EUROPEAN CENTRAL BANK
EUROSYSTEM

Occasional Paper Series

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Costs of retail payments – an overview of recent national studies in Europe

Revised December 2022

No 294 / May 2022

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Contents

Abstract

The paper provides an overview of studies on the social and private costs of retail payments conducted since 2013 in nine EU countries and collates the results obtained. Social costs of retail payments are the overall costs resulting from providing payment services to society and deriving from the resource costs incurred by all parties along the payment chain. Private costs, in contrast, are the costs incurred by the individual stakeholder only, such as banks and other payment intermediaries. Understanding the social and private costs of retail payments is crucial for assessing the impact of the rapidly changing retail payment landscape, such as the shift to electronic payments, and for designing strategies for moving towards cost efficient retail payments.

Despite varying scopes and methodological differences, the analysis reached the following findings: a comparison of results between 2009 and 2016 in Denmark and Italy, between 2015 and 2018 in Poland and between 2009 and 2017 in Portugal, points to decreasing overall social costs for retail payments relative to gross domestic product (GDP). Moreover, the data suggest that changing payment habits – the shift to electronic payments and in particular debit cards – have an impact on unit costs, which represent the costs per transaction. The unit costs of debit card payments have decreased over time and the gap between the unit costs of cash and those for debit cards has narrowed. This suggests that the increasing number of debit card payments, to which high fixed costs are attached, has led to lower unit costs relative to those of cash.

The only study on the costs of retail payments in Europe, published as an ECB occasional paper, dates from 2012 and is based on data from 2009.[1] Although more recent surveys at national level are available, no single source exists that sheds light on recent information on the costs of retail payments in Europe. Since the national surveys follow different approaches, in terms of both scope and methodology used, for obtaining the costs of retail payments, the results are not easily comparable with each other across countries.

JEL codes: D23, D24, O52, E42

Keywords: social costs, private costs, retail payments, payment instruments

[1] Schmiedel et al (2012).

Executive summary

This paper provides an overview of recent studies on the social and private costs of retail payments that have been or are being carried out in nine EU countries: Denmark, Germany, Italy, Hungary, the Netherlands, Poland, Portugal, Austria and Finland.[2] Understanding the costs of retail payments is crucial for assessing the impact of the rapidly changing retail payments landscape, such as the shift to electronic payments, and for designing strategies for moving towards cost efficient retail payments. Despite substantially different methodologies applied in the studies reviewed, the paper identifies the main trends and draws general conclusions as to how the changing retail payment landscape and consumer preferences affect the associated costs.

The social costs of retail payments relative to GDP have declined in Denmark, Italy, Poland and Portugal, suggesting that development in payment methods and the related innovations have made retail payments less costly overall. In Denmark, where the move from cash to card payment was particularly notable,[3] this ratio has almost halved, declining from 0.96% in 2009 to 0.53% in 2016. In Portugal, social costs in relation to GPD also declined quite significantly between 2009 and 2017, falling from 1.38% to 0.99%. The situation is, however, different in Hungary, where the social costs to GDP increased between 2009 and 2019. This rise is explained, inter alia, by an exceptional period of high investment in payment infrastructure and significant increase in transaction numbers.

In terms of efficiency, the payment instruments with the lowest unit costs (costs per transaction) differ between countries, depending on payment habits. The level of unit costs greatly depends on the number of payment transactions carried out with a payment instrument, thereby reflecting the different payment preferences in each country. The unit costs are the lowest for debit cards in Denmark, the Netherlands, Austria and Finland and, for credit transfers in Poland and for direct debits in Portugal. Unit costs in Austria, however, are almost equal for debit cards and cash. By applying a substantially different methodology, the German retailer study found that unit costs were the lowest for cash for small amounts up to €20, whereas for higher amounts the most efficient payment instrument was the Girocard debit card. For Austria, this efficiency threshold was found to be around €10 based on the costs incurred by all stakeholders along the payment chain. Cash was one of the most efficient payment instruments in terms of unit costs in countries where paying with cash is more common, such as Germany, Italy, Austria, Poland and Portugal.

Moreover, the data suggest that changing payment habits – the shift to electronic payments and in particular debit cards – have, over time, led to changing unit costs.

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2 The studies carried out in Finland and Hungary have not yet been concluded, however, and results are only partially available.

3 While only slightly over 20% of retail turnover in Denmark related to payment cards in 1995, this share increased to roughly 80% in 2015 (Danmarks Nationalbank, 2017) and by 2019, the share of cash in physical trade was only 10% in terms of volume and 16% in terms of value (Danmarks Nationalbank, 2020).

The unit costs of debit card payments have declined significantly in Denmark, Italy, Poland and Portugal. In contrast, in countries with high cash usage (Italy, Poland and Portugal), the unit costs for cash have either declined only slightly or not at all, thus leading to narrowing differences between the unit costs of cash and those of debit cards. This trend likely reflects the shift from cash to electronic means of payments, such as debit cards, as well as different cost structures for cash and card payments.

The studies vary substantially in terms of their scope, meaning which retail payment methods are covered and which stakeholders in the payment chain are considered. Four of the studies completed, in Denmark, Italy, Poland and Portugal, seek to encompass the main payment instruments used (cash, debit and credit cards, direct debits and credit transfers) and the key stakeholders along the payment chain, such as central banks, banks and/or other payment intermediaries, retailers and other non-financial companies. The remaining studies are more focused. The German and Dutch surveys investigate the costs incurred by retailers only, while the Austrian study covers the costs of cash and debit card payments with the aim of identifying an efficiency threshold for the amount below which cash becomes more cost efficient than debit cards.

The social costs of retail payments, namely the overall costs to society of providing payment services determined by adding together the resource costs incurred by all the parties along the payment chain, are calculated in almost all of the studies, except retailer surveys. The latter calculate the private costs only, namely the costs incurred by the individual stakeholder.

A breakdown between fixed and variable costs, making it possible to derive assumptions about the effects of changing payment habits on social costs, is provided by the studies carried out in Denmark, Poland and Finland and, on a private cost basis, in the German and the Dutch retailer studies. The results of the breakdown between fixed and variable costs are mixed: cash is one of the payment instruments with the lowest share of fixed costs in the Danish (45%), Polish (31%) and Finnish (6% of costs incurred by the banking sector) studies, as well as in the German retailer study (2%), but not in the Dutch retailer study (29%). This is broadly in line with the expectation that cash, compared to electronic payments, requires lower upfront investment in the payment infrastructure for most participants in the payment chain. For cash, however, fixed costs may still represent a significant share of overall costs for retailers, notably when only a small share of payments is made with cash. In contrast, international debit and credit cards are the payment instruments with the highest share of fixed costs (60% and 75% respectively) in Denmark, whereas credit transfers and mobile payments are the instruments with the highest share of fixed costs in Poland (54% and 59% respectively).

1 Introduction

Understanding the costs of retail payment instruments and services is of key interest to central banks, payment service providers (such as banks and related infrastructures), merchants, retailers and consumers. As providers of banknotes and given their central role more generally in the economic system, central banks take a special interest in safe and efficient retail payment markets given that they facilitate economic activity and support economic growth.

The constantly evolving retail payment landscape has been greatly shaped by increasing digitalisation, regulatory changes and changing payment habits, which undoubtedly have an impact on the costs associated with retail payments. Knowing about the relative costs of retail payment instruments can help policymakers to decide whether, and to what extent, to promote certain payment instruments and to communicate that decision.[4] Strategies for moving towards cost efficient retail payments can therefore only be designed with a sound knowledge of their costs.

Up-to-date and detailed retail payment costs data are, however, not always readily available. This is because obtaining data on the costs of retail payments is a complex matter, requiring substantial effort on the part of all participants involved, and often takes years to complete. Moreover, surveys are not usually undertaken at regular intervals or at great frequency.

At European level, between 2008 and 2012, 13 European System of Central Banks (ESCB) national central banks carried out a pan-European study of the social and private costs of retail payments under the auspices of the ECB, the results of these studies being published in 2012.[5] This study remains the main source of data on the costs of retail payments in Europe. Since then, more up to date studies on the costs of retail payments in Europe have been conducted, but only at national level. This paper aims to fill the gap by taking a closer look at nine recent national studies and compiling their key elements, methodologies and results. The paper should thereby facilitate access to the most recent information on the costs of retail payments in Europe.

As this paper shows, these studies vary substantially in terms of methodology and scope. A comparison of estimated costs between countries therefore needs to be interpreted with caution. Also, since not all studies calculate the same costs (e.g. private or social costs[6]) for all retail payment instruments and for all stakeholders, they can only be compared within a subset of the already small sample of national studies examined. Even though the studies cannot be easily compared with each other, this paper seeks to identify the main trends and the general conclusions to be

4 Hayashi and Keeton (2020).

5 Schmiedel et al. (2012).

6 The concepts of social and private costs are explained in more detail in Section 4.

drawn in terms of the impact of changes in the retail payments market on the associated costs.

Despite these shortcomings, a few observations can be made. Overall, the costs of retail payments in relation to GDP have declined in most countries for which cost data are available for two different points in time since the publication of the pan-European cost study in 2012 (i.e. Denmark, Italy, Poland and Portugal).[7] In countries where paying with cash is more common, such as Germany, Italy, Poland, Portugal, and Austria, cash is still one of the most efficient payment instruments in terms of costs per transaction (unit costs). However, unit costs for debit card payments have seen a sharper decline than those for cash, which have either declined only slightly or not at all, reflecting the increasing use of debit cards.

The paper is structured as follows.

Section 2 compares the scope of the studies, looking at the payment instruments covered, the methods used and the stakeholders involved. Section 3 analyses the data samples considered and the degree to which they are representative. Section 4 describes the various methods applied, how costs were calculated and which cost concepts were employed. Section 5 provides an overview of the estimated unit costs and the costs in relation to GDP, broken down by payment instrument and stakeholder. Section 6 concludes.

[7] In Hungary, social costs to GDP increased between 2009 and 2019. This is, however, explained by an exceptional increase in payment infrastructure investment, transaction numbers and salaries during that period (see Section 5).

2 Scope

This paper reviews studies on the costs of retail payments which have been, or are still in the process of being, carried out in nine European countries since 2013, not all of which have been finalised or published yet (Table 1) and the scopes of which vary.

Table 1
Studies under review

Country	Title[8]	Published	Year(s) of data collection	Year(s) of publication	Language
Denmark	Series: Costs of payments in Denmark 2016[9]	Yes	2016-18	2016-19 (series)	English
Germany	The costs of cash payments in the retail sector	Yes	2017	2019	English
Italy	Il costo sociale degli strumenti di pagamento in Italia	Yes	2016	2020	Italian
Hungary[10]	Report is under preparation	No	2018-20		
Netherlands[11]	Kosten van het toonbankbetalingsverkeer in 2017	Yes	2017	2018	Dutch
Austria	The cost of cash and debit cards in Austria	Yes	2013	2016	English
Poland	Costs of payment instruments on the Polish market Costs of payment instruments on the Polish market broken down into fixed costs	Yes	2015; 2018	2019; 2020	English
Portugal[12]	Custos sociais dos instrumentos de pagamento de retalho em Portugal	Yes	2017	2019	Portuguese
Finland	Vähittäismaksamisen kustannukset: mitä maksaminen maksaa?	Yes	2018	2022	Finnish

The scopes of the studies on the costs of retail payments differ substantially in several dimensions, namely in terms of which retail payment instruments are covered, which parties are involved in the payment process and which other stakeholders are considered, and in terms of how big and representative the dataset analysed is. The scope greatly affects the effort to collect data. It makes a big

8 The full reference is provided in the list of references at the end of this paper.

9 Danish Payments Council (2018a, 2018b, 2018c, 2018d, 2019a, 2019b and 2019c).

10 The study currently under preparation by Magyar Nemzeti Bank is mainly considered from a conceptual point of view given that many of the results were not yet available at the time of this paper.

11 On 10 February 2022, the Dutch Payments Association published the results of a new cost study conducted by Panteia, entitled “Kosten van het toonbankbetalingsverkeer in 2020”, relating to the private costs of retail payments for retailers in 2020. Given that this study became available only at a late stage of preparation of this paper, it is not presented in greater detail. However, up-to-date figures on the unit costs are included in certain tables in Section 6.

12 Banco de Portugal published two updated national studies during this period: one in 2016 with data collected in 2013 and one in 2019 with data collected in 2017. For this review, the 2017 data were considered.

difference if a study covers, for example, retailers only or all the main actors involved along the payment chain. Surveys on the costs of retail payments typically distinguish the following categories: banks and other payment intermediaries, non-financial companies and retailers, as well as consumers or households. However, which entities fall into these categories is not commonly defined, and there can therefore also be differences as to which entities are included. In some surveys, banks form a single stakeholder group, whereas other surveys combine banks with card companies or clearing houses into one stakeholder group, for example. In some studies, cash-in-transit (CIT) companies are singled out, in others they are part of a broader category together with banks and other payment intermediaries. The non-financial companies category sometimes focuses on retailers only but may also include other businesses. In view of the multiple questions and considerable effort involved in planning and realising cost of retail payment studies, the surveys are often carried out over a time span of several years and are not undertaken frequently. Finally, the differences in scope and scale typically make it difficult to compare the results of different studies.

Most of the surveys under review seek to cover the key retail payment instruments used (Table 2). Cash and card payments are considered in all countries, and most surveys include direct debits as well as credit transfers. The costs of mobile payments are only considered for Denmark and Poland, and person-to-person (P2P) transactions are only included for Denmark. Instant payments as a payment method are not considered separately in any of the surveys explicitly, but are included indirectly as one of the underlying payment methods for mobile payments, or, for Poland, are included in the cost of credit transfers.[13] In some countries, the inclusion of certain payment methods follows a rule, such as the need to represent at least 5% of the non-cash transactions market in terms of transaction volume or number. This is the case in Finland[14] and Italy, for example. In the German and Polish studies, no such rule was applied. None of the studies consider e-money payments.

Table 2

Retail payment instruments

Retail payment instruments covered in the national studies

	Cash	Cheque	Debit card	Credit card	Direct debit	Credit transfer	Mobile payment	Other
Denmark (2016)	√		√	√	√[15]	√	√[16]	Inpayment giro forms
Germany (2017, retailers)	√		√	√	√			
Hungary (2018/20)	√		√	√	√	v		Postal money orders

13 The costs of two instant payment systems (Express Elixir and BlueCash) are presented separately.

14 Although falling within the scope of the study, the share represented by direct debits was so small (less than 1%) in Finland that their costs are not included in the study to be published.

15 Betalingsservice and Leverandørservice.

16 Social costs have been calculated for mobile person-to-person (P2P) payments based on data from the Danish mobile payment provider, MobilePay, and from banks. The banks have provided information about the costs of mobile payments and MobilePay has provided information about the number of payments. Most of those payments involved a card payment from the payer to MobilePay and a credit transfer from MobilePay to the payee.

	Cash	Cheque	Debit card	Credit card	Direct debit	Credit transfer	Mobile payment	Other
Italy (2016)	√	√	√	√	√	√		
Netherlands (2017, retailers)	√		√	√				
Austria (2013)	√		√					
Poland (2015)	√		√	√	√	√	√[17]	Prepaid cards and charge cards
Portugal (2017)	√	√	√	√	√	√		Prepaid cards
Finland (2018)	√		√	√	(√)	√		

Note: Years in brackets refer to years of data collection.

Some studies consider payment instruments that are common in their respective country but are not in others, such as the use of postal money orders in Hungary, or inpayment giro forms in Denmark, which can be both staffed[18] (requiring support from bank staff) or online/mobile payments.

The studies also vary in terms of the stakeholders in the payment chain considered (Table 3). The Danish, Italian, Hungarian, Polish and Portuguese and Finnish[19] studies seek to cover the key players in the payment process, namely central banks, banks and other payment intermediaries or infrastructures, as well as retailers and other companies. Card companies are included under banks and other payment intermediaries in the studies from Denmark, Italy and Poland. The German and the Dutch studies focus on the retail sector only. Estimations of costs for consumers or households are included in the studies on Denmark, Hungary, Poland and Portugal.

17 BLIK and PeoPay.

18 The study on Denmark considers staffed credit transfers or staffed inpayment forms. These are payments requiring support from bank staff, such as when a payer calls the bank or appears physically in a bank branch to ask bank staff execute the payment.

19 In Finland, only costs incurred by banks and other payment intermediaries were considered in the first stage of the study. In the second stage of the analysis, conducted in 2021, retailers were also addressed. In the case of cash, the study also includes the central bank and CIT companies. Only consumers and households are excluded from the study.

Table 3
Stakeholders

	Central banks	Banks and other payment intermediaries	Retailers and other companies	Cash-in-transit companies	Consumers/ households
Denmark (2016)	√	√	√	√	√
Germany (2017)	-	-	√ (retailer only, narrow set)	-	-
Hungary (2018/20)	√	√	√	√	√
Italy (2016)	√	√	√	-	-
Netherlands (2017)	-	-	√ (retailer only)	-	-
Austria (2013)	√	√	√	-	-
Poland (2015)	√	√	√	√	√
Portugal (2017)	-	√	√	-	√
Finland (2018)	√	√	√ (largest retail chains only)	√	-

Note: Years in brackets refer to years of data collection.

All the surveys consider the costs of consumer-to-business (C2B) transactions to be the main focus of investigation, and only some also look at business-to-business (B2B) and person-to-person (P2P) relationships. However, not all the surveys make a clear distinction between the different payment relationships that would make it possible to achieve a breakdown. In addition, the definitions of the categories differ. In the Polish study, for example, payment transactions for banks and payment infrastructure include B2B up to PLN 200,000[20].

In some cases, whether payment relationships are included differs depending on the type of costs calculated. The Italian study, for example, includes all transactions in calculating the social costs without differentiating between the different payment relationships; in estimating the private costs on the merchant side, however, it only considers C2B transactions. The Dutch and German studies focus solely on private costs for retailers and only in the C2B domain.

[20] The focus of the survey is on C2B transactions. As costs are not easy to obtain for banks and other payment intermediaries, payments above PLN 200,000 (approximately €50,000) were excluded for those stakeholders, irrespective of the payor (consumer or business).

Table 4
Payment relationships

	P2P	C2B	B2B
Denmark (2016)	√	√	√
Germany (2017)	-	√	-
Hungary (2018/20)	√	√	√
Italy (2016)	√	√	√
Netherlands (2017)	-	√	-
Austria (2013)	-	√	-
Poland (2015)	√	√	(√)
Portugal (2017)	√	√	-
Finland (2018)		√	

Note: Years in brackets refer to years of data collection.

3 Samples and representativeness of the data

The samples for obtaining cost of retail payment data should ideally meet certain criteria to ensure that they are represent the retail payments market activity and the sector size of the stakeholders in an appropriate manner.

For banks and other payment intermediaries, this means that they should represent a significant share of retail payment transactions, depending also on the composition and size of the banking sector in the country.

For retailers and other non-financial companies, the sample design should consider those economic activities where a direct relationship between retailers/companies and consumers exists, ranging from small(er) retailers to larger companies/industries accepting different payment instruments to a varying degree.

Samples for household surveys should consider characteristics such as age, gender, education level and region if they are to be representative of the national population of each country.

As set out in Table 5, the surveys of banks and other payment intermediaries cover at least 70% of their respective market shares in every national study, which makes it possible to scale up the data in order to estimate the costs for the entire sector in the given country. This means, in practice, a limited degree of simplification, given the assumption that the cost structures of the reporting banks and other banks do not differ materially. In Denmark, the calculation of the costs for the banking sector was based on the reporting submitted by the five largest banks.[21] In addition, the costs for card companies in Denmark were calculated based on the reporting submitted by two leading payment card companies in the Nordic countries, which provided data on payment card costs broken down by costs for card issuer and card acquirer services. In Hungary, almost all banks and other payment intermediaries provided data, achieving close to 100% coverage. This makes it possible to observe and compare the cost volume and structure of large retailer banks and of corporate banks with a smaller number of clients (and transactions). In Poland, Narodowy Bank Polski (NBP) sent two separate questionnaires to banks and payment infrastructure providers, reaching a total of 20 institutions, thereby covering approximately two-thirds of the market. In Finland, the calculation of costs was based on responses received from commercial banks[22], covering 79-86% of transaction values and comparing them with the payment statistics held by the

21 In a previous study from 2009 it was found that the cost structures of small banks do not substantially differ from those of larger banks.

22 Responses from card acquirers were not received. Therefore, the social costs of card payments are downward biased since acquiring services are mainly provided by non-bank payment intermediaries in Finland.

central bank, Suomen Pankki. Data for those banks that had not responded were estimated from the difference between the payment statistics and the data received from the responding banks. The sample in Italy represented 70% of the payment services market (calculated based on transacted volumes), consisting of 15 banks and other payment intermediaries, including Poste Italiane and certain payment card issuing companies. In Portugal, the costs for the banking sector were calculated based on data provided by the seven largest banks operating in the country, which together represent 82% of the market.

In most countries, the costs of non-financial enterprises were collected using separate surveys for retailers and for companies with a main activity other than the retail trade. This is mainly due to the distinguished characteristics of the merchant sector with a high number of transactions. In the retail sector, the number of payments received generally exceeds the number of outflow transactions, and the most frequently used means of payments are cash and cards. The difficulty with conducting a survey in which such complex information is collected is highlighted by the Danish example, where a total of 4,000 businesses were selected for the sample, but only 2,148 fully completed responses were received. In addition, in Denmark, the design of the sample resulted in an overrepresentation of large businesses. This was also an important aspect of the surveys in Germany and the Netherlands, where separate questionnaires were sent to large chains of retailers, or separate interviews were conducted with representatives of these organisations, in order to cover most of the retailer transactions. In Poland, most of the sample (1,000) consisted of physical retail and service outlets, but also e-commerce entities (150) and mass creditors (150). A similar approach was followed in Hungary, where data from retailers and other types of companies were collected in separate surveys each with a sample size of 300. In Finland, responses were received solely from the three largest retail chains.

In five countries, the study did not cover the consumer side at all. In Poland, data were not obtained from a survey, but the calculations were carried out based on data published by Statistics Poland on the value of household consumption, on statistical data held by the NBP and, in part, on the results of a survey of enterprises. In Hungary and Portugal, household surveys were mainly used to obtain the necessary information.

Table 5

Sample sizes and representativeness

	Banks and other payment intermediaries		Retailers and other non-financial companies	Consumers
	Sample size	Market share (%)	Sample size	Sample size
Denmark (2016)	5 banks 2 card companies	70	2,148[23]	1,202
Germany (2017)	n/a	n/a	10 large retailers 20 SMEs	n/a
Hungary (2018/20)	16	close to 100	300 retailers (including 3 large) 300 other companies	1,500
Italy (2016)	15	70	403[24]	n/a
Netherlands (2017)			25 large retailers 898 SMEs	n/a
Austria (2013)	n/a[25]	90 (commercial banks)	80	
Poland (2015)	10 banks 10 infrastructure providers	52-66 (banks)[26] 50-99 (infrastructure providers)	1,302[27]	
Portugal (2017)	7 banks	82	245	825[28]
Finland (2018)	-	79-86	3 largest retail chains (which cover about 87% of grocery store sales)	-

Note: Years in brackets refer to years of data collection.

23 Retailers/traders and other, larger businesses.

24 Shops (small shopkeepers and large retail chains), petrol stations, catering industry and street trade.

25 The Oesterreichische Nationalbank, Austrian Mint, Geldservice Austria (GSA), Payment Services Austria (PSA) and 90% of the commercial banks were surveyed.

26 The market shares differ depending on the basis on which they are calculated. The survey in Poland involved 10 banks – representing 51.54% of the banking sector in terms of assets, 61.51% in terms of the number of cards and 65.84% in terms of the number of card transactions – and 10 infrastructure providers – handling over 50% of the number of transactions in the case of acquiring services; high representativeness was recorded for credit transfers (99.9% of the number of transactions), similarly to cash services (65% of the number of transactions).

27 The research sample for retailers distinguished three groups of entities: physical points of sale (1,002 entities), e-commerce (150 entities) and mass creditors (150 entities).

28 The survey included 825 personal interviews and 6,574 payment diaries.

4 Cost calculation methodology

Ideally, to make the costs calculated comparable across countries, all cost of retail payment studies should apply a commonly agreed methodology, as was done for the pan-European study by Schmiedel et al. (2012). Choosing a methodology touches on two basic questions: which cost concept to apply and how to break down the costs.

4.1 Cost concepts

All the studies calculated the costs either as private or as social costs, or as both. Private costs are the costs incurred by the individual stakeholder. These may be the resources used by the participant itself or the payments (fees, etc.) paid to other participants for services provided along the payment chain. Resources used by the stakeholder itself, which do not involve a payment to another stakeholder considered in the survey, are the internal costs. These may be payroll costs, costs for devices[29], IT costs and costs related to fraud/robbery, for example, or services purchased from other participants that are not considered to be separate items (e.g. software and leased terminals). For consumers, internal resource costs are typically the time they need to conclude the payment process or to withdraw cash.

External costs are payments made to other stakeholders in the payment chain, such as fees or tariffs, for direct services provided. Thus, private costs are the sum of internal and external costs and can be derived per payment instrument but also at the level of the stakeholder. Social costs, in contrast, capture all resources used by the parties involved in the payment process to complete the payment, thus representing the overall costs to society for providing payment services. Given that along the payment chain the costs incurred by one party may be the revenue of another, these costs are excluded, or they would otherwise be overestimated in calculating the social costs. Fees paid by consumers, for example to banks, are excluded (in those cases in which consumers were also surveyed) because they are costs for private households, but also revenues for banks. In contrast, fees paid by banks to card companies are part of the social costs (banks' internal costs) if card companies are not part of the survey. The pan-European study by Schmiedel et al. (2012) uses the concept of private and social costs, with the latter being calculated as sum of internal costs.

Among the national studies considered, the Italian, Polish, Portuguese and Finnish studies consider both private and social costs, whereas the Danish, Hungarian and Austrian studies estimate social costs alone. For the German and Dutch retailer studies, only private costs are calculated.

[29] From a social costs perspective, the price of a point-of-sale (POS) terminal paid by a merchant to a bank, for example, would not be considered to be an internal cost if both the retail and banking sectors were included in the survey (where this is the case, it is a cost for merchants).

Table 6

Costs concepts

Costs	Denmark (2016)	Germany (2017, retailers)	Hungary (2018/20)	Italy (2016)	Netherlands (2017, retailers)	Austria (2013)	Poland (2015)	Portugal (2017)	Finland (2018)
Social costs	√		√	√		√	√	√	√
Private costs		√		√	√		√	√	√

Note: Years in brackets refer to years of data collection.

Besides collecting data on specific expenses, such as the costs of devices needed for payments, most national studies also considered the opportunity cost of the time needed for the execution of a payment transaction.

The German retailer study calculated the costs of cash and cashless payments from the time measured for the checkout process and based on the insights gained from the surveys into the time spent on background activities, valued at an average staff cost rate. With regard to cashless payment methods, these are similarly calculated to encompass additional processing costs (terminal costs and transaction fees). The Dutch retailer study, too, calculated costs based among other things on the labour costs of time spent on different back and front-office related payment activities.[30]

The Danish study estimated the social costs based on the resources used by the parties involved to complete a payment, which included time spent on activities related to payments. The Portuguese study considered time spent on a transaction only in calculating the private costs for consumers and merchants, while the Hungarian study considered the opportunity costs of time spent on transactions by consumers, merchants and other companies, whereas the Italian study made no allowance for such time spent.

The Austrian study focused on calculating the total costs of domestic payments and on identifying an efficiency threshold, which is defined as the transaction amount below which cash and above which debit cards are the most cost efficient, from a social cost perspective. Smaller cash amounts meant lower costs because small cash payment transactions take less time than cash transactions for higher amounts. As the Austrian study showed, cash payment transactions for amounts up to €10 take, on average, 13 seconds, whereas cash transactions for amounts over €30 take an average of 24 seconds.

The Danish study also calculated efficiency thresholds and sought to identify transaction amounts below which the social costs of cash are lower than those of the national debit card, Dankort, international debit cards and international credit cards[31]. Some of the questionnaires used for the Polish study (for banks and payment infrastructure providers) were prepared based on material used for a Norwegian study[32].

30 The Dutch study applies the methodology developed in Pleijster and Ruis (2011).

31 See Chart 6 in Danish Payments Council (2019c).

32 Gresvik and Haare (2009).

4.2 Direct and indirect costs

The costs incurred in providing a payment service, in terms of the resources used, for instance, can be split into direct and indirect costs. Direct costs result from the use of resources that are directly involved in providing of a payment service (e.g. staff) or from fees to be paid, whereas indirect costs are those relating to the provision of services or products that cannot be directly allocated to a payment instrument or service. The latter may consist of, for example, support functions, such as administrative services, accounting, or IT services, for which the allocation of costs to a payment service or instrument is not straightforward. Cost allocation therefore requires allocation keys of some kind.

For the main non-central bank stakeholders (i.e. banks), other payment intermediaries and retailers, identifying direct and indirect costs is particularly challenging for the banking sector. The pan-European study by Schmiedel et al. (2012), as well as many other studies, applies the activity-based costing (ABC) method, which helps to allocate costs to different product lines. Broadly speaking, with this approach, banks are asked to list all cost items and departmental cost centres and to identify which are direct and which are indirect costs. Subsequently, costs are allocated to the different payment instruments. Direct and indirect costs can be translated into internal and external costs and added together to generate the private costs per payment instrument. The ABC method is applied in the studies for Italy, Hungary, Poland, Portugal and Finland. It should be noted, however, that, in general, banks´ controlling payment systems are not prepared to provide this type of data in the required level of detail, which may result in significant discrepancies between the costs reported by banks, even at national level.

The costs of retailers in the pan-European study by Schmiedel et al. (2012) were obtained by applying a simplified resource-based approach, assuming that a breakdown into direct and indirect costs would not be feasible given that this would require retailers to provide data on back-office/administrative costs, acceptance, deposit, storage and transport costs, terminals and telecommunications costs.

4.3 Fixed and variable costs

Costs could be further separated into fixed and variable costs. Fixed costs do not depend on the degree of use of a specific payment instrument, meaning they do not change with each additional payment. Variable costs depend on the number or value of payments and can be divided into two types: transaction-related variable costs, which are dependent on the number of transactions regardless of the payment amount, and sales-related variable costs, which are dependent on both the number and amount of payments.

Differentiating between fixed and variable costs helps to justify the payments decisions made by economic operators and, more importantly, to understand the effects of changing payment habits on social costs. By differentiating between fixed

and variable costs, assumptions can be made about changes in social costs amid changing payment habits.

The more often a payment is made with a payment instrument, the greater the possible return on the fixed investment. Debit cards, credit cards and international payments tend to have a large share of fixed costs resulting from resource-demanding investments in infrastructure (e.g. IT systems and card terminals). Once that investment has been made, the additional costs resulting from processing payments tend to be low. Conversely, cash tends to have a higher share of variable costs because processing cash involves a lot of labour intense, manual handling and raw material for printing, but requires smaller investments in infrastructure. An increase in card payments will result in significantly decreasing unit costs, as the relatively high (fixed) costs of infrastructure development can be spread across an increasing number of transactions. However, an increase in cash payments will change the unit costs of this payment method to a lesser extent.

The studies from Denmark, Germany, Netherlands, Poland and Finland differentiate between fixed and variable costs. As these are calculated for different sets of stakeholders in each of the studies, the ratios cannot be compared with each other.

The Danish study provides information on the breakdown into fixed and variable costs for cash, the Danish national debit card Dankort, as well as international debit and credit cards. Of these, cash and Dankort have the lowest share of fixed costs at approximately 45%, while the shares of fixed costs for international debit cards and credit cards are approximately 60% and 75% respectively (all the figures relate to physical trade only). The authors of the study pinpoint the difference between the relatively low level of fixed costs for Dankort, with its more frequent usage as compared with international credit cards, which have a relatively low prevalence in Denmark. In physical trade, Dankort is the most frequently used means of payment with 1,094.4 million payments. This is followed by cash with 456.1 million transactions. International debit cards only account for 290.6 million payments and international credit cards are used for 19.4 million payments.

In the Finnish study, fixed and variable costs are broken down for cash and credit transfers. For Finnish banks, cash entails the largest share of variable costs, equating to 94% of total costs and only 6% of fixed costs, while credit transfers incur costs that are equally split between fixed and variable costs. For banks, for all means of payments, variable costs represent 70% of the total costs. For retailers, variable costs (including merchant service charges) account for 90% of the costs for card payments. The Finnish study considers variable costs without distinguishing between sales-related and transaction-related variable costs.

The German retailer study splits variable costs into transaction-related and sales-related costs. Fixed and variable costs are calculated per transaction for cash, direct debits, debit cards and credit cards. For cash payments, the cost components considered are cashier time, background costs and cash management (supply and removal), while for electronic payments, the costs components are cashier time,

background costs[33], transaction costs and terminal costs. According to the study, the fixed costs of cash payments are relatively low (€0.005 per transaction), thus representing 2% of the unit costs for cash, whereas transaction-related variable costs are significantly higher at €0.198 per transaction and, at 83%, accounting for the largest share of the unit cost for cash. For debit cards (Girocard), credit cards and direct debits, fixed costs are €0.038 per transaction and higher than those of cash. However, they still account for a relatively small share of the respective total unit costs: 12% for debit cards, 11% for direct debits and 4% for credit cards (Table 7). The share of sales-related costs as part of unit costs is highest for credit cards (78%)[34].

Table 7

Share of fixed and variable costs per transaction in the German retailer study

	Fixed costs	Sales-related variable costs	Transaction-related variable costs
Debit cards	12%	35%	53%
Credit cards (PIN)	4%	78%	18%
Direct debits	11%	18%	71%
Cash	2%	15%	83%

The Dutch retailer study estimates fixed and variable costs and, for cash, debit cards and credit cards, also splits them into transaction-related and sales-related costs. For cash payments, back-office costs are considered only as general cost components, which include staff costs resulting from the time spent handling cash payments. Most of the back-office costs for cash payments are considered to be sales-dependent variable costs (71%) and all costs related to cash transport and the deposit of cash are counted as being sales dependent. Additional cost components include costs resulting from depreciation of the cash drawer and counterfeit money detection. Variable sales-related costs represent 51% of the total costs for cash payments, whereas variable transaction-related costs account for around 20% and fixed costs for 29%. Costs for debit card payments are estimated be made up of 20% fixed costs and 80% variable costs, those costs being almost exclusively transaction related. Variable costs of paying with a debit card are therefore found to be independent of the amount to be paid. Credit cards have a 3% share of fixed costs, an 80% share of variable costs in terms of sales and a 17% share of variable costs in terms of transactions (Table 8).

33 Background costs for cash payments include costs for safes, cash counting machines or banknote verification machines (fixed costs) and depositing and counting cash (variable costs). For card payments, these are software updates and terminal registration, for example (fixed costs).

34 The authors of the study point out that some of the transaction costs of card payments, notably fees, are classified as variable sales-dependent costs, while they in fact may be transaction-dependent. A clear distinction can however not always be made.

Table 8

Share of fixed and variable costs in the Dutch retailer study

	Fixed costs	Transaction-related variable costs	Sales-related variable costs
Debit cards	20%	0%	80%
Credit cards	3%	80%	17%
Cash	29%	51%	20%

The Polish study provides a detailed analysis of fixed and variable costs for the years 2015 and 2018, for both internal and external, private and social costs, as well as for unit costs. Overall, the share of fixed costs was 38.5% in 2015 and fell to 37.4% in 2018. The change in the share in fixed costs was most pronounced for mobile payments, with a decline from 92.4% in 2015 to 58.6% in 2018, and for direct debits (from 29.7% in 2015 to 11.6% in 2018) and credit transfers (from 64.5% in 2015 to 54% in 2018), thus hinting at greater use of these payment methods. In contrast, for cash, the share of fixed costs slightly increased from 30.4% in 2015 to 31.4% in 2018.

5 Costs of retail payments

The key characteristics and results of the nine studies under review are put together in Tables 9 and 10. In terms of estimated costs, Table 9 depicts the results for total social and/or private costs in relation to GDP per country, broken down by stakeholders. Table 9 shows social and/or private costs in relation to GDP, as well as the unit costs per payment instrument. Given that the costs of payments for Poland were calculated for 2015 and subsequently extrapolated to 2018 (using the costs for 2015 and the cost drivers for 2018), data are available for those two years.

Table 9

Comparison of the results of national studies on the cost of retail payments per stakeholder

Country	Stakeholder	Costs/GDP	
		Social costs/GDP	Private costs/GDP
Denmark (2016)	Banks and other payment intermediaries	0.18%	-
	Retailers	0.22%	-
	Households	0.13%	-
	Total	0.53%	-
Germany (2017)	Retailers		0.17%
Hungary (2019, preliminary data)	**Total**	1.75%	
Italy (2016)	Central banks		
	Banks and other payment intermediaries	0.38%	
	Retailers and other companies	0.42%	
	Total	0.80%	
Netherlands (2017)	Retailers		0.19%
Austria (2013)	**Total**	0.40%	
Poland (2015)	Central banks	0.03%	0.03%
	Banks and other payment intermediaries	0.68%	0.76%
	Retailers	0.46%	0.62%
	Cash in transit	0.03%	0.03%
	Consumers	0.07%	0.23%
	Total	1.27%	1.67%
Poland (2018)	Central banks	0.02%	0.02%
	Banks and other payment intermediaries	0.63%	0.72%
	Retailers	0.46%	0.64%
	Cash in transit	0.02%	
	Consumers	0.07%	0.18%
	Total	1.21%	1.60%
Portugal (2017)	Banks and other payment intermediaries	0.41%	0.44%
	Retailers	0.48%	0.62%
	Consumers	0.10%	0.41%
	Total	0.99%	
Finland (2018)	Banks and other payment intermediaries	0.11%	
	Retailers	0.01%	
	Central bank	0.00%	

Note: Years in brackets refer to years of data collection.

Table 10

Comparison of the results of national studies on the cost of retail payments per payment instrument

Country	Payment instrument	Costs/GDP		Unit costs (EUR)
		Social costs/GDP	Private costs/GDP	
Denmark (2016)	Cash	0.10%		0.6
	Debit cards (Dankort)	0.15%		0.34
	International debit cards	0.07%		0.57
	International credit cards	0.01%		1.9
	Direct debit	-		0.55
	Credit transfers	-		2.12
	Staffed credit transfers	0.02%		3.41
	Inpayment forms	0.04%		2.07
	Staffed inpayment forms	0.01%		3.33
Germany (2017)	Cash			0.24
	Debit cards			0.33
	Credit cards			1.02
	Direct debit			0.34
Hungary (2019, preliminary data)	**Total**	1.75%		
Italy (2016)	Cash	0.44%		0.35
	Cheques	0.04%		3.80
	Debit cards	0.06%		0.59
	Credit cards	0.05%		1.1
	Credit transfers	0.08%		1.63
	Direct debit	0.02%		0.49
Netherlands (2017)	Cash			0.29
	Debit cards			0.17
	Credit cards			1.17
Austria (2013)	Cash	0.36%		0.4
	Debit cards	0.05%		0.39
Poland (2015)	Cash	0.90%	1.11%	0.33
	Debit cards	0.21%	0.35%	0.43
	Credit cards	0.04%	0.06%	0.54
	Credit transfers	0.09%	0.13%	0.17
	Direct debit	0.00%	0.01%	0.64
	Total	1.27%	1.67%	
Poland (2018)	Cash	0.78%	0.93%	0.32
	Debit cards	0.26%	0.43%	0.33
	Credit cards	0.04%	0.07%	0.49
	Credit transfers	0.10%	0.14%	0.19
	Direct debit	0.01%	0.01%	1.12
	Total	1.21%	1.60%	
Portugal (2017)	Cash	0.57%		0.34
	Cheque	0.06%		3.54
	Debit cards	0.21%		0.38
	Credit cards	0.08%		1.88
	Credit transfers	0.03%		0.39
	Direct debit	0.04%		0.27
Finland (2018)	Cash			0.22

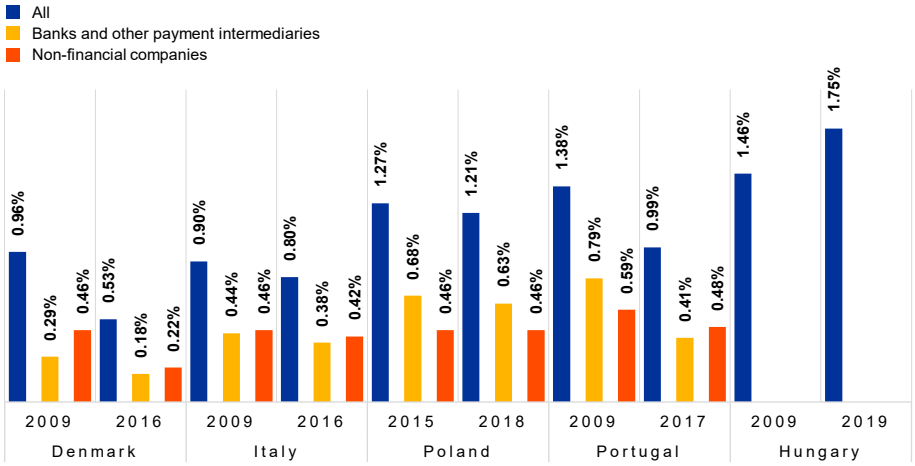
Country	Payment instrument	Costs/GDP		Unit costs (EUR)
		Social costs/GDP	Private costs/GDP	
	Cards	0.11%		0.15

Among the studies that consider the main stakeholders (and not just retailers, for example), the social costs in relation to GDP are derived for Denmark, Italy, Austria, Poland and Portugal, ranging from 0.53% in Denmark to 1.21% in Poland (Table 9). The pan-European study by Schmiedel et al. (2012) estimated this figure to be roughly 1% for the 13 countries analysed, based on data from 2009. However, comparing these figures across countries is not straightforward, as pointed out in Section 2, given that the stakeholders considered vary across countries, among other things. For example, the Danish, Polish and the Portuguese studies all include costs incurred by consumers, while the Portuguese study does not include central banks, and the Danish and Polish studies are the only ones to consider CIT companies (in addition to the Hungarian survey). The social costs incurred by central banks and CIT companies are, however, marginal and were found to range between 0.01% and 0.03% of GDP in the pan-European study by Schmiedel et al. (2012). Another factor that makes comparison across countries challenging is the different years used by the studies for data collection, which range between 2013 and 2018. Even during this relatively short period, changing payment habits, such increasing use of electronic payments and other factors, may have had an impact on the cost calculation. Differences in the payment instruments covered (for Austria, for example, only the social costs for cash and debit cards were analysed) may also lead to different levels of social costs in relation to GDP.

A comparison of social costs to GDP for the same country over time may therefore be more revealing, provided that the same scope and methodology are retained. The social costs in relation to GDP at two different points in time can be found for Denmark, Italy, Hungary, Poland and Portugal. Based on these figures, the overall social costs in relation to GDP have declined quite substantially in Denmark from 0.96% in 2009 to 0.53% in 2016, almost halving, and fell in Italy over the same period from 0.9% to 0.8%. Declines were likewise seen in Poland, with overall social costs falling from 1.27% to 1.21% between 2015 and 2018, and in Portugal, from 1.38% to 0.99% between 2009 and 2017 (Chart 1).

Chart 1

Social costs of retail payments in relation to GDP



Sources: Banca d'Italia, Banco de Portugal, Danish Payments Council, Magyar Nemzeti Bank, Narodowy Bank Polski, own calculations.

The studies concerned attribute this development to, among other things, digitalisation, changing consumer preferences for lower cost electronic payment instruments or improved efficiency of cash distribution channels, rapid technological developments and regulatory interventions to support efficiency and security, such as those introduced by EU Payment Services Directive 2 (PSD2)[35].

Non-financial companies and retailers in Denmark seem to have incurred a higher social cost to GDP ratio than banks and other payment intermediaries in both 2009 and 2016 (Chart 1). Likewise, this ratio decreased more substantially for non-financial companies than for banks and other payment intermediaries over that period. The main factors for the reduction in social costs (namely changing payment habits as reflected in the shift towards electronic forms of payment forms, faster payments and measures to enhance efficiency such as outsourcing cash handling to professionals) seem to have benefited non-financial companies, such as retailers, more than banks and other payment intermediaries. The picture is different for Portugal and Italy, where the share of social costs of retail payments in relation to GDP that is sustained by banks and other payment intermediaries decreased more than that attributable to non-financial companies, particularly in Portugal. This may reflect the growing investments made by financial intermediaries to support the efficiency of business processes and the significant share of "internal" resources still used by companies for payments management.

The results are somewhat different in the case of Hungary, where the social costs to GDP ratio was already the highest in 2009, and has even increased in the decade between the two rounds of the survey. The high cost ratio may largely be attributable to the fact that the Hungarian survey is one of the most comprehensive, covering all sectors and main players in the payment chain. Consequently, the scope of the

35 Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC (OJ L 337, 23.12.2015, p. 35).

surveyed costs was significantly wider than in other countries. The increase in the cost ratio would seem, however, to stem from several factors. The number of card transactions multiplied fivefold between 2010 and 2020, which meant that the volume of variable costs associated with card payments also grew. In addition, there was extensive development of the acceptance network. By the end of 2020 most of the merchants were mandated by law to provide electronic payment options. This meant significant investment costs on the infrastructure side, which are unlikely to be required in the coming years and which may be absorbed by the further increases in transaction numbers. Finally, in all sectors, but especially in the case of retailers and households, the steep rise in salaries over recent years have also led to higher costs. In conclusion, for Hungary, it is expected that the use of electronic payment methods will grow dynamically in the wake of the extensive widening of the acquiring network (and the associated cost) and that unit costs will sink below those for cash.

6 Unit costs

Unit costs – the total costs divided by the number of retail payment transactions – are summarised in Table 11. For most countries, these represent unit social costs. The data for Germany and the Netherlands are, however, based on private costs. As indicated in the previous section, comparison over time is only possible for Denmark, Italy, Poland and Portugal, although their data may provide some indication of changes in costs per payment instruments overall.

The level of unit costs is highly dependent on consumer payment habits, and hence on the number of payment transactions carried out using the different payment methods. In the studies for Germany, Italy, Poland or Portugal, cash was still the most frequently used payment method. Consequently, the total costs are divided by a relatively large number of transactions and tend to be relatively low per payment transaction.

Debit cards are the payment instrument with the lowest unit costs in Austria, Denmark[36], Finland[37] and the Netherlands, while this honour goes to credit transfers in Poland and direct debits in Portugal. In Austria, however, the unit costs for cash are almost equal to those of debit cards – €0.40 as against €0.39. In the German retailer study, unit costs were found to be the lowest for cash. The German cost study found that the variable costs of cash payments were only marginally higher than the variable costs of payments by Girocard or electronic direct debit, and were below the variable costs of credit card payments. As a result of the low fixed costs, cash payments up to an average payment amount of just under €20 were the most cost efficient for the retail sector, with Girocard proving more cost efficient for higher amounts. Cash payments were invariably the most cost efficient if all the card payment methods were considered in aggregate. In the Portuguese study (which also considered consumers to be stakeholders), cash was the second most cost-efficient instrument overall, but still entailed the highest costs for banks.

It should be remembered, however, that the studies for Germany and the Netherlands calculate the private costs for retailers only. Moreover, the German study is very specific, with a focus on cash and card payments for a small sample of narrowly defined retailers, applying a specific methodology. For Austria, it should be noted that the study looks at two payment instruments only: cash and debit cards, for which the unit costs are, in fact, low for both instruments.[38] The authors of the Austrian study explain that the low unit costs for both cash and non-cash payments is due, among other things, to the fact that many operations, such as counting,

36 For C2B payments.

37 In Finland, only the unit costs for the total card payments are available. However, most card payments are made with debit cards and thus the unit costs for cards mainly equate to the costs of debit cards (debit card payments accounted for 93% of all domestic card payments in 2018).

38 The Austrian study, while conducted by the Vienna University of Business and Economics, was made possible with the financial support of Payments Service Austria, a transaction service provider and the competence centre for cashless payment in Austria. This may need to be taken into account when considering the recommendation made in the abstract to further increase cost efficiency by increasing the share of debit card payments.

transport, safe storage and automated-teller-machine (ATM) management, are centralised with specialised companies: GSA (Geldservice Austria) and PSA (Payments Services Austria).

In Poland, credit transfers, as the least expensive payment instrument, have become a popular payment instrument over the past few years, thus leading to a high number of transactions. The origins for this may be the efforts made by banks in Poland to build an efficient system for bank transfer settlements in the 1990s, which made credit transfers more attractive for customers.[39]

Table 11

Social unit cost per payment instrument (EUR)[40]

	Cash	Cheque	Debit card	Credit card	Credit transfer	Direct debits	Mobile payments
Austria (2013)	0.40	-	0.39	-	-	-	-
Germany (2017, retailers)	0.24	-	0.33	1.02	-	0.34	-
Denmark (2009)	1.08	-	0.53	3.13	5.24	-	-
Denmark (2016)	0.60	-	0.34[41]/0.57[42]	1.90[43]	2.12[44]/3.41[45]	0.55[46]	0.28[47]
Finland (2018)	0.22	-	0.15[48]			-	-
Hungary (2019, preliminary data)	0.32	-	0.72	-	1.11	0.51	-
Italy (2009)	0.33	3.54	0.74	1.91	2.27	0.94	-
Italy (2016)	0.35	3.80	0.59	1.10	1.63	0.49	-
Netherlands (2017, retailers)	0.29	-	0.17	1.17	-	-	-
Netherlands (2020, retailers)	0.49	-	0.17	1.19			
Poland (2015)	0.33	-	0.43	0.54	0.17	0.64	1.60
Poland (2018)	0.32	-	0.33	0.49	0.19	1.12	0.58
Portugal (2009)	0.42	2.13	0.47	2.12	0.68	0.35	-
Portugal (2017)	0.34	3.54	0.38	1.88	0.39	0.27	-
ECB[49] (2009)	0.42	3.55	0.99	2.39	1.27	1.92	-

Note: Years in brackets refer to years of data collection.

39 Whether this is indeed the case still needs to be further investigated, as pointed out by the authors of the Polish study.

40 Private costs for Germany and the Netherlands.

41 For Dankort, the national debit card, the weighted average across physical and remote payments based on the volume of payments.

42 For international debit cards, the weighted average across physical and remote payments based on the volume of payments.

43 For international credit cards, the weighted average across physical and remote payments based on the volume of payments.

44 For credit transfers, the weighted average across physical and remote payments based on the volume of payments.

45 For staffed credit transfers, the weighted average across physical and remote payments based on the volume of payments.

46 The unit costs for Betalingsservice, a Danish direct debit product.

47 P2P only.

48 In Finland, only unit costs for total card payments are available. However, the majority of card payment are made with debits cards and thus the unit costs for cards equate mainly to the costs of debit cards (debit card payments accounted for 93% of all domestic card payments in 2018).

49 Weighted average, see Table 9 in Schmiedel et al. (2012).

In Portugal and Italy, the most expensive payment instruments in terms of unit costs are cheques, these being the only countries in which cheques were considered. In Denmark, the most expensive were staffed credit transfers (executed at a bank counter or with the help of bank staff over the phone), in Hungary credit transfers (including staffed ones), while in Finland it was cash, in Germany and the Netherlands credit cards, and in Poland mobile payments and direct debits. The high level of unit costs for cheques and staffed credit transfers is not surprising. While the use of cheques creates low fixed costs, their handling is resource-intensive, as it is for staffed credit transfers, and this results in high variable costs. Since ever less use is being made of cheques, their unit costs increased between the two different years considered in Italy and Portugal.

Credit cards are among the most expensive payment instruments in terms of unit costs in all countries that considered credit cards. They also involve relatively high fixed costs, which are mostly borne by banks given the need to assess customers' creditworthiness, among other things. Unit costs for credit cards in Denmark, Italy, Poland and Portugal have declined, possibly due to the fact that the payment volume in terms of value has increased overall, but also due to entry into force of the Interchange Fee Regulation (IFR)[50].[51]

In Denmark, the costs for staffed credit transfers in Denmark need to be distinguished from those for online and mobile credit transfers, which are much more common and have lower unit costs. However, unit costs for online or mobile credit transfers in Denmark are still relatively high as compared with those for cash and card payments. The primary explanation for this is time spent by both the payer and payee. For consumers, an online credit transfer can take a considerable amount of time if account numbers need to be typed in, while for businesses significant resources are spent sending out invoices by email or post, both of which add to the overall costs calculated. The study in Denmark provides a much more granular breakdown between the different payment instruments than the other studies given that it distinguishes between national and international cards, inpayment forms and staffed inpayment. Moreover, it distinguishes between payment situations, meaning between physical trade and remote trade.[52]

Overall, in terms of changes to unit costs, based on the data for Denmark, Italy, Poland and Portugal, a few more observations can be made. The unit costs of cash payments in Denmark were higher, in both 2009 and 2016, than those of payments with debit cards, whereas in Italy, Poland and Portugal unit costs of payments with cash were lower than those of debit cards in both years considered. The unit costs of debit cards declined, however, in Italy, Poland and Portugal, and at the same time the difference between the unit costs of cash and debit cards narrowed (Chart 2).

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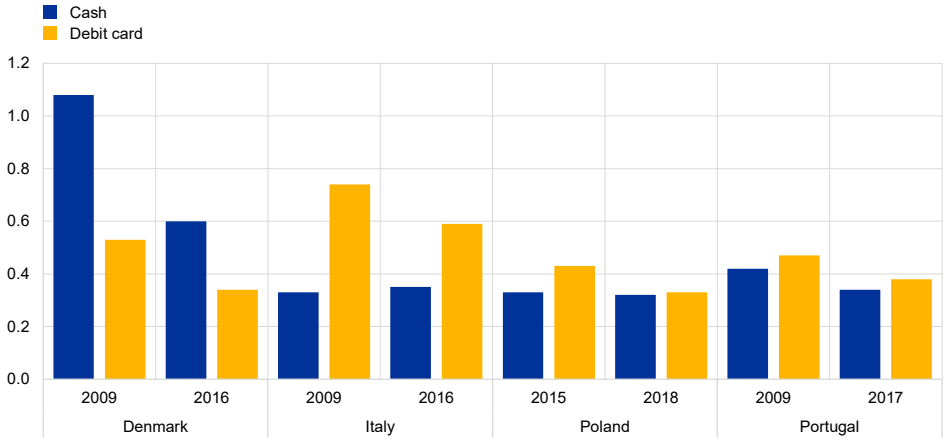
50 Regulation (EU) 2015/751 of the European Parliament and of the Council of 29 April 2015 on interchange fees for card-based payment (OJ L 123, 19.5.2015, p. 1).

51 The IFR caps the maximum interchange fee for consumer debit cards to 0.2% and consumer credit cards to 0.3% of the value of the transaction. This fee is paid by the retailer's bank (the "acquiring bank") to the consumer's bank that issued the card (the "issuing bank"). The IFR has applied in the EU since December 2015.

52 The costs for each specific situation and payment instrument are detailed in the Annex.

Chart 2

Unit costs of cash and debit cards over time in selected countries (EUR)[53]



Sources: Banca d'Italia, Banco de Portugal, Danish Payments Council, Narodowy Bank Polski.

This may reflect different payment habits between countries and also changes in payment habits over time. A key finding of the pan-European study by Schmiedel et al. (2012) was that in the Nordic countries, such as Denmark, with a relatively high number of debit card payments and a low number of cash payments per capita, social costs in relation to GDP are lower as compared with other countries in which cash transactions are more common and debit card transactions somewhat rather less frequent.

At the same time, in countries with higher usage of cash payments (as in Italy, Poland and Portugal),[54] cash transactions typically incur lower unit costs than in countries in which electronic means of payment are more popular. The number of payment transactions affects the average unit costs of the various payment methods. As cash payments typically entail a lower share of fixed costs than payments with debit cards, which require significant infrastructure investments, it may be assumed that the unit costs of payments with debit cards will decrease more significantly as the number of transactions rises than the unit costs associated with cash.[55] Ilyes and Varga (2016), for example, assess the impact of substituting debit card payments for cash on the unit costs of these payment methods and potentially on the overall economic performance of Hungary. By considering four scenarios with different ratios of debit card usages, ranging from a scenario with an 11% share to a scenario with a 89% share of card usage, the study finds that an increasing share of debit card transactions goes hand in hand with lower unit costs for debit card payments, whereas a corresponding decreasing in the share of cash transactions

53 The Danish Payments Council (2018d) states data for both years in 2016 prices, while the figures for the remaining countries are stated in nominal prices. It should be noted that for Italy, Poland and Portugal, assuming increasing price levels over time, the observed decline in costs would be most likely more pronounced if all figures were stated in real prices.

54 For the share of cash payments in terms of the number of POS transactions in Italy (82%) and Portugal (81%) in 2019, see European Central Bank (2020), "Study on the payment attitudes of consumers in the euro area (SPACE)", Frankfurt am Main.

55 Additional factors may have contributed to declining unit costs for electronic payment instruments, such as the increasing transaction speed with electronic funds transfer at point-of-sale (EFTPOS) terminals, which contributes to the decline in costs for debit card payments.

would lead to an increase in unit costs for cash payments. The relative high level of unit costs for cash payments in Denmark may reflect the fact that cash usage in Denmark was already low in 2009 as compared with countries, such as Italy, Portugal and Poland, which are characterised by relatively high levels of cash usage. The narrowing of unit costs between debit card and cash payments in those three countries may reflect the substitution process arising from increasing use of electronic payments, which can be seen across all European countries.

7 Conclusion

This paper describes the key elements and results of existing and ongoing and yet unpublished national payment studies that have been conducted since the last pan-European study was published in 2012. The merits of this exercise are primarily bringing together the key elements of those studies in a single document, making them accessible to a broader audience that is unfamiliar with all the languages in which some of the studies were published in their original version. However, comparing the results across countries and drawing common conclusions from the surveys is not straightforward. As pointed out earlier, the studies differ in many ways, notably in terms of the scope, such as instruments and stakeholders considered, the definition thereof, the payment situations covered, the cost concepts used and the years in which the studies were conducted. Therefore, to enhance comparability and enable more general conclusions to be reached at European level, greater harmonisation of national surveys would be of benefit.

Finally, one general observation that can be made is that the changing payment landscape would seem to be having an impact on payment costs. In most national payment markets, the dominance of cash is decreasing. Some national studies show that the current low unit costs of cash transactions are mainly a result of the large transaction numbers and volumes. As countries like Denmark show, with electronic alternatives such as (debit) cards, contactless and mobile payments becoming more important and more widely used, the higher fixed costs that they entail can be distributed across an increasing number of transactions, leading to lower unit costs for individual transactions.

Annex

Table A1

Total (EUR millions) and unit social costs (EUR) (C2B) in Denmark – physical trade in 2016

Stakeholders	Total	Cash	Debit cards (Dankort)	International debit cards	International credit cards
Banks and other payment intermediaries	359.4	124.1	108.5	95.7	31.1
Retailers and businesses	271.2	86.3	144.1	37.9	2.8
Households	190.5	63.5	99.1	26.1	1.8
Overall	821.1	273.9	351.7	159.7	35.7
Unit costs	-	0.6	0. 32	0.55	1.9

Table A2

Total (EUR millions) and unit social costs (EUR) (C2B) in Denmark – remote trade in 2016

Stakeholders	Total	Debit cards (Dankort)	Inter-national debit cards	Inter-national credit cards	Direct debits	Credit transfers	Staffed credit transfers	Inpayment forms	Staffed inpayment forms
Banks and other payment intermediaries	131.3	8.9	8.4	4.0	-	-	11.6	11.1	3.7
Retailers and businesses	331.3	10.5	1.2	1.0	-	-	20.4	62.1	6.3
Households	182.4	28.7	9.1	0.9	-	-	18.9	25.4	6.4
Overall	644.9	48.1	18.7	5.9	-	-	50.9	98.6	16.2
Unit costs	1.3	0.6	0.74	2.4	0.55	2.1	3.4	2.1	3.3

Table A3

Total (EUR millions) and unit private/social costs (EUR) in Italy in 2017[56]

Stakeholders	Costs	Cash	Cheques	Debit cards	Credit cards	Cards	Credit transfers	Direct debits
Banks and other payment intermediaries	Unit	2.5	2.8	0.5	1.0		0.9	0.3
	Total	3,312.4	515.2	826.2	691.9	1,518.1	769.0	181.4
Retailers	Unit	0.2	1.0			0.5	0.7	0.4
All stakeholders	Total	7,440.0	710.0	1,080.0	850.0	1,930.0	1,410.0	390.0
	Unit	0.35	3.80	0.59	1.10	0.74	1.63	0.49

[56] Private costs for each stakeholder, social costs for all stakeholders.

Table A4

Total (EUR millions) and unit social costs (EUR) in Poland in 2015

Stakeholder	Costs	Total	Cash	Debit cards	Credit cards	Direct debits	Credit transfers	Mobile payments
Central bank	Unit	0.01	0.01	0.00	0.00	0.00	0.00	0.00
	Total	135.33	123.42	5.26	0.68	0.06	5.90	0.00
Banks and other payment intermediaries	Unit	0.17	0.16	0.27	0.37	0.07	0.13	1.42
	Total	2,925.22	1,898.74	573.92	103.80	1.82	298.09	48.86
Retailers	Unit	0.12	0.13	0.14	0.15	0.57	0.03	0.15
	Total	1,961.09	1,513.42	299.88	41.35	14.32	82.87	5.22
Overall	Unit	0.30	0.30	0.41	0.52	0.64	0.16	1.58
	Total	5,021.63	3,535.58	879.06	145.82	16.20	386.86	54.08
Overall + CIT + consumers	Unit	0.32	0.33	0.43	0.54	0.64	0.17	1.60
	Total	5,444.61	3,889.83	922.53	151.31	16.20	405.84	54.82

Table A5

Total (EUR millions) and unit social costs (EUR) in Poland in 2018

Stakeholder	Costs	Total	Cash	Debit cards	Credit cards	Direct debits	Credit transfers	Mobile payments
Central bank	Unit	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	121.5	106.7	8.1	0.8	0.1	5.5	0.3
Banks and other payment intermediaries	Unit	0.2	0.2	0.2	0.3	0.1	0.1	0.5
	Total	3,150.8	1,888.4	720.2	128.5	1.9	334.7	77.0
Retailers	Unit	0.1	0.1	0.1	0.1	1.1	0.1	0.1
	Total	2,273.6	1,543.2	483.3	49.2	31.3	146.5	15.5
Overall	Unit	0.3	0.3	0.3	0.5	1.1	0.2	0.6
	Total	5,545.8	3,538.3	1,211.6	178.5	33.2	486.7	92.9
Overall + CIT + consumers	Unit	0.3	0.3	0.3	0.5	1.1	0.2	0.6
	Total	6,006.3	3,889.6	1,284.3	185.6	33.2	514.8	94.0

Table A6

Total (EUR millions) and unit private/social costs (EUR) in Portugal[57] in 2017

Stakeholder	Costs	Total	Cash	Cheques	Debit cards	Credit cards	Direct debits	Credit transfers
Consumers	Unit		0.06	3.42	0.30	2.56	0.06	0.54
	Total	789	212	39	301	177	14	45
Banks and other payment intermediaries	Unit		0.08	3.01	0.18	1.69	0.16	0.24
	Total	793.3	255.2	105.3	201.4	133.4	42.2	55.8
Retailers	Unit		0.21	0.45	0.34	0.92	0.16	0.10
	Total	1,206.4	702.8	11.6	370.7	72.8	41.2	7.1
All	Unit		0.34	3.54	0.38	1.88	0.27	0.39
	Total	1,909	1,093	117.1	413	148.5	70.4	67

57 Private costs for each stakeholder, social costs for all stakeholders.

Glossary

Activity-Based Costing (ABC) method	The ABC method allocates the cost of the activities along the payment chain to the different payment products and services within an entity, such as a bank.
Cash in transit (CIT) company	An entity providing transport, storage and handling services for banknotes and coins to credit institutions and/or retailers.
Consumer-to-business (C2B) transaction	A payment carried out by private individuals, typically as consumers, with commercial businesses, such as retailers. C2B payments are distinct from payments between individual persons (P2P payments) and payments between businesses (B2B payments).
Direct costs	Those costs arising from direct and exclusive use of resources to make payment products and services available. Direct costs are the costs "directly related" to the activities carried out for each payment instrument and that can be imputed in a straightforward way (e.g. costs associated with fees and commissions and with staff directly involved in each activity and with each payment instrument).
Direct debit	A payment instrument for debiting a payer's account, where a payment transaction has been initiated by the payee on the basis of an authorisation granted by the payer. This is a popular payment instrument in some European countries (e.g. Germany), but not used in other countries.
Electronic funds transfer at point-of-sale (EFTPOS)	A terminal that assists in the transfer of funds from a customer's bank account to a merchant (business) bank account.
External costs	Payments (fees, tariffs and other charges) made to other participants in the payment chain for services rendered. They are in contrast to internal costs, which are the resources used by the participant itself.
Girocard	A debit payment card issued by the German banking industry that enables the cardholder to withdraw cash at an automated teller machine (ATM) or to pay at the point-of-sale (POS) terminal after entering a personal identification number (PIN). In 2007, the designation was changed from EC card to Girocard.
Indirect costs	Those costs that arise from non-exclusive use of resources to make payment products and services available. Indirect costs are typically the costs associated with local overheads and the support functions that are necessary to carry out the activities involved for each payment instrument. They can be imputed using specific allocation keys (e.g. costs associated with equipment rental, maintenance and depreciation, and other corporate support services).
Inpayment forms	A physical or electronic form sent to the payer on behalf of the payee and used for the collection of payments. Typically, the inpayment form includes an invoice that details the goods or services supplied. Basically, an inpayment form is a form of credit transfer that includes data to enable automatic processing of the payment.
Internal costs	Resources used by the participant itself, including services bought from other service providers in the payment chain that are not treated separately, such as leased terminals or software. Internal costs equate to private costs minus external costs.
Overheads	Costs that are direct at the level of the organisational entity that is responsible for executing the activities concerned or delivering the service or product concerned, but that cannot directly be allocated to those activities in an economically feasible way. Examples are divisional heads and secretariat or other support functions (e.g. conceptual work) within the organisational entity concerned.
Person-to-person payments (P2P)	Payments between individual persons.
Private costs	Costs incurred by the relevant individual participants in the payment chain. Private costs equate to the sum of the internal costs and external costs.
SMEs	Small and medium-sized enterprises.
Social costs	The sum of all internal costs incurred by the relevant participants in the payment chain in carrying out payment transactions.
Unit costs	Typically, the costs per transaction. They are generally calculated as the total costs (e.g. total social costs) per payment instrument divided by number of transactions per payment instrument.

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Acknowledgements
The authors would like to thank Kristian Nørgaard Bentsen (Danmarks Nationalbank) for his valuable comments.

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PDF ISBN 978-92-899-4848-7, ISSN 1725-6534, doi:10.2866/3482, QB-AQ-21-037-EN-N