



Costs of retail payments in Finland: What paying costs?

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Expository Studies

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The views expressed in this article are those of the authors and do not necessarily reflect the views of the Bank of Finland.

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Abstract

Despite the central role of payments in all economic activities, surprisingly little is known about the costs associated with payment transactions. This is the first study conducted in Finland to comprehensively investigate both the private and the social costs of retail payments (i.e. costs incurred by various parties involved in the processing of payments and society as a whole). The study focuses on the costs of the most commonly used payment methods in Finland, i.e. payment cards, credit transfers and cash. The results are mainly based on data collected from commercial banks and merchants with 2018 as the reference year. The questionnaires and calculation methods used follow methodologies jointly agreed in the Eurosystem.

Based on the results, the social costs of retail payments, namely the overall costs to society, were an estimated EUR 646 million in 2018, which was 0.3% of Finland's GDP. Of the social costs, 39% was accounted for by card payments, 38% by credit transfers and 23% by cash. In terms of total cost per transaction, card payments were shown to be the least expensive payment method: in 2018, a single card payment cost society on average 15 cents, a cash payment 22 cents and a credit transfer 25 cents. Although the costs associated with individual payment transactions are relatively small, large payment volumes make them a significant cost element in the national economy.

Most of the social costs are incurred by the commercial banks' production costs of payment services. Based on data provided by banks and comparing them to the previous study carried out in Finland, costs related to cash nearly halved between 2009 and 2018 due to a decline in the use of cash and a reduction in cash services. Although the use of cash as a means of payment has decreased significantly over the years, the banks' average unit cost of cash withdrawals has remained almost unchanged. In 2018, cash was, however, the only payment service that still generated losses for banks, but the losses arising from cash also more than halved in ten years.

The digitalisation of payments has had a significant impact on banks' costs. Banks have been able to automate the processing of payments and take advantage of the economies of scale associated with electronic payments, which has significantly reduced the unit costs of card payments and credit transfers. As a result, banks' overall costs of retail payments have declined, despite an increase in the number of payment transactions. At the same time, banks' revenues from payment services have increased. In 2018, credit card payments were the most profitable payment instrument for banks.

The total cost to merchants of accepting different payment methods was an estimated EUR 194 million in 2018, which was approximately 0.5% of total retail sales. Most of this arose from card payments but, in terms of unit costs, accepting them was cheaper for merchants than cash payments. Merchants have, however, raised concerns about increase in fees related to card payments services, which is why they were still studied separately with regard to the largest retail groups for 2019 and 2020. Based on the results, the benefits of digitalisation do not appear to have benefited the retailers in recent years to the same extent as banks, and therefore their concerns would appear to be justified.

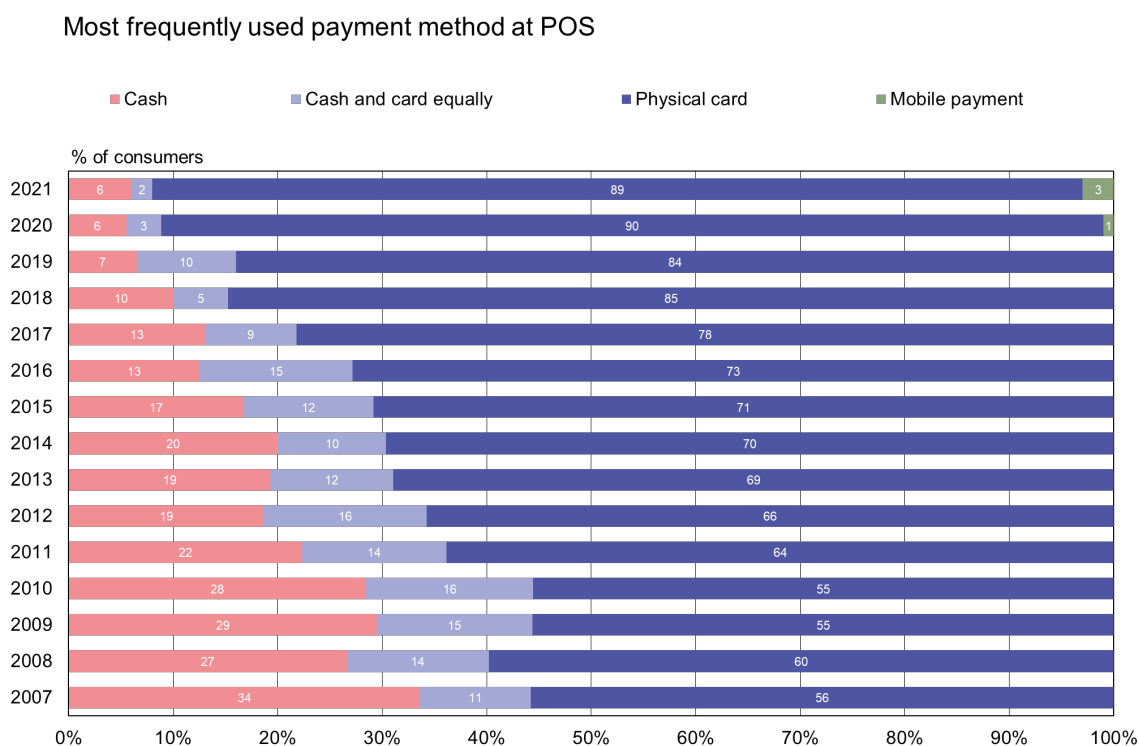
The cost-efficiency of retail payments is important, as rising overall costs are eventually also passed on to consumers. A comparison of the results with similar studies carried out in other countries suggests that, in terms of payments, Finland is among the most cost-efficient countries in Europe. Comparing the results across countries and drawing conclusion about the cost-efficiency of different countries is not straightforward, however, as the studies differ in many ways, e.g. the level of digitalisation, the structure and concentration of the retail payments market and the scope of the analysis. The improvement of European retail payments and their competitiveness has been made one of the key priorities at EU level for the coming years.

Introduction

Payments are a fundamental function of society and play a key role in everyone’s daily economic interactions. However, most people probably do not often think about what paying costs. The costs of retail payments means the costs incurred by different parties involved in initiating, processing, settling, using and accepting a payment service. Understanding these costs helps both central banks and payment service providers to promote the cost-efficiency of payments. Reliable and efficient payment services are a prerequisite for all economic activity, and they support economic productivity and growth.

The purpose of this study is to empirically measure the costs of retail payment methods in Finland. The study focuses on assessing the costs of the most commonly used payment methods in Finland, i.e. payment cards, credit transfers and cash. Most payment transactions are made with cards, but in value terms, credit transfers are the most significant payment method¹. At point-of-sale (POS) card payments have long been the dominant payment method, while use of cash as a means of payment has declined year by year (Chart 1). Credit transfers, on the other hand, are typically used e.g. to bill payments and various recurring payments.

Chart 1. Most frequently used payment method at POS, 2007–2021.



Source: Bank of Finland consumer surveys, 2007-2022.

Processing of payments typically begins with the initiation of a payment transaction and ends with the transfer of funds to the payee. The payment chain usually involves several different parties, such as banks and other payment service providers, merchants, consumers and the central bank. In addition to these, banks, for example, have outsourced many functions related to payment services to subcontractors, such as ATM

¹ Bank of Finland, payments statistics: <https://www.suomenpankki.fi/en/Statistics/payments-statistics/tables/>.

and cash-in-transit (CIT) companies. This study aims to estimate the costs of retail payments for most of the key parties involved in processing of payments. For simplicity, the costs incurred directly by consumers (such as the time taken to make payments) are not considered, as estimating them is a very challenging task and would require conducting a separate study.

The costs of retail payments can be divided into private and social costs. Private costs are the costs incurred by individual market participants involved in the processing, accepting and using of a payment service. Social costs, on the other hand, describe the total net costs at society level reflecting the real use of resources in the production of payment services. Social costs are obtained by adding together the private costs of all the various parties, less the fees paid between them, which are merely transfers from one market participant to another. Social costs are therefore an expression of the costs of retail payments to Finland as a nation.

In this study, the costs of retail payment are estimated mainly using data collected from domestic payment service providers and retailers in 2019. Most of the results presented in this paper relate to the reference year 2018. However, as merchants have expressed concern about increase in the costs of card payments in recent years, these were studied further through a survey directed at the largest retail chains in 2021. The cost-efficiency of payments is assessed by, among other things, comparing the results with similar studies carried out previously both in Finland and in other countries. Finally, the significance of the results is also reviewed in the light of the ongoing development of retail payments in Europe.

The cost-efficiency of retail payments is important for the society as a whole, because the costs of payments are ultimately passed on to the end users, i.e. consumers. Measuring the social costs of payments comprehensively is not straightforward, however, as production of payments is widely outsourced and processing of transactions may involve numerous intermediaries in a chain for example, in the case of card payments, the costs for each stage of the chain were not available. It is therefore worth noting that the data and methodology underlying the estimates in this study are associated with uncertainties. The results should accordingly be considered as uncertain point estimates.

Data and methodology

Costs of payments have not been studied in Finland before as extensively as in this study. The last time the costs of retail payments in Finland were examined at national level was in a study published in 2011². However, the results were based on only the costs and revenues incurred by commercial banks from the production of payment services with 2009 as the reference year. The study was conducted as part of research project carried out by the European Central Bank (ECB) on the social and private costs of different payment instruments in Europe³. A corresponding survey was conducted at the same time in a total of 13 EU countries⁴. For comparability of results, the

² Nyandoto, E. (2011), "Vähittäismaksamisen kustannukset pankeille" (Costs of Retail Payment Instruments for Finnish Banks), December 2011, Bank of Finland, BoF Online, 7/2011, <https://helda.helsinki.fi/bof/bitstream/handle/123456789/8424/169804.pdf?sequence=1>.

³ Schmiedel H., Kostova G. & Ruttenberg, W. (2012), The Social and Private Costs of Retail Payment Instruments: A European Perspective, September 2012 European Central Bank, Occasional Paper Series, No. 137, <https://www.ecb.europa.eu/pub/pdf/scpops/ecbocp137.pdf>.

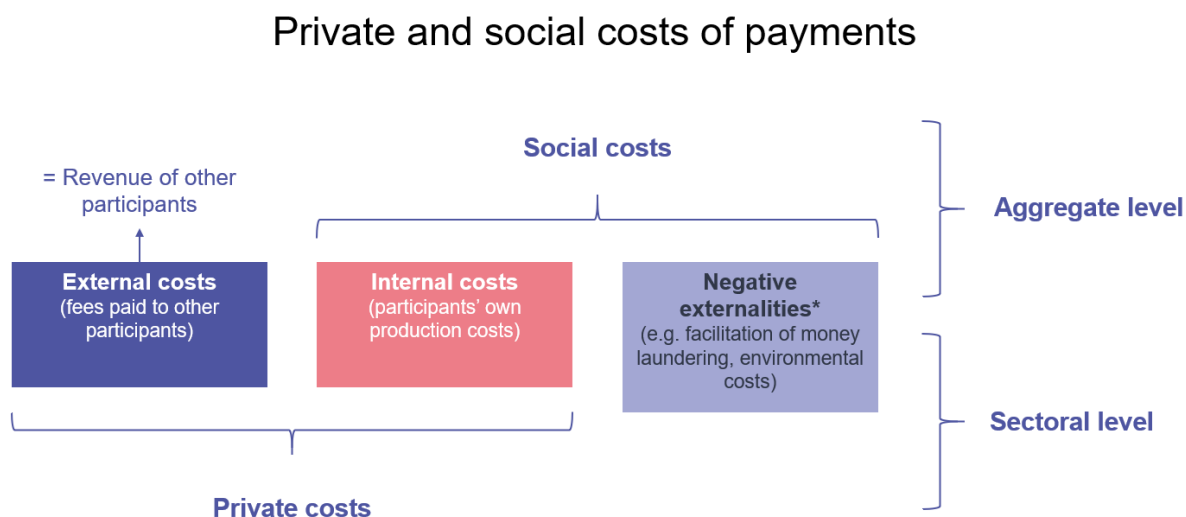
⁴ See e.g. Bergman, M., Guilbourg, G., Segendorf, B. (2007), The Costs of Paying – Private and Social Costs of Cash and Card, September 2007, Sveriges Riksbank, Working Paper Series, No. 212, http://archive.riksbank.se/Upload/Dokument_riksbank/Kat_publicerat/WorkingPapers/wp212.pdf, Banco de Portugal (2007), Retail Payment Instruments in Portugal: Costs and Benefits,

questionnaires and calculation methods used in this study are largely based on the methodologies jointly agreed at that time.

The purpose of this study is to empirically measure both the private and the social costs of different retail payment methods. Private costs refer to all the costs incurred by the relevant individual parties in the payment chain. Private costs can be divided into internal and external costs. Internal costs, simply speaking, are the parties' own production costs, i.e. resource costs, such as the investment and maintenance costs related to equipment or software as well as cost of staff. External costs, on the other hand, are fees paid to other parties, such as subcontractors. Private costs can also be further divided into fixed and variable costs, for example.

The social costs of retail payments refer to the net costs incurred by all the relevant parties, i.e. the society as a whole. Social costs are calculated as the sum of all internal costs (or total private costs minus external costs) of different parties, i.e. the costs incurred from the real use of resources (Chart 2)⁵. From the standpoint of the national economy, they therefore reflect the total resources required in order to carry out payments. The calculation of the social costs must take into account the fact that revenue of one party is always a cost to another party. To avoid double-counting of some cost elements, we calculate the social costs of a payment instrument by first calculating the total private costs of each participant and then subtract those costs that are merely transfers from one market participant to another.

Chart 2. Private and social costs of payments.



Source: Seitz & Kruger, Typology of payment costs.

* For simplicity, negative externalities are excluded from the analysis.

Alternatively, social costs can also be calculated by deducting from the total private costs the fees received from other market participants (i.e. revenues). Social costs therefore

<https://www.bportugal.pt/sites/default/files/anexos/pdf-boletim/study%20-%20july%202007.pdf> ja

Danmarks Nationalbank (2012), Costs of Payments in Denmark,

https://www.nationalbanken.dk/en/publications/Documents/2012/04/betaling_engelsk_samlet_web.pdf.

⁵ In principle, the social costs of payments also include negative externalities, such as the potential adverse environmental impacts of providing payment services as well as indirect financing of money laundering and terrorism. For simplicity, however, negative externalities have been excluded from this analysis.

also describe the net costs of retail payments to the society as a whole. These alternative calculation methods should in principle yield the same end result, but they provide different insights into the costs structure of the industry. However, following the methodology used by the ECB, the social costs are calculated in this paper in the former way. The robustness of the results is addressed, however, by finally calculating the social costs also in the latter way.

Calculating social costs of payments requires detailed information on the various costs incurred by the different parties along the transaction value chain. This study examines the costs associated with cash, card payments and credit transfers for all the major stakeholders involved in the payment transaction chain. We estimate the costs of different payment instrument mainly using data based on information given in responses to different questionnaires for payment service providers (primarily commercial banks) and merchants (retailers). The costs of cash also cover ATM and CIT (cash-in-transit) companies as well as the central bank. The costs of ATM and CIT companies are estimated using the companies' public financial statements.

The survey of payment service providers was sent to all commercial banks and certain other payment intermediators operating in Finland in 2019 with 2018 as the reference year. The survey covered the total costs related to production of different payment services, including costs associated with execution of payments as well as development and investment costs, for example. The payment instruments considered in the survey were cash withdrawals, debit card and credit card payments, credit transfers and direct debits⁶. Responses were received from five banking groups and one payment institution, covering around 80% of transaction values and comparing them with the Bank of Finland's payments statistics⁷. Data for those payment service providers that did not respond are estimated from the difference between the payments statistics and the data received from the responding banks.

In addition to the total costs, the survey covered banks' own production costs (internal costs), fees paid to other market participants (external costs) and fees received from others. It is worth noting that, when estimating social costs, all fees paid to parties outside the scope of the analysis are included in internal costs. For example, non-bank payment intermediaries (so-called card acquirers) mainly provide acquiring services, e.g. merchant settlement, clearing and development of infrastructure related to card payments, in Finland. As responses from card acquirers were not received or the data were not otherwise available, the fees paid by the banks to the acquirers have been included in the banks' internal costs. External costs, in turn, include, for example, fees paid by banks to ATM and CIT companies, which are covered separately in the study.

A corresponding questionnaire for merchants with 2018 as the reference year was also conducted in 2019. The questionnaire was also targeted at smaller shopkeepers, but responses were received solely from the largest retail chains in the consumer non-durables trade. The respondents accounted for 95% of consumer non-durables sales and nearly half of total retail sales in 2018⁸. In order to gain understanding of the total costs of payments incurred by the retail sector, the results of the survey are extrapolated first to the level of the whole consumer non-durables trade and then to the level of the

⁶ The survey only covered domestic and cross-border retail payments in the EU area worth less than EUR 50,000. The survey also included direct debits, but as their use is very low in Finland, they were excluded from the analysis.

⁷ Data on the entire sector were obtained from the Bank of Finland's payments statistics, which include the volumes of all payment transactions reported annually by payment service providers operating in Finland: <https://www.suomenpankki.fi/en/Statistics/payments-statistics/tables/>.

⁸ Statistics Finland, Enterprises financial statements (enterprise unit), https://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin_yri_yrti_yri/statfin_yrti_pxt_11d4.px/.

whole retail trade using data from Statistics Finland and the Tax Administration⁹. As merchants have indicated that the costs of card payments have increased after 2018, they were further investigated by a separate questionnaire targeted at the largest retail chains in 2021.

In some other countries, the costs incurred by consumers from the use of different payment methods have also been estimated¹⁰. As in the case of other parties, the costs of consumers can also be divided into internal and external costs. Consumers' external costs include costs incurred directly from the use of different payment services, such as fees paid to banks. Consumers' internal costs, in turn, include indirect costs, such as the time spent making payments (e.g. the time it takes to withdraw cash or to complete a payment transaction). However, as measuring the indirect costs is very challenging and would require a separate study, the consumers' costs have been excluded from this paper. A similar approach has been used by, for example, the ECB.

Results

This section firstly looks at the private costs of retail payments based on information received from the commercial banks and the retailers. The results relate only to the aggregate costs of the different sectors so that information on individual respondents cannot be derived. After this, the social costs of different payment methods, estimated on the basis of the private costs, are examined. Finally, the estimated costs are compared with similar studies conducted in other countries in recent years.

Private costs and revenues of banks

Commercial banks play a key role in the payments value chain, as nearly all payment transactions and cash withdrawals are ultimately debited from bank accounts. Based on the survey results and comparing them to the previous study carried out in Finland, banks' costs and revenues of retail payments have significantly changed between 2009 and 2018 (Table 1). In 2018, the total private costs incurred by banks from cash, card payments and credit transfers were nearly EUR 560 million, which was around one-fifth less than in 2009. At the same time, the total revenues received by banks from different payment methods have increased by more than half. As a result, banks' net costs (i.e. total costs minus total revenues) were only around EUR 11 million in 2018, which was significantly less than ten years earlier.

⁹ Statistics Finland, turnover and consumption statistics, https://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin_yri_yrti_oik/statfin_yrti_pxt_11qb.px/, and https://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin_kan_vtp/statfin_vtp_pxt_127s.px/, and Tax Administration, retail trade VAT accruals by type of trade, http://vero2.stat.fi/PXWeb/pxweb/en/Vero/Vero_Verotulojen_kehitys/010_verottol_tau_101.px/?rxid=0076dc7f-8b50-4931-837f-016dbe317dad.

¹⁰ See e.g. Danmarks Nationalbank (2018), Series: Costs of Payments in Denmark 2016, https://www.nationalbanken.dk/en/bankingandpayments/danish_payments_council/Pages/Theme_Cost-of-payments-in-Denmark.aspx. ¹¹ Negative interest rates have narrowed the interest rate margin between banks' borrowing and lending, as negative interest rates are more difficult to pass on, particularly to consumer customers. See e.g. Klein, M. (2020), Implications of negative interest rates for the net interest margin and lending of euro area banks, March 2020, Bank for International Settlements, BIS Working Papers, No. 848, <https://www.bis.org/publ/work848.pdf> and Nucera, F., Lucas, A., Schaumburg, J. & Schwaab, B. (2017), Do negative interest rates make banks less safe?, September 2017, European Central Bank, Working Paper Series, No. 2098, <https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2098.en.pdf>.

Table 1. Private costs and revenues of banks per payment instrument, 2009 and 2018.

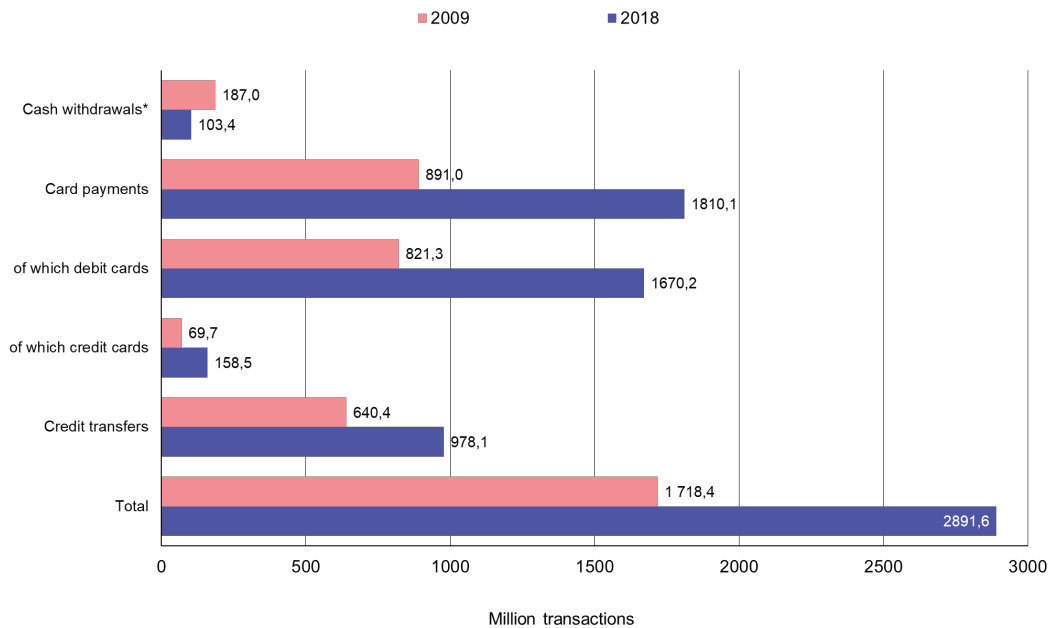
Private costs and revenues of banks per payment instrument, 2009 and 2018, EUR million.						
	2009			2018		
	Total costs	Total revenues	Net costs (costs - revenues)	Total costs	Total revenues	Net costs (costs - revenues)
Cash	142.7	30.9	111.8	76.6	25.4	51.2
Card payments	225.0	186.6	38.4	238.3	281.7	-43.4
of which debit cards	104.7	122.0	-17.3	95.0	126.3	-31.3
of which credit cards	120.3	64.6	55.7	143.3	155.4	-12.1
Credit transfers	327.3	134.2	193.2	243.8	240.7	3.0
Total	695.0	351.7	343.4	558.7	547.8	10.8

Sources: Bank of Finland's calculations, and cost surveys of banks conducted in 2010 and 2019.

The total costs incurred by banks from cash were an estimated EUR 77 million in 2018, which was approximately 14% of the banks' total costs of payments. Banks' total costs related to cash nearly halved from 2009, but their net costs were still more than EUR 50 million in 2018. Cash was therefore the only payment service that still generated clearly a loss for banks. Although the number of card payments more than doubled between 2009 and 2018 (Chart 3), their total costs hardly increased. At the same time, total revenues from card payments increased by more than half. In 2018, debit and credit card payments were therefore the only payment methods where the banks' revenues exceeded costs. Banks incurred the most costs from credit transfers, but revenues generated from them almost entirely covered the costs.

Chart 3. Number of transactions by payment instrument, 2009 and 2018.

Number of transactions by payment instrument, 2009 and 2018.



Source: Bank of Finland's payments statistics.
 * Includes only ATM withdrawals.

When estimating the costs of payments, it is also essential to examine the unit costs of the various payment methods, i.e. the total costs per number of payment transactions. This makes it easier to compare the cost-efficiency of different payment instruments. Table 2 shows that unit costs incurred by banks, particularly for electronic payments, have fallen significantly over the last decade. In 2018, the average unit cost of a retail payment was 19 cents, which was 21 cents less than in 2009. The average unit revenue was also 19 cents in 2018, i.e. a single payment transaction did not generate for banks, on average, a profit or loss. The differences between the unit costs and revenues of different payment methods are significant, however.

Table 2. Unit costs and revenues of banks per payment instrument, 2009 and 2018.

Unit costs and revenues of banks per payment instrument, 2009 and 2018						
	2009			2018		
	Unit costs	Unit revenues	Unit net cost	Unit costs	Unit revenues	Unit net cost
Cash*	€0.76	€0.17	€0.59	€0.74	€0.25	€0.49
Card payments	€0.25	€0.21	€0.04	€0.13	€0.16	€-0.03
of which debit cards	€0.13	€0.15	€-0.02	€0.06	€0.08	€-0.02
of which credit cards	€1.73	€0.93	€0.80	€0.90	€0.98	€-0.08
Credit transfers	€0.51	€0.21	€0.30	€0.25	€0.25	€0.00
Total	€0.40	€0.21	€0.19	€0.19	€0.19	€0.00

Sources: Bank of Finland's calculations, and cost surveys of banks conducted in 2010 and 2019.
 * For cash, unit costs are calculated per individual cash withdrawal.

Based on data for 2009 and 2018, credit card payments are the most expensive retail payments in terms of unit cost, but they are also the most profitable for banks per a single payment transaction. Debit card payments, on the other hand, are the least expensive of all, but their unit revenue is correspondingly the lowest. Nevertheless, the total net revenues received by banks from debit card payments were the largest of the different payment methods in 2018. The number of card payment transactions more than doubled between the years in question, which explains most of the increase in the total revenue. The increase in the number of transactions has also reduced the unit costs of card payments due to economies of scale. Indeed, the unit costs of both debit and credit card payments roughly halved over the past decade.

As banks' costs of cash mainly arise from services related to cash withdrawals, the unit costs and revenues of cash are calculated for a single cash withdrawal in the case of banks. In 2018, the unit cost of cash was approximately 74 cents and the unit revenue 25 cents, so each cash withdrawal generated for banks an average loss of roughly 50 cents. Although the use of cash has declined significantly over the years, the unit cost of cash faced by banks has hardly changed in ten years. At the same time, the unit revenue of cash has increased. This is probably a result of the fact that banks have cut costs arising from cash by, among other things, reducing the number of bank branches providing cash services and their opening hours. In addition, banks have, for example, increased the service fees charged from ATM cash withdrawals.

Private costs can also be subdivided into fixed and variable costs. Fixed costs (such as expenditure on making payment cards and the costs of acquiring and maintaining systems) do not depend on the usage of a particular means of payment. Variable costs (such as costs of processing payments), on the other hand, depend on the number or value of payment transactions. Based on the information received from the banks, the costs related to cash consist mainly of variable costs, which are determined on the basis of the volume of banknotes and coins processed. The decline in the use of cash does not therefore appear to have had a significant impact on the banks' unit costs of cash, as the reduction in the number of transactions reduces also the total costs associated with cash.

Because cash is a paper-based means of payment, it requires a different kind of support system for distribution, use, counting and supply than electronic payments. In contrast, in the case of electronic payments, fixed costs generally account for most of the costs, and the number of payment transactions does not have such a large impact on banks' total costs. This means that, for example, as the popularity of card payments grows, fixed costs can be shared by an ever-increasing number of transactions. In other

words, the unit costs of card payments typically decreases as the number of transactions grows.

As a conclusion, retail payment services were still clearly a loss-making activity for banks in 2009 and banks were only able to cover about half of the costs of payments through fees charged directly from consumers and businesses. In 2018, on the other hand, the revenues generated by banks from payment services corresponded better with the costs incurred. Compared with the situation that prevailed more than a decade ago, banks' costs relative to revenues therefore appear to have become more balanced, particularly with regard to card payments and credit transfers. In case of cash services, banks continued to make losses, but they were able to almost halve the losses over the past decade.

Banks have also been able to automate the processing of payments and take advantage of economies of scale related to electronic payments. As a result, banks' total costs have declined, despite the increase in the volume of payments. Earlier, there occurred more cross-subsidisation in banking services, i.e. banks covered part of costs related to payments with revenues they received from other business activities, such as interest income. Based on the results, however, this does not seem to be the case anymore; the banks cover the production costs of each payment service to a large extent with the revenues they receive directly from them. In addition, due to the low interest rate

environment and lower interest income, the revenues generated from payment services have become more important to banks¹¹.

Private costs of merchants

Next, we examine what kind of costs are incurred from the use of cash and cards by the retailers that accept them. The merchants' costs of retail payments are examined primarily for cash and card payments, as they are the most commonly used payment instruments at point-of-sale. Estimates of the merchants' total private costs are mainly based on information provided by the largest consumer non-durables chains operating in Finland. In 2018, the total retail trade sales amounted to EUR 38.9 billion, of which consumer non-durables accounted for nearly a half.

Based on the results, merchants' total private costs for payments were an estimated EUR 194 million in 2018, which was approximately 0.5% of the total retail trade sales (Table 3). It is worth noting that in Finland, the consumer non-durables trade is highly concentrated on the largest enterprises, which typically have more bargaining power in relation to the unit costs of different payment methods than small and medium-sized enterprises. The merchants' estimated total costs of retail payments are therefore probably downward biased since the large enterprises are dominant among the respondents.

Table 3. Private costs of retailers, 2018.

Private costs of retailers, 2018.				
	No. of transactions (million)	Total costs (EUR million)	Internal costs (EUR million)	Unit costs
Cash*	≈ 694.4	73.7	19.0	€0.11
Card payments**	1 683.1	120.0	13.2	€0.07
Total	2 377.5	193.7	32.2	€0.08

Source: Bank of Finland's calculations, and survey of retailers conducted in 2019.

* Complete statistics on cash payments are not available in the same way as for card payments, so their number is partly based on an estimate. The value of cash withdrawals made in Finland from various distribution channels, i.e. ATMs, bank branches and retail outlet checkouts, totalled EUR 14.5 billion in 2018. According to the ECB's SPACE study¹², the average cash payment was an estimated EUR 20.88 in the same year. When the value of cash withdrawals is divided by the average cash payment, an estimated figure of 694 million is obtained for payments made in cash in 2018.

** Card payments include only card payments made in Finland with card issued in Finland.

Total costs incurred by merchants from accepting cash payments were an estimated EUR 74 million in 2018, which was just over a third of the merchants' overall costs of

¹¹ Negative interest rates have narrowed the interest rate margin between banks' borrowing and lending, as negative interest rates are more difficult to pass on, particularly to consumer customers. See e.g. Klein, M. (2020), Implications of negative interest rates for the net interest margin and lending of euro area banks, March 2020, Bank for International Settlements, BIS Working Papers, No. 848, <https://www.bis.org/publ/work848.pdf> and Nucera, F., Lucas, A., Schaumburg, J. & Schwaab, B. (2017), Do negative interest rates make banks less safe?, September 2017, European Central Bank, Working Paper Series, No. 2098, <https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2098.en.pdf>.

¹² ECB (2020), Study on the payment attitudes of consumers in the euro area (SPACE), December 2020 European Central Bank, <https://www.ecb.europa.eu/pub/pdf/other/ecb.spacereport202012~bb2038bbb6.en.pdf>.

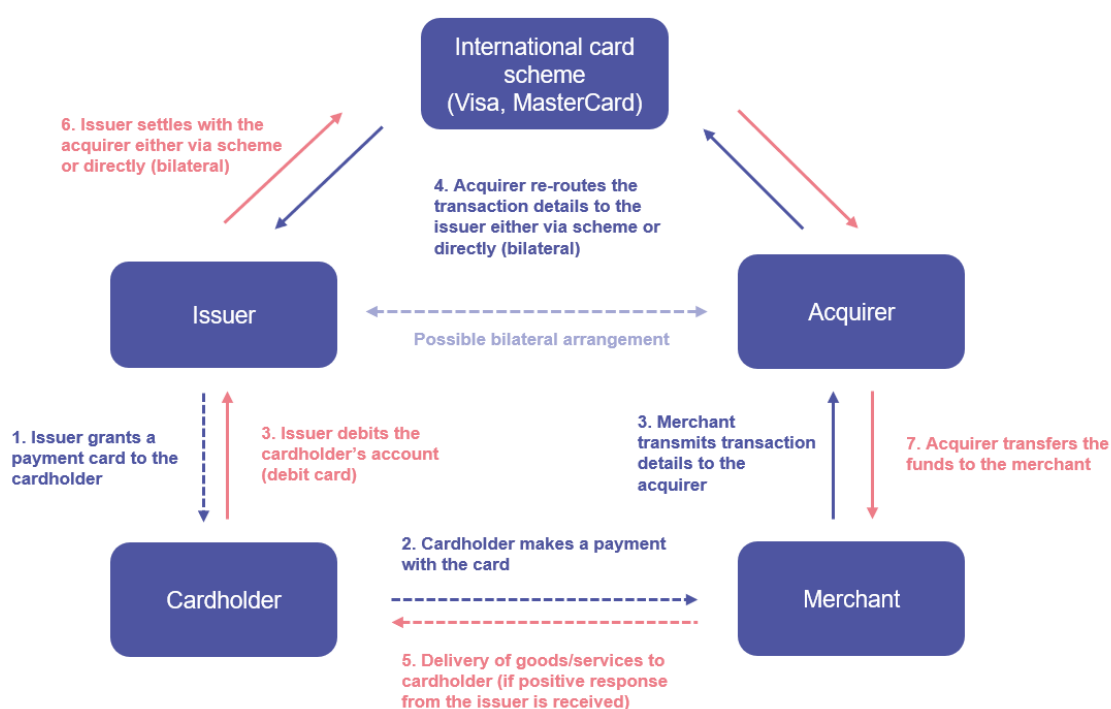
retail payments. The bulk of merchants' costs of cash consist of external costs paid to other participants, such as banks and cash-in-transit companies. These costs are mainly related to cash handling and sorting, settlement services, transportation and insurance services. In contrast, merchants' internal costs related to cash were an estimated EUR 19 million in 2018, which was approximately one quarter of the total costs of cash.

Nevertheless, most of the merchants' total private costs associated with payments incurred from card payments. The merchants' total costs of card payments, extrapolated to the level of the whole retail sector, were approximately EUR 120 million in 2018. If the unit costs of the different payment methods are considered, however, it is less expensive for merchants to receive card payments than cash payments. In 2018, a single card payment cost a retailer, on average, 7 cents, whereas a single cash payment cost, on average, 11 cents.

For a company to receive card payments, it must have an agreement with a separate payment service provider, i.e. a so-called acquirer. In practice, the acquirer collects payment data, transfers the funds to the merchant and debits them from the issuers with whose cards the payments were made (Chart 4). Banks and other payment service providers, such as some of the companies providing POS terminals, may operate as acquirers. In Finland, the merchant settlement and clearing services for card payments are nowadays provided primarily by payment service providers other than banks.

Chart 4. Stylised overview of card payment value chain (so called 4-corner model).

Card payment value chain (4-corner model)



Source: Bank of Finland.

A merchant pays a service fee to the acquirer, a merchant service charge, when customers pay by card. Most of merchants' costs of card payments arise from these merchant service charges. In 2018, the total euro amount of service fees paid to acquirers was approximately EUR 107 million, which was nearly 90% of the merchants' total costs associated with card payments. The merchant service charge generally includes both a small fixed amount per transaction and a percentage rate of the transaction value. The percentage rate, in turn, depends on, among other things, the value of the card payment transaction and the type of card used (e.g. fees for debit card payments are lower than for credit card payments).

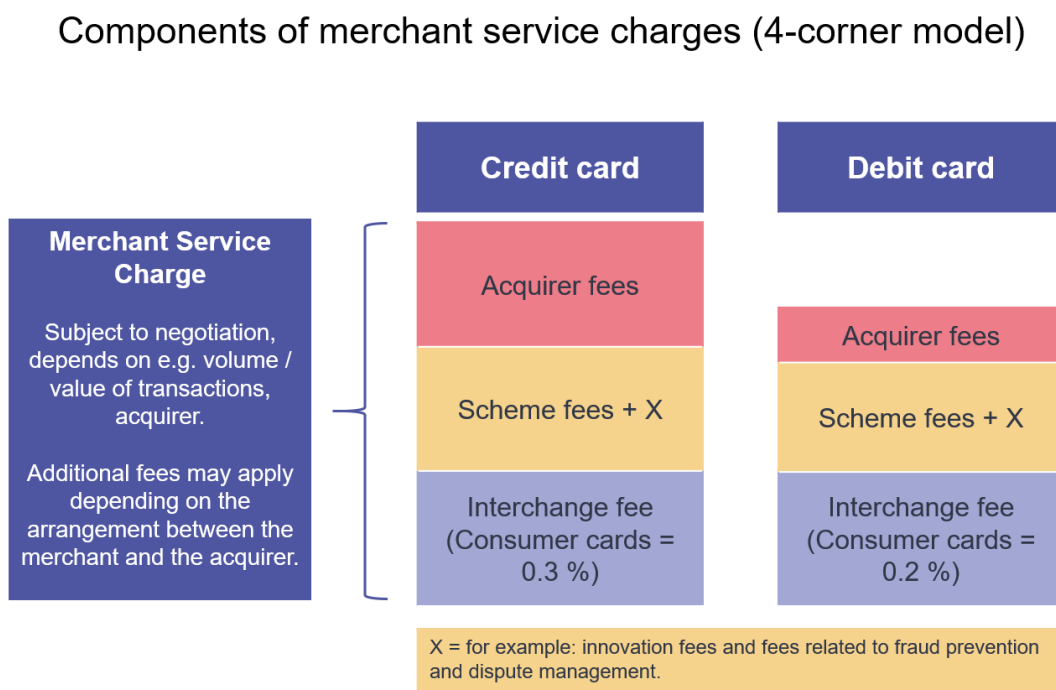
Based on the results, the merchant service charge paid by retailers was, on average, 0.26% of the value of a card payment in 2018¹³. The fee for a credit card payment was, on average, more than ten percentage points higher than for a debit card payment. The merchant service charge also varies significantly between different acquirers and merchants: the fees are typically lower the higher a merchant's card sales are. According to data received from the retailers taking part in the survey, the service fee debited by different acquirers varied between 0.22% and 0.50% of the transaction value in 2018. However, the general level of fees is probably somewhat higher than this, because the survey only covered large retail companies, which generally have more bargaining power when fees are set.

Merchant service charge debited by an acquirer for card payments consists of different shares paid to various stakeholders, such as an acquirer fee paid to the card acquirer itself, an interchange fee paid to the card issuer, and a scheme fee paid to an

¹³ The percentage rates have been calculated using the euro volumes of card payments received from the largest retail chains as well as the euro amount of merchant service charges paid by the retailers.

international card network (e.g. Visa and Mastercard). In addition to merchant service charges, the retailers also incur internal costs associated with card payments, for example from acquiring or leasing payment terminals. The total euro amount of the internal costs, extrapolated to the level of the whole retail sector, was an estimated EUR 13 million in 2018.

Chart 5. Components of merchant service charges on card payments.



Source: ECB (2019), Card payments in Europe, Current landscape and future prospects: a Eurosystem perspective, April 2019.

Interchange fees for card payments have been regulated at EU level since 2015¹⁴. The aim of the Interchange Fee Regulation (IFR) has been to harmonise card payments within the EU and to limit the amount paid for credit and debit card transactions by setting maximum limits for the interchange fees¹⁵. However, the regulation does not appear to have brought about a significant improvement in the situation, as large international card schemes have meanwhile raised fees not regulated by the IFR, such as so-called scheme fees. This has been further reflected in the fees paid by merchants accepting card payments¹⁶.

The increase in merchants' costs of card payment is also revealed by the information received from the largest Finnish retailers taking part in the survey conducted in 2021 (Table 4). The results show that the total euro amount of merchant service charges (extrapolated to the level of the entire sector) had risen by nearly 14% between 2018 and 2020. In addition to increases in percentage rates, however, the increase in the euro

¹⁴ Regulation (EU) 2015/751 of the European Parliament and of the Council on interchange fees for card-based payment transactions: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32015R0751>.

¹⁵ The EU Interchange Fee Regulation regulates interchange fees charged for payments made in the EU with the cards of private customers. The interchange fee caps provided in the Regulation are 0.20% of the total amount of the transaction for debit card transactions and 0.30% for credit card transactions.

¹⁶ Eurocommerce (2020): Benefit of Interchange Fee Regulation now nullified by fee increases, December 2020, EUBusiness.com, <https://www.eubusiness.com/focus/20-12-072/>.

amount of the service fees paid by retailers has also been impacted by the increase in the overall usage of card payments, which has been further accelerated by the COVID-19 pandemic¹⁷.

Table 4. Merchant commissions on card payments 2018–2020.

Merchant service charges on card payments 2018			
	2018	2019	2020
Merchant service charge (EUR million)	106.8	112.6	121.4
Value of payment transactions (EUR billion)	40.8	43.0	46.0
Merchant service charge (%)*	0.2616%	0.2619%	0.2637%

Source: Bank of Finland calculations and survey of largest retail chains conducted in 2021.
** The average percentage rate of merchant service charges is calculated by dividing the total euro amount of merchant services charges paid by the total value of card payments.*

Based on these results, most of the increase in merchants' costs of card payments appears to have stemmed from the increase in the volume of card payments. Although the results suggest that the average merchant service charge has hardly changed, according to information provided by individual respondents, some increases have, however, been made to the fees charged by the acquirers after 2018. Some respondents have also been able to negotiate lower merchant service charges for card acquiring services and thereby partially mitigate the effects of rising fees. It should be borne in mind, however, that smaller and medium-sized merchants may not have a similar opportunity to do so as they lack sufficient bargaining power compared to merchants processing more transactions of an overall higher value.

As a conclusion, merchants do not appear to have benefited in recent years from the advantages of the digitalisation of payments in the same way as banks; the increase in the volume of card payments has not reduced merchants' unit costs as in the case of banks, rather the opposite. Under EU legislation, retailers cannot surcharge their customers for the use of the most common payment methods, so merchants have little choice but to include costs of payments, like any other production costs, in the prices of the goods and services they sell¹⁸. Therefore, the costs imposed on merchants are ultimately also passed on to consumers.

Social costs of payments

After examination of the private costs incurred by different parties, it is possible to move on to estimation of the overall costs to society of providing payment services. The calculation of social costs must take into account the fact that the revenue of one party is always a cost to another party. Otherwise, cost elements between the parties would be included in the calculation multiple times, which would result in an overestimation of social costs. Simply speaking, the social costs of payments are obtained by adding together the internal costs (i.e. resource costs) incurred by all the stakeholders along the payment chain.

¹⁷ Hellqvist, M., Liikanen, J., Sintonen, M., Takala, K. (2021), Coronavirus pandemic causing permanent change in payment habits, Bank of Finland Bulletin 2/2021, <https://www.bofbulletin.fi/en/2021/2/covid-19-pandemic-causing-permanent-change-in-payment-habits/>.

¹⁸ Under the EU Payment Services Directive (PSD2), undertakings are not permitted to surcharge consumers for the use of the most common means of payment: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32015L2366>.

Based on the results, in 2018 the overall costs to society of cash and card payments were an estimated EUR 402 million (Table 5). If banks' private costs of providing credit transfers are also included, the social costs of retail payments in Finland were an estimated EUR 646 million in 2018. This was equivalent to 0.3% of Finland's GDP and 117 euros per Finn. Most of the social costs of payments stemmed from the production costs of banks. It should be noted, however, that in terms of credit transfers, the estimated costs are based solely on the data provided by banks, which exaggerates the banks' share of social costs.

The costs of card payments to society were an estimated EUR 252 million in 2018, which was nearly 40% of the total social costs of payments. The social costs of card payments are estimated by adding together the total private costs of commercial banks and merchants, less the costs paid by merchants to banks and other payment intermediators (e.g. card acquirers). It should be noted, however, that the social costs of card payments are probably downward biased, as responses from acquirers were not received. In addition, it is worth noting that the costs of card payments may also partly include costs related to cash, as a payment card is always needed to make ATM withdrawals.

The costs of cash at the society level, on the other hand, were an estimated EUR 151 million in 2018, which was 23% of the total social costs of payments. The results for cash are obtained by deducting from the sum of the total private costs incurred by all the various parties related to the production of cash services the costs paid by commercial banks and merchants to ATM and CIT companies. CIT and ATM companies together accounted for over 60% of the social costs of cash in 2018. Commercial banks correspondingly accounted for 20%, merchants for 13% and the central bank for 6%. The central bank's cash-related costs mainly consist of personnel and banknote acquisition costs (although banknote acquisition costs were lower than usual in 2018).

Table 5. Social costs of retail payments.

Social costs of retail payments (EUR million), 2018			
	Total costs	Internal costs (social costs)	Share of social costs
Central banks			
Cash	9.0	9.0	6.0%
Banks			
Cash	76.6	30.4	20.2%
Card payments	238.3	238.3	94.8%
Credit transfers	243.8	243.8	100.0%
Total	558.7	512.5	79.3%
CIT companies			
Cash	49.8	49.8	33.1%
ATM companies			
Cash	42.4	42.4	28.2%
Merchants			
Cash	73.7	19.0	12.6%
Card payments	120.0	13.2	5.2%
Total	193.7	32.2	12.8%
Social costs			
Cash	251.5	150.6	23.3%
Card payments	358.3	251.5	38.9%
Credit transfers	243.8	243.8	37.7%
Total	853.6	645.9	100.0%

Source: Bank of Finland calculations.

The cost-efficiency of the different payment methods can be assessed by comparing their unit costs. Table 6 presents the social costs of the most commonly used payment instruments in Finland per number and value of payment transactions. The results suggest that in relation to the number of transactions, card payments are the least expensive payment method: in 2018, a single card payment cost society on average 15 cents, a cash payment 22 cents and a credit transfer 25 cents¹⁹. Although, relative to the number of transactions, credit transfers appear to be the most expensive payment method for society, the costs per euro paid are clearly the lowest due to the high total value of credit transfers.

Table 6. Unit costs of retail payment methods.

Unit costs of retail payment methods, 2018					
	Social costs (EUR million)	No. of transactions (million)	Value of transactions (EUR billion)	Unit cost in terms of number of transactions	Unit cost in terms of value of transactions
Cash	150.6	≈ 694.4*	≈ 10.9	€0.22	1.38%
Card payments	251.5	1 683.1	45.1	€0.15	0.56%
Credit transfers	243.8	962.4	2 320.8**	€0.25	0.01%
Total	645.9	3 340.0	2 376.8	€0.19	0.03%

Source: Bank of Finland calculations.

* Complete statistics on cash payments are not available in the same way as for card payments, so their number is partly based on an estimate. The value of cash withdrawals made in Finland from various distribution channels, i.e. ATMs, bank branches and retail outlet checkouts, totalled EUR 14.5 billion in 2018. According to the ECB's SPACE study, the average cash payment was an estimated EUR 20.88 in the same year. When the value of cash withdrawals is divided by the average cash payment, an estimated figure of 694 million is obtained for payments made in cash in 2018.

** Based on Bank of Finland's payments statistics, where credit transfers also include, e.g. large business-to-business (B2B) payments, unlike in the cost survey, which focused mainly on consumer-to-business payments (C2B).

¹⁹ Complete statistics on cash payments are not available in the same way as for card payments, so their number is partly based on an estimate. The value of cash withdrawals made in Finland from various distribution channels, i.e. ATMs, bank branches and retail outlet checkouts, totalled EUR 14.5 billion in 2018. According to the ECB's SPACE study, the average cash payment was an estimated EUR 20.88 in the same year. When the value of cash withdrawals is divided by the average cash payment, an estimated figure of 694 million is obtained for payments made in cash in 2018.

Comparison with other countries

The cost-efficiency of retail payment methods can also be assessed by comparing the results with similar studies carried out in other countries. In addition to Finland, the social costs of payments are studied for the main participants in the payments chain in, for example, Denmark, Italy, Poland and Norway²⁰. In these studies, the social costs in relation to GDP range from 0.3% in Finland to 1.2% in Poland (Table 7). Moreover, the data suggests that the unit costs of cash and card payments are also the lowest in Finland among the reference countries. Based on these results, Finland therefore appears to be one of the most cost-efficient countries in Europe in terms of payments. However, a comparison of estimated costs between countries needs to be interpreted with caution.

Drawing conclusions about cost-efficiency between countries is not straightforward, as the studies vary substantially in terms of, e.g. the level of digitalisation in different countries, the structure of the retail payments market and the scope and methodology of the analysis. There are some differences, for example, between the stakeholders included in the studies. For example, in Denmark, Norway and Poland, the costs of payments incurred by consumers are also estimated, in contrast with Finland and Italy. The Dutch and the German studies, on the other hand, focus only on the private costs of the retail sector²¹. In addition, the years in which the studies were conducted differ, which may also affect the comparability of the estimated costs.

There are also some differences in the payment instruments covered in the studies. Cash and card payments are considered in all of the studies, and most of them also cover credit transfers. In other countries than Finland, the unit social costs of card payments are estimated separately for debit and credit cards. In Finland, this breakdown was not available for the retail sector, so the unit social costs of card payments are estimated for the total card payments only. On the other hand, in the case of some other countries, unit social costs for the total card payments were not readily available so, for the comparability of the results, they are calculated in Table 7 as the weighted average of payments made with debit and credit cards.

²⁰ Danmarks Nationalbank (2018), Series: Costs of Payments in Denmark 2016, Table annex for the Danish Payments Council's survey of the costs of payments in Denmark, November 2018, https://www.nationalbanken.dk/en/bankingandpayments/danish_payments_council/Documents/Tabellanneks_uk.pdf, Przenajkowska, K., Polasik, M., Maciejewski, K., Koźliński, T. (2019), Costs of payment instruments on the Polish market, Narodowy Bank Polski, https://www.nbp.pl/en/system_platniczy/costs-of-payment-instruments.pdf, Banca d'Italia (2020), Il costo sociale degli strumenti di pagamento in Italia, March 2020, https://www.bancaditalia.it/pubblicazioni/tematiche-istituzionali/2020-costo-soc-strum-pagamento/Tem_Istituzionali_2020_costo_sociale_strumenti_pagamento.pdf and Norges Bank (2014), Costs in the Norwegian payment system, Norges Bank Papers, No. 5, https://norges-bank.brage.unit.no/norges-bank-xmlui/bitstream/handle/11250/2576008/norges_bank_papers_5_2014.pdf?sequence=1&isAllowed=y.

²¹ Van Marwijk, M., De Ruiter, M. & Van Der Zeijden, P. (2018), Kosten van het toonbankbetalingsverkeer in 2017, September 2018, De Nederlandsche Bank, https://www.pin.nl/wp-uploads/2018/12/Kosten_van_het_toonbankbetalingsverkeer_2017.pdf and Cabinakova, J., Knümann, F. & Horst, F. (2019), The costs of cash payments in the retail sector, March 2019, Deutsche Bundesbank, <https://www.bundesbank.de/resource/blob/808970/ab9bedd6dbb9000fa525e147bd0e16b8/mL/koste-n-der-bargeldzahlung-im-einzelhandel-data.pdf>.

Table 7. Unit social costs per payment instrument in different countries.

Unit social costs per payment instrument in different countries						
	Cash	Card payments, total	of which debit cards	of which credit cards	Credit transfers	Total social costs/GDP
Finland (2018)	€0.22	€0.15	€0.06*	€0.90*	€0.25*	0.28%
Netherlands (2017)**	€0.29	€0.21	€0.17	€1.17	-	-
Poland (2018)	€0.29	€0.33	€0.31	€0.47	€0.18	1.21%
Germany (2017)**	€0.24	€0.41	€0.33	€1.02	-	-
Denmark (2016)	€0.60	€0.41	€0.39	€1.90	€2.12	0.53%
Italy (2016)	€0.35	€0.74	€0.59	€1.10	€1.63	0.80%
Norway (2013)	€0.82	€0.53	€0.37	€1.61	€1.11	0.48%

Sources: Bank of Finland calculations and cost studies made in some other countries in recent years.

* Based only on data provided by banks.

** Based only on data provided by retailers.

Note. Drawing conclusions about cost-efficiency between different countries is not straightforward, as studies vary substantially in terms of, e.g. the level of digitalisation in different countries, the retail payments market and the scope and methodology of the analysis.

In Finland, the Netherlands, Denmark and Norway, where paying by card is more popular than by cash, the unit costs of card payments are the lowest among the different payment methods. In contrast, in Italy, Poland and Germany, where cash payments are more common and card payments less frequent, a single cash payment costs society on average less than a card payment. Credit cards are among the most expensive means of payment in terms of unit costs in all the countries. In the Nordic countries, which are advanced in the digital transformation in payments, social costs in relation to GDP are lower as compared with the other countries. Despite varying scopes and methodological differences, these results suggest that changing payment habits and digitalisation of payments have a significant impact on the costs of retail payments.

Conclusions

This is the first study conducted in Finland to comprehensively investigate the costs of retail payments incurred by various parties and society as a whole. Based on the results, the overall costs to society of providing payment services were an estimated EUR 646 million in 2018, which was 0.3% of Finland's GDP. In reality, however, the social costs of payments are probably somewhat higher than this. Ideally cost calculations should include all parties' costs (consumers, merchants, banks and other payment intermediators, operators, central bank). However, measuring them thoroughly is a very complicated task, as there are generally numerous stakeholders involved in the processing of payments.

Based on data provided by commercial banks, the costs of payments have declined over the past decade. This suggests that the cost-efficiency of the various payment methods has improved over the years. Digitalisation of payments, which has facilitated the utilisation of economies of scale associated with electronic payment methods, has particularly contributed to this. In practice, this means, for example, that as card payments have become more common, the increase in the number of transactions has led to a decrease in banks' unit costs. At the same time, banks' revenues from payment services have increased.

The advantages of digitalisation do not, however, appear to have benefited all parties equally. For example, this study shows that the unit costs of card payments for merchants have not decreased in recent years as in the case of banks, rather the opposite. One reason for this is that international card schemes have raised fees that remain outside the scope of EU regulation, which has been reflected in the costs paid by retailers. Ultimately, the costs of payments are passed on to consumers through the prices of the goods and services, although the direct payer would be some another party. The cost-efficiency of retail payments is therefore significant for the society as a whole.

The consumer's choice of payment method is primarily influenced by the speed, ease of use, reliability and security of payments. Since consumers do not face direct per-transaction charges, the actual costs of payments are not transparent. This may result in the overuse of inefficient payments instruments that are costly to society. It should be noted, however, that in addition to the costs of payments, the benefits of different payment methods should also be taken into account. Thus, there are important policy issues associated with payments and the evolution of their costs.

The European Central Bank and the European Commission have designated the improvement of European retail payments and their competitiveness as a key priority for the coming years. The European retail payments market remains, to a significant degree, fragmented and inconsistent. This benefits a few big global players that largely dominate the European card payments market. With the exception of the international payment card networks and large technology providers, consumers do not have access to any digital payment solution that can be used across Europe to make payments in physical stores and in e-commerce. Measures have already been initiated at European level to resolve these challenges²².

For example, a group of European banks has launched a project called the European Payments Initiative (EPI). The project aims to harmonise electronic payments in Europe, improving their cost-efficiency by developing a pan-European payment solution that could be used in shops and in e-commerce as well as in person-to-person payments. The development of a pan-European payment method is a key objective of both the Eurosystem's and the Commission's retail payment strategies, and both have given the initiative their political support.

The ECB, for its part, has started more detailed investigations on the central bank digital currency (CBDC), i.e. the digital euro, provided by the Eurosystem. The digital euro would complement cash as a kind of electronic version of banknotes and would be used as a means of payment in much the same situations as cash. As the use of cash declines, the use of a digital euro alongside banknotes could support the evolution of European retail payments. A decision on its introduction has not been made, but the investigations will continue in the coming years. The Governing Council of the ECB decided to launch the actual investigation phase in July 2021²³.

The development of pan-European payment solutions is still at an early stage and they will not bring about a rapid change in the costs of retail payments. If successful, the projects could bring truly European and cost-efficient payment options to the market in the future. Alternative payment methods maintain competition and the cost-efficiency of payments.

²² See on the topic: Kempainen, K., Miettinen, P. & Terho, J. (2021), Eurooppalaisen vähittäismaksamisen kehityssuunta ja sen vaikutukset Suomen markkinoihin, May 2021, Bank of Finland, Euro & talous 2/2021, <https://www.eurojatalous.fi/fi/2021/2/eurooppalaisen-vahttaismaksamisen-kehityssuunta-ja-sen-vaikutukset-suomen-markkinoihin/>.

²³ See on the topic: Rehn, O. & Välimäki, T. (2021), Digitaalisen euron hankkeessa siirrytään selvitys- ja määrittelyvaiheeseen: maksaminen tulee olemaan turvallista ja tehokasta tulevaisuudessakin, July 2021, Bank of Finland, Euro & talous, <https://www.eurojatalous.fi/fi/2021/artikkelit/digitaalisen-euron-hankkeessa-siirrytaan-selvitys-ja-maarittelyvaiheeseen-maksaminen-tulee-olemaan-turvallista-ja-tehokasta-tulevaisuudessakin/>.