

■ Prices and costs in the Swedish payment system

A business efficiency analysis of the major Swedish banks' costs in connection with the production of payment services shows that they only in exceptional cases provide users with information on the cost of these services through the prices they set. This undermines one of the tasks of the price mechanism, that is to say, to give users of payment services the information they need to make rational choices. At present, different types of payment service subsidise one another. Pricing that better reflected costs should help to reduce the banks' total costs. This also creates the conditions for lower total charges to bank customers. However, other welfare aspects have not been considered in this analysis.

The Riksbank has the statutory task of promoting a safe and efficient payment system. This means that in addition to stability, achieving efficiency in the payment system is an important goal. Part of the Riksbank's oversight responsibility entails studying the payment system from the perspective of efficiency and identifying possible problems. Here, attention is paid to the market for payment services, with the main focus on the relationship between transaction fees and the banks' variable costs.

Most payments made within the economy involve relatively small amounts and are between households, firms and the public sector. These payments are called retail payments. This category includes payments in cash, credit transfers, card payments, cheque payments and so on. Common to the payments not made directly in cash is that they are account-based; that is to say, involve payment from one bank account to another.

The banks play an important role as mediators of payments and distributors of cash. These operations lead to costs for the banks. The size of these costs depends on which payment services are most in demand. Payment services are cheaper to produce the higher the degree of automation. The demand for the services depends in turn on their design and the prices charged. Different payment services can be more or less close substitutes to one another, often depending on the context in which they are used. For instance, consumers often find it more practical to pay small amounts in cash, while debit cards are easier to use for larger purchases. Somewhere in between, the alternatives are perceived to be equal.

Apart from the inherent properties of the different payment services, the customers' choice also depends on the charges made for the services. Developments in Norway are a good example of this. There, the use of card payments and other electronic payment instruments increased rapidly when the banks altered their pricing and began to charge fees that better reflected their actual costs.^{78, 79}

⁷⁸ See Humphrey, D., M. Kim and B. Vale (1998), "Realizing the Gains from Electronic Payments: Costs, Pricing and Payment Choice", Arbeidsnotat 1998/1, Norges Bank.

⁷⁹ Previously the banks primarily financed their payment services through floats and net interest income. To simplify, a float is the interest the bank can assimilate during the period the payment is in transit, i.e. between debiting the payer's account and crediting the payee's account. Net interest income on a deposited amount is the difference between the interest the bank has to pay the account-holder and the earnings the bank itself receives on this amount. Both floats and net interest income are methods of financing that are not transparent to the users.

In Sweden the increase in transaction fees for cheques contributed to bank customers beginning to use debit cards and credit transfers instead of cheques. Similar examples of how changes in the pricing of cheques directly affected their use can be found in other Nordic countries.

What significance does this have for the use of the payment system? Table 1 provides a survey of how the payment systems are used in Sweden, Denmark, Finland and Norway. The figures are from 2001, as this was the last year with reliable data on M0 in Finland, which introduced the euro in 2002. However, the data from 2002 shows the same qualitative pattern. The use of cash in a country is usually measured as the relationship between the value of banknotes and coins in circulation and the value of the goods and services produced, that is to say, M0/GDP. The use of cards is measured as the number of card payments per person per year.

The table shows that Swedes use cash to a greater extent and cards to a lesser extent than citizens of other Nordic countries.⁸⁰ The number of cards per person is low, as is the number of payment terminals where cards can be used. This difference is somewhat surprising considering that payments systems and payment patterns are otherwise quite similar in the Nordic countries. The difference in the way different services are priced may partly explain this. In 2002 Norwegian bank customers paid an average withdrawal charge of NOK 3.76 if the withdrawal was from their own bank's ATMs outside of office hours. For withdrawals from other banks' ATMs, they paid NOK 3.89 during office hours and NOK 4.79 outside of office hours. The same charge patterns can be found in Denmark. In Finland, customers only pay a withdrawal charge outside of office hours. It is rare that charges are made for ATM withdrawals in Sweden. This difference in charging still applies and could be part of the explanation for the differences in the use of cards and cash in the Nordic countries.

Table 1. Cash and card use in the Nordic countries 2001.

	M0/GDP	Electronic payments	Number of card payments per capita	Number of cards per capita	Number of terminals per 1,000 inhabitants
Denmark	2.90%	n.a.	87	0.69	n.a.
Finland	1.84%	88%	76	1.31	12.9
Norway	2.75%	87%	99	1.43	15.9
Sweden	4.48%	89%	45	0.85	9.9

Sources: Blue Book 2003 and Norges Bank.

There is thus a direct link between the fees the banks charge for their services and how the customers use different instruments of payment. Prices shall provide information on what the payment alternatives cost. It is only when prices reflect the costs behind them that users can consistently choose to use the payment services that cost the least

⁸⁰ Nyberg, L., and G. Guibourg (2003), "Card payments in Sweden", *Economic Review* 2003:2, Sveriges Riksbank.

to produce in relation to the other properties of the payment services. Given this, the Riksbank has examined the four major banks' pricing of payment services in Sweden. Together these banks account for just over 90 per cent of the retail payments market. Our aim is to study whether the bank's private and corporate customers are faced with prices that reflect the banks' costs for producing the various payment services. A business approach was used, as only the banks' costs are taken into account.⁸¹

The payment process

Each payment is essentially a transfer of an amount of money between two parties. The way in which this transfer is made is determined by which instrument of payment is used and which channel the parties choose to make the payment through. A cash payment means that the payment is completed at the actual time of payment with the exchange of banknotes and coins. No intermediaries are required here. Account-based instruments of payment, such as credit transfers, cards, cheques and direct debits entail money being moved between two accounts held at one or more banks, which then act as payment intermediaries. Customers can utilise different channels to access account-based instruments. For instance, a credit transfer can be made by visiting a bank, posting an envelope or using the Internet. Corporate customers can also make electronic file transfers. A payment service here refers to a combination of payment instrument and payment channel. The existence of intermediaries makes it possible to implement a payment without the sender and recipient of the payment meeting in person. At the same time, it also entails a risk that the payment will not reach the payee, despite being sent by the payer.

Account-based payments require one or more intermediaries, including the banks or other financial institutions where the payer and the payee have their accounts. This requires a number of checking and information processing stages. At the actual point of payment, a check is made on the validity of the payment instrument and the holder's right to use this instrument. The account-holding bank checks that there are sufficient funds in the payer's account and then allows the transaction. If the payee has an account with the same bank, the amount can be transferred immediately. However, if the payee and the payer have accounts in different banks, the transaction must be cleared and settled. During clearing the banks' liabilities and claims on one another are compiled. This information is then used as a basis for settlement, that is to say, the final payment transfer between the

⁸¹ An economic approach would also take into account the costs arising for other participants in the economy. These are not included in the Riksbank's study as the banks' costs do not cover, for instance, private customers' costs in the form of time and telephone charges for payment via Internet banks. The retail trade's costs for administering cash or card payments are also excluded. The same applies to any deficiencies in market efficiency. This could be caused by what are known as network effects, which occur with certain instruments of payment. These occur when the benefits of participating in a network increase with the number of participants. For instance, the usability of a debit card, and thus its usefulness to the holder, depends on how many retail outlets will accept the card.

banks when they settle their debts and claims. Settlement almost always takes place between the institutions' accounts in the central RIX system that is owned and operated by the Riksbank.⁸² When all this has been done, the recipient's account is credited.

Cost structure and pricing

Clearing and settlement requires that there is an infrastructure. This infrastructure consists of computers, systems, lines of communication, terminals and so on that produces the services required in the different stages of the payment process. The infrastructure is generally characterised by large fixed costs and low variable costs, with each further transaction made leading to relatively small additional costs. It is this characteristic that leads to economies of scale.

How can prices reflect costs when fixed costs are high and variable costs are low? One simple method is to use a combination of fixed fees and variable fees. The variable fee is a transaction fee that is paid for each transaction and the fixed fee is usually made in the form of an annual fee that the bank customer pays to obtain access to the service in question. Prices reflect the bank's actual costs if the variable fee is equal to the variable cost that arises through a further payment and the fixed fee covers the other operating costs.

The banks often use this form of two-part pricing system, with their customers paying a fixed fee, a form of admission into an entire package of payment services. A paid-up annual fee for a debit card, charge card or credit card allows the holder to make payments with the card and to withdraw cash from ATMs. In the same way, a bank customer can make different kinds of credit transfers over the Internet once the annual fee has been paid.⁸³ Once the admission fee has been paid, it is mainly the transaction fee that influences the bank customers' choice of instrument and channel and the Riksbank has therefore chosen to focus on these fees and corresponding variable costs. The question that the Riksbank tries to answer is to what extent transaction fees for each instrument and channel reflect variable costs. Although the focus is on variable costs and transaction fees, the Riksbank has also gathered data on fixed costs and fees. However, it is in the nature of fixed costs that they often are difficult to distribute between the different payment services.

Table 2 describes the cost and fee structure for an average major bank in Sweden in 2002. The table shows fixed and variable fees, and also fixed and variable costs per transaction for each of the most common payment services. The cost of sending a payment and receiving a payment are reported separately as the sending bank is often different from the receiving bank. In addition, receiving and

⁸² For a detailed description, see the section on the financial infrastructure in *The Swedish Financial Market 2004*.

⁸³ In 2002 every adult Swede had on average at least one card. Similarly, the number of Internet bank customers in relation to the number of adults was 0.7. The annual charge for these instruments and channels is thus largely already paid in Sweden.

sending payments involve different services, often directed at different customers. The variable, fixed or total cost of producing a particular payment service from account to account is obtained by totalling the corresponding costs for sending and receiving payments. For example, the variable cost of a paper-based credit transfer is calculated in Table 2 by totalling "paper-based" under "Credit transfers (send)" with "other" under "Credit transfers (receive)". The variable cost will then be $1.76 + 0.74 = \text{SEK } 2.50$. The fixed costs will be $0.25 + 0.16 = \text{SEK } 0.41$ and the total cost will be $2.50 + 0.41 = \text{SEK } 2.91$. Both of these cost examples are underlined in Table 2.

In some types of payments, the banks pay fees to one another, known as interchange fees. This applies to card payments, where the recipient bank on average pays the sending bank SEK 0.70 in interchange, and for direct debits, where the recipient bank on average pays the sending bank SEK 1 in interchange fees. The sending bank therefore receives a net income of 2 öre for sending a direct debit. Interchange also occurs in the case of cash withdrawals from ATMs, when one bank's customers take out cash from another bank's ATMs. The sending bank then pays on average SEK 5.14 to the bank owning the ATM, which is the explanation for the high variable costs of SEK 5.61 under "ATM-OC/FT" (own card/foreign terminal) and variable net income of SEK 3.18 under "ATM-FC/OT" (foreign card/own terminal). The banks have to maintain a reserve of banknotes in order to meet the general public's demand for cash withdrawals, both through ATMs and over the counter at bank offices. This cash reserve entails a cost in terms of lost interest.⁸⁴ The cost is calculated at 12 öre per average ATM withdrawal and 6 öre per average withdrawal over the counter.

As an instrument of payment, debit cards have similar properties to charge cards and credit cards. However, the variable cost for the sending bank is much lower for debit cards than for charge cards and credit cards. The difference is that charge cards and credit cards also grant the cardholder a payment respite period. This form of credit provision causes a loss of interest income and some loan losses for the sending bank.

With regard to the different types of credit transfer, we see that the variable costs are lowest for electronic transfers, then come paper-based transfers and transfers over the counter have the highest costs, that is to say, the variable costs appear to decline as the degree of payment automation increases. In Sweden, there are two different kinds of clearing systems for credit transfers. One based on bank account numbers and the other, that allows for a larger variety of services based on a giro system. The variable costs for credit transfers routed through bank account numbers are lower than for credit transfers based on a giro number system, partly because the former do not allow the same amount of information to accompany the

⁸⁴ The Riksbank has used the average repo rate for 2002 to calculate the fictitious interest income the bank loses. Data on the total number of cash withdrawals – over the counter and through ATMs – and the average size of the withdrawals is used to calculate the cost per withdrawal.

payment. The variable cost for cash withdrawals through ATMs varies according to interchange. If one disregards interchange, the average variable cost is SEK 1.30 per withdrawal. Withdrawals over the counter lead to almost no variable costs, but on the other hand are connected with high fixed costs. However, payments and withdrawals over the counter currently account for a very small part of the total number of payments and withdrawals.

Fixed fees are usually paid per customer and year and have here been converted into fee per payment for the sake of comparability. Transaction fees are a weighted average of the transaction charges paid by private and corporate clients. In general, it can be said that private customers only face transaction fees when making transfers over the counter and that corporate customers also face transaction fees for acquiring services related to card payments, outgoing paper-based and electronic credit transfers and receiving direct debits.

Table 2. Fees, costs and volumes for the most common payment services in an average major Swedish bank, 2002.

Payment service		The average major bank's charges and costs per payment (SEK)				Number* of payments
		Fees		Costs		
		fixed	transaction	transaction	fixed	
Cards (send)	debit cards	1.76	0.00	0.23	0.43	98834
	charge & credit cards	2.54	0.00	2.85	0.62	13419
Cards (receive)	debit cards	0.00	2.04	1.09	0.09	98834
	charge & credit cards	0.00	22.01	1.09	0.09	13419
Credit transfers (send)	over the counter	0.00	41.93	4.72	1.90	644
	paper-based	2.86	0.44	1.76	0.25	51228
	electronic	4.02	0.17	0.80	0.41	66353
Credit transfers (receive)	direct debit	0.00	0.00	-0.02	0.25	27405
	other	0.00	1.50	1.01	0.16	27405
Electronic transfers	send	0.00	0.00	0.30	0.28	31473
	receive	0.00	0.00	0.18	0.05	17123
Withdrawal of cash	ATM-OC/OT**	1.65	0.00	1.37	4.50	38301
	ATM-OC/FT**	1.65	0.00	5.61	0.08	30841
	ATM-FC/OT**	0.00	0.00	-3.18	5.15	30841
	ATM, total	1.14	0.00	1.27	3.34	99983
cheques	send/receive	0.00	0.00	0.06	10.98	11170
			24.82	1.97	18.05	932

* Number of payments expressed in thousands.

** ATM is an abbreviation of Automated Teller Machine. OC/OT stands for Own card/own terminal, OC/FT for Own card/foreign terminal and FC/OT for Foreign card/own terminal.

The marked columns in Table 2 show clearly that the variable costs and fees differ significantly, with the exception of debit card transactions and direct debits. There are high transaction fees for acquiring of charge card and credit card transactions, sending credit transfers over the counter and cheques. Otherwise, there are seldom any transaction fees. When the average major bank does take transaction fees, they are almost exclusively taken from corporate customers, particularly merchants. Moreover, prices for corporate customers were not sufficiently transparent to the extent that price information was sometimes difficult to obtain. However, this situation has improved since 2002; for instance, most major banks publish

corporate price lists on the Internet. Pricing with regard to private customers reflects the underlying costs to a much lesser extent than pricing with regard to corporate customers. However, there are major differences in the costs arising from different payment instruments. In general, payments over the counter, cheques, cash withdrawals and paper-based credit transfers are expensive to produce. Electronic payments, such as direct debits, credit transfers via Internet banks and debit card transactions are relatively cheap to produce. Figure 1 summarises the above discussion by illustrating the agreement between variable costs and transaction charges.

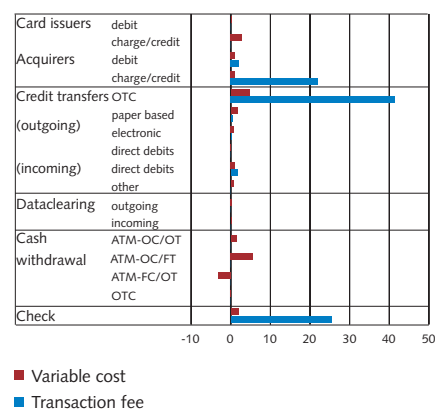
Conclusions

Our study shows that the major Swedish banks only in exceptional cases provide their users with information on the business costs of various types of payment service through the prices they set. Private customers receive practically no price signals at all through transaction fees; they pay almost exclusively fixed charges. Corporate customers receive slightly more information. Calculations show that total fees for most services cover total costs and that mediation of payments as a whole provides an average major bank with net income of SEK 155 million per annum. The largest surplus is generated by card operations and in particular through the acquiring services for charge card and credit card transactions.

A deficit of a corresponding size arises in cash distribution, where large costs but no transaction fees arise, but instead a fixed charge is normally made for debit cards or ATM cards.⁸⁵ There is thus extensive cross-subsidising between these payment services and this ought also to give rise to a financial redistribution between different customer groups. The fees paid by merchants for card purchases contribute to covering the banks' distribution of cash to the general public through ATMs, a service that is probably mostly utilised by private individuals, although it may be in the merchants' interest that cash be readily available. It was pointed out in the introduction that withdrawal charges are more common among our Nordic neighbours. These countries also have more ATMs; an average of 14.4 per 1,000 inhabitants, compared with 9.9 in Sweden. One possible explanation is that, as Swedish major banks do not price withdrawal services per transaction, they instead ration access to ATMs to keep costs down.

In light of the experiences from Norway's transition to a more cost-based pricing system and pricing of cheques in Sweden and other countries at the beginning of the 1990s, there is reason to believe that the demand for payment services is price-sensitive; that is to say, that changes in prices will affect how bank customers use the payment system. A plausible conclusion is thus that the banks could reduce their costs through more transparent pricing that is more

Diagram 1. Transaction fees and variable costs for the most common payment services in an average major Swedish bank, 2002.



Source: The Riksbank.

⁸⁵ This refers to withdrawals in SEK and from ATMs owned by one of the four major banks. However, some withdrawal charges do exist among smaller banks.

firmly based on their actual costs. Such a price structure would lead to use of charge cards and credit cards as well as cash declining in favour of increased use of debit cards. Similarly, the number of paper-based credit transfers would decline in favour of electronic transfers. This change in payment behaviour would reduce the banks' cost and create scope for lower charges to bank customers. Determining the extent to which these changes would also benefit the economy requires further analysis, as a welfare analysis would cover the costs incurred by all participants in connection with payments, not merely the banks' costs. In addition, there may be market imperfections that affect the conclusions.

One interesting aspect to discuss, and which may also require further analysis, is the reason the banks apply this pricing strategy. The banks are probably aware that they could reduce their costs for payment intermediation if they applied a more transparent and cost-based price structure. One possible explanation as to why they have not yet taken this step could be that although the banks understand that all banks can gain from changing to a price structure where charges better reflect the underlying costs, the bank that takes the first step will lose customers to the other banks. No bank dares to be the first to take this step. Experiences from the Nordic countries, with pricing of cheques, support this theory.

One closely related explanation is that the banks do not see the mediation of payments as an isolated business area, but as part of a larger business area. There may thus be commercial reasons for under-pricing certain services, partly for publicity reasons and partly to establish a customer relationship and then charge more for other services, such as savings. This type of pricing can be found in other operations, such as mobile phones, where the actual telephone is often sold cheaply. The operator's profits then come from the telephony services generated. These two explanations are not mutually exclusive, and it is quite possible that both play a role in the banks' pricing.

Data collection and processing

Data collection includes costs and charges connected to the production and sale of payment services during 2002 for the four major banks in Sweden. Together they cover just over 90 per cent of the retail payment market in Sweden.

Data on variable costs were gathered separately for different payment services. For instance, data were gathered separately regarding the costs of credit transfers over the counter, paper-based credit transfers and electronic or Internet-based credit transfers respectively. Data on the number of transactions for each payment instrument and channel were used to calculate the variable unit cost per instrument, channel and participating bank. After this, a weighted average of the four banks' variable unit costs per instrument and channel was calculated. The banks' internal market shares in the relevant market segment were used as weights in the estimate. A simplified example with only two banks is the following: bank A had 30 per cent transaction volumes with debit cards and a variable unit cost of SEK 0.20, while bank B had 70 per cent of its transactions with debit cards and a variable unit cost of SEK 0.40. The weighted average variable unit cost is then SEK 0.34 ($=0.30 \times 0.20 + 0.70 \times 0.40$). Fixed costs were broken down by the various payment instruments and channels with the aid of data on transaction volumes for the various instruments as the key to distribution. In the same way as for variable costs, a weighted average of the fixed costs was calculated per instrument and channel. Together these weighted averages constitute a cost structure within an average major Swedish bank.

The representative bank's transaction charges were calculated in the same way as the variable costs. One complication is that banks apply different charges for private customers and corporate clients. The charges for these categories were calculated separately with the aid of data on the number of payments initiated by the different customer categories in the different banks. Table 2 shows a weighted average of both customer categories' fees. The average reflects the average fee for the service in question in the market as a whole. Another complication of the price structure was that the fixed fees were made per customer, while all other data was expressed in terms of "per transaction". By calculating each bank's income from fixed fees per customer category and then dividing this by the number of payments, it was possible to calculate an average fixed fee per payment. The calculated fees are based on officially-stated prices. However, it is probably possible for corporate clients to negotiate the size of the fees in some cases. The Riksbank's calculations do not take this into account and may therefore to some extent overestimate the fees to corporate clients. The calculations are based on stated fees per payment service and therefore do not take into account the fact that the banks in some cases offer packages of payment services, which also means that the calculated fees may be slightly too high.

For a more detailed description of the methods and results, please see WORKING PAPER 172 in Sveriges Riksbank's Working Paper Series.