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Costs and Income in the Norwegian Payment System 2001. An application of the Activity Based Costing framework

by

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An application of the Activity Based Costing framework

Olaf Gresvik and Grete Øwre

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Abstract

This paper summarizes a survey of costs and income in the payment system of Norwegian banks in 2001. The cost analysis was carried out by using the activity based costing (ABC) framework. The results from this analysis are presented in the paper, combined with information from other sources to form a complete picture of the costs and income in the retail payment systems run by banks in Norway. The results are compared with results from two previous surveys, performed in 1988/1989 and 1994. The main findings show that the costs have been substantially reduced over time, income based on direct pricing has risen, and although the banks still deliver payment services with a loss, the negative margin has decreased.

Keywords: bank's costs, payment systems costs, retail systems, activity based costing, ABC.

JEL code: G21, M1

1. Introduction

Cost surveys in the Norwegian payment system

Norges Bank has performed surveys of the banks costs, pricing and income in the payment system for the years 1988/1989 and 1994. This survey was performed for the year 2001[1]. This Paper elaborates the method used in the survey for 2001, and includes a review of the results.

Section 1 of this paper provides a rationale for performing cost surveys and some useful background information. A short description of the ABC- method is shown in section 2. The third section is a description of the method used in this survey. Section 4 provides analysis and results, and section 5 sums up the conclusions.

Should central banks perform cost surveys? Are the results of interest to the banks?

Smooth and efficient operation of payment systems is an important issue for most central banks. Information about the use and pricing of the different payment instruments give important insight about the payment system, but this information does not necessarily give information about *how efficient* the payment system is. Information about the cost of producing payment services combined with prices give the central bank an opportunity to evaluate the degree of efficiency in the payment system.

The surveys performed by Norges Bank focus on the part of the payment system designed to meet the needs of the bank customer. This is primarily small-value payments made in large number of transactions. Such payments are often referred to as *retail payments*. The interbank system for large value transfers between banks is not evaluated in this paper.

Banks use cost surveys as a benchmark to their own analysis of costs and pricing strategies. After the publication of the results from this survey in *Economic Bulletin* 4/02, inquiries by banks have shown that the method and results are used for internal analysis in other banks in Norway. Information itself is a vital prerequisite to competition in any market; this also includes information on costs and prices.

[1] The surveys were published in Norges Banks *Penger og Kreditt* 3/89 and 4/89 (Norwegian only), *Economic Bulletin* 2/95 and 3/95 and 4/02 (English translations).

In the annual report on payment systems, Norges Bank publishes statistics on the use and pricing of most payment services offered in Norway. This is important information to most banks. The results published in this survey are only for seven banks, but still considered representative, due to their large market shares. The seven banks vary very much in size, and both savings and commercial banks are represented. These banks use services provided by institutions such as Banks' Payment and Central Clearing House (BBS), EDB Business Partner ASA (EDB)[2] and Norges Bank, like other banks in Norway.

Principles for efficiency

Section 1 of the Norges Bank Act requires Norges Bank to "promote an efficient payment system domestically as well as vis-à-vis other countries." An efficient payment system ensures that payments are executed quickly, safely and at a reasonable price. In Norway, all payments are settled on the same day as they are initiated[3], which is considered to be quick. The Norwegian payment system is characterized by a high degree of security and a low level of misuse and fraud. The reasonable price is in focus in this survey. Prices should reflect the *value* of the product or service and the *cost* of producing it. Prices that reflect *relative costs* of producing various payment services provide an incentive for users to select services that meet their needs at the lowest possible cost. This promotes correct use of resources and increases the efficiency of the payment system.

Traditionally, payment services have been low-priced or (seemingly) free of charge in most countries. This forced banks to cover the loss incurred from payment services from other activities in the bank, such as lending or investment banking. Banks have traditionally used income from float and cross-subsidization to cover the loss in payment services. This distorts the price signal to the users of payment services. The pricing becomes less transparent, and the most popular payment services rarely turns out to be the most cost-efficient. Direct pricing in accordance with the differences in production costs give important economic signals to the market participants. In Norway, pricing has become the rule, and as the survey shows, the prices reflect the relative cost differences for payment services.

[2] EDB Fellesdata is a part of EDB ASA. The information used in this survey is from applications provided by EDB Fellesdata.

[3] Settlement is achieved the same working day or the next working day, dependent on at which hour the payer initiate the payment.

Financial services and the payment system

Financial services are among the sectors of the Norwegian economy that have made the strongest contribution to the rise in productivity in the past decade. Revised national accounts figures show that productivity for Mainland-Norway (non-oil sector) rose by 2.4 per cent annually in the 1990s. Financial services represent one of the sectors showing strongest productivity growth, with an annual average of 6.3 per cent in the same period. Payment services - an important part of financial services - have contributed to the increase in productivity (see Lindquist (2002)). The rise in payment system productivity is attributable both to more rational production methods and increased use of the most cost-effective services. Due to their pricing policy for payment services, banks have brought about a shift in demand from paper-based to electronic services (see Humphrey, Kim and Vale (2001)). The results presented in this working paper give further support to the analysis and statistics that show increased productivity.

Table 1 contains key figures that shed light on productivity developments. Since 1994, the number of payment transactions has doubled to 968 million in 2001. The total number of employees in the banking industry has risen by 1 per cent, while the number of branches has been reduced by 13 per cent. The number of post offices halved from 1994 to 2001.

Table 1: Key figures

	1988	**1994**	**2001**
No. of bank branches	2 200[a]	1 600	1 390
No. of bank staff (Full-time employees)	33 000[a]	23 200	23 400
No. of payment transactions (millions)	381[b]	481	968[c]
Total costs (NOK billions, 2001 NOK)	5.4[b]	6.3	5.9
Average unit cost per transaction (2001 NOK)			
- including cash withdrawals at the counter[d]	n. a.	13.00	5.80
- excluding cash withdrawals at the counter[d]	14.10	10.70	5.30

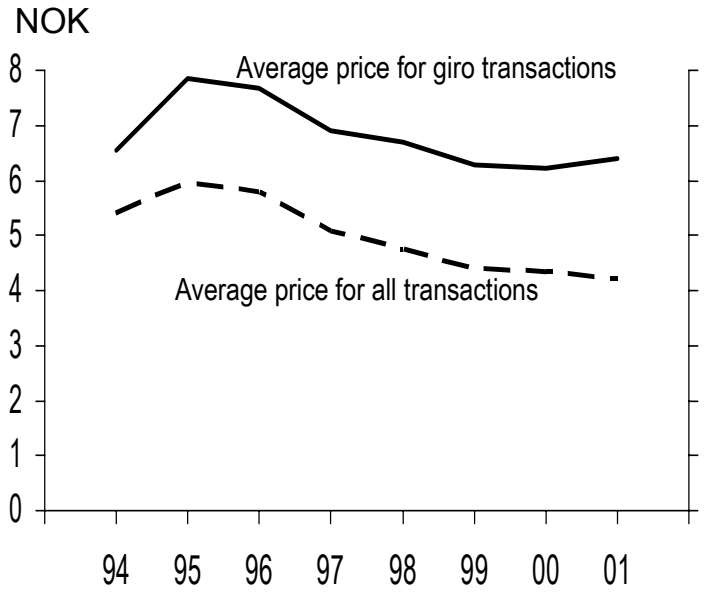
[a] Approximate figure
[b] Excl. withdrawals at the counter
[c] All transactions, incl. estimates for services not included in national statistics, viz. deposits, night safe and transfers
[d] Excl. night safe

Total costs for producing payment services fell from NOK 6.3 billion in 1994 to NOK 5.9 billion in 2001 (in 2001-NOK), a fall of 6 per cent. The reason for this is a shift from manual services to electronic payment services such as payment cards and electronic giros. The

average cost of producing payment transactions[4] was halved in the period. At the same time, prices charged to customers have increasingly reflected the actual costs of producing the services. As from 1 July 2000, Norwegian banks were no longer allowed to earn float income.

The gain achieved by increased productivity accrues both to customers and the banks. Chart 1 show that, on average, the customers paid less for a transaction in 2001 than in 1994 (in terms of 2001-NOK) both when the basis is all services and when we base the calculation on giro services only[5]. Since 1994, more transactions have been produced by banks by lesser recourses (measured in NOK).

Chart 1: Average prices per transaction and average prices per giro transaction in Norway. Prices in 2001-NOK.



Source: Norges Bank

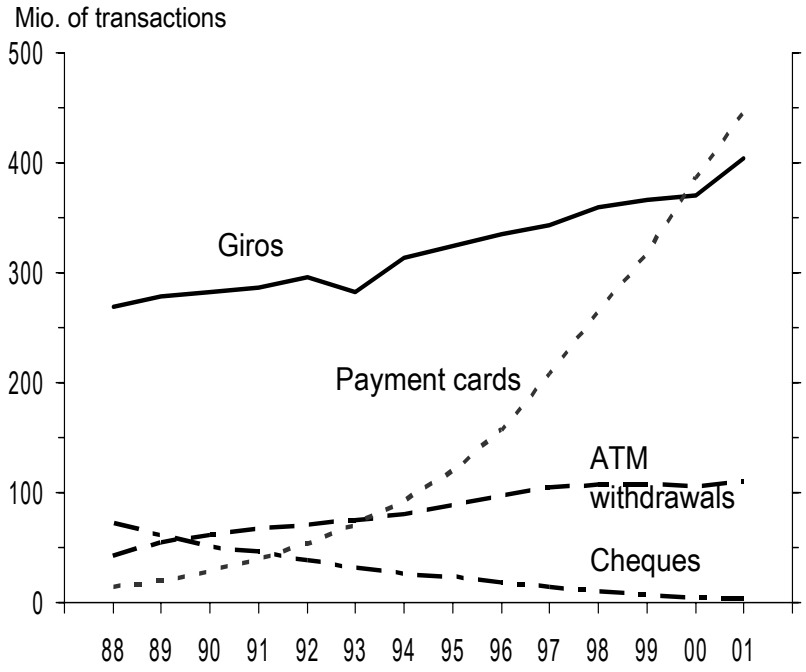
Chart 2 shows that the use of various payment services has changed substantially since the first survey. In 1988, payments at point of sale were usually made by cheque or in cash, whereas in 2001, payment cards were the most frequently used non-cash payment instrument. Bills are mainly paid by giro, and the number of giro payments has increased slightly over the whole period. Today, about half of all cashless transactions are executed by means of cards.

[4] The average cost is calculated by weighting unit costs for the individual services by national transaction figures. The figures in Table 1 are adjusted by the general consumer price index and express costs in 2001-NOK.

[5] Chart 1is from the analysis in Norges Banks ”Annual report on payment systems (2002)”, chapter 5.

In 1994, 40 per cent of all cashless payments were electronic. This share increased to 83 per cent in 2001.

Chart 2: Use of payment instruments 1988-2001



Source: Norges Bank

2. ABC – Activity Based Costing

The banks participating in the survey delivered data on costs which were analysed in accordance to the Activity Based Costing (ABC) – method. The method is developed by Cooper and Kaplan (1999), and others, among them Bjørnenak (1993) and Sti (1993) have contributed in the further use of the method. Norges Banks two previous surveys applied the Contribution Margin Analysis. Change of method leads to some problems in comparing results between the surveys, but since we found the ABC-method to deliver more accurate results, we found it appropriate to use the ABC-method in the 2001-survey.

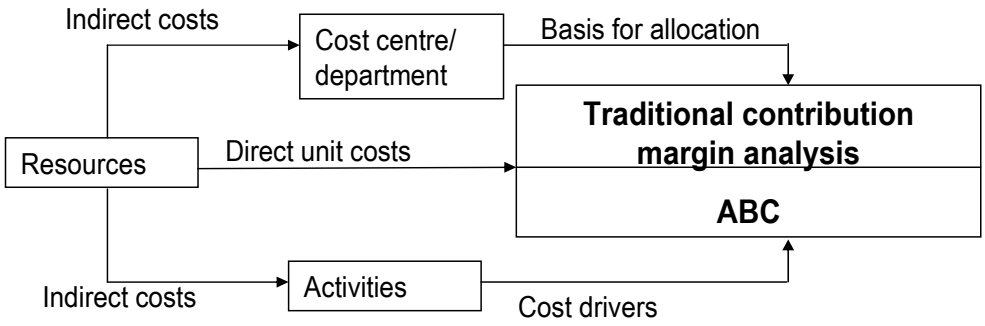
The ABC-method is particularly suited in cases where support functions' share of total costs is high and rising over time, and/or where there is wide variation in products, services, customers and production processes. Banks' production of payment services is characterised both by support functions that generate a large proportion of the total costs and wide variation in how the services are produced, and hence also wide variations on the level of costs

allocated to each service. The ABC-method is useful to measure the use of resources (labour and machinery) for producing different services. Through the detailed allocation pattern, based on activities that the employees or machinery really perform, the costs are allocated to the product/service in a more satisfactory way than in other methods, as the Contribution Margin Method. This results in a more precise picture of the distribution of costs and a useful basis for strategic decisions.

The costs generated by the support functions are *indirect costs*, and we allocate the indirect costs with an *allocation key* to each product. In the ABC-analysis, the allocation key is the *activities* performed in producing the products. This is different from the contribution margin analysis, where cost centres or departments are used as allocation keys. A list of the activities in this survey is shown in Table 5. As in other methods, the ABC-framework also includes *direct costs*. Direct costs are costs related directly to each individual service provided by the bank and vary with the volume delivered. In this survey the volume is measured by the number of transactions.

Costs are generated by the *resources* the bank use to produce their products and services. The resources are labour, machinery and other facilities necessary in the production. As chart 3 shows, the allocation of direct costs is similar in the contribution margin analysis and in the ABC-analysis. The methods differ in how indirect costs are allocated.

Chart 3: ABC analysis and contribution margin analysis



Source: Bjørnenak (1993)

In the analysis of the banks' costs in producing payment services, the participating banks provided and processed the requested information in a specific framework. Those banks who

already used an ABC-framework for payment services adjusted their existing method to fit our framework. This did not affect the results in our survey adversely.

3. Implementation of theory

Seven banks

In the 2001-survey, seven banks participated. Originally, 28 banks were asked to participate.

Table 2: Participating banks		
2001	**1994**	**1989**
DnB (incl. Postbanken)	DnB	DnB
Nordea (Kreditkassen)	Postbanken/Postgiro	Postbanken/Postgiro
Romsdals Fellesbank	Kreditkassen	Kreditkassen
BNBank	NOR	NOR
Larviksbanken		
Andebu Sparebank		
Harstad Sparebank		

The basis for the analysis was annual accounts for 2001. The first step in the analysis was to define relevant and irrelevant costs in the production of payment services. Some costs in the annual accounts were replaced with calculated costs, for example calculated rent for property or depreciation of machinery. Some costs were not displayed in the annual accounts in a manner useful for the survey. Invoices from BBS and EDB Fellesdata were used as basis for some figures, as they were the primary source for information relating to number of transactions, accrued costs in centralized functions in the Norwegian banking structure, and also interbank fees for ATM and giros.

Table 3: Bank's costs		
Relevant costs	**Irrelevant costs**	**Calculated values**
Direct costs (costs incurred from processing transactions etc in the payment system) *Indirect costs* (other costs incurred from overhead activities in the bank, distributed to the services by allocation keys)	Interest cost Brokerage costs for in-house brokers Depreciation on property, furniture and machinery	*Alternative cost* on property, furniture, machinery and product development

Table 4: Costs	
Direct costs	**Indirect costs**
Transaction costs	Personell costs
Message reports and receipt forms from BBS and EDB Fellesdata	Training
Cash difference	Travel costs
Interbank fee (ATM)	Information Technology
Settlement costs	Property
Security costs for cash distribution	External revision
Postage	Marketing
Vouchers	Machinery/Inventory/Bank technology
Development costs	Fees on notes and coins from Norges Bank
Sum direct costs	Portfolio/investment management dependent costs
	Foregone interest on cash stock
	Security
	Card services bought from external parties (production of cards etc.)
	Office supplies
	Telephone
	Postage
	Other running expences
	Sum Indirect costs

Calculated values

The banks were recommended to carry out some alternative/special calculations to obtain a cost picture as close to the correct distribution as possible.

Costs based on operation of internal computer systems and communications were distributed to the banks' four different operational areas (see next sub-section and Appendix A: Worksheet 1) by the number of computers in the different areas of the bank. If 50 of 200 computers were used in the area Payment Systems, 1/4th of the costs should be distributed to Payment Systems. IT-costs related to the running of payment systems are included in the direct costs "transaction costs and settlement costs".

Costs caused by marketing could be distributed to the four operational areas by the nature and size of the marketing campaigns. Examples: Costs related to campaigns for payment cards should be allocated to the Payment Systems area. Costs related to campaigns for loan-financed consumption should be allocated to Banking consultant services.

Costs related to total assets, like fees for the banks deposit insurance funds, fixed fees for BBS and other costs dependent on the size of total assets were allocated by the share of total assets assigned to each operational area in the banks. In the area Payment Systems, the value

of transaction deposits were used as weighting base. In the area Portfolio/Investment management, value of savings accounts were weighting base. For Administration and Banking consultant services areas, value of securities was used as weighting base.

Depreciation and write down of machinery and inventory were replaced with an alternative calculation. The banks were encouraged to use economic lifespan to allocate costs. If an asset had an economic lifespan of N years, the cost for each year was 1/N. Furthermore, if an asset were used in more than one operational area, the bank had to distribute the annual cost across the areas.

Costs related to buildings and housing were calculated using market rental costs for the buildings. The calculated costs should be distributed to the different operational areas after number of square meters each operational area employs.

Costs related to foregone interest due to cash stock should be calculated as a loss of interest income based on the NIBOR (Norwegian inter bank offer rate) interest rate.

Development costs were calculated as the development costs for each new service, divided on the expected economic lifespan of the service (the same method as for depreciation and write-off). An alternative approach was to use average depreciation for the service, wich were used by two banks in the survey.

The four main areas of operational activity in banks

Banking operations include a lot more than payment services, and the costs presented in Table 4 include both costs from payment services and costs from other types of banking operations. Therefore, we asked the banks to split the ordinary operations into four areas: *Payment systems, Portfolio/Investment management, Administration* and *Banking consultant services (customer consulting)*. The costs were then split on these four areas in a matrix, shown in Appendix A: Worksheet 1. We distributed a list of operations for these four areas that the banks could complete based on time-studies carried out in each bank (see below). The banks were allowed to use other allocation keys if they had better data available. Indeed, some of the banks had better data available, mostly based on the division of labour on departments in the banks.

Costs related to the Portfolio/Investment management area were eliminated, as they were considered irrelevant to the survey.

Part of the costs related to the areas Administration and Banking consultant services were considered irrelevant for the area Payment services. The irrelevant costs were costs generated by consulting and administration for other operations in the banks. The relevant part of the costs in the areas Banking consultant services and Administration were then allocated to the Payment Systems area (see Appendix A: Worksheet 4).

An alternative allocation pattern was to distribute costs related to Banking consultant services and Administration by doing time studies. Using this approach, the costs were distributed directly to the different areas of operations. The approach described in the previous paragraph was simplified, as the distribution of the costs generated in the two areas were distributed directly into the Payment system area.

Time studies and activities

Time studies were carried out in most of the participating banks. We applied an activity framework that could be used as a basis for the time studies (Appendix A: Worksheet 2). The same list of activities was also used as basis for distributing the indirect costs to the different payment services (Appendix A: Worksheet 4 and 5). The list is displayed in Table 5.

As the list of activities show, we concentrated on the activities related to payment services. For a complete ABC-analysis of the entire bank, the list of activities would be much longer. But as many activities were irrelevant to the survey, we chose to sum them up in the activity "All other activities". As this activity is an aggregate of a large proportion of the activities carried out, there is a possibility that the banks underestimated this activity in relation to the other specified activities related to payment services. We asked the banks to be attentive to this, and as far as we know, they tried to make a correct evaluation of its size. This is, however, a potential weakness of the survey.

The list of activities was originally based on results from a former study done in one of the banks in the survey, Andebu Sparebank. Andebu is a very small bank, even in Norwegian terms. The activities performed in such a small bank is not necessary the same activities as in larger banks. To make the list more relevant to other banks, we added some activities based on experiences from other, larger banks in the survey. The largest banks had their own list of

activities, including up to several hundred activities related to the payment system area. As it turned out, our list covered the main activities in the larger banks, but their activity lists were a lot more detailed than our suggestion. A more detailed list of activities gives a more accurate view of the banks operations. We allowed banks with existing analysis to base the survey results on their own analysis framework. They were asked to adapt the analysis, though, so that the analysis would be in accordance with the survey framework. In whole, the seven banks' analyses were consistent with each other.

Table 5: Activities

Group of activities	Activities	Description
At the counter services	Pay Desk	Opening and closing the cashier's window, registering forms, deposits, withdrawals, information about the customer etc. Cash handling, transfers, cheques, paper-based giro, foreign currency, travellers cheques
Service	Maintenance of payment services	Registering and updating agreements with customers (for cards, direct debits etc.)
	Maintenance of accounts	Establishing and deleting customers accounts in the bank and in the securities registry
	Maintenance of payment cards	Activate and close down cards, establish and renew agreements, ordering of cards
	Maintenance of investments	Buying and settling funds, activities connected to the size of the portfolios
	Account inquiries	Handle enquiries on account status from customers
	Voucher handling	Handle enquiries on earlier payment transactions from customers
	Cash handling	Filling of ATMs and safe deposits with cash, value transports, contact towards NOKAS and Norges Bank
	Night safe	Counting and entering of incoming night safe deposits
	Mail and postage	Franking, stamping, post distribution etc.
	Switchboard	Switchboard functions
Payment counselling	Payment products	Counselling, evaluation and recommending salary accounts and account products/payment instruments
Sales	Campaign / Active sale	Initiation and implementation of campaigns, announcements, sponsoring, active sale to specific customers etc.
	Sales and activity registration	Registering sales promotions, campaigns etc
Banking operations	Personnel administration	Wages, wage administration and other personnel related expenses
	Account keeping	Account keeping
	Reporting	Internal and external reporting
	Auditing	Internal and external auditing, contact toward the auditor(s)
	Safety	Evaluation of existing safety routines
	Work in administrative board	
Information Technology	Support, running, systems	Support on office/desk systems. Contact towards suppliers of systems and applications. Operation of the banks own systems and computer networks, upgrading of existing applications and evaluation of new systems.
Other	Training	Planning and implementing internal courses, participation in external courses and classes.
Clearing and settlement	Settlement	Accounts in Norges Bank and other settlement bank(s)
	Settling RTGS transactions	
	Clearing	Clearing in EDB and BBS (NICS)
Every other process	All other activities	Everything not mentioned in the other activities in this list

Payment services

The next step was to identify the different payment services that banks offered. In Table 6, the most important payment instruments in Norway are listed. The annual report on payment systems published by Norges Bank provides a statistics of prices on these payment instruments.

National statistics show that payment card is the most popular payment service that banks offer, followed by giro. The term "giro" includes different methods for paying credit transfers and two types of direct debits. A few cheques are also issued in Norway, but the use of this service is diminishing.

The largest banks in this survey offered all the services we listed. As we discovered of the information the banks provided, the largest banks tended to define "services" to be a very large range of services. An example is payment cards for use in EFTPOS terminals where the banks defined the service as multiple services, reflecting multiple customer segments. To adapt the different bank's payment services to our survey, we had to sum the different cards and the assigned cost into fewer services. This occurred both for cards, giros and cheques.

Company terminal giro and remittance is similar services delivered to large companies with large number of payments. The companies use an electronic terminal with direct online connection to the bank to initiate giro payments. It is a fully automated service in most cases. There are several suppliers of the services, BBS deliver remittance, different banks or bank groups deliver several variations of company terminal giro (Sparnett, Nornett etc.). Smaller banks in the survey offered just one ore none of the services company terminal giro and/or remittance. To simplify, we combined these services, and the cost is therefore a weighted average of remittance and company terminal giro.

Table 6: Payment services				
Payment medium	**Payment service group**	**Payment service**	**Payment is initiated by**	**Used (mostly) by**
Deposits	**Giro (Credit transfers and direct debits)**			
	Electronic giro services	Giro by telephone	Payer	Private customers
		PC/Internett	Payer	Private customers and small businesses
		Direct debits (Avtalegiro)	Payee	Business and Private customers
		Unnotified remittance / company terminal giro	Payer	Business customers
		Notified remittance / company terminal giro	Payer	Business customers
		Remittance / Company terminal giro with customer identification (KID)	Payer	Business customers
	Paper-based giro services	Giromail	Payer	Business and Private customers
		Giro cash payment	Payer	Business and Private customers
		Giro account debits	Payer	Business and Private customers
		Remittance / Company terminal giro sent as a money order	Payer	Business customers
		OCR Optical Character Recognition - File	Payer – information service to payee	Business customers
		OCR Optical Character Recognition - Return	Payer – information service to payee	Business customers
	Cheque	Cheque (Paper based)	Payer	Business and Private customers
	Payment cards	Payment terminal (EFTPOS) Debit cards BankAxept and Visa	Payer	Private customers
Cash	**ATM**	Own bank's ATM during business hours	Payer	Private customers
		Own bank's ATM outside business hours	Payer	Private customers
		Other bank's ATM during business hours	Payer	Private customers
		Other bank's ATM outside business hours	Payer	Private customers
	At the counter / desk	Deposits/Withdrawals	Payer	Business and Private customers
		Transfers	Payer	Business and Private customers
		Night safe	Payer	Business customers

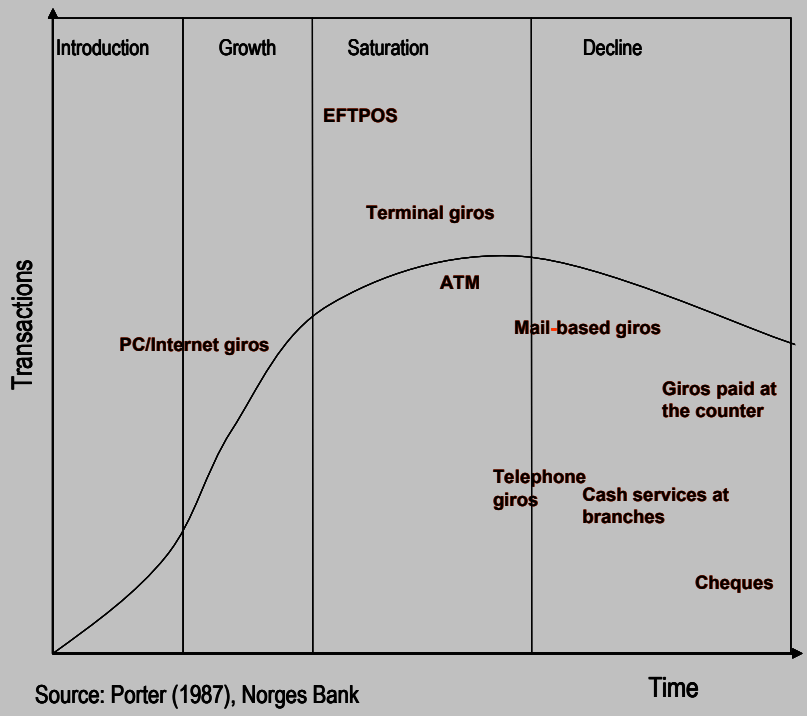
Box 1: Payment services and life cycle

The costs of producing payment services vary to some extent with how long the services have been in use. To shed light on the cost structure of different services, and the banks strategy for further developments of the products, a useful approach is the products' life cycle.

Initially, cash was the dominant payment means and payment instrument. But cheque has existed for a long period of time, regulated by the Act of Cheques since 1932. Postgiro and Bankgiro was established in 1943 and 1946 respectively, and were replaced by the common standard form Giro in 1996. BBS was established in 1973, to process bankgiro etc. Several different variations of giro has been established, among them Giromail in 1992, Telephone giro in 1992 and PC/Internet giro in 1996. Payment cards were introduced by the international card companies in the mid 1980-ies, accompanied of four different incompatible Norwegian debit card/network solutions which were unified in the Norwegian debit card solutions Bankaxept in 1992. ATM services were introduced in the late 1970-ies

The life cycle is illustrated in Chart 4, which is based on Porter (1987). Services in the *introduction phase* are marked by intensive marketing and high depreciation costs associated with developing such services. There is often surplus capacity and production has yet to find its final form. Competitors are few and risk is high. In 2001 the PC/Internet giro was passing from this phase to the next one, i.e. the *growth phase*.

Chart 4: Location of payment services in the life cycle



Source: Porter (1987), Norges Bank

In the growth phase there are more users, and fewer alternative solutions from which to choose. This is exemplified by the debate about electronic invoicing, which was introduced with two sets of standards in 2001. The growth phase is characterised by considerable marketing and the first signs of mass production. At times, capacity may be insufficient to accommodate the growth generated. Most payment service providers establish their operations in this phase, as was the case for PC/Internet giros and EFTPOS. Prices fall compared with the introduction phase.

The most popular payment services were in the *saturation phase* in 2001. In this phase, services are used by "everyone", they are familiar with the use of the service, and the technology is no longer alien. The quality of the service is stable and satisfactory and some services may have surplus capacity. Marketing is less intensive. Providers compete on price, and there is greater focus on costs. Services may remain in this phase for some time.

The final phase is *decline* when the number of transactions falls; customers know the product well and demand good service, advertising costs are low. There is little risk of new competitors to enter the market. Prices may rise towards the end of this phase due to diseconomies of small scale operations. Ultimately, fewer providers will offer the service. Cheques may be a good example service in the declining phase, the price has increased, and, in addition, not all shops will accept the cheque today.

Transaction data

A vital condition to accomplish such a survey was that the participating bank could provide transaction data for each payment service. Some banks had already collected the necessary data for internal analysis, and the rest could find the data in their EDB Fellesdata database. The corresponding national transaction numbers for each payment service is available in the annual report on payment systems. These data are mainly collected through BBS and EDB Fellesdata, where all payments are cleared or processed in various ways.

Direct costs

When the banks had found the number of transactions generated by the different services, it was possible to allocate direct costs to the different services. Most of the banks used number of transactions to allocate costs to the service. The total direct costs were divided by the number of transactions for the relevant services to find unit direct cost. Unit direct costs were multiplied by the number of transactions generated by each service to find the cost relevant to

each service. Experience based on internal calculations showed that in some cases, this distribution method was good, but not adequate. In some banks, experience and invoices were complementary information when the direct costs were calculated and allocated. The costs that were allocated are presented in Table 4 under the heading "Direct Costs". See also Appendix A: Worksheet 3.

Indirect costs and cost drivers

To allocate indirect costs in the ABC-method, we use *cost drivers*. A cost driver is a factor identified as the "driver of costs" in the activity. As the factor (cost driver) repeats itself costs generated by the activity will increase. In this survey, we used three cost drivers: *transactions*, *accounts* and *products*.

Transactions were defined as number of transactions of the different services.
Accounts were defined as the number of accounts that offered the service according to terms in the account agreement. Some of the services, like cash giro, do not require an account at all by the payer. Some services, like giro at the counter, are offered to all customers with an account in the relevant bank.
Products are defined as "1" or "0", depending on whether the bank offers the product or not.

The cost drivers were allocated to the different activities and the different services. A large matrix in an MS Excel-spreadsheet was used for this purpose, see Appendix A: Worksheet 6, to give the banks a good overview over the different combinations.

The use of only three cost drivers may be a weakness to the survey. Other analyses in the ABC framework often use several cost drivers, potentially hundreds of drivers. The number of cost drivers is dependent on internal processes in the company analysed. For a more accurate analysis than shown in this paper, banks should try to identify all relevant cost drivers. To complete a survey covering both small and large banks, we had to use few and common cost drivers. We identified three, as mentioned above. The three drivers were chosen to cover most of the activities we identified, and to fit into every bank. For the purpose of this survey, three cost drivers therefore seemed appropriate.

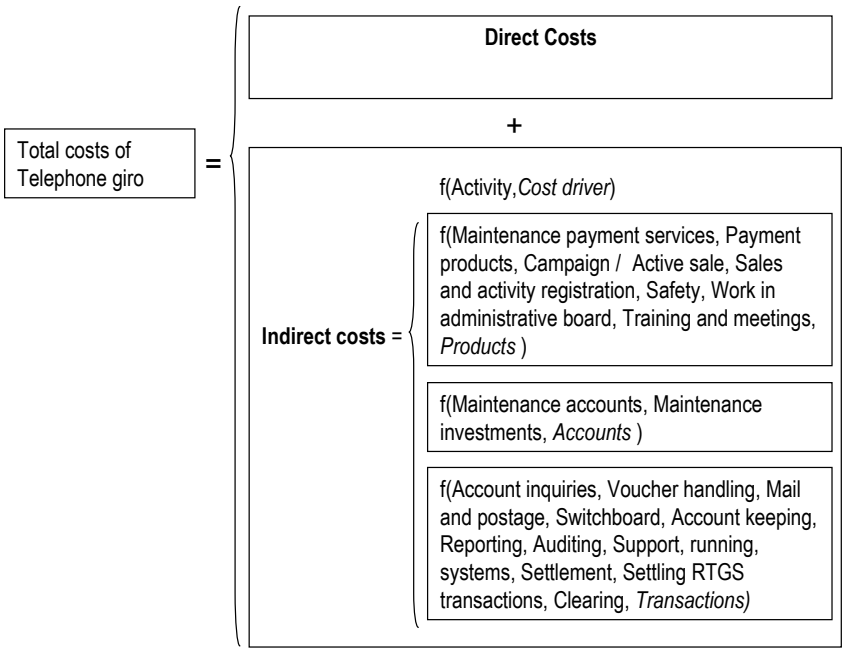
In the matrix, this gave most services three cost drivers, dependent on which activities the bank used to produce the service. An example is shown in Table 7. As shown, not all activities are relevant for each of the services offered. The complete matrix is shown in

Appendix A: Worksheet 6 Part I and II. Blank cells in the matrix indicate that the cost driver is not relevant to the activity.

Table 7: Example of assignment of costs through cost drivers	
Payment service: Telephone giro	
Activity	**Cost driver**
Pay Desk	Not relevant activity for this service
Maintenance payment services	Products
Maintenance accounts	Accounts
Maintenance payment cards	Not relevant activity for this service
Maintenance investments	Accounts
Account inquiries	Transactions
Voucher handling	Transactions
Cash handling	Not relevant activity for this service
Night safe	Not relevant activity for this service
Mail and postage	Transactions
Switchboard	Transactions
Payment products	Products
Campaign / Active sale	Products
Sales and activity registration	Products
Personnel administration	Not relevant activity for this service
Account keeping	Transactions
Reporting	Transactions
Auditing	Transactions
Safety	Products
Work in administrative board	Products
Support, running, systems	Transactions
Training and meetings	Products
Settlement	Transactions
Settling RTGS transactions	Transactions
Clearing	Transactions
All other activities	Not relevant activity for this service

As Chart 5 illustrates, the indirect costs are calculated as a function of the activities and the cost driver. One unit more of the cost driver for each activity will increase the total cost. Telephone giro is shown as an example, but the same is valid for every service delivered by the banks in the survey.

Chart 5: Distribution of costs. Example: Telephone giro



Most services were analysed like this: one activity normally had one cost driver, and the cost drivers distributed the indirect costs to the service after the following formula:

Indirect cost assigned to the relevant activity / Sum of cost driver

Sum of cost driver included cost drivers for services that were either processed automatically or manually. The cost of pay desk activities corresponds to all services that include manual procedures at the pay desk. This includes all services processed at the counter; cheque, giro cash payments, giro account debits, transfers and deposits/withdrawals. The sum of transactions for these five services is the relevant cost driver for the activity Pay desk, meaning that the pay desk costs are allocated to these five services according to the number of transactions of each service. For the activity Clearing, transactions is also cost driver. But Clearing affects most services, so all services except cash deposits/withdrawals and night safe are included when the sum of transactions (the relevant cost driver) is calculated. See also Appendix A: Worksheet 7.

Not all services fit this pattern, though. Two services, Remittance and Company terminal giro, were each delivered in four different variations. The variations were different information in the message confirming the completion of the transaction: with or without KID (KID is a

code, consisting of up to 21 digits, confirming the identity of the payer), with notification and as money order. This gave, in our framework, eight services.

With the allocation of costs used on the telephone giro and other services, the eight services would be assigned a too large proportion of the indirect costs with products as cost driver. The eight variations of the two services were all weighted with "1" in connection with the cost driver Products. To solve the problem, we had to alter our initial approach.

We realised that the eight different services merely were eight varieties of two services. We therefore had to aggregate the eight varieties into two services when we distributed indirect costs with Product as cost driver. The solution was to assign *two* cost drivers to some activities; that is, a combination of Products and Transactions. The number of Transactions decided the weighting of the Products driver. An example: for remittance, four services with different number of transactions were assigned costs from different activities after the following formula:

*[Indirect cost assigned to the relevant activity / (sum of services-3)]**
[Number of transactions of the service/Number of transactions of all four services]

This solution gave what we found to be a feasible cost allocation of product related costs to the services. Also, it allocated more of the total indirect costs to other services, as the eight services now were treated as two products with weights in accordance to transactions. Some of the banks offered both remittance and company terminal giro to their customers, but not all banks did. In the analysis, we combined remittance and company terminal giro and treated the two services as one, but with four different variations. This was to simplify the results in the survey.

Furthermore, for the other services with the same cost driver (Products) on the same activities (Pay desk, Payment products, Campaign/active sale, Sales and activity registration, Safety, Work in administrative board and Training and meetings), the initial formula had to be altered to fit to the reduced number of services. The formula then was:

Indirect cost assigned to the relevant activity / (Sum of cost driverProducts-3)

Formulas are also illustrated in appendix A: Worksheet 7.

Having identified services, cost drivers, activities and costs, we distributed the indirect costs to the services from the activities, using the cost drivers as allocation key. This gave us the possibility to analyse the indirect total costs and indirect unit costs. We then summed the direct and indirect costs for each service and came up with a total cost per service based on the ABC framework. The direct costs distribution is explained earlier. To identify unit costs, we divided the total cost with number of transactions. The framework made it possible to identify total and unit direct and indirect costs, total cost per transaction for each service etc. In Appendix A: Worksheet 8, the calculations were done. The results are shown in the next section.

Table 8: Payment service: Unnotified remittance / company terminal giro		
Activity	**Cost driver**	**Cost driver**
Pay Desk	-	-
Maintenance payment services	Products	Transactions
Maintenance accounts	Accounts	-
Maintenance payment cards	-	-
Maintenance investments	Accounts	-
Account inquiries	Transactions	-
Voucher handling	Transactions	-
Cash handling	-	-
Night safe	-	-
Mail and postage	Transactions	-
Switchboard	Transactions	-
Payment products	Products	Transactions
Campaign / Active sale	Products	Transactions
Sales and activity registration	Products	Transactions
Personnel administration	-	-
Account keeping	Transactions	-
Reporting	Transactions	-
Auditing	Transactions	-
Safety	Products	Transactions
Work in administrative board	Products	Transactions
Support, running, systems	Transactions	-
Training and meetings	Products	Transactions
Settlement	Transactions	-
Settling RTGS transactions	Transactions	-
Clearing	Transactions	-
All other activities	-	-

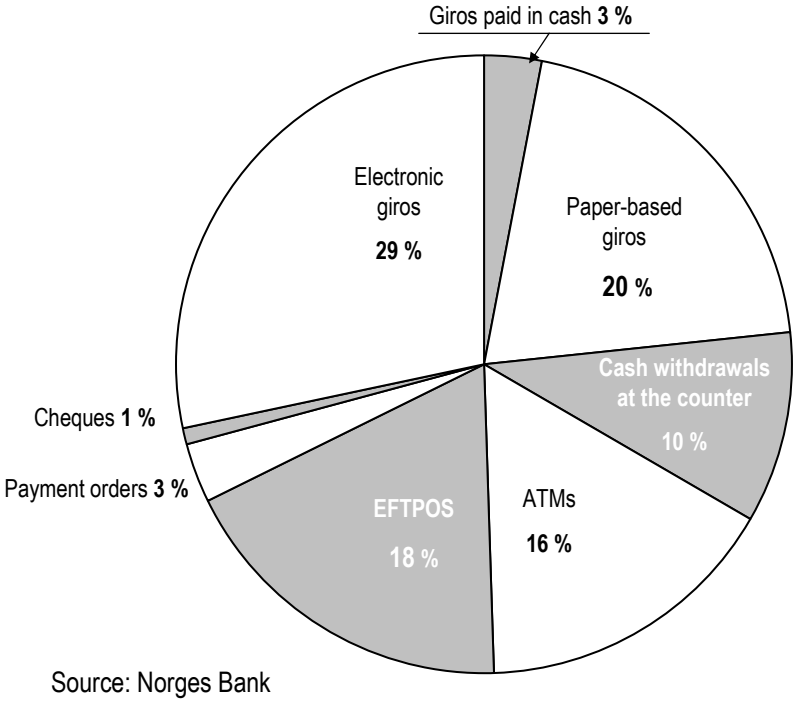
4. Findings

Total costs and income

To calculate total costs, the results from the survey had to be combined with other statistics. We used transaction data for each service, as provided by "Annual report on payment systems 2001". The unit cost for each service was multiplied by the total number of transactions for the same service. The sum of all the services gave us total costs. Total costs were 5.9 billion NOK in 2001.

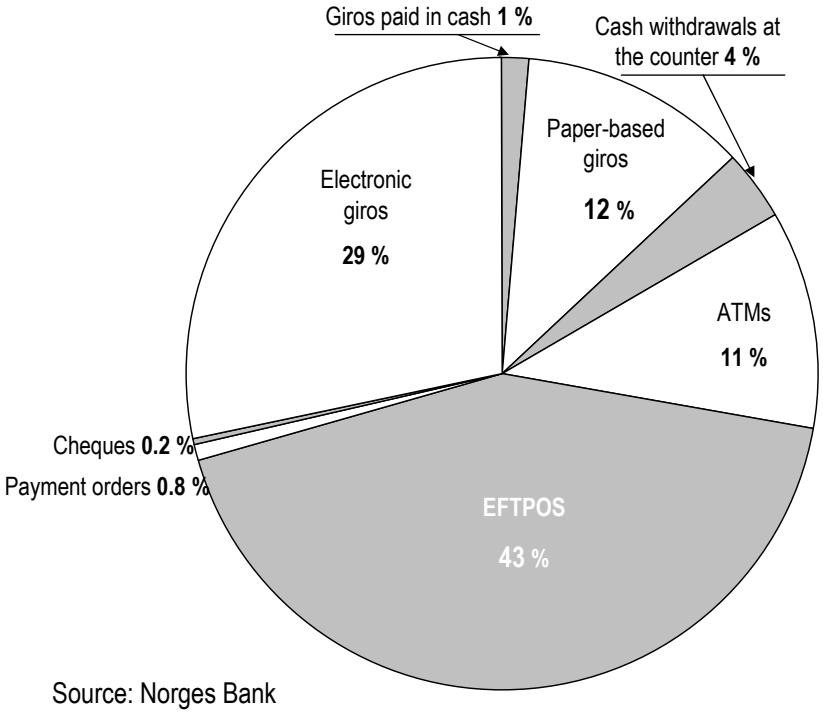
Chart 6 breaks down banks' total costs and chart 7 breaks down number of transactions related to the various payment services. Giro services generate 52 per cent of total costs, i.e. almost NOK 3 billion for little more than 400 million transactions. Giro services at the counter (in cash and charged to account) are very expensive with costs of NOK 725 million (12 per cent of total costs) spread over 50 million transactions. Traditional, paper-based services are relatively more expensive to produce than modern, electronic services. Paper-based services including cheques account for 27 per cent of the costs, but only 14 per cent of the transactions. Electronic giro services account for 29 per cent of costs and 28 per cent of the transactions. EFTPOS card transactions and ATM withdrawals account for 34 per cent of the costs and 54 per cent of the transactions, while cash withdrawals at the counter account for 10 per cent of costs and 4 per cent of transactions.

Chart 6: Costs by payment service



Source: Norges Bank

Chart 7: Transactions by payment service



Source: Norges Bank

Income is reported to Norges Bank each year[6], and is based on the annual accounts of the banks. For 2001, the income from domestic payment services for all banks was NOK 4.1 billion. Based on list prices per transaction (excl. discounts), annual card fees, income from OCR and transaction figures from Norges Bank (2001), income totals approximately NOK 5 billion. The difference between estimated and actual income is attributable to customer discounts.

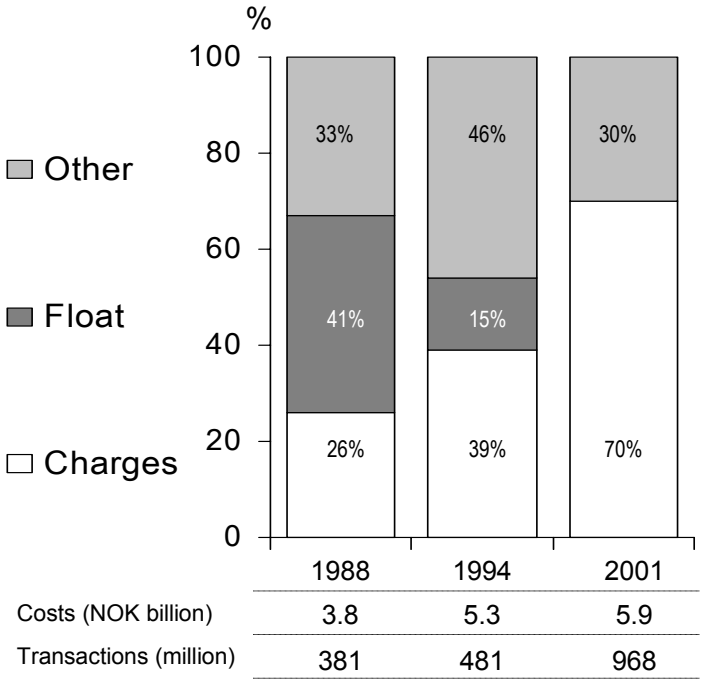
Banks' income from direct prices (fees) has risen even though the average price per transaction has not increased since 1994 (see chart 1). Chart 8 shows how the banks cover the costs of payment services in 1988, 1994 and 2001. Prices charged directly to customers covered 70 per cent of the banks' costs related to payment services in 2001. This was a marked increase from 1988 and 1994. Cost coverage via float is not taken into account in 2001 because of the statutory amendments in the Financial Contracts Act, effective from July 1st 2000. The residual item "other" refers to costs that are not covered by direct prices on payment services or float.

This survey focuses on the costs of supplying the various payment services. The results show that the income generated by prices fails to cover all of banks' costs connected to payment services. Banks frequently base their pricing decisions on customer profitability analyses. This combined with the fact that banks are dependent on providing payment services in order to be a satisfactory alternative for customers will influence the pricing of payment services.

An important point is that the direct prices does not necessary have to cover the total unit costs for each service. Prices should reflect the relative cost differences in producing the service, and it should at least cover the variable costs. Furthermore, as most banks consider payment services as a prerequisite to perform banking activities, some of the costs may be covered by interest rate margin or other sources of income in the individual bank. Cross subsidising will disrupt the principle of transparency in pricing of payment services toward the customers, but as long as the prices reflect the differences in costs between services the relative price signal will be correct. A cost coverage from direct pricing of 70 per cent is satisfactory, but the banks should still seek to cover their costs by direct pricing of payment services.

[6] The income figure refers to accounting data from all banks and branches in Norway, taken from "Accounting Statistics for Banks and Other Financial Intermediaries" delivered by the banks to Norges Bank. The income figure does not include VISA Norge's earnings on merchant commission.

Chart 8: How banks cover the cost of producing payment services, per cent



	1988	1994	2001
Costs (NOK billion)	3.8	5.3	5.9
Transactions (million)	381	481	968

Source: Norges Bank

Unit costs

The framework in the survey gave adequate information to calculate unit costs for each service in each bank. To secure anonymity, we calculated average unit costs for the seven participating banks.

Unit costs for various services vary widely. The night safe is the most expensive per unit, followed by terminal giro sent as a money order. Most paper-based services cost more than their electronic equivalents. The exception is the mail giro, which costs less than the PC/Internet giro. EFTPOS transactions are produced at the lowest unit cost. Table 9 shows unit costs, transaction figures, total costs and prices for the services.

Giro

Paper-based giro services require far more resources per transaction than electronic services. Table 9 shows that the cost per transaction ranges from NOK 7.50 to NOK 24.50. This is due to the manual operations required and the costly machinery needed to process the forms. Electronic giros pass more rapidly through the system, they share to some degree the

infrastructure (telephone lines etc.) with non-bank users, and as a rule require no manual processing. This is reflected in unit costs, which vary from NOK 4.50 to NOK 8. Electronic giro services are considered to be more efficient than paper-based services, not only due to the cost structure, but also because of short processing time and the low incidence of errors[7].

Table 9: Costs, prices and transactions

	Transactions[1] (million)	Total costs[2] (NOK million)	Costs[3] (NOK)	Price[4] (NOK)
Mail giro	74	543	**7.50**	5.14
Giro, account debits	38	564	**15.00**	18.59
Giro, cash payments	12	161	**13.00**	27.37
Company terminal giro sent as money order	7	182	**24.50**	30.14
Phone giro	29	167	**6.00**	2.45
Internet giro	66	527	**8.00**	1.89
Direct debit	33	162	**5.00**	1.42
Company terminal giro -electronic	144	657	**4.50**	2.78
Cheques	3	65	**22.50**	21.06
Payment terminal (EFTPOS)	412	996	**2.50**	2.24
Own bank's ATMs	66	562	**8.50**	2.14
Other banks' ATMs	39	283	**7.50**	4.41
Withdrawals/deposits[a]	37	558	**15.00**	0.00
Transfers[b]	4	116	**28.00**	0.00
Night safe[c]	6	318	**55.50**	-
Total	968	5 867		
Average weighted by no. of transactions (except [a],[b] and [c])			**5.30**	
Average weighted by no. of transactions (all services except [c])			**5.80**	

[1] Source: *Annual Report on Payment Systems*
[2] Transactions multiplied by unit costs
[3] Unit costs for the seven banks in the survey rounded to the nearest 50 øre
[4] Unit prices for all banks excl. discounts (Source: *Annual Report on Payment Systems*)

Giro services at the counter are still among the most expensive to produce[8], even though costs have fallen since 1994. There are probably several reasons for the reduction in unit costs. Banks have undergone internal restructuring resulting in fewer cashiers at branches. At the same time, technological changes in cash transaction systems have improved processing speed. With a steady customer flow, bank staff is likely to make more efficient use of their

[7] Payment cards, direct debit and terminal giro services in particular are marked by a low incidence of errors. There are relatively more errors related to new electronic services such as PC/Internet since customers are still learning to use them.

[8] Giros processed at the counter can be paid in two ways: either by charging an account or by paying in cash. Giros paid in cash are usually paid by persons who do not have a customer relationship with the bank in question. Banks therefore choose to set a higher price for giros paid in cash.

time than when they must wait for customers. Moreover, costs incurred by the customer while waiting in a queue are not charged the bank. Viewed in isolation, giro services performed at branches generate income for banks, but when non-priced services at the counter are taken into account, overall at-counter business is not profitable. Interviews with banks suggest that it is necessary to maintain at-counter services in order to provide the service level expected by the customer. At-counter services, both those which are profitable on and those which are not priced, are used by the same groups of customers, like elderly people and/or small firms etc. according to anecdotal evidence from the banks in the survey. But as prices for services at-counter increase, it can be expected that the customers will use other services more extensively in the future. Overall, individual customers who use expensive services may be profitable for banks, even though costs related to the use of individual services are high.

Giro payments via PC/Internet are banks' most expensive electronic service. There are several reasons for this. One is that the service is relatively new and introduction costs related to technical solutions, marketing, contracts, training and customer support are high. Moreover, the computer systems have substantial surplus capacity. There is reason to believe that unit costs will decline when transaction numbers rise and development and introduction costs are reduced. Since the PC/Internet giro solution is closely related (technologically and cost-wise) to the telephone giro, there are similarities in the cost structure of these services. Banks no longer focus on promoting the telephone giro to the customers and transaction numbers are expected to fall. Telephone giro unit costs may therefore rise in the future.

Large companies pay giros via a terminal with closed terminal lines, and this is the most frequently used giro service. This survey covers both direct remittances and company terminal giros. The 1994 survey was confined to direct remittance services, which have become slightly cheaper to produce since 1994. Company terminal giro services which banks produce are more expensive since they cater to a greater degree to the customer's information needs. The service can be reckoned to be slightly more advanced and need more advanced software and hardware. Since the average figures include both direct remittance and company terminal giro services, costs are higher in 2001 than in previous surveys.

Branch services and cheques

Branch services include deposits, cash withdrawals at the counter and manual transfers between accounts as well as night safe and cheques. While the Annual Report on Payment Systems provides transaction statistics of cash withdrawals at the counter and cheque

transactions, no national transaction statistics are available for the other services. We have therefore estimated national transaction figures for these services on the basis of the market share of other services provided by the seven surveyed banks. Therefore, there is greater uncertainty about these figures than about the figures for the other services. Table 2 shows that it costs NOK 1 057 million to provide branch services that comprise about 50 million transactions. The night safe service has the highest unit costs in the survey and showed large variation in cost structure and cost level from bank to bank. The night safe service allows companies to make cash deposits outside banks' business hours, and therefore has no close substitutes. Costs are high due to security requirements, manual processing and limited possibilities for centralisation.

Cheques are used infrequently. Costs per transaction rose from NOK 14 in 1994 to NOK 22.50 in 2001, but prices have risen during the years, enabling banks to nearly cover the costs for providing this service. Cheques are usually processed manually by branch cashiers. One bank in the survey allows customers to mail cheques in the same way as mail-based giros. This is a flexible means of processing cheques, and appears to offer the possibility of cost and efficiency gains. In some other countries, cheques are processed electronically, similar to the mail giro system in Norway. Due to the decline in transactions performed by cheque, the business case for introducing such services seems weak in Norway. Electronic giro is anyway considered to be a more efficient way of paying bills than cheques. At the same time, card payments in EFTPOS terminals are more efficient means of payment at the point of sale than cheques.

Payment cards

In Norway, payment cards may be used at ATMs to withdraw cash and to make payments and withdraw cash at EFTPOS terminals. Hence, the costs for issuing cards and operating a card system are spread over ATMs and EFTPOS.

EFTPOS is the most popular payment service in Norway, accounting for 412 million[9] transactions in 2001. EFTPOS is a low-priced service with a unit cost of NOK 2.50 per transaction, down from the 1994 figure of NOK 4.50. Costs associated with establishing card agreements etc. are included in the survey and are spread over each individual transaction.

[9] The survey covers transactions performed by Norwegian bank customers using bank cards and VISA, totalling 412 million transactions. Oil company cards and other international credit cards are not included in the survey.

Banks charge the card holder an annual fee which is meant to cover these costs. Banks' development of EFTPOS in the mid-1990s initially involved substantial costs for deployment of terminals at new merchants, at the same time as costs for training and marketing were high vis-à-vis merchants and card holders. The reduction in costs since 1994 is probably due to lower unit costs in the production of this service, triggered by steadily increasing transaction numbers (economies of scale). Banks will introduce payment cards with an EMV chip[10] by 2005, which requires replacement of bank cards and terminals. This will entail additional costs which may raise unit costs for EFTPOS transactions slightly for a time.

Payment cards are increasingly used for cash withdrawals in shops. The numbers of cash withdrawals in conjunction with goods purchases in shops almost equal the total number of withdrawals at the counter and from ATMs in 2001. The number of days that cash circulates between shop and customer prior to returning to the banks is probably higher now than in 1994. Fewer ATM and at-counter withdrawals combined with longer circulation time reduce banks' cash handling costs.

Payment cards are also used to withdraw cash at ATMs. In 2001, withdrawals from their own ATMs cost banks NOK 1 more than withdrawals from other banks' ATMs. In the case of withdrawals from their own ATMs, banks have costs connected with cash replenishment, maintenance and security etc. When cash is withdrawn from another bank's ATM, costs are covered by an interbank charge that was NOK 4.50 in 2001[11].

Cost structure and unit prices

Our analysis draws a distinction between direct and indirect costs. Chart 9 shows unit costs broken down by direct costs (arising from external providers and/or other banks mainly via interbank charges) and indirect costs (arising from bank's own operations). The chart also shows unit prices charged for the various services[12].

Direct costs account for a large portion of total costs for automated services, while indirect costs account for a large share of total costs for manual services. This is partly because the

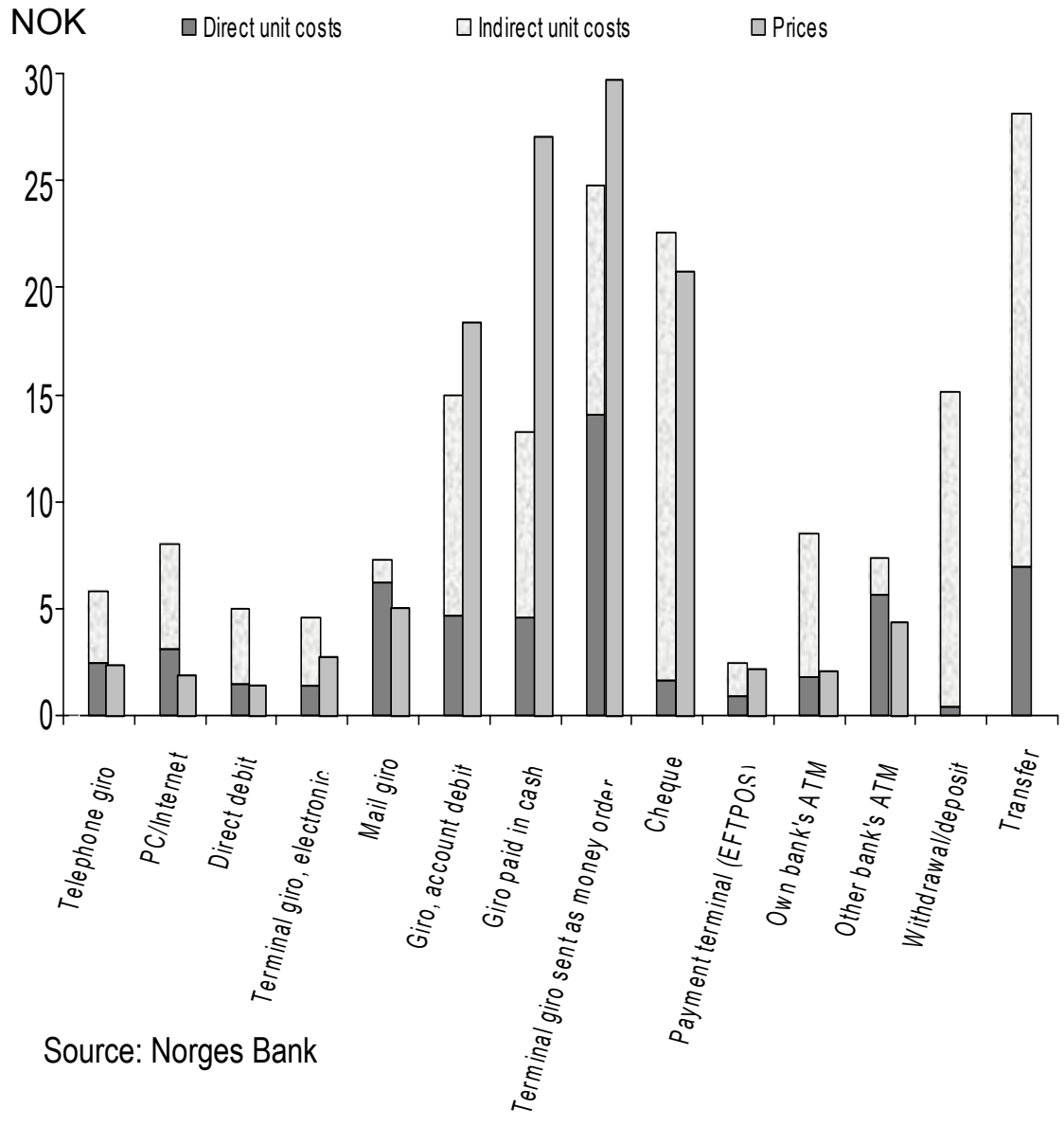
[10] EMV chips are based on a standard established by Europay, Mastercard and VISA, the largest card companies in the world. Combined with use of PIN codes, these cards are expected to achieve a higher security threshold against misuse than magnetic-stripe cards. Replacement of terminals has started. Introduction of the EMV chip will also require upgrading of ATMs.

[11] This fee was raised to NOK 6,50 in 2002.

[12] Information on prices has been taken from the Annual Report on Payment Systems.

analysis treats personnel costs as indirect costs. Indirect costs account for a relatively large share of total costs for PC/Internet services and several other automated services, since these services require a considerable amount of manual work in connection with contracts, marketing and customer support etc. Cheques are manually processed, and therefore indirect costs account for a large share of total costs. Direct unit costs predominate in other banks' ATMs, due to interbank charges, while indirect costs predominate in own ATMs. Direct costs also dominate for mail giro, since this is a mature service where the customer needs little support from the staff at the banks' branches and most banks use the centralised processing service at BBS. Direct costs account for a high share of total night safe costs, since some banks purchase such services from Norsk Kontantservice AS and/or Securitas et al. When night safe services are handled in-house, the share of indirect costs is high.

Chart 9: Direct costs, indirect costs and prices



Source: Norges Bank

Direct costs vary in the short term. Ordinary commercial principles state that variable unit costs must be covered by prices in order to secure operations in the short term. Chart 9 therefore compares unit costs with unit prices. Unit prices taken from the Annual Report on Payment Systems do not incorporate discounts. Most customers are able to attain some form of discount from the bank on payment services prices, and therefore a number of services probably generate income per transaction lower than the prices in the graph.

Cost coverage per unit

Most services' direct costs are covered by list prices. Income on the services PC/Internet, mail giros, direct debits and other banks' ATMs as well as free-of-charge services does not cover direct costs. This is not a problem in the short term, but in the case of ATMs [13] and mail-based giros the same applied in 1994 and 1998. Direct costs are not fully reflected in prices, and this suggests that banks should consider taking steps to remedy the problem by lowering costs or increasing charges (or wait for a rapid increase in transaction numbers, which is not realistic for all services). The problem is more pronounced for the PC/Internet giro. The difference between price and direct costs is larger, and indirect costs are high. The price covers only a quarter of the unit cost. The service is relatively new in the market, and indirect costs are expected to fall since a relatively high share of the costs refers to marketing and other establishment costs. Better utilisation of economies of scale and repayment of development costs (treated as direct costs) will reduce direct costs. In the long term, the current price-cost ratio for this service will probably not continue. As of 2001, the PC/internet giro service generates losses for banks.

Unit prices on banks' own ATMs cover the direct but not the indirect costs, whereas the prices charged for using other banks' ATMs cover a higher share of the unit costs, but not the direct costs. The direct costs are higher in the case of withdrawals from other banks' ATMs due to the interbank charge. The price structure for the ATM withdrawals derives from the fact that banks do not charge for cash withdrawals from their own cashiers and ATMs during business hours, whereas they do charge for withdrawals outside business hours and in other

[13] ATM services probably generated net income for banks in 2001 since part of their income from annual card fees is additional to earnings generated by prices. Moreover, part of the deficit is due to the fact that withdrawals from the bank's own ATMs are free of charge during business hours. This service is cheaper for banks to provide than withdrawals at the counter, because net costs for one free-of-charge ATM withdrawal are lower than net costs for one at-counter withdrawal.

banks. Thus, the share of costs covered by direct prices is highest for withdrawals from other banks' ATMs.

Direct prices charged for a number of services generate net earnings for banks. This is true of all giro services at the counter because unit costs are lower than list prices. Since the number of giro services at the counter is steadily falling, unit costs may rise in the years ahead due to diseconomies of small-scale operations.

Unit costs are higher than list prices for EFTPOS transactions and ATM withdrawals, but earnings from annual card fees make up the deficit. Banks in Norway have a net income from card services totalling NOK 95 million. This figure is based on total reported earnings of NOK 1 936 million and the costs listed in Table 2, which shows that EFTPOS costs NOK 996 million to produce and ATM services costs NOK 845 million. Income generated by annual card fees makes up the shortfall. According to the Annual Report on Payment Systems, income from annual fees averaged NOK 205 per card in 2001. Earnings on cards are one of the most important reasons why cost coverage has risen since 1994. In 1994, the unit cost for EFTPOS was NOK 4.50, while the price was NOK 1.88, showing that the price cost ratio has moved in the right direction.

Large and small banks

The survey provides no clear indication of whether large or small banks produce services at the lowest unit costs. Economies of scale appear to be spread over all banks as a result of the institutional structure involving the Banks' Payment and Central Clearing House and the EDB group. The marked efficiency improvement since 1994 is essentially due to a massive increase in the use of electronic services, especially cards. This is the result of a deliberate focus by the banks, the banking associations and Norges Bank. The coordination of card systems in Norway has also allowed small banks to participate in this development. Moreover, interbank charges appear to smooth out many potential differences between large and small banks' costs for individual services.

Large-scale potential

Prices charged for services still do not cover all costs in connection with providing the majority of payment services. For recently introduced services, this may be due to the fact that the services are priced below unit cost in order to rapidly increase the service's

popularity, with a view to exploiting economies of scale in the future. The price for EFTPOS was set low in order to achieve popularity, and due to a subsequent reduction in costs, full cost coverage has nearly been achieved for this service even if the price increases has been very modest. Banks appear to be pursuing the same strategy with regard to the pricing of giro payments via the Internet/PC. The picture is unclear in relation to older services, although list prices still do not cover the costs of providing some of the heaviest used services, such as company terminal giro and mail giro.

5. Conclusions

Banks set the price per transaction of different payment services in accordance to the relative differences in the costs of producing these services.

Some services give the banks a profit per transaction, like giros paid at the counter. Other services give the banks a profit through bundling. For payment cards, where the transaction price itself does not cover the unit cost, neither for EFTPOS or ATM, the annual fee for holding the card makes the total income from payment cards services larger than the total costs. Other services, like electronic giros, cause a loss, as the unit costs are larger than the unit price, and there are normally no fees to cover the difference. Some services are not priced at all, and they most certainly cause a loss per unit.

In total, the costs are about 5.9 billion NOK in 2001, and the income from payment services about 5 billion. This gives a cost coverage from prices of 70 per cent. This is an increase since the cost surveys in 1994 and 1989. Also, the elimination of float should, as an isolated effect, have reduced the cost coverage. Due to increased use of the services with the lowest production costs, the cost coverage has increased over time, even if average prices have not increased.

The more widespread use of direct prices has probably given a more transparent price regime towards the banks' customers. The competition for customers is rather fierce, even though the banks cooperate closely in producing card and giro services. These are indications that show that it is possible to reap the benefits of competition and cooperation and economics of scale in production and supply of payment services simultaneously.

The Norwegian solution, with common standards and cooperation in some fields, competition and alternative solutions in other fields, has given a rapid increase in the use of effective payment services. The costs of the most popular services are rather low, so are the prices, and so the price signal is mainly correct. Due to the pricing tool and information about costs, banks can influence the public's preferences for effective payment services. A strategy like this should also be encouraged in the future.

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Data obtained from seven banks formed the basis for the ABC analysis referred to in this article. The banks were: Andebu Sparebank, Bolig- og Næringsbanken ASA, Den norske Bank ASA, Harstad Sparebank, Larvikbankenes Brunlanes, Nordea Bank Norge ASA and Romsdals Fellesbank ASA.

Appendix A

Printouts of Excel spreadsheets used in the survey.

Worksheet 1: Operation areas

A1	B	C	D	E	F	G
2						
3		**Payment systems**	**Portfolio/Investment management**	**Banking consultant services (customer consulting)**	**Administration**	**Sum**
4	**Direct costs**					
5	Transaction costs	0	0	0	0	=SUMMER(C5:F5)
6	Message reports and receipt forms from BBS and EDB Fellesdata	0	0	0	0	=SUMMER(C6:F6)
7	Cash difference	0	0	0	0	=SUMMER(C7:F7)
8	Interbank fee (ATM)	0	0	0	0	=SUMMER(C8:F8)
9	Settlement costs	0	0	0	0	=SUMMER(C9:F9)
10	Security costs for cash distribution	0	0	0	0	=SUMMER(C10:F10)
11	Postage	0	0	0	0	=SUMMER(C11:F11)
12	Vouchers	0	0	0	0	=SUMMER(C12:F12)
13	Development costs	0	0	0	0	=SUMMER(C13:F13)
14	Sum direct costs	=SUMMER(C5:C13)	=SUMMER(D5:D13)	=SUMMER(E5:E13)	=SUMMER(F5:F13)	=SUMMER(C14:F14)
15	**Indirect costs**					
16	Personnel costs	0	0	0	0	=SUMMER(C16:F16)
17	Training	0	0	0	0	=SUMMER(C17:F17)
18	Travel costs	0	0	0	0	=SUMMER(C18:F18)
19	Information Technology	0	0	0	0	=SUMMER(C19:F19)
20	Property	0	0	0	0	=SUMMER(C20:F20)
21	External revision	0	0	0	0	=SUMMER(C21:F21)
22	Marketing	0	0	0	0	=SUMMER(C22:F22)
23	Machinery/Inventory/Bank	0	0	0	0	=SUMMER(C23:F23)
24	Fees on notes and coins from Norges Bank	0	0	0	0	=SUMMER(C24:F24)
25	Portfolio/Investment	0	0	0	0	=SUMMER(C25:F25)
26	Foregone interest on cash	0	0	0	0	=SUMMER(C26:F26)
27	Security	0	0	0	0	=SUMMER(C27:F27)
28	Card services bought from external parties (production of cards etc.)	0	0	0	0	=SUMMER(C28:F28)
29	Office supplies	0	0	0	0	=SUMMER(C29:F29)
30	Telephone	0	0	0	0	=SUMMER(C30:F30)
31	Postage	0	0	0	0	=SUMMER(C31:F31)
32	Other running expenses	0	0	0	0	=SUMMER(C32:F32)
33	Sum Indirect costs	=SUMMER(C16:C32)	=SUMMER(D16:D32)	=SUMMER(E16:E32)	=SUMMER(F16:F32)	=SUMMER(C33:F33)
34						
35	**Sum costs**	=C14+C33	=D14+D33	=E14+E33	=F14+F33	=SUMMER(C35:F35)

Explanation: Every cell with "0" was to be filled with the bank's cost figures, calculated and from accounts. This worksheet is complete, as the banks received it.

Worksheet 2: Labour supply

A1	B	C	D	E	F	G
2						
3	**Man-labour years distributed on activities**					
4			**Payment systems**	**Portfolio/Investment management**	**Banking consultant services (customer consulting)**	**Administration**
5	**Activity**	**Man-labour year**				
6						
7	Man-labour years (total in bank)	0	=SUMMER(D8:D35)	=SUMMER(E8:E35)	=SUMMER(F8:F35)	=SUMMER(G8:G35)
8	Control sum	=SUMMER(D10:G35)				
9						
10	Pay Desk	=SUMMER(D10:G10)	0	0	0	0
11	Maintenance of payment services	=SUMMER(D11:G11)	0	0	0	0
12	Maintenance of accounts	=SUMMER(D12:G12)	0	0	0	0
13	Maintenance of payment cards	=SUMMER(D13:G13)	0	0	0	0
14	Maintenance of investments	=SUMMER(D14:G14)	0	0	0	0
15	Account inquiries	=SUMMER(D15:G15)	0	0	0	0
16	Voucher handling	=SUMMER(D16:G16)	0	0	0	0
17	Cash handling	=SUMMER(D17:G17)	0	0	0	0
18	Night safe	=SUMMER(D18:G18)	0	0	0	0
19	Mail and postage	=SUMMER(D19:G19)	0	0	0	0
20	Switchboard	=SUMMER(D20:G20)	0	0	0	0
21	Payment products	=SUMMER(D21:G21)	0	0	0	0
22	Campaign / Active sale	=SUMMER(D22:G22)	0	0	0	0
23	Sales and activity registration	=SUMMER(D23:G23)	0	0	0	0
24	Personnel administration	=SUMMER(D24:G24)	0	0	0	0
25	Account keeping	=SUMMER(D25:G25)	0	0	0	0
26	Reporting	=SUMMER(D26:G26)	0	0	0	0
27	Auditing	=SUMMER(D27:G27)	0	0	0	0
28	Safety	=SUMMER(D28:G28)	0	0	0	0
29	Work in administrative board	=SUMMER(D29:G29)	0	0	0	0
30	Support, running, systems	=SUMMER(D30:G30)	0	0	0	0
31	Training	=SUMMER(D31:G31)	0	0	0	0
32	Settlement	=SUMMER(D32:G32)	0	0	0	0
33	Settling RTGS transactions	=SUMMER(D33:G33)	0	0	0	0
34	Clearing	=SUMMER(D34:G34)	0	0	0	0
35	All other activities	=SUMMER(D35:G35)	0	0	0	0
36	**Sum - Activities Man-labour year**	= SUMMER(C10:C35)	= SUMMER(D10:D35)	= SUMMER(E10:E35)	= SUMMER(F10:F35)	= SUMMER(G10:G35)

Explanation: Every cell with "0" was to be filled with the bank's labour sypply figures, estimated and/or from time sheets. This worksheet is complete, as the banks received it.

Worksheet 3: Direct costs (extract)

A1	B	C	D	E	F	G	H
2							
3			Giro by telephone	PC/Internett	Unnotified remittance / company terminal giro	Transfers	Night safe
4							
5	No. of transactions	=SUMMER(D5:H5)	0	0	0	0	0
6		**Direct costs**					
7		Payment systems					
8	Transaction costs	='Operation areas'!C5	0	0	0	0	0
9	Message reports and receipt forms from BBS and EDB Fellesdata	='Operation areas'!C6	0	0	0	0	0
10	Cash difference	='Operation areas'!C7	0	0	0	0	0
11	Interbank fee (ATM)	='Operation areas'!C8					
12	Settlement costs	='Operation areas'!C9	0	0	0	0	0
13	Security costs for cash	='Operation areas'!C10					
14	Postage	='Operation areas'!C11	0	0	0	0	0
15	Vouchers	='Operation areas'!C12	0	0	0	0	0
16	Development costs	='Operation areas'!C13	0	0	0	0	0
17							
18	**Sum direct costs**	=SUMMER(C8:C17)	=SUMMER(D8:D17)	=SUMMER(E8:E17)	=SUMMER(F8:F17)	=SUMMER(G8:G17)	=SUMMER(H8:H17)

Explanation: Every cell with "0" was to be filled with the bank's estimated direct costs for each service for each activity. Costs for each activity is stated in column C. This worksheet is not complete, due to space considerations. 16 services are removed from the worksheet. For the all services, though, the concept is exactly the same, the costs are stated in column C, and distributed to the different services.

Worksheet 4: Indirect costs 1

A1	B	C	D	E	F
2					
3		**Indirect costs**			
4					
5		***Personnel dependent***		***Not dependent on personnel***	
6		Personnel costs	='Operation areas'!C16	External revision	='Operation areas'!C21
7		Training	='Operation areas'!C17	Marketing	='Operation areas'!C22
8		Travel costs	='Operation areas'!C18	Fees on notes and coins from Norges Bank	='Operation areas'!C24
9		Information Technology	='Operation areas'!C19	Tied-up capital due to cash reserves	='Operation areas'!C26
10		Property	='Operation areas'!C20	Card services bought from external parties (production of cards etc.)	='Operation areas'!C28
11		Machinery/Inventory/Bank technology	='Operation areas'!C23	Portfolio/investment management dependent costs	='Operation areas'!C25
12		Office supplies	='Operation areas'!C29		
13		Telephone	='Operation areas'!C30		
14		Postage	='Operation areas'!C31		
15		Other running expenses	='Operation areas'!C32		
16		Administration	0		
17		Banking consultant services (customer consulting)	0		
18		Security	='Operation areas'!C27		
19	**Sum**		=SUMMER(D6:D18)		=SUMMER(F6:F18)
20					
21	**Sum indirect costs**	=SUMMER(D19+F19)			

Explanation: Every cell with "0" was to be filled with the bank's cost figures, calculated on basis of the worksheet Operation areas. This worksheet is complete, as the banks received it.

Worksheet 5: Indirect costs 2 (part I)

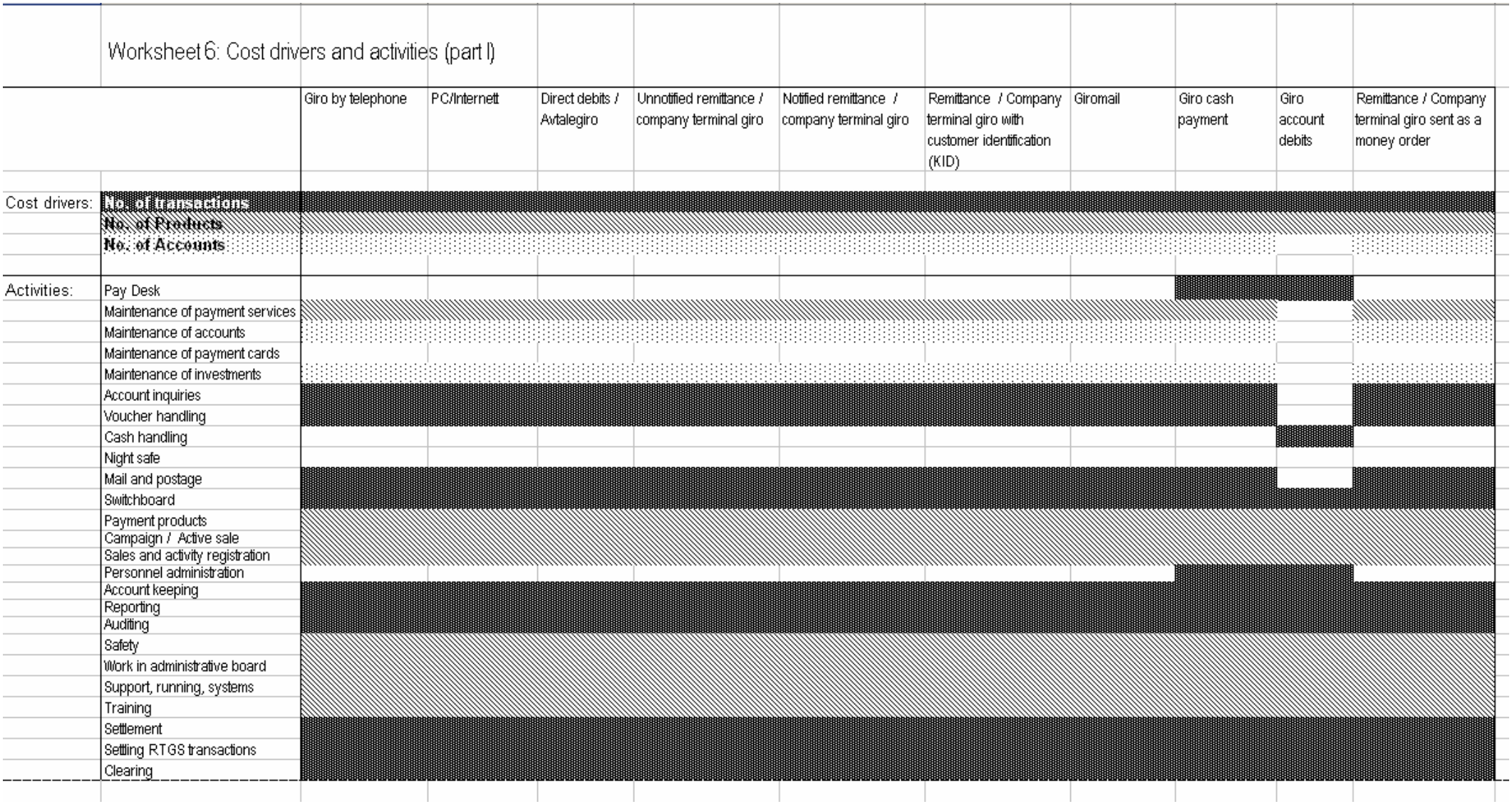
A1	B	C	D	E	F	G
2	**Personnel dependent costs distributed to activities**					
3	**Process**	**Activity**	**Relevant for Payment services**	**Man-labour year for payment services**	**Man-labour year for payment services. Percentage share**	**Personnel dependend costs distributed on activites**
4		Cost to distribute in this sheet	='Indirect costs 1'!D19			
5						
6		**Sum**		**=SUMMER(E8:E40)**	**=SUMMER(F8:F40)**	**=SUMMER(G8:G40)**
7						
8	At the Counter services	Pay Desk	Yes	=HVIS(D8="No";"Not relevant";'Labour supply'!D10)	=HVIS(E8="Not relevant";0;E8/$E$6)	=$D$4*F8
9						
10	Service	Maintenance of payment services	Yes	=HVIS(D10="No";"Not relevant";'Labour supply'!D11)	=HVIS(E10="Not relevant";0;E10/$E$6)	=$D$4*F10
11		Maintenance of accounts	Yes	=HVIS(D11="No";"Not relevant";'Labour supply'!D12)	=HVIS(E11="Not relevant";0;E11/$E$6)	=$D$4*F11
12		Maintenance of payment cards	Yes	=HVIS(D12="No";"Not relevant";'Labour supply'!D13)	=HVIS(E12="Not relevant";0;E12/$E$6)	=$D$4*F12
13		Maintenance of investments	Yes	=HVIS(D13="No";"Not relevant";'Labour supply'!D14)	=HVIS(E13="Not relevant";0;E13/$E$6)	=$D$4*F13
14		Account inquiries	Yes	=HVIS(D14="No";"Not relevant";'Labour supply'!D15)	=HVIS(E14="Not relevant";0;E14/$E$6)	=$D$4*F14
15		Voucher handling	Yes	=HVIS(D15="No";"Not relevant";'Labour supply'!D16)	=HVIS(E15="Not relevant";0;E15/$E$6)	=$D$4*F15
16		Cash handling	Yes	=HVIS(D16="No";"Not relevant";'Labour supply'!D17)	=HVIS(E16="Not relevant";0;E16/$E$6)	=$D$4*F16
17		Night safe	Yes	=HVIS(D17="No";"Not relevant";'Labour supply'!D18)	=HVIS(E17="Not relevant";0;E17/$E$6)	=$D$4*F17
18		Mail and postage	Yes	=HVIS(D18="No";"Not relevant";'Labour supply'!D19)	=HVIS(E18="Not relevant";0;E18/$E$6)	=$D$4*F18
19		Switchboard	Yes	=HVIS(D19="No";"Not relevant";'Labour supply'!D20)	=HVIS(E19="Not relevant";0;E19/$E$6)	=$D$4*F19
20						
21	Payment Counselling	Payment products	Yes	=HVIS(D21="No";"Not relevant";'Labour supply'!D21)	=HVIS(E21="Not relevant";0;E21/$E$6)	=$D$4*F21
22						
23	Sales	Campaign / Active sale	Yes	=HVIS(D23="No";"Not relevant";'Labour supply'!D22)	=HVIS(E23="Not relevant";0;E23/$E$6)	=$D$4*F23
24		Sales and activity registration	Yes	=HVIS(D24="No";"Not relevant";'Labour supply'!D23)	=HVIS(E24="Not relevant";0;E24/$E$6)	=$D$4*F24
25						
26						
27	Banking operations	Personnel administration	Yes	=HVIS(D27="No";"Not relevant";'Labour supply'!D24)	=HVIS(E27="Not relevant";0;E27/$E$6)	=$D$4*F27
28		Account keeping	Yes	=HVIS(D28="No";"Not relevant";'Labour supply'!D25)	=HVIS(E28="Not relevant";0;E28/$E$6)	=$D$4*F28
29		Reporting	Yes	=HVIS(D29="No";"Not relevant";'Labour supply'!D26)	=HVIS(E29="Not relevant";0;E29/$E$6)	=$D$4*F29
30		Auditing	Yes	=HVIS(D30="No";"Not relevant";'Labour supply'!D27)	=HVIS(E30="Not relevant";0;E30/$E$6)	=$D$4*F30
31		Safety	Yes	=HVIS(D31="No";"Not relevant";'Labour supply'!D28)	=HVIS(E31="Not relevant";0;E31/$E$6)	=$D$4*F31
32		Work in administrative board	Yes	=HVIS(D32="No";"Not relevant";'Labour supply'!D29)	=HVIS(E32="Not relevant";0;E32/$E$6)	=$D$4*F32
33						
34	Information Technology	Support, running, systems	Yes	=HVIS(D34="No";"Not relevant";'Labour supply'!D30)	=HVIS(E34="Not relevant";0;E34/$E$6)	=$D$4*F34
35						
36	Other	Training	Yes	=HVIS(D36="No";"Not relevant";'Labour supply'!D31)	=HVIS(E36="Not relevant";0;E36/$E$6)	=$D$4*F36
37						
38	Clearing and settlement	Settlement	Yes	=HVIS(D38="No";"Not relevant";'Labour supply'!D32)	=HVIS(E38="Not relevant";0;E38/$E$6)	=$D$4*F38
39		Settling RTGS transactions	Yes	=HVIS(D39="No";"Not relevant";'Labour supply'!D33)	=HVIS(E39="Not relevant";0;E39/$E$6)	=$D$4*F39
40		Clearing	Yes	=HVIS(D40="No";"Not relevant";'Labour supply'!D34)	=HVIS(E40="Not relevant";0;E40/$E$6)	=$D$4*F40
41	Every other process	All other activities	No	=HVIS(D41="No";"Not relevant";'Labour supply'!D35)	=HVIS(E41="Not relevant";0;E41/$E$6)	=$D$4*F41

Explanation: In coloumns D and J, 'Yes' or 'No' decides wich part of the formulas in coloumns E and F shall apply. The notation HVIS in the formulas in coloumn E and F = excel-command IF in english versions of MS Excel.

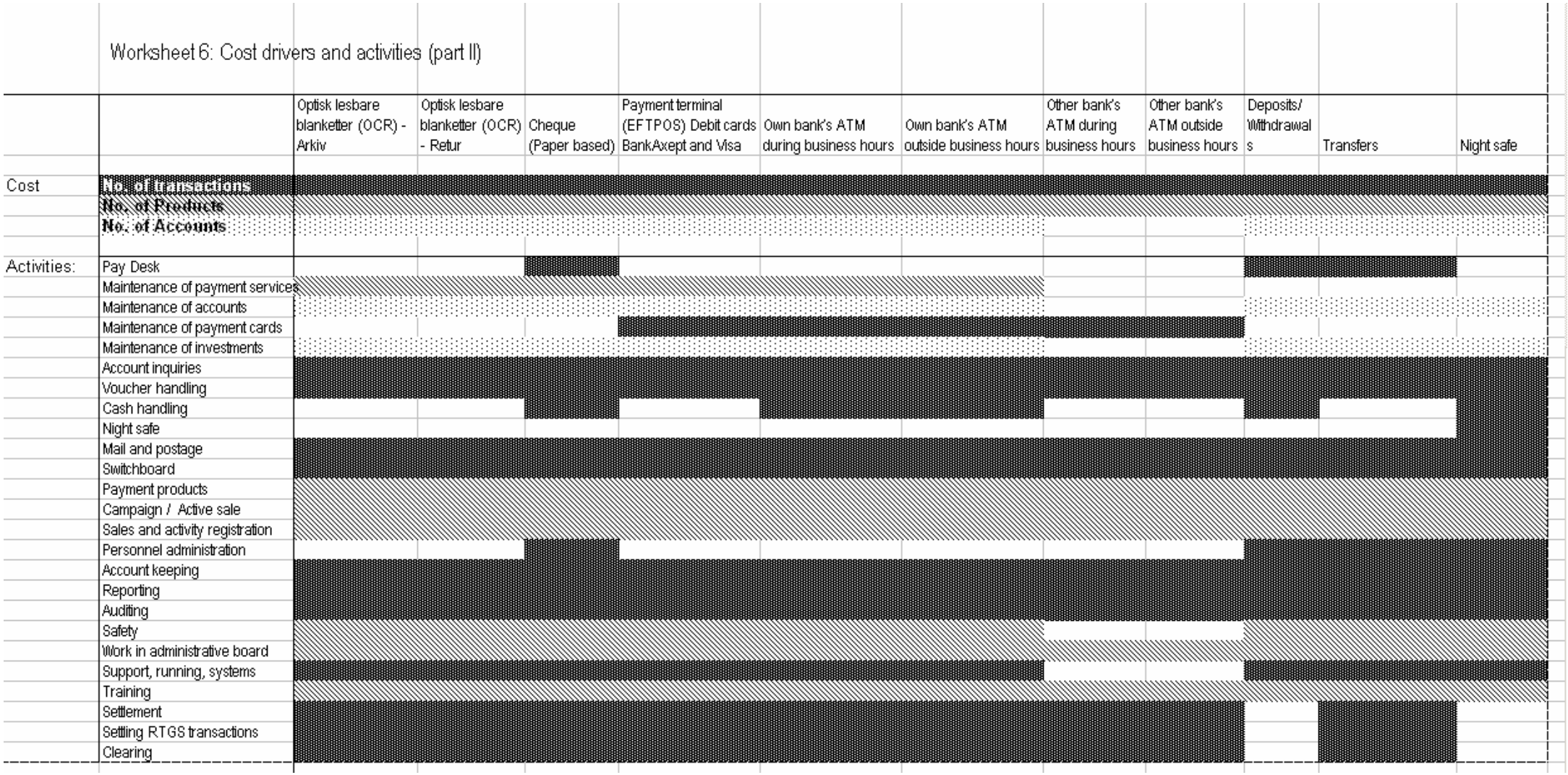
Worksheet 5: Indirect costs 2 (part II)

H	I	J	K	L	M	N
Non-personnel dependent costs distribudet to activities					**Sum indirect costs distributed**	
Process	**Activity**	**Relevant for Payment services**	**From sheet "Operation areas"**	**Cost distributed to activity**	**Activity**	**Sum**
	Cost for distribution	='Indirect costs 1'!F19				
					Sum	=SUMMER(N8:N41)
At the Counter services	Pay Desk	No			Pay Desk	=G8+L8
Service	Maintenance of payment services	No			Maintenance of payment services	=G10+L10
	Maintenance of accounts	No			Maintenance of accounts	=G11+L11
	Maintenance of payment cards	Yes	Card services bought from external parties (production of cards etc.)	='Indirect costs 1'!F10	Maintenance of payment cards	=G12+L12
	Maintenance of investments	Yes	Portfolio/investment management dependent costs	='Indirect costs 1'!F11	Maintenance of investments	=G13+L13
	Account inquiries	No			Account inquiries	=G14+L14
	Voucher handling	No			Voucher handling	=G15+L15
	Cash handling	Yes	Fees on notes and coins from Norges Bank	='Indirect costs 1'!F8	Cash handling	=G16+L16
	Night safe	Yes	Tied-up capital due to cash reserves	='Indirect costs 1'!F9	Night safe	=G17+L17
	Mail and postage	No			Mail and postage	=G18+L18
	Switchboard	No			Switchboard	=G19+L19
Payment Counselling	Payment products	No			Payment products	=G21+L21
Sales	Campaign / Active sale	Yes	Marketing	='Indirect costs 1'!F7	Campaign / Active sale	=G23+L23
	Sales and activity registration	No			Sales and activity registration	=G24+L24
Banking operations	Personnel administration	No			Personnel administration	=G27+L27
	Account keeping	No			Account keeping	=G28+L28
	Reporting	No			Reporting	=G29+L29
	Auditing	No			Auditing	=G30+L30
	Safety	No			Safety	=G31+L31
	Work in administrative board	Yes	External revision	='Indirect costs 1'!F6	Work in administrative board	=G32+L32
Information Technology	Support, running, systems	No			Support, running, systems	=G34+L34
Other	Training	No			Training	=G36+L36
Clearing and settlement	Settlement	No			Settlement	=G38+L38
	Settling RTGS transactions	No			Settling RTGS transactions	=G39+L39
	Clearing	No			Clearing	=G40+L40
Every other process	All other activities	No			All other activities	=G41+L41

Worksheet 6: Cost drivers and activities (part I)



Worksheet 6: Cost drivers and activities (part II)



A1	Worksheet 7: Distribution B	C	D	E	F	G	H
2			Giro by telephone	PC/Internett	Unnotified remittance / company terminal giro	Transfers	Night safe
3	Cost drivers						
4	No. of Transactions	=SUMMER(D4:H4)	0	0	0	0	0
5	No. of Products	=SUMMER(D5:H5)	0	0	0	0	0
6	No. of Accounts	=SUMMER(D6:H6)	0	0	0	0	0
7							
8	Pay Desk	='Indirect costs 2'!N8					
9	Maintenance of payment services	='Indirect costs 2'!N10	=C9/(SUMMER(D5:H5)-3)	=C9/((SUMMER(D5:F5)-3))	=(C9/(SUMMER(D5:F5)-3))*(F4/SUMMER(F4:F4))		
10	Maintenance of accounts	='Indirect costs 2'!N11	=C10/(SUMMER(D6:H6))	=C10/(SUMMER(D6:H6))	=C10/(SUMMER(D6:H6))	=C10/(SUMMER(D6:H6))	=C10/(SUMMER(D6:H6))
11	Maintenance of payment cards	='Indirect costs 2'!N12					
12	Maintenance of investments	='Indirect costs 2'!N13	=C12/(SUMMER(D6:H6))	=C12/(SUMMER(D6:H6))	=C12/(SUMMER(D6:H6))	=C12/(SUMMER(D6:H6))	=C12/(SUMMER(D6:H6))
13	Account inquiries	='Indirect costs 2'!N14	=C13/(SUMMER(D4:H4))	=C13/(SUMMER(D4:H4))	=C13/(SUMMER(D4:H4))	=C13/(SUMMER(D4:H4))	=C13/(SUMMER(D4:H4))
14	Voucher handling	='Indirect costs 2'!N15	=C14/(SUMMER(D4:H4))	=C14/(SUMMER(D4:H4))	=C14/(SUMMER(D4:H4))	=C14/(SUMMER(D4:H4))	=C14/(SUMMER(D4:H4))
15	Cash handling	='Indirect costs 2'!N16					
16	Night safe	='Indirect costs 2'!N17					=C16/(SUMMER(H4))
17	Mail and postage	='Indirect costs 2'!N18	=C17/(SUMMER(D4:H4))	=C17/(SUMMER(D4:H4))	=C17/(SUMMER(D4:H4))	=C17/(SUMMER(D4:H4))	=C17/(SUMMER(D4:H4))
18	Switchboard	='Indirect costs 2'!N19	=C18/(SUMMER(D4:H4))	=C18/(SUMMER(D4:H4))	=C18/(SUMMER(D4:H4))	=C18/(SUMMER(D4:H4))	=C18/(SUMMER(D4:H4))
19	Payment products	='Indirect costs 2'!N21	=C19/(SUMMER(D5:H5)-3)	=C19/(SUMMER(D5:H5)-3)	=(C19/(SUMMER(D5:F5)-3))*(F4/SUMMER(F4:F4))	=C19/(SUMMER(D5:H5)-3)	=C19/(SUMMER(D5:H5)-3)
20	Campaign / Active sale	='Indirect costs 2'!N23	=C20/(SUMMER(D5:H5)-3)	=C20/(SUMMER(D5:H5)-3)	=(C20/(SUMMER(D5:F5)-3))*(F4/SUMMER(F4:F4))	=C20/(SUMMER(D5:H5)-3)	=C20/(SUMMER(D5:H5)-3)
21	Sales and activity registration	='Indirect costs 2'!N24	=C21/(SUMMER(D5:H5)-3)	=C21/(SUMMER(D5:H5)-3)	=(C21/(SUMMER(D5:F5)-3))*(F4/SUMMER(F4:F4))	=C21/(SUMMER(D5:H5)-3)	=C21/(SUMMER(D5:H5)-3)
22	Personnel administration	='Indirect costs 2'!N27				=C22/(SUMMER(G4:H4))	=C22/(SUMMER(G4:H4))
23	Account keeping	='Indirect costs 2'!N28	=C23/(SUMMER(D4:H4))	=C23/(SUMMER(D4:H4))	=C23/(SUMMER(D4:H4))	=C23/(SUMMER(D4:H4))	=C23/(SUMMER(D4:H4))
24	Reporting	='Indirect costs 2'!N29	=C24/(SUMMER(D4:H4))	=C24/(SUMMER(D4:H4))	=C24/(SUMMER(D4:H4))	=C24/(SUMMER(D4:H4))	=C24/(SUMMER(D4:H4))
25	Auditing	='Indirect costs 2'!N30	=C25/(SUMMER(D4:H4))	=C25/(SUMMER(D4:H4))	=C25/(SUMMER(D4:H4))	=C25/(SUMMER(D4:H4))	=C25/(SUMMER(D4:H4))
26	Safety	='Indirect costs 2'!N31	=C26/(SUMMER(D5:H5)-3)	=C26/(SUMMER(D5:H5)-3)	=(C26/(SUMMER(D5:F5)-3))*(F4/SUMMER(F4:F4))	=C26/(SUMMER(D5:H5)-3)	=C26/(SUMMER(D5:H5)-3)
27	Work in administrative board	='Indirect costs 2'!N32	=C27/(SUMMER(D5:H5)-3)	=C27/(SUMMER(D5:H5)-3)	=(C27/(SUMMER(D5:F5)-3))*(F4/SUMMER(F4:F4))	=C27/(SUMMER(D5:H5)-3)	=C27/(SUMMER(D5:H5)-3)
28	Support, running, systems	='Indirect costs 2'!N34	=C28/(SUMMER(D4:H4))	=C28/(SUMMER(D4:H4))	=C28/(SUMMER(D4:H4))	=C28/(SUMMER(D4:H4))	=C28/(SUMMER(D4:H4))
29	Training	='Indirect costs 2'!N36	=C29/(SUMMER(D5:H5)-3)	=C29/(SUMMER(D5:H5)-3)	=(C29/(SUMMER(D5:F5)-3))*(F4/SUMMER(F4:F4))	=C29/(SUMMER(D5:H5)-3)	=C29/(SUMMER(D5:H5)-3)
30	Settlement	='Indirect costs 2'!N38	=C30/(SUMMER(D4:G4))	=C30/(SUMMER(D4:G4))	=C30/(SUMMER(D4:G4))	=C30/(SUMMER(D4:G4))	
31	Settling RTGS transactions	='Indirect costs 2'!N39	=C31/(SUMMER(D4:G4))	=C31/(SUMMER(D4:G4))	=C31/(SUMMER(D4:G4))	=C31/(SUMMER(D4:G4))	
32	Clearing	='Indirect costs 2'!N40	=C32/(SUMMER(D4:G4))	=C32/(SUMMER(D4:G4))	=C32/(SUMMER(D4:G4))	=C32/(SUMMER(D4:G4))	

Explanation: 16 of the 21 different services (illustrated in the sheet "Cost drivers and activities") are omitted. The remaining services, though, still illustrate the calculations made to distribute the indirect costs to the different services. The row number in the formulas from D to H show wether the activity has transactions (row 4), products (row 5) or accounts (row 6) as cost driver. Formulas in Excel are written in Norwegian. In English: SUMMER=SUM. Formulas in coloumn F illustrate how some activities need more than one cost driver to distribute costs as explained in the text in this paper. The formula to the left of the multiplication sign is dependent on Products as cost driver, the rest of the formula is dependent on Transactions as cost driver. To distribute the correct amount to the four remittance/Company

Worksheet 8: Total and unit costs

	B	C	D	E	F	G	H
2			Giro by telephone	PC/Internett	Unnotified remittance / company terminal giro	Transfers	Night safe
3							
4	**Total Direct Costs**		='Direct costs'!D18	='Direct costs'!E18	='Direct costs'!F18	='Direct costs'!G18	='Direct costs'!H18
5							
6	**Indirect Costs**						
7	Cost driver:	Aktivitet:					
8	Transactions		=Distribution!D4	=Distribution!E4	=Distribution!F4	=Distribution!G4	=Distribution!H4
9		Pay Desk					
10		Maintenance of payment cards					
11		Account inquiries	=Distribution!D13	=Distribution!E13	=Distribution!F13	=Distribution!G13	=Distribution!H13
12		Voucher handling	=Distribution!D14	=Distribution!E14	=Distribution!F14	=Distribution!G14	=Distribution!H14
13		Cash handling					
14		Night safe					
15		Mail and postage	=Distribution!D17	=Distribution!E17	=Distribution!F17	=Distribution!G17	=Distribution!H17
16		Switchboard	=Distribution!D18	=Distribution!E18	=Distribution!F18	=Distribution!G18	=Distribution!H18
17		Personnel administration					
18		Account keeping	=Distribution!D23	=Distribution!E23	=Distribution!F23	=Distribution!G23	=Distribution!H23
19		Reporting	=Distribution!D24	=Distribution!E24	=Distribution!F24	=Distribution!G24	=Distribution!H24
20		Auditing	=Distribution!D25	=Distribution!E25	=Distribution!F25	=Distribution!G25	=Distribution!H25
21		Support, running, systems	=Distribution!D28	=Distribution!E28	=Distribution!F28	=Distribution!G28	=Distribution!H28
22		Settlement	=Distribution!D30	=Distribution!E30	=Distribution!F30	=Distribution!G30	=Distribution!H30
23		Settling RTGS transactions	=Distribution!D31	=Distribution!E31	=Distribution!F31	=Distribution!G31	=Distribution!H31
24		Clearing	=Distribution!D32	=Distribution!E32	=Distribution!F32	=Distribution!G32	=Distribution!H32
25	**Cost per "driver" unit**		**=SUMMER(D9:D24)**	**=SUMMER(E9:E24)**	**=SUMMER(F9:F24)**	**=SUMMER(G9:G24)**	**=SUMMER(H9:H24)**
26	**Total cost services with cost driver transactions**		**=D25*D8**	**=E25*E8**	**=F25*F8**	**=G25*G8**	**=H25*H8**
27							
28	Accounts		=Distribution!D6	=Distribution!E6	=Distribution!F6	=Distribution!G6	=Distribution!H6
29		Maintenance of accounts	=Distribution!D10	=Distribution!E10	=Distribution!F10	=Distribution!G10	=Distribution!H10
30		Maintenance of investments	=Distribution!D12	=Distribution!E12	=Distribution!F12	=Distribution!G12	=Distribution!H12
31	**Cost per "driver" unit**		**=SUMMER(D29:D30)**	**=SUMMER(E29:E30)**	**=SUMMER(F29:F30)**	**=SUMMER(G29:G30)**	**=SUMMER(H29:H30)**
32	**Total cost services with cost driver Accounts**		**=D31*D28**	**=E31*E28**	**=F31*F28**	**=G31*G28**	**=H31*H28**
33							
34	Products		=Distribution!D5	=Distribution!E5	=Distribution!F5	=Distribution!G5	=Distribution!H5
35		Payment products	=Distribution!D19	=Distribution!E19	=Distribution!F19	=Distribution!G19	=Distribution!H19
36		Campaign / Active sale	=Distribution!D20	=Distribution!E20	=Distribution!F20	=Distribution!G20	=Distribution!H20
37		Sales and activity registration	=Distribution!D21	=Distribution!E21	=Distribution!F21	=Distribution!G21	=Distribution!H21
38		Training	=Distribution!D29	=Distribution!E29	=Distribution!F29	=Distribution!G29	=Distribution!H29
39		Work in administrative board	=Distribution!D27	=Distribution!E27	=Distribution!F27	=Distribution!G27	=Distribution!H27
40		Safety	=Distribution!D26	=Distribution!E26	=Distribution!F26	=Distribution!G26	=Distribution!H26
41		Maintenance of payment service	=Distribution!D9	=Distribution!E9	=Distribution!F9	=Distribution!G9	=Distribution!H9
42	**Cost per "driver" unit**		**=SUMMER(D35:D41)**	**=SUMMER(E35:E41)**	**=SUMMER(F35:F41)**	**=SUMMER(G35:G41)**	**=SUMMER(H35:H41)**
43	**Total cost services with cost driver Products**		**=D42*D34**	**=E42*E34**	**=F42*F34**	**=G42*G34**	**=H42*H34**
44							
45	**Total indirect cost**		**=D43+D32+D26**	**=E43+E32+E26**	**=F43+F32+F26**	**=G43+G32+G26**	**=H43+H32+H26**
46							
47	Total cost		=D45+D4	=E45+E4	=F45+F4	=G45+G4	=H45+H4
48							
49	Cost pr transaction		=D47/D8	=E47/E8	=F47/F8	=G47/G8	=H47/H8

Explanation: 16 of the 21 different services (illustrated in the sheet "Cost drivers and activities") are omitted. The remaining services, though, still illustrate the calculations made to distribute the indirect costs to the different services. Formulas in Excel are written in Norwegian. In English: SUMMER=SUM.

Appendix B

Definitions and often used expressions

ABC, Activity Based Costing: the method used in this paper to analyze the cost structure in banks, particularly for the part of the banks that encompass payments

Retail, retail payments: payments of small value initiated by payers in large number of transactions. The treating of these payments differs significantly from how large-value payments are processed in the banking system. Retail payments are handled with speed and for as low cost as possible per transaction, whereas large-value payments are handled in a manner that minimizes the risk for the payment to fail.

Direct pricing: Prices set by banks on the use of payment services. Example: giro payment via the internet typically costs NOK 2,- per transaction.

Interbank system: the system that banks use to transfer, clear and settle payments between them.

Clearing and settlement: When banks effectuate payments, they accumulate liabilities and assets toward each other. These claims are *cleared*, that is, the assets for each bank and liabilities for each bank are calculated against each other, and the net position is sent for settlement. *Settlement* takes place when the central bank or a settlement bank transfer money between accounts owned by the participating banks in the payment to complete the transaction and end the banks claims towards each other.

BBS: Bankenes BetalingsSentral, the Banks' Payment and Central Clearing House owned by the banks in a joint ownership.

EDB Fellesdata: a part of the company EDB Business Partner ASA. EDB Fellesdata delivers clearing services to a many Norwegian banks.

NICS: Norwegian Interbank Clearing System, operated by BBS, used by the banks to perform clearing of payments.

NOKAS: Norsk Kontantservice AS, a company owned by the central bank of Norway and some banks in a joint ownership, to distribute and handle cash throughout the country.

ATM: Automated Teller Machine (in Norway: Minibank), a machine that provides access to bank-accounts and cash by use of payment cards.

EFTPOS, Electronic Fund Transfers at Point Of Sale: electronic use of payment cards at shops etc in terminals designed for accepting card electronically. The most popular EFTPOS system in Norway is the Bank-axept system, which is a payment card systemjointly owned bay the banks in Norway and operated by BBS. Other EFTPOS systems is VISA, Diner's club etc. Some of the card systems operate debit cards, some operate credit cards.

RTGS, Real Time Gross Settlement: Payments that are effectuated and settled in real-time, usually used for large-value, time-critical payments. Retail payments are, as they are not equally time-critical, settled in batches two times a day in Norway.

EMV cards: EMV chips, imbedded in payment cards, are based on a standard established by Europay, Mastercard and VISA, the largest card companies in the world. Combined with use of PIN codes, these cards are expected to achieve a higher security threshold against misuse than magnetic-stripe cards. Replacement of EFTPOS - terminals is necessary, and has started. Introduction of the EMV chip may also require upgrading of ATMs.

Interbank charge: When a payment is processed, the payer uses the giro system or an EFTPOS system. These are infrastructure jointly owned by the banks. To secure a fair distribution of costs between banks, after use of the system, sorted by which bank the payer and payee has customer relationships, the bank pay a fee for each transaction processed to the counterparty bank in the transaction. The existence of an interbank charge is a help for banks to develop and maintain a common infrastructure.

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