

The use of cash in the Swedish economy

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Despite the fact that cash is used to an ever-declining extent as a means of payment in the Swedish economy, the volume of banknotes and coins in circulation, M0, has not continued to decrease in relation to economic activity. A large part of the public's cash holdings cannot be explained by the need for cash for normal transactions and to maintain a safety buffer.

The role of cash as a means of payment

Traditionally, cash has been the most commonly used means of payment in the economy.

As recently as fifteen years ago, industrial workers could still receive their wages in cash. Today an increasing number of payments in society are made by card or through electronic transfers. The Nordic countries are at the forefront of this development.

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Sweden and other industrial nations; the amount of cash in relation to GDP has stabilised and even increased slightly.

Traditionally, cash has been the most commonly used means of payment in the economy. However, the percentage of payments made using cash has declined continuously.

The amount of banknotes and coins in circulation (M0) in relation to activity in the economy (GDP) has declined steadily over the past fifty years. However, over the past ten years there has been a break in the trend in

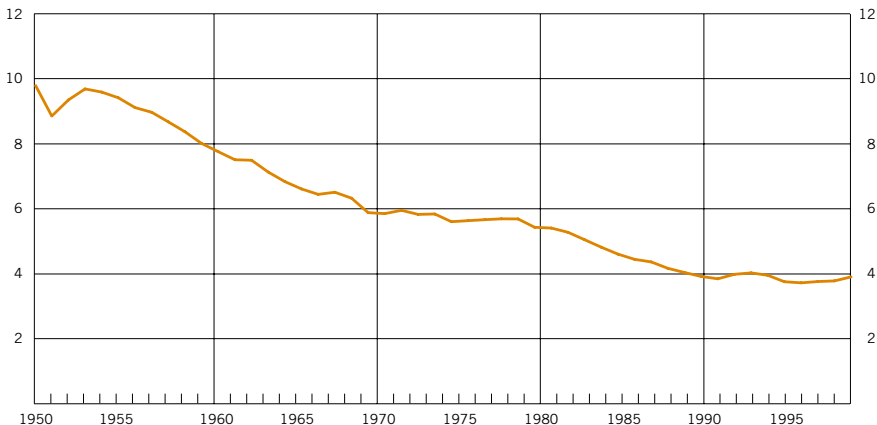
The fact that the trend in M0 does not reflect the reduction in the use of

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cash in society is puzzling. As the sole issuer of banknotes the Riksbank is interested in knowing how cash is used. This article analyses the way cash is used in Sweden, as well as possible explanations for the relatively large amount of banknotes in circulation.

Figure 1. The amount of banknotes and coins (M0) as a percentage of GDP
Per cent



What is cash used for?

To enable us to understand why the amount of cash is not continuing to decline, we must try to establish what the banknotes and coins in circulation are used for and estimate the amount of banknotes necessary to meet these needs. Households can use cash in various types of transaction, but they also hold onto banknotes and coins as savings or as small safety buffers. Banks and certain companies in the retail trade may wish to hold cash in hand for similar reasons.

The use of banknotes and coins in various payment transactions should reasonably account for the major part of the use of cash by households. Cash is probably the primary means of payment when buyer and seller meet face to face. This type of transaction is commonly known as a point of sale transaction. When payments are made at a distance, the use of some form of giro system is probably more common.

The amount of cash held by the general public for registered transactions can be estimated using a model. The Bank of Norway, together with David

Households' use of banknotes and coins in various transactions can reasonably be expected to account for the major part of their use of cash.

There is a model available for estimating the scope of the use of cash in transactions subject to VAT.

Humphrey from Florida State University, has worked out a method of estimating the use of cash in retail transactions subject to VAT.¹

This method is based in turn on a model and forecasts produced by Humphrey in collaboration with the Bank of Finland.²

Humphrey et al. presents two alternative methods of calculating the use of cash: an econometric model and a direct calculation method. These two methods provide the same result in principle. The estimate using direct calculation is simple and based on the following relationship:

- (1) The value of payments with banknotes and coins =
total turnover from point of sale transactions –
the value of payments by card –
the value of payments by cheque.

The value of payments refers to purchases that are subject to VAT in shops, hotels, restaurants and purchase of communications and transport services, as well as other services during one year, that is to say, almost all of the payment transactions where cash could be regarded as a payment alternative. After the total turnover from these sales has been obtained, the payments by card and by cheque are subtracted. The value of payments by cheque cannot be seen directly in the statistics. This therefore has to be estimated with the aid of information on the number of transactions using cheques. Given that the average value of a payment by cheque corresponds to the average value of a card payment, the value of the cheque transactions can be estimated to be the product of the average value and the volume of cheque payments.

Relationship (1) gives the value of the use of cash during one year. Because a bank note can be used many times during a year, it is necessary to estimate the amount of actual banknotes and coins needed to carry out the cash transactions. This estimate can then be compared to the stock of notes and coins outstanding. The estimate is done in accordance with relationship (2). On the basis of statistics on withdrawals made from ATMs, at banks and post offices and the use of cash in the retail trade, Humphrey et al. calculates how often consumers stock up on cash expressed in the number of days between cash withdrawals. By dividing the number of days in one year by these days, they obtain a circulation quota that shows

¹ Humphrey, D., Kaloudis, A. & Öwre, G., (2000).

² Snellman, J., Vesala, J. & Humphrey, D., (2000).



how large a part of the year the cash is expected to last. In this way it is possible to obtain a figure for the amount of cash in circulation required for the registered sales. The estimate thus corresponds to:

- (2) The value of payments using banknotes and coins/
 (365 days/number of days between cash withdrawals) =
 the amount of cash needed for the registered tradesales.

The result obtained so far with regard to the use of cash needs to be supplemented by estimates of how much cash may be needed for other purposes. It is probable that in addition to the registered sales as described in relationship (1), cash is also used in trade in second-hand goods between private persons, where cars comprise the largest part. Cash can also be held for other reasons than direct use in payment transactions. In addition to saving cash at home “under the mattress”, the general public may also hold cash in their wallets as a safety buffer; this is usually called “idle cash”. This safety buffer is the average value of cash the general public has in their wallets when they make a new withdrawal. The amount depends on how easy it is to get cash. More ATMs or increased opportunities for withdrawals via the retail trade reduce the need for a safety buffer.

It is probable that in addition to the registered sales, cash is also used in trade in second-hand goods, as a safety buffer or as a cash balance in banks and certain companies.

Cash can also be held by banks, the central government or non-financial companies, primarily to meet the demand from the general public for cash transactions, but also because it is in practice impossible to immediately deliver daily takings to the bank or to the Riksbank. Holdings of cash ought thus to correlate to the use of cash otherwise and to the cost of deliveries to and from the bank or the central bank. One example that can be mentioned is that as customers increasingly choose to pay via credit or debit cards, the average cash holdings in the retail trade decline.

If we have succeeded in considering all the reasons as to why participants in the economy hold cash and in estimating the amount of cash needed to carry out these transactions, then this amount should correspond to the stock of notes and coin in Sweden, measured as M0.

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The use of cash in Sweden

The percentage of cash payments in the registered sales has declined by 18 percentage points between 1991 and 1999.

The application of relationship (1) to Swedish data shows that the percentage of cash payments in the registered purchases has declined by 18 percentage points between 1991 and 1999 (see Figure 2).³ Practically the whole of this decline can be explained by the ever-increasing use of cards as a means of payment. The use of cheques, on the other hand, has steadily fallen and almost disappeared entirely in recent years. At the end of 1999 the percentage of payments by cheque amounted to only 0.5 per cent of the total number of transactions registered.

Figure 2. Percentage of cash payments in registered trade
Per cent

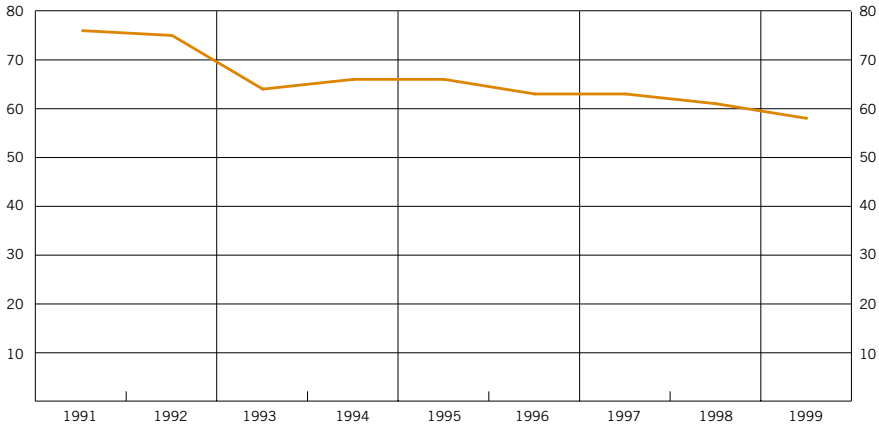


Table 1 describes different types of cash requirement. To find out the amount of banknotes and coins needed to meet households' registered consumption, the total value is divided by a circulation quota. The circulation quota is based on the number of withdrawals from ATMs and the number of Swedes over the age of 14 years (those who could be imagined to withdraw cash). Compared with the circulation quota in the Norwegian survey, this one is lower, as we do not take into account other types of withdrawal than via ATMs. We then added to this figure the other items, the safety buffer and cash holdings, where some data and surveys are available.

³ In Sweden, the collection of data on payments using different types of instruments did not begin until the end of the 1980s. Information on payments by bank card and credit card or by cheque is available for before 1988, but data on payments using other types of card is only available from 1990 onwards. The information on registered trade is based on data from Statistics Sweden's national accounts on households' consumption expenditure.

Table 1. The use of cash in Sweden
SEK million (unless otherwise stated)

	1991	1993	1995	1997	1999
The use of cash in registered transactions	336 892	273 480	296 606	295 889	298 868
/circulation quota (times/year)	29	35	39	43	43
= Cash requirement for transactions	11 617	7 814	7 605	6 881	6 950
+ Safety buffer	1 413	711	717	719	722
+ Cash in banks and non-financial companies	23 038	17 967	18 659	17 044	19 313
= Total cash requirement	36 068	26 492	26 981	24 644	26 985
/MO	57 557	60 315	64 331	68 582	77 880
= Explained percentage	63	44	42	36	35
1–explained percentage = unexplained percentage	37	56	58	64	65

There is no reliable Swedish data regarding the *safety buffer*. Calculation of this item is based on the Norwegian survey, where adults are estimated to hold cash to an amount corresponding to SEK 200 per person in their wallets when they make a new withdrawal. However, this only applied for the period 1991 to 1992. The increased opportunities for withdrawing cash in connection with card purchases have reduced the need to maintain a safety buffer, and this has now fallen to only SEK 100 after that period.

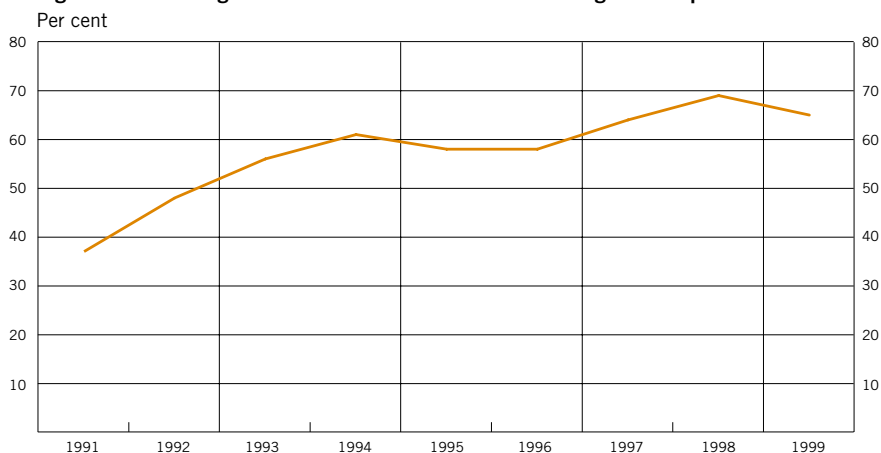
The estimate of the *cash in hand* held by banks, the central government and non-financial companies is based on data from Statistics Sweden's financial accounts. The data for non-financial companies is based on an arbitrary division between households and companies. We have therefore instead assumed that the quota between the holdings of cash by the banks and companies is the same as that in Norway.

Given these estimates and calculations, the total cash requirement proves to comprise only a certain part of the amount of banknotes and coins in circulation. A large portion of the cash, around two thirds, is thereby used for other purposes than those taken up in the table (see Figure 3). However, the use of cash for other purposes is based entirely on estimates and cannot be based on any existing statistics or surveys.

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Trade between private persons in second-hand goods was an item we did not include in Table 1, as we have not made estimates for the entire period. Generous assumptions would give an annual turnover of almost SEK 40 billion for 1999. Trade in used cars between private persons is assumed to comprise the largest percentage of the turnover, at SEK 4.5 billion. If these items are added to the figures for registered sales for 1999, the unexplained part declines by approximately 1 percentage point.

Figure 3. Percentage of cash in circulation not used in registered operations



We have also omitted from Table 1 what is known as saving under the mattress. Nor are there any statistics or surveys available in this area. However, there is no reason to believe that this form of cash use would be able to explain a very large part of the cash in circulation.⁴

In addition to this, the estimates of the items included in Table 1 are rather uncertain. To obtain an idea of the possible size of the error margin, we have also made calculations based on more generous assumptions with regard to the safety buffer and cash holdings.

A survey carried out by Temo last year indicates that more than half of the adult population in Sweden has coins at home corresponding to an average value of SEK 750.⁵ If we act on this survey, it should mean that persons over the age of fourteen have instead SEK 512 in reserve, that is to say, between three times and five times as much as the Norwegian survey showed.⁶ Using these figures, the unexplained percentage of cash in circulation would decline by between 3 and 5 percentage points per year.

The cash holdings can also be modified if we instead make use of the estimates of non-financial companies' cash holdings contained in Statistics Sweden's financial accounts.⁷ These estimates give cash holdings by companies that are two to three times higher than those we have calculated. If consideration is given to

⁴ An assumption that 100 000 persons have SEK 20 000 in their mattresses would explain SEK 2 billion of the cash use, i.e. one percentage point or so.

⁵ Swedes' use of coins, April 2000, (2000).

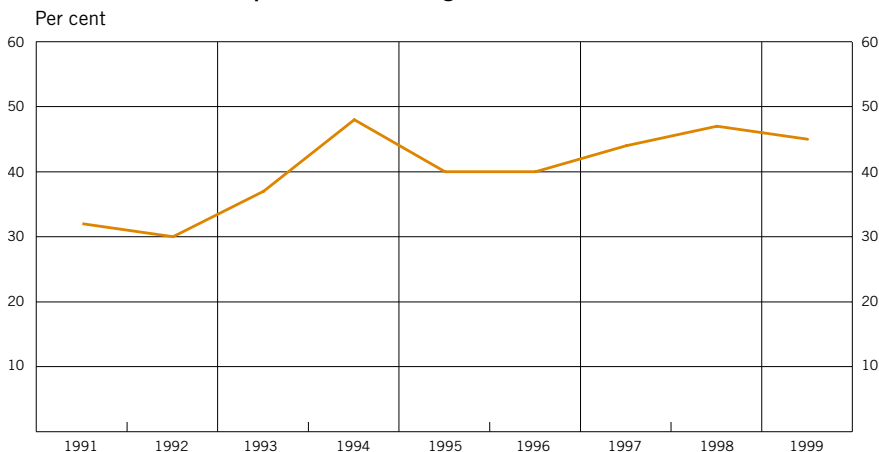
⁶ The product of the percentage of the population and the average value is added to the earlier safety buffer.

⁷ In the financial accounts the difference between the banks' cash holding and M0 is divided into different categories according to definite key figures. The allocation figures are based on historical conditions that do not necessarily apply today.



the new estimates for these two items, the unexplained percentage declines by around 20 percentage points (see Figure 4). However, developments over time are unchanged, with an increased percentage that cannot be explained.

Figure 4. The residual of alternative estimates of idle cash and non-financial companies' cash holdings



Some factors could actually indicate the opposite – that we have overestimated the use of cash. Firstly, we have only taken into account withdrawals via ATMs. If we add withdrawals made at banks and post offices, cash withdrawals made when shopping by card, etc. the circulation speed increases and the percentage of cash holding that can be explained therefore declines. Secondly, the assumptions are based on all individuals withdrawing money at the same time, and the withdrawals not affecting the cash holding of the financial institutions. If we instead assume that these withdrawals are more spread out, it would mean that only half of the amount of cash were required.

Even if we modify the various items, the conclusion remains that a large part of the cash holding – between 45 and 65 per cent – is used for other purposes than those we have so far been able to identify. Humphrey and his co-authors in the Norwegian study found

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similar results. However, in contrast to the development in Norway, the use of cash for transaction purposes increased in Sweden at the beginning of the 1990s (see Figures 2 and 3). This could possibly be due to a sharp decline in the use of cheques during this period.

The consequences for issuing banknotes

Shall the Riksbank subsidise the use of a means of payment in transactions where the parties do not wish to be detected?

What, then, can explain the fact that the amount of cash in circulation has remained unchanged or increased over the past ten years in relation to economic activity, while the use of cash as we have identified it appears

to have declined? One possible explanation is that cash is used in transactions where the parties do not want to be traced, e.g. in cases where the buyer and seller want to avoid paying tax or for other reasons do not want the authorities to be able to detect the transaction.⁸ If this is the case, there could be reason for the Riksbank, as the sole issuer of banknotes and coins, to reconsider its guidelines for issuing cash.

Until very recently the Riksbank was responsible for the administration of cash through its network of offices around the country. In June 1999 these operations were transferred to an independent subsidiary company and today it is that company called Pengar i Sverige AB (PSAB) that administers the distribution of cash. As the distribution of banknotes was previously carried out free of charge, the use of cash has in practice been subsidised. This type of subsidy can always be brought into question and this is of course especially the case if cash is mainly being used so that the transactions cannot be detected. However, with effect from this year, the banks and the post office will pay fees that largely cover the cost of cash distribution.

The Riksbank's choice of the denominations of banknotes should also affect the use of cash. A significant percentage of the amount of cash in circulation comprises thousand krona notes. These are unusual in the normal banknote circulation, but are probably used mainly for transactions that cannot be traced. Naturally, if this is the case, the Riksbank could reduce the number of thousand krona banknotes in circulation, but the effect of such a measure is dubious. Of course, transactions where the anonymous nature of cash is used to avoid paying tax would become more difficult if lower denominations or foreign banknotes had to be used, but it is probable that such transactions would still occur as long as there is an incentive to avoid paying tax. In addition, it would make it difficult to use higher denomination banknotes in legitimate transactions, which would be a cost for society. If there is a desire to increase the number of payments reported for tax purposes, there are certainly more effective ways of doing so than reducing the number of thousand krona notes in circulation.

The role of cash in society has changed. Our hope is that this article will stimulate a debate on the continued role of cash and on the shaping of cash management in society.

⁸ Examples of this type of activity are trading in drugs and other serious crimes.



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