

FEBRUARY 2019  
SERIES: COSTS OF PAYMENTS IN DENMARK 2016

# The mobile phone has contributed to reducing the costs of person-to-person payments



**In P2P payments,  
mobile payments entail  
the lowest social costs**

In 2016, the average social costs of a mobile P2P payment were approximately kr. 2. Credit transfers entailed the lowest social costs per krone spent.



**Households' time  
consumption for making  
payments constitutes  
half of the social costs**

The other half is made up of banks' and other payment intermediaries' costs for processing the payments.



**Notable development  
in P2P payment methods**

Mobile payments are gaining ground, while cash is now used less and less for P2P payments.

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

The Danish Payments Council<sup>1</sup> has surveyed the social costs of payments in Denmark. This analysis is part of a series of analyses and for the first time presents the social costs of domestic payments between private individuals, i.e. P2P payments<sup>2</sup>.

Social costs express the aggregate use of resources by the parties involved in a payment transaction, i.e. payment intermediaries, the payer, and the payee, cf. Box 1. Social costs do not comprise transfers between the parties, such as fees, as they constitute an expense for one party and income for the other. Consequently, the social costs do not say anything about e.g. the possible fee for withdrawing cash or the annual fee for holding an international credit card.

The Danish Payments Council's survey of the costs of payments gives payment market participants and other stakeholders insight into the social costs of various types of payment.

### P2P payments

Denmark has a well-functioning payments market where private individuals have a choice of payment methods, depending on the payment situation. P2P payments include all transfers of money between private individuals, whether in the form of gifts, pocket money, purchases at garage sales or for other purposes.

In 2016, some 180 million P2P payments were made using the most frequent methods of payment. The three most prevalent payment methods for P2P payments are mobile payments, cash and credit transfers via online or mobile banking. All three are comprised by this analysis, cf. Chart 1.

### Social costs

Box 1

P2P payments are made every day all year round. The calculation of the social costs of making a P2P payment includes elements from both households and payment intermediaries. Payment intermediaries are banks and cash-in-transit (CIT) companies, among others.

Each party incurs costs when executing a payment. These costs are either internal *resource costs*, such as the time it takes the payer to complete a payment, or *transfers* to other parties, such as a bank's transfer to a CIT company.

This analysis reviews the social costs, i.e. the aggregate use of resources by the parties involved in a payment. Transfers between the parties have been excluded.

For payment intermediaries, the resource costs relate to payroll costs for employees such as cashiers, as well as expenses for equipment, e.g. IT systems.

For households, the resource costs of a payment relate to the opportunity cost of the time a payment takes. This means that the cost is not money to be paid by the households, but rather a reflection of the value of the time the households spend making payments.

The basis for the survey is an extensive data collection from households and businesses via questionnaire surveys, as well as direct collection from selected banks and other payment intermediaries. The household survey was conducted in the spring of 2017, but is referred to as 2016 in the analysis as this is the reference year for the other data. For further details, see the website of the Danish Payments Council ([link](#)), where a description of the method and the other analyses in the series can be found.

1 The Danish Payments Council is the framework for collaboration on the payments of consumers and businesses. The Council was set up by Danmarks Nationalbank and includes representatives of a broad range of stakeholders in the Danish payments infrastructure.

2 P2P stands for *Person-to-Person*.

### Households mainly use three methods of payment when making P2P payments

Chart 1



Note: Credit transfers are P2P payments via online or mobile banking. Note that mobile payment is a service for initiating other methods of payment (card payments and credit transfers), but nevertheless it is treated separately in this survey as the payment experience is different from the underlying methods.

### P2P payment costs amounted to almost kr. 500 million

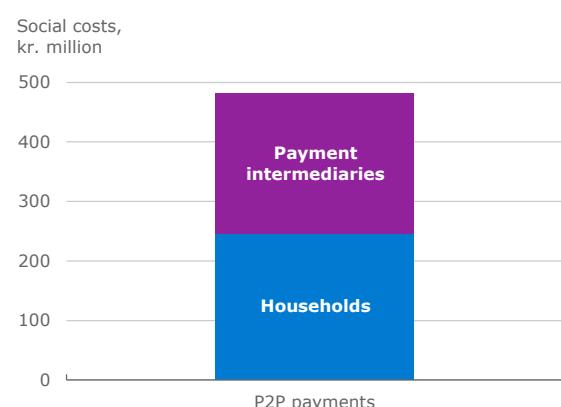
The aggregate social costs of P2P payments were almost kr. 500 billion in 2016, cf. Chart 2. That is equivalent to around 0.02 per cent of GDP. A P2P payment involves not only the households making and receiving the payment, but also payment intermediaries. Depending on the payment method, payment intermediaries are banks, card companies, etc., CIT companies and Danmarks Nationalbank.

The households' resource costs make up around half of the social costs of P2P payments. These comprise the time spent making payments, checking account statements and withdrawing cash. The households' time is included as a social cost because this time could otherwise have been spent productively, e.g. for work.

The other half of the social costs of P2P payments is made up of the payment intermediaries' resource costs, i.e. payroll costs for employees, costs for equipment and IT systems, and losses in connection with fraud.

### The social costs of P2P payments amounted to almost kr. 500 million

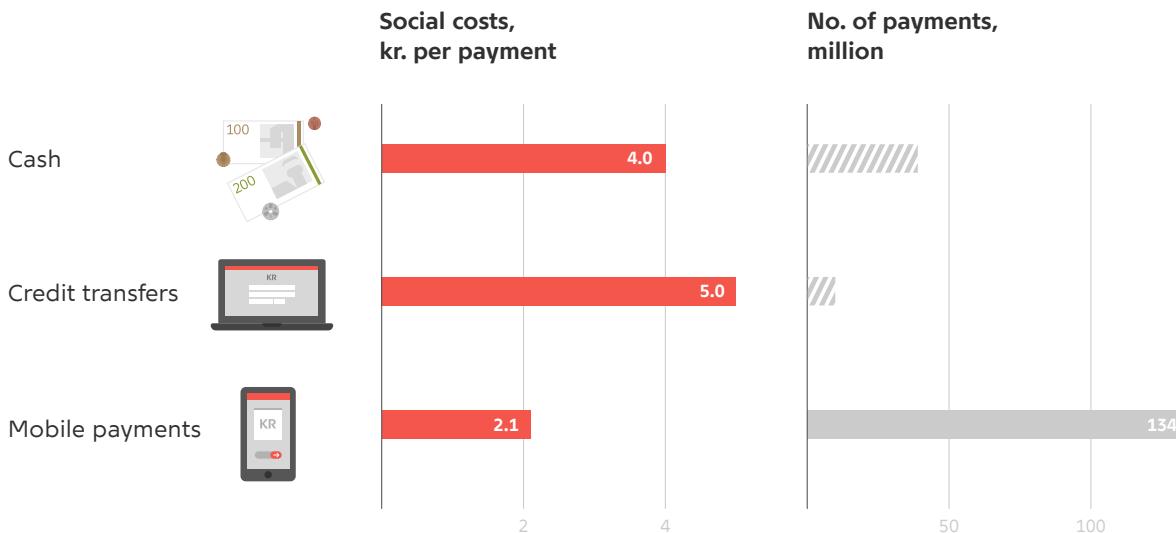
Chart 2



Source: The Danish Payments Council.

### Mobile payments are the most inexpensive P2P payment method for society

Chart 3



Note: The hatched horizontal bars indicate that the numbers of cash payments and credit transfers are subject to uncertainty. However, this does not affect the cost per payment. In the chart, credit transfers are only those made via online or mobile banking. The costs of P2P payments should not be compared with the costs of C2B payments, as the payment situation and the parties involved differ. For example, P2P payments do not involve businesses and their resource costs for receiving payment.

Source: The Danish Payments Council and MobilePay.

### Mobile payments are the most inexpensive P2P payment method

At an average cost of kr. 2.1 per payment, mobile payments involved the lowest social costs in 2016, cf. Chart 3. A cash P2P payment cost kr. 4, while the social costs of a P2P credit transfer via online or mobile banking were kr. 5.

Payments are characterised by involving relatively large fixed costs. Therefore, the number of payments for each payment method has an impact on the average cost. 3 out of 4 P2P payments were mobile payments in 2016, equivalent to around 134 million payments. This widespread use contributes to reducing the average social cost per payment. Consequently, it is important to keep the prevalence and the fixed costs of payments in mind when comparing the different payment methods.

When calculating the social costs, it is important to be aware that there are major differences between

payments to private individuals and to retailers. The Danish Payments Council has also surveyed the social costs of consumer-to-business, C2B, payments.<sup>3</sup> In a cash transaction, for example, a private individual can simply pocket the cash and use it later. A retailer, on the other hand, has a cash register and must among other things take excess cash to the bank, and the cost structure is therefore entirely different. Nor is a mobile payment to a private individual comparable to e.g. a Dankort payment in a retail store.

Although some payment methods involve higher social costs per payment than others, there may still be good reasons to use them. The calculation of the payment costs covers the actual payment situation only and thus not any other reasons there might be for choosing a specific payment method.

<sup>3</sup> See Danish Payments Council, The costs of consumer-to-business payments have decreased considerably, *Danish Payments Council Analysis*, September 2018.

### The resource costs of the parties depend on the method of payment

The resource costs of both payment intermediaries and households varied somewhat, depending on the P2P payment method, cf. Chart 4.

The social costs per payment incurred by payment intermediaries were approximately twice as high for cash P2P payments as for the other two methods of payment. This is attributable to the physical nature of cash; it must be produced and handled, which involves social costs.

The payment intermediaries' social costs per payment were lowest for credit transfers and slightly higher for mobile payments. This is because in many situations a mobile payment involves not only a credit transfer but also a card payment, cf. Box 2.

The households' social costs per payment varied considerably, depending on the method of payment, cf. Chart 5. The costs were lowest for mobile payments and highest for credit transfers. The costs for cash were about midway between the two. For households, the social costs are the opportunity costs linked to the time spent making payments, including the time consumption for withdrawing cash and checking account statements.

For cash payments, household costs are to a large extent the time spent withdrawing cash. Time is also spent making the payment, while checking the account statement plays a smaller role as the individual payments are not listed in the account statement.

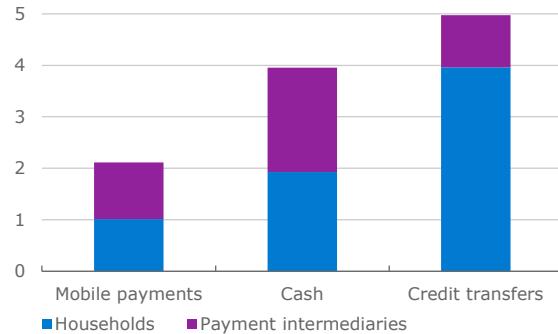
For credit transfers there is, of course, no time consumption for withdrawing cash. On the other hand, more time is spent checking account statements, as payments are entered individually to the account. The actual payment time is also considerably longer for credit transfers. This is due to the need to log onto the mobile or online banking solution to make a credit transfer and also to state an account number and perhaps approve the transaction using NemID<sup>4</sup>.

For mobile payments, the payment time is similar to that for cash payments, but the distribution on payer and payee is not the same. For the payer, it

### Use of resources varies with the method of payment

Chart 4

Social costs,  
kr. per payment



Note: Payment intermediaries are banks, card companies, etc., CIT companies and Danmarks Nationalbank.

Source: The Danish Payments Council.

### Mobile P2P payments

Boks 2

In the Danish Payments Council's survey, the social costs of mobile P2P payments have been calculated on the basis of data from the Danish mobile payment provider, MobilePay.

In 2016, Danish households had a choice of two mobile P2P payment options: Swipp and MobilePay. The preferred product was MobilePay, which had more than 3 million users at end-2016, while Swipp had around 900,000. Swipp was discontinued in February 2017.

In 2016, most mobile payments via MobilePay involved a card payment from the payer to MobilePay and a credit transfer from MobilePay to the payee (in certain cases, however, a credit transfer could be made directly from the payer to the payee). Hence, MobilePay is a service for initiating other methods of payment. Nevertheless, mobile payment is treated as a separate method of payment in this survey as the payment experience is different from the underlying methods. Since the survey results for mobile payments are based on MobilePay, the number of mobile P2P payments is underestimated, as are the aggregate social costs of mobile payments. But the average costs per mobile payment and per krone spent are assessed to be accurate.

4 NemID is a Danish common secure two-factor login solution used for digital signatures in a multitude of public and private institutions.

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takes longer to make a mobile payment than a cash payment. But for the payee it takes no time to receive a mobile payment, unlike a cash payment. So ultimately the time consumption is almost the same for the two methods of payment.

### Large payments make credit transfers most cost-effective relative to the turnover

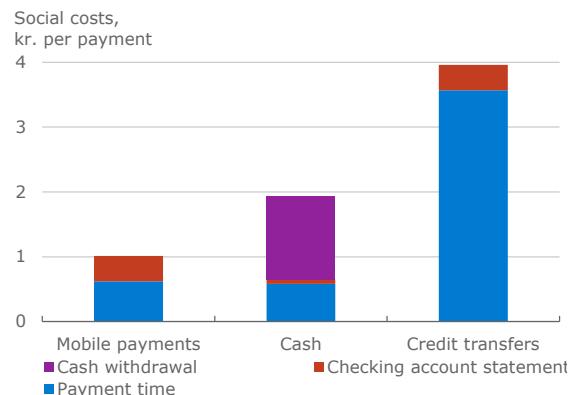
The payments households typically make using the various P2P payment methods differ in size. Consequently, it is relevant to compare the social costs of the payment methods with the value of the payments.

If a P2P payment in connection with the sale of a second-hand car has a value of kr. 100,000, it is more justifiable to incur slightly higher social costs than when two friends split the bill at a restaurant. And indeed, this is the picture emerging when social costs are related to the value of payments using the individual methods, cf. Chart 6.

Relative to the turnover, credit transfers involved the lowest social costs. This is closely linked to the fact that the average value of these payments was by far the highest. Mobile payments take second place,

### The payment costs of households are the time they spend

Chart 5

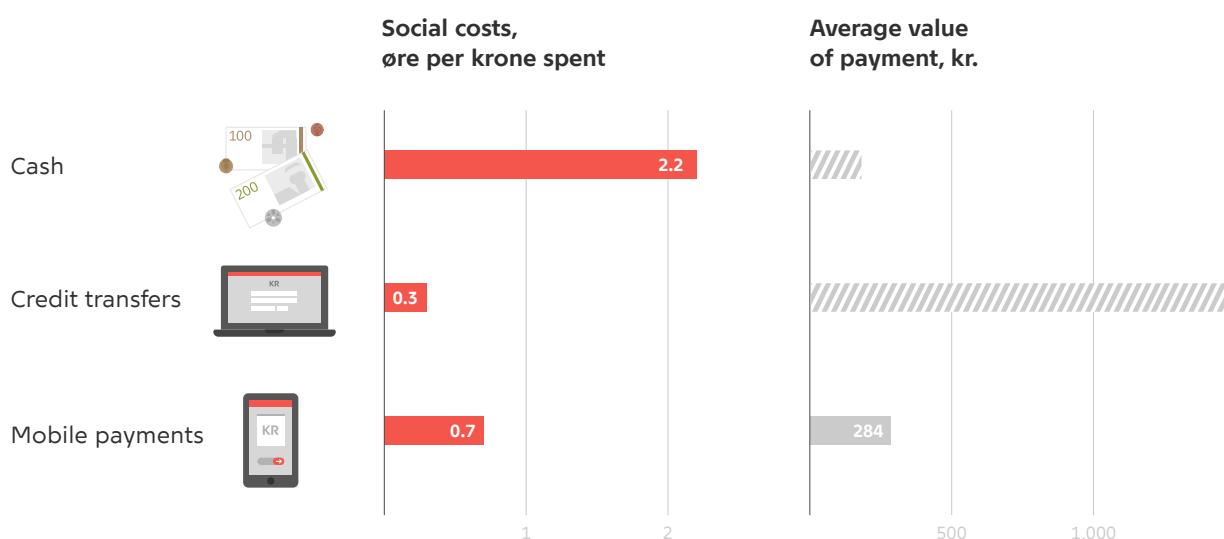


Note: Cash withdrawals include withdrawals from ATMs, at the counter in a bank, as well as cashback at retailers.

Source: The Danish Payments Council.

### High-value payments mean that credit transfers entail the lowest costs per krone spent for P2P payments

Chart 6



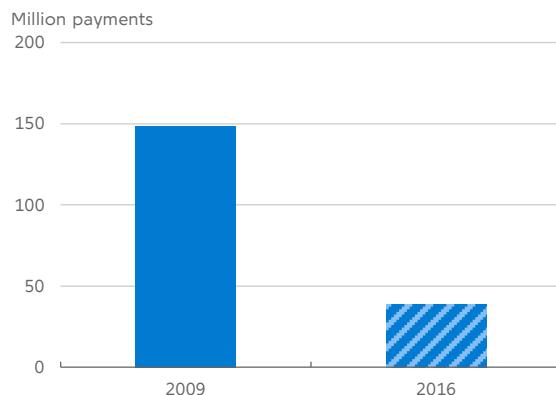
Note: The hatched horizontal bars indicate that the numbers of cash payments and credit transfers are subject to uncertainty. However, this does not affect the cost per payment. In the chart, credit transfers are only those made via online or mobile banking.

Source: The Danish Payments Council and MobilePay.

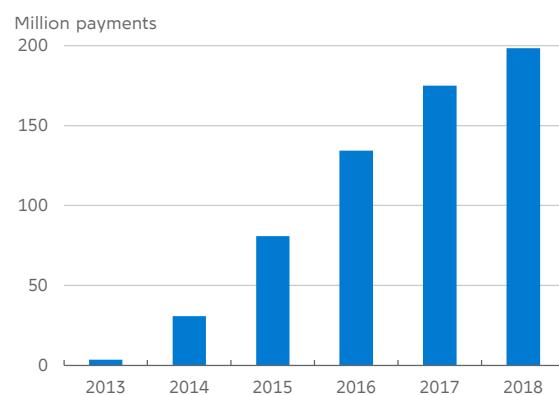
### Mobile payments are gaining ground for P2P payments

Chart 7

#### Cash payments



#### Mobile payments



Note: The number of cash P2P payments in Denmark has been calculated in 2009 and 2016 only. Data for the number of cash payments in 2016 is subject to measurement uncertainty. Hence, the number in the chart is indicative. The number of mobile payments is based on MobilePay.

Source: The Danish Payments Council, Danmarks Nationalbank and MobilePay.

while cash involved the highest costs per krone spent. The high costs of using cash should be viewed in the light of cash having the lowest average value per payment. Electronic payments, such as credit transfers and mobile payments, are more cost-effective for larger payments, as the social costs do not rise with the amount paid. The opposite applies to cash payments, as more cash must be produced and handled if the amount increases.<sup>5</sup> Indeed, cash is used primarily for smaller payments – both in C2B and P2P payments.<sup>6</sup>

#### Fewer P2P payments in cash

In 2016, cash was used approximately 40 million times for P2P payments, down from almost 150 million in 2009, cf. Chart 7. This is a decline of almost 75 per cent. In the same period, mobile payments entered the Danish payments market. In 2016, the Danes made approximately 134 million mobile P2P payments.

A questionnaire survey performed by Danmarks Nationalbank among Danish households shows that some of the preferred characteristics of cash are also emphasised in connection with mobile payments. For both payment methods, the respondents say that they are "easy to use" and that "payments are settled immediately". These responses show that the unique characteristics of cash are no longer so unique, indicating that mobile payments to a large extent replace cash payments. Therefore, some of the 134 million mobile payments in 2016 can be assumed to have replaced cash payments. This has contributed to reducing the social costs of P2P payments.

In the same period, mobile banking has also made credit transfers easier. Access to online banking via a mobile phone was very limited in 2009, and mobile banking as we know it today was not launched in the Danish market until 2010. Access to mobile banking

5 See e.g. Danmarks Nationalbank, *Omkostninger ved betalinger i Danmark* (in Danish only), December 2011. An English summary, Report on domestic payment transfers in Denmark, was published in January 2012. The report collates results from multiple countries, which all find that the marginal costs of cash payments are increasing.

6 See Victor Gørtz Smestad, Danish households opt out of cash payments, *Danmarks Nationalbank Analysis*, no. 24, December 2017.

and new features, such as the option of using a fingerprint to approve payments, may also have made it more attractive to use credit transfers rather than cash for P2P payments in certain situations.

All in all, there is reason to believe that the new, more convenient methods for making P2P payments increase the number of payments. It has become faster and easier to settle accounts immediately rather than compiling payments and offsetting them against each other.

### New P2P solutions on the horizon

The launch of mobile payments in recent years has brought about a change in P2P payments. New payment methods have been introduced, and the selection may become even wider in the future. At present there are three obvious options for those wishing to offer payment services on the Danish market:

The first option is as a third party, either via direct agreements with e.g. a bank or by using the possibilities offered by the Payments Act, which entered into force in 2018. This Act gave payment service providers third-party access to customers' bank accounts, subject to customer consent. This will give payment service providers more opportunities to offer e.g. P2P payment services that could potentially be both fast and inexpensive for society. This option of conditional access can be used to offer payment services by large technology firms and small fintechs as well as the current actors in the payments market, including banks and card companies, etc.

The second option is to offer e-money<sup>7</sup>, as large technology firms are already doing abroad. E-money, which should not be confused with digital central bank money, is an electronically or magnetically stored monetary value that can be widely used as a means of payment. The monetary value is created when the user deposits money with the service in question. In some countries, large technology firms such as Apple, Facebook, PayPal and Google already offer P2P payment services. Payment takes place using either e-money or a payment card via mobile

phones or online. These services are not offered in Denmark yet.

The third option is to conclude partnerships between participants in the payments market. MobilePay is an example of a product offered via a partnership between existing parties in the payments market, in this case the banks. The service began as a Danske Bank product that used the payment card infrastructure to allow all users to make payments to each other, irrespective of where they banked. Subsequently, MobilePay has been hived off from Danske Bank so that it is now a partnership between most Danish banks, with payments primarily being effected as credit transfers. This reduces costs, as payments can be effected without use of the payment card infrastructure. This development has been underway since 2016, so it is assumed that mobile payment solutions such as MobilePay now involve lower social costs than this survey finds.

The three options are not necessarily mutually exclusive and do not require special technology, such as mobile phones. New methods of payment may well be linked to e.g. biometrics<sup>8</sup> or other technologies.

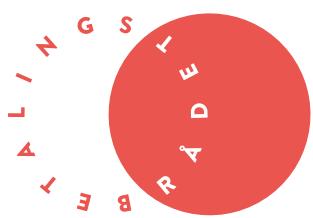
The marked development in the market for P2P payments is expected to continue in the coming years. To the extent that the trend goes in the direction of more mobile payments, this is assumed to reduce the social costs of payments. However, developments depend on their prevalence and how new mobile payment solutions are designed. In which way brand new methods of payment will affect the social costs of payments will also depend on the technology used, as well as how popular the new solutions become.

<sup>7</sup> Electronic money, or e-money, is an electronically or magnetically stored monetary value representing a claim on the issuer. It is issued in connection with the reception of payment with a view to executing payment transactions and it is accepted by others than the issuer of electronic money. PayPal is an example of e-money.

<sup>8</sup> Biometrics is a means of identifying a person on the basis of specific characteristics such as fingerprints or facial features.

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