, cash would not be burdened with an interest cost. Such an arrangement is ruled out in practice by the physical handling it would entail – the cash would have to be transported, authenticated and counted. Still, allowing cash to be value-dated in connection with private cash centres would reduce the interest cost for cash, besides limiting security transports. That is in fact the path that has been chosen in many other countries.

Allowing cash to be value-dated in connection with private cash centres would reduce the interest cost for cash and also limit security transports.

THE RIKSBANK'S ROLE IN AN EFFICIENT CASH SUPPLY

It is a general principle that the State ought not to intervene unless there are particular reasons in the form of market failure. So the Riksbank's responsibility for administering the supply of cash should be confined to activities that require State intervention to be efficient. The role of the Riksbank in supplying cash should therefore be modified as the financial system develops.

The Riksbank's responsibility for administering the supply of cash should be confined to activities that require State intervention to be efficient.

As the conversion of cash to deposits is one of banking's commercial ideas, it is not necessary for everyone who needs Swedish cash to have a Riksbank account – provided banks have an account in the Riksbank, others will also have access to cash. In places where banks do not consider it would pay to establish a presence, the Post Office is responsible for providing cash services. In that politicians have required the Post Office to ensure the availability of basic cash services, it can be said that the Riksbank's responsibility for supplying cash can be limited to providing the Post Office with cash.²² It would therefore be sufficient in theory for the Post Office to have a Riksbank account. In practice, of course, this distri-

²² The Post Office's responsibility was considered recently in an enquiry (see SOU 2004:52). The report proposes that the Post Office shall cease to be responsible for cash services. Instead, the State is to be responsible for basic payment services, comprising payment mediation, cash withdrawal and handling the daily takings of retail traders and non-profit associations. The National Post & Telecom Agency is to be commissioned by the Government to procure these services in places where there is no commercial alternative. Thus, the proposals do not involve any reassessment of the Riksbank's role in the supply of cash.

bution of responsibility recognises the banks' major role in supplying cash. Moreover, banks need a Riksbank account for other reasons. The payment system is based on banks being able to settle their mutual payments via their Riksbank accounts. In addition, the banks function as channels for monetary policy. The Riksbank is able to influence liquidity in the economy by adjusting the banks' costs for borrowing from the Bank.

For universal access to cash it is sufficient if banks have a Riksbank account.

Besides conferring the exclusive right to a Riksbank account, the central role of the banks in the payment system gives rise to special regulations and supervision.

The Riksbank is responsible for cash being produced and stocked on an adequate scale.

In practice the Post Office has chosen to obtain cash from a bank. So as far as providing society with cash is concerned, the Riksbank can restrict its role to supplying the banks with genuine cash of an acceptable quality. It is up to the Riksbank to ensure that sufficient Swedish cash is produced and that enough cash is held in stock to cope with demand from the banks at any time. To be able to deal with extraordinary events, the Riksbank also needs to have reserve stocks. As the banks have no cause to hold reserve stocks of cash, the size and location of such stocks must be a matter for the Riksbank. The Riksbank should also be responsible for the development of cash that is difficult to forge. Confidence in cash as a means of payment may be eroded if cash is easy to forge.

In order to avoid an inefficient logistic structure, the Riksbank's responsibility for a stock of cash should be limited to what is considered necessary to be able to deal with extraordinary events.

In order to avoid the conservation of an inefficient logistic structure, the Riksbank's responsibility for a stock of cash should be limited to what is considered necessary to be able to deal with extraordinary events. Leaving the cash market agents to pay for other stocks of cash has the clear advantage that they can then weigh the benefits of an additional stock against the costs of holding it plus the effects on the relevant transportation costs. If such a solution is to be efficient, the Riksbank should also provide compensation for interest lost on cash in private cash centres.

Compensation for lost interest should be available to a bank only for counted and authenticated cash in a cash centre.

Compensation from the Riksbank for lost interest is available only to banks because only they are entitled to borrow cash from the Riksbank. To obtain such compensation, a bank must be able to demonstrate that the cash in question is not in circulation; otherwise, as pointed out above, the bank's alternative cost would be too low. For the same reason it must be simple for the Riksbank to check the value. All this means that a bank should be entitled to the compensation only for counted and authenticated cash in a cash centre.

To avoid the Bank having to form an opinion about security, ownership of cash in a cash centre should not pass to the Riksbank. In that way the number of cash centres will be limited not only by economies of scale in authentication and sorting but also by access to secure premises and the level of insurance costs. Such an arrangement would also mean that, for reasons of security, the banks will prefer to deliver the cash they know

will not be needed for some time to the Riksbank. The Riksbank's reserve stocks should be open for such deliveries. Banks should also be able to collect new cash as required from these stocks.²³

In practice, banks will probably procure cash handling services from CiT companies, so it will presumably still be these companies that collect cash and run the cash centres. The Riksbank has no cause to voice an opinion about this arrangement unless it were to be detrimental to payment system efficiency and security. The Riksbank has the banks as its counterparties and it should be up to Finansinspektionen (the Swedish Financial Supervisory Authority) to ensure that the banks exercise adequate risk management.

Cash that is unfit for use must be destroyed. Today this is done by the Riksbank. When a bank hands in unfit notes, its account in the Riksbank is credited in the same way as with value-dating. In time, a conceivable solution would therefore be for destruction to be arranged at the cash centres; that would do away with the deliveries to the Riksbank. However, such an arrangement would require stricter controls by the Riksbank.

Unfit cash must be destroyed.

When notes are destroyed, it is not only their number that is important but also their authenticity. To maintain confidence in cash as a means of payment, the amount of counterfeit notes must be limited. Forgers are most likely to be traced if every recipient of a payment in cash checks that the cash is authentic. An incentive to do so is provided by the cost of accepting counterfeit notes. The Riksbank check of authenticity sets off a chain reaction where everyone has an incentive to do the same. The general level of authenticity checks is set by the level practiced by the Riksbank. Today, by checking the authenticity of fit notes sampled at random as well as of all notes prior to destruction, the Riksbank gives banks a financial incentive to make advanced checks. Moreover, when counterfeit notes have been handed in, the Riksbank imposes heavy penalties.

To maintain confidence in cash as a means of payment, the amount of counterfeit notes must be limited.

If the cash centres were permitted to destroy notes, the Riksbank could supervise this via a technical monitoring system that provides the Riksbank with information about every note the machines handle. The Riksbank already has such a technical system. However, the machines required for destruction are advanced and expensive because the Riksbank wants to be certain that only authentic notes are destroyed. For

²³ Making active use of the reserve stock is an advantage because notes deteriorate if they are left lying for a long time. In cash management a distinction is usually made between strategic and logistic stocks; the former are for unforeseen events and the latter for normal use but in practice they are held in one and the same stock.

this the machines have to be equipped with special sensors. On the other hand, the turnover of notes is such that just a few of these machines would be needed. Technical developments in this field, leading for instance to cheaper machines, might make destruction at the cash centres feasible in the future. In the final analysis, the costs of transportation have to be weighed against the economies of scale in the destruction process.

WHICH COSTS SHOULD THE RIKSBANK CARRY?

In the allocation of costs between the Riksbank and other agents in the market for cash, it should be borne in mind that efficiency is enhanced both when costs can be influenced by those that carry them and when it is the operator that is responsible for the costs and reaps the surplus.

The Riksbank, like other agents, should carry the costs of its operations so as to have an incentive to operate efficiently.

There are those who are in a better position than the Riksbank to find efficient solutions to the logistic problems associated with the distribution of cash. To give them an incentive to search for efficient solutions, it is important that they carry the costs and can reap the benefit of any savings in this respect. The Riksbank in turn should carry the cost of its own operations. In the absence of competition, this is important to give the Riksbank an incentive to operate efficiently. Given seignorage income, the Riksbank has no cause to cover costs – by charging fees, for example – so as not to subsidise cash.

As an exception from this principle, the Riksbank could charge cash centres a fee for the Bank's work of checking that the deposited value is as reported. One purpose of making the centres carry this cost is that all socioeconomic costs should be taken into account when deciding whether or not to establish such facilities. A licensing procedure that entitles the Riksbank to withdraw a permit if the rules are not adhered to would also be appropriate. The private agents would then have an incentive to toe the line even if supervision by the Riksbank were to be relatively limited.

Conclusion

In August 2004 the Riksbank decided to transfer the operations of SKAB to the Riksbank and enable banks to establish private cash centres.

Cash still plays an important role as a means of payment in Swedish society and is likely to continue to do so for the foreseeable future. The function of cash as a means of payment requires large-scale physical handling of cash, as described in this article. In accordance with the principles outlined here for appropriate arrangements for supplying cash, in August 2004 the Executive Board of the Riksbank approved the objectives of transferring the operations of SKAB to the Riksbank and of enabling banks to establish private cash centres for the reception and distribution of cash. Compensation for lost interest is proposed for the cash that

banks hold in these centres. The arrangement can be likened to the current value-dating procedure. Destruction will, however, continue to be performed at two offices run by the Riksbank. Besides receiving unfit notes for destruction, the Riksbank will provide new cash at these offices.²⁴ The detailed structure of the cash centres is being discussed in the autumn of 2004 with representatives of the private agents in the market and the Riksbank hopes that they will be in place in the course of 2005.

²⁴ In time it is intended to establish a more efficient flow of coins from the suppliers straight to the cash centres, bypassing the Riksbank's offices.

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