

SEPTEMBER 2018
SERIES: COSTS OF PAYMENTS IN DENMARK 2016

Background to series on the costs of payments in Denmark



**The Danish Payments Council
has surveyed the social costs
of payments in Denmark**

The costs were calculated for 2016 and include domestic payments using the most common methods of payment in Denmark, including cash, the national card scheme Dankort and international payment cards.



**This survey updates
the results of Danmarks
Nationalbank's previous
survey**

Danmarks Nationalbank has previously surveyed the social costs of consumer-to-business payments in 2009. The Danish Payments Council's new survey updates the results with figures for 2016.



**The survey includes
both business-to-business
payments and person-
to-person transfers**

For the first time, the social costs of both business-to-business payments and person-to-person transfers have also been calculated.

The Danish Payments Council has surveyed the social costs of payments in Denmark

The Danish Payments Council has surveyed the social costs of the most frequently used methods of payment in Denmark. These include cash and payment cards, among others. The survey is based on data from 2016 and forms the backbone of a series of analyses of the Danish payments market with focus on the aggregate social costs of three different payment relationships: (1) consumer-to-business payments, (2) business-to-business payments and (3) person-to-person transfers. This part of the series is a method paper describing key concepts and how the Danish Payments Council collected data for the survey.

The purpose of the survey is to generate knowledge about the social costs of payments in Denmark. The survey provides insights into the social costs of the various types of payment and how payments have developed over time. It also enables comparison of social costs in Denmark with costs in other countries that have performed similar surveys.¹

Danmarks Nationalbank has previously performed a similar cost survey for Denmark using data for 2009.² That was the first survey of its kind in Denmark. The Danish Payments Council's survey updates the results for payments between households and businesses, i.e. consumer-to-business payments, C2B payments, which were also examined in 2009. In addition, the survey has been expanded to include payments between businesses, i.e. business-to-business payments, B2B payments, and payments between private individuals, i.e. person-to-person transfers, P2P transfers.

The Danish Payments Council began its work in 2016 and as its secretariat, Danmarks Nationalbank has been responsible for collecting, validating and calculating the extensive data. To assist the secretariat in this process, the Danish Payments Council set up a working group. Its members are listed in the Appendix. The Danish Payments Council would like to thank

everyone who contributed to the survey. Not only those who supplied data directly, but also those who offered their knowledge in relation to compiling the data on which the analyses are based.

As we also see today, the Danes primarily used payment cards and cash when shopping in physical stores in 2016. Payment by mobile phone was not as widely available in physical trade as it is in 2018, and was used primarily for P2P transfers. Contactless payments were relatively new in 2016 and only 9 per cent of all card transactions in physical trade were contactless, compared with around half in early 2018. Online trade has been increasing since 2016 and website payment solutions have been introduced that have reduced payment time for the payer. The rules applying to the payments market have also been amended since 2016, e.g. in relation to passing fees for card payments on to the payer and in relation to accepting cash in the night-time hours.

The concept of social costs

Social costs express the aggregate use of resources by all parties involved in a payment transaction. Broadly speaking, there are three main parties in the payments market: payment intermediaries, payers and payees. Payment intermediaries are e.g. banks or card companies, whose services make it possible to transfer money from a payer to a payee. The payer could be a household, while the payee could be a retailer, such as a supermarket.

The parties in the payments market incur both internal and external costs in connection with payments.

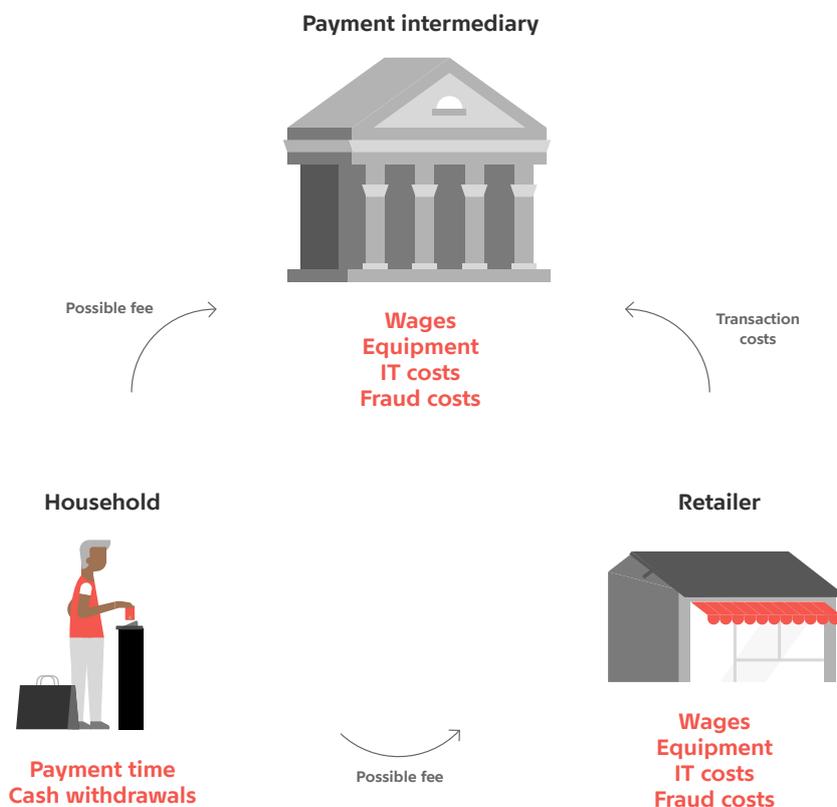
Internal resource costs are the costs incurred by payment intermediaries and payees for payments in the form of payroll costs, costs for devices and equipment, IT costs and costs related to fraud/robbery. For the payer, in the form of a household,

1 See e.g. Norges Bank, Costs in the Norwegian payment system, 2014, or Bank of Canada, The Costs of Point-of-Sale Payments in Canada, 2017.

2 Cf. Danmarks Nationalbank, Costs of Payments in Denmark, 2012.

What do the **social costs** comprise?

Chart 1



Note: The chart shows the parties to a consumer-to-business payment. The social costs are shown in red. The arrows indicate transfers between the parties, e.g. fees. Transfers between the parties are not regarded as social costs. Payment intermediaries are banks, card companies etc., providers of online payment modules, cash-in-transit companies and Danmarks Nationalbank. Transaction costs cover all expenses payable by the retailer to the payment intermediary. These include e.g. an acquirer fee, but also payment for transport of cash by a cash-in-transit company.

internal resource costs are the time it takes to pay or to withdraw cash – time which could have been spent on other things and hence represents a social cost. In this survey, the *social costs* are the sum of the internal resource costs for all parties in Denmark.³ So the social costs of each payment method are an expression of the resources used by the parties involved to complete the payment.

External costs, which are transfers between two parties in the market, are not included in the social costs, cf. Chart 1. This is because such costs for one party in the market constitute income for another party. So a transfer in the form of a fee is not included in the social costs even though it is a cost incurred by the individual payer for a service linked to a payment.

³ Making payments also involves drawbacks that could be included in the social costs. For example, you have to be physically present to make payments in physical stores, which is not the case when you pay online. The survey is limited to the costs associated with the payment itself, which means that the costs of such inconveniences are not included.

The sum of an individual party's or participant's internal costs and the transfers made to others, such as fees, are called *private costs*. Whereas the social costs are the costs to society of the individual methods of payment, the private costs are the foundation for the individual participants' or parties' payment decisions.⁴

In the analyses, costs are not split into variable and fixed costs, but a cost per payment is calculated. In this way, it becomes an average cost. This implies that frequently used payment methods will have low costs as the fixed costs are distributed on many transactions.

Which payments are comprised by the survey?

The survey covers households' and businesses' payments for purchase of goods and services, i.e. retail payments. Hence, the survey covers daily purchases in physical stores and online as well as large one-off payments, e.g. tradesmen's bills or payments to suppliers. Finally, the survey covers regular payments such as amortisation of loans, media subscriptions and utilities bills.

The survey is limited to Danes' payments in Denmark, not including cross-border payments. This also means that all costs are net of activities that are attributable to cross-border payments. An example is the use of a payment card, e.g. a VISA/Dankort, abroad. In the survey, payment card costs have been calculated net of costs for activities in 2016 that are attributable to the use of the cards abroad. Another example is costs for currency exchange.

The survey covers payment methods commonly used by households and businesses

The survey distinguishes between three payment relationships. The first one is payment between a consumer and a business, i.e. C2B. The second one is payment between two businesses, i.e. B2B. And finally, the survey also covers transfers between individuals, i.e. P2P. The breakdown by C2B, B2B and P2P is new relative to the 2009 cost survey, which looked into the costs of C2B payments only.

The survey also distinguishes between *physical trade* and *remote trade*. Physical trade is where both the

buyer and the seller are physically present. In the survey, remote trade comprises online trade with card payment and remote payment of bills as well as mobile payments.

In physical trade, the analysis covers the payment methods cash and payment cards, the latter covering three card types: Dankort, international debit cards and international credit cards. For remote trade, the survey comprises costs for the above three types of payment card as well as the most frequently used methods for paying bills, i.e. Betalingservice (a direct debit payment method), Leverandørservice (a direct debit payment method for B2B-payments) and credit transfers with or without the use of inpayment forms. Credit transfers and payments based on inpayment forms can be made via online or mobile banking or at the cash desk in a bank, i.e. as a staffed service. In addition, the survey comprises mobile payments in connection with P2P transfers.

Not all payment methods are used for all three areas (C2B, B2B and P2P), cf. Table 1. The reason is that in 2016 some payment methods could either not be used for all three areas or they were used only to a limited extent.

When comparing payment methods across C2B, B2B and P2P, it is important to keep in mind that they are not substitutes for each other. The parties involved in a payment differ, depending on whether it is a C2B, B2B or P2P payment, which is also reflected in the social costs. For example, a P2P transfer involves costs for households and payment intermediaries only, while a C2B payment also involves costs for businesses and retailers.

The survey results are estimates and not calculations based on data for accounting purposes. In addition, the underlying data is subject to uncertainty. Such uncertainty may be linked both to the basic data and to the calculation of the aggregate social costs. As regards the basic data, this reflects both measurement uncertainty in the questionnaire-based data and that the delineation of the costs of payments is sometimes based on estimates. In connection with

⁴ Transfers may constitute both income and expenses for some participants. For example, a bank receives fees from households and pays a cash-in-transit company for transport of cash.

Payment methods included in the survey

Table 1

	Method of payment	C2B	B2B	P2P
Physical trade	Cash	X		X
	Dankort	X	X	
	International debit cards	X	X	
	International credit cards	X	X	
Remote trade	Dankort	X	X	
	International debit cards	X	X	
	International credit cards	X	X	
	Betalingservice/Leverandørservice	X	X	
	Credit transfers:			
	- Online and mobile banking	X	X	X
	- Staffed transfers	X	X	
	Inpayment forms:			
	- Online and mobile banking	X	X	
	- Staffed transfers	X	X	
	Mobile payments			X

Note: Dankort, Betalingservice and Leverandørservice are products. In the analyses, they are all referred to as methods of payment. Automated card payments are included in calculations of total costs and transactions but not presented as a separate method of payment. Automated card payments take place on the basis of an agreement between a payer and payee, without the payer actively having to approve each individual payment. In the survey, information about automated card payments is used e.g. to adjust the payment methods remote trade using Dankort, international debit cards and international credit cards so that remote trade using payment cards include only payments where the payer actively approves each individual payment.

the grossing up of data for social costs, a number of assumptions were made regarding e.g. the distribution of costs on the payment methods in the survey, and it has also been necessary to apply estimates if data has been inconsistent. It has been sought to minimise these uncertainties, e.g. via a dialogue with data providers and by comparing data with other sources.

The key participants in the Danish retail

payments market took part in the survey

The cost survey is based on information from key participants in the Danish payments market. The costs incurred by payment intermediaries, retailers and businesses and households that are included in the survey are described below, cf. Table 2.⁵

Banks incur costs in connection with all payment methods included in the survey. The banks handle

5 Costs borne by participants that have not provided data for the analyses are in some cases nevertheless covered by the analysis. For example, transfers from banks to service providers that have not reported for the survey are included in the banks' internal costs. So for the service provider, there is an implicitly assumed one-to-one correlation between the payment for the service provided and the participant's internal costs.

Which payment-related costs do participants in the payments market incur?

Table 2

	Physical trade				Remote trade							
	Cash	Dankort	International debit cards	International credit cards	Dankort	International debit cards	International credit cards	Betalingservice/Leverandørservice	Credit transfers	Impayment forms	Mobile payments	
Banks	X	X	X	X	X	X	X	X	X	X	X	X
Card companies etc.		X	X	X	X	X	X	X	X	X	X	X
Providers of online payment modules					X	X	X					
Danmarks Nationalbank	X											
Cash-in-transit companies	X											
Businesses/Retailers	X	X	X	X	X	X	X	X	X	X		
Households	X	X	X	X	X	X	X	X	X	X	X	X

or pay cash-in-transit (CIT) companies to handle cash, they issue payment cards and develop and operate online and mobile banking and mobile payment solutions. In addition, they perform a number of tasks related to payments, including customer services and handling of issues surrounding fraud, etc. And via Finance Denmark, the Danish banks jointly own the Danish systems for clearing and settlement of retail payments, which are core elements of the Danish payments infrastructure.

Card companies, etc. incur costs in connection with all electronic payment methods included in the survey. As card acquirers and issuers, these companies perform important underlying tasks related to payments. In short, the acquirer accepts retailers' card payments and passes them on through the payment systems. A retailer/business that wants to accept a payment card must conclude an acquisition agreement with a card company. Card issuer services are tasks performed on behalf of a bank in relation to issuance of payment cards. These tasks are operation of IT systems supporting the bank's processing of transactions, monitoring of payment

card fraud, etc. Several operators in Denmark offer card acquirer and issuer services, but in 2016 the majority of these activities was performed by Nets. Besides being a card company, Nets also operates the retail clearing systems, which are, as previously mentioned, owned by Finance Denmark, and Nets also owns the payment products Dankort, Betalingservice and Leverandørservice.

Providers of online payment modules incur costs for card payments in remote trade. Retailers selling online need solutions for receiving customer payments and forwarding them to card acquirers. This function is carried out by a payment module. Providers of such modules incur costs for operating and developing these platforms.

Danmarks Nationalbank incurs costs that are included in the survey via its role as producer of banknotes

and coins.⁶ *Cash-in-transit companies* are also included in the survey as they service banks and retailers by supplying, collecting and transporting cash between stores, branches and cash centres.

Retailers and businesses incur costs in the survey as recipients of payments from consumers (C2B) and businesses (B2B) and as senders of payments to other businesses (B2B). Retailers receive and send payments in physical and remote trade. In connection with physical trade, retailers incur payroll costs for employees at the checkout and expenses for cash registers, card terminals and possibly security devices. These costs are not incurred in connection with payments related to remote trade. But both remote and physical trade involve costs for balancing the books and checking payments. Costs for public authorities have not been calculated separately in the survey.

Finally, there are the *households*. In the survey, the households' costs are the time it takes to execute payments, withdraw cash and check transactions in bank accounts. Time is a social cost because it could have been used for e.g. working. This means that households' costs are estimated since they are not actually paid, but nevertheless constitute a social cost.

How was data for the survey collected?

As the secretariat of the Danish Payments Council, Danmarks Nationalbank has been responsible for preparing questionnaires and collecting and validating the extensive data. This work was initiated in 2016 and continued until May 2018, when validation of the data had been completed. After that, the secretariat has been responsible for calculating the social costs and preparing the analyses in the Council's series about the costs of payments in Denmark in collaboration with the working group, cf. the Appendix.

Banks

This section describes how information was collected from the various participants providing data for the analysis.

The calculation of costs for the banking sector is based on reporting by the five largest banks in Denmark. Danske Bank, Nordea, Jyske Bank, Sydbank and Nykredit Bank have all provided data for the survey. The data consists of information on the number and value of payments executed by the banks on behalf of their customers, payment-related costs broken down by the methods of payment included in the survey and income from payments broken down by main areas.

The banks have estimated the costs that are directly attributable to a particular method of payment, e.g. payment card fraud or expenses for ATMs. Furthermore, they have distributed the costs supporting several different payment methods, such as customer services, anti-money laundering costs, administration, etc. Finally, the banks have assessed the shares of the individual cost components that reflect fixed costs.

The banks, Finance Denmark and Danmarks Nationalbank in its capacity as secretariat to the Danish Payments Council kept up a dialogue before, during and after the reporting of data so as to ensure a uniform understanding of the data to be included in the analysis.

The reporting banks make up approximately 70 per cent of the sector's size, measured by deposits that can be withdrawn or used for payments here and now. Costs have been scaled up to take the rest of the sector into account. It has been assumed that the cost structures of the reporting banks and other banks do not differ materially.

Information from the banks was collected in collaboration with the Danish Competition and Consumer Authority. The purpose of working together was to reduce the banks' reporting burden as the Authority needed to collect information at the same time as the Payments Council. The Authority's purpose

⁶ In the autumn of 2014, Danmarks Nationalbank decided for financial reasons to outsource production of banknotes and coins to external suppliers. 2016 was the last year with production of banknotes and coins in Danmarks Nationalbank's building in Copenhagen. Danmarks Nationalbank remains the issuer.

was to calculate the costs of operating Dankort in physical trade in order to lay down the framework for retailers' subscription fees to Nets for accepting Dankort in physical trade. The Danish Payments Council's cost survey has a broader focus as regards the definition of costs and also covers other methods of payment. The social costs include, inter alia, development costs and indirect costs for e.g. rent, lighting, heating, etc. Hence Dankort-related results in the two surveys are not comparable.

In connection with the calculation of costs for mobile payments, MobilePay has provided information about the number of transactions using its mobile payment solution, while the banks have provided information about the costs. Mobile payment has been included only as a P2P solution in the survey as this was its primary use in 2016.

Card companies and other payment intermediaries

The calculation of costs for card companies, etc. is based on reporting by SEB Kort and Nets. Like the banks, both these companies have provided data for the functions they perform in the payments market. For example, Nets has provided a breakdown of payment card costs by costs linked to card issuer and card acquirer services, respectively. SEB Kort has provided data with a view to covering the costs related to its role in the market for international credit cards.

In 2016, Nets acquired the majority of payment card transactions in Denmark. To take into account the rest of the market for card acquirers, the reported costs for card acquirer services have been grossed up to the full population.

Besides its own reporting, Nets has handled contacts with Netaxept and DIBS, which have provided data for the survey as providers of online payment modules.

Danmarks Nationalbank has also provided information for the survey in the form of data for calculating the costs of producing cash.

Finally, information about the costs linked to cash handling has been collected via financial statements from the three cash-in-transit companies that were active in 2016. They were BKS, Loomis Danmark and Nokas.⁷

Retailers and other businesses

Information about costs of payments for retailers and other businesses was collected via a questionnaire survey.

The actual survey was conducted by DST Survey in the spring of 2017. A total of 4,000 businesses were selected for the sample, and 2,148 complete responses were received. The sample was divided into two groups. A sample of retailers and other traders and a general sample of other businesses. The reason for the special focus on traders and retailers is that they receive many payments. For the same reason, the sample was designed so as to have an overrepresentation of large businesses.

The questionnaire itself also consisted of two parts. The first part contained questions about costs paid for receiving payments, both for C2B and for B2B payments. The second part related to the costs of sending payments to other businesses, i.e. B2B payments. The information is from 2016.

Households

Data for calculation of households' costs were primarily collected from a single household survey. The survey consisted of a questionnaire and a payments diary to be kept by the respondent.

In the payments diary, the respondent was to note information about the payments and cash withdrawals performed on a specific day. The information included method of payment, type of payment situation, payment time and amount.⁸

Kantar Gallup was responsible for the data collection, which comprised 1,202 interviews with full responses. The survey was conducted over one month in the spring of 2017. This means that the household

⁷ In August 2016, BKS was acquired by Loomis. The survey takes this into account.

⁸ The payment time is calculated from the time when the payer is notified of the amount until the time when the payment has been completed.

survey is slightly staggered relative to the other data in the survey, which relates to 2016. The survey took place over a month in order to take into account variations in payment patterns within a month.

To supplement the information in the payments diaries, Salling Group provided information about the average payment time for card and cash payments in their stores. This provided greater certainty about the payment times applied in the survey.

To calculate the households' social costs for the individual methods of payment, the payment time is multiplied by the number of transactions and a wage rate.

Sources for the number of payments

Various sources have been used to calculate the number of payments for the various payment methods. The number of payments is the key to distributing costs not broken down by the various payment methods in the analysis, including whether they are C2B, B2B or P2P costs. In addition, the number of payments is used to calculate costs per payment.

The primary source for the number of card payments is Danmarks Nationalbank's payments statistics. They include information about the number of card payments broken down by card type, customer type and sales channel. The payments statistics are supplemented with data from Nets about the number of payments using Leverandørservice, Betalingsservice and an estimate of the number of automated card payments. Kantar Gallup's household survey has been used for calculating the number of cash payments and the number of P2P, online and mobile banking payments. Finally, the numbers of the various credit transfers (P2P excepted) have been estimated on the basis of data from the banks and Finance Denmark. It has not been possible to eliminate credit transfers via online or mobile banking made between accounts held by the same person or business. Hence the number of credit transfers via online or mobile banking also includes transactions for other purposes than payment.

Appendix

Working group membership

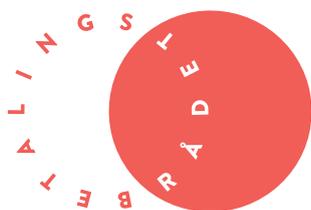
Box 1

In 2016, the Payments Council decided to initiate a survey of the social costs of the most frequently used methods of payment in Denmark. As the secretariat of the Payments Council, Danmarks Nationalbank has been responsible for collecting and validating the data and for scaling-up. To assist the secretariat in this process, a working group was set up. Initially it comprised only members representing the parties that were to provide data for the survey. When the analyses were to be prepared, the working group was expanded to include more representatives of Payments Council members.

The working group consisted of:

- Henrik Sedenmark, Danish Chamber of Commerce
- Joachim Nørgaard Strikert, Confederation of Danish Industry
- Lars Magnus Christensen, SMEdenmark
- Anders Laursen, Finance Denmark
- Andreas Kaus Jensen, Nets
- Jonas Aaen, Ministry of Industry, Business and Financial Affairs
- Troels Hauer Holmberg, Danish Consumer Council

Danmarks Nationalbank was represented by: Kristian Nørgaard Bentsen, Mads Mejborg Borup, Søren Truelsen and Marianne C. Koch.



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