
# Payment behaviour in Germany

## An empirical study of the selection and utilisation of payment instruments in the Federal Republic of Germany

Deutsche Bundesbank

2009

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Completed on 30 June 2009

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# I. Definition of the problem, and design of the study

Cash continues to be consumers' preferred payment method. Nonetheless, the turnover share of cash transactions in the German retail trade has been slowly but continually falling for years. Having said that, the proportionate fall is balanced out by the absolute increase in the transaction volume. The declining significance in the retail trade contrasts with the overall increase in cash circulation in Germany. By contrast, above all debit cards have become increasingly popular in recent years owing to a greater level of acceptance and technical improvements. Against the background of this development, in this paper the Deutsche Bundesbank comprehensively analyses the cash and cashless payment habits of the general public in Germany, as well as the factors influencing their choice of payment instrument, and estimates future developments on this basis. This study focuses on payment habits at the so-called point-of-sale (POS). This is to be understood as those payments which are effected for goods and services at the place of performance. However, regularly recurring payments, which are generally settled on a cashless basis or debited from the individual's account directly (such as rent and ancillary costs, insurance premiums, telephone bills) are not taken into consideration. In order to receive reliable and current data on payment behaviour, the Ipsos market research institute carried out an empirical survey on behalf of the Deutsche Bundesbank in the spring of 2008. Over and above this, publicly accessible statistics, for instance on card ownership and retail trade payments made, were used as further sources of information.

The primary statistical survey that was carried out consisted of two parts: A computer-assisted personal interview (CAPI) and a payments diary to be completed by the respondent. All the interviews were carried out over the period between the beginning of April and June 2008. The sample group for the survey consisted of German speaking individuals aged 18 years and above, residing in private households in Germany. On the basis of the master sample of the Association of German Market Research Institutes (*Arbeitskreis Deutscher Marktforschungsinstitute e.V. – ADM*), a representative random sample was taken from this population using a three-stage drawing process. All in all, it was possible to carry out 2,272 interviews (2,217 of which with a payments diary), which corresponds to a response rate of approx. 63%. By way of a correction of the random sample, the sample of households was additionally transformed into a sample of individuals, and the unweighted sample structure was adjusted to the official statistics by means of weighting.

The results of the survey are presented below. After introducing the study in Chapter I, a comparative view is to be initially provided of cash and cashless payment procedures in Chapter II. This focuses on the question of the importance which the respondents attach to certain features of payment instruments, and how each payment instrument is rated in respect of these criteria from the point of view of the customers. Following on from this, in Chapter III, the ownership of cash and payment cards is evaluated in a first step. Secondly, the actual payment behaviour of private individuals, as documented in aggregated form in the payment diaries, is evaluated not only in terms of the overall picture, but also by different socio-demographic characteristics and purchasing locations. Over and above this, in the

ensuing Chapter IV, the data that have been collected at individual level are tested in microeconometric terms as to the degree to which individual cash payment behaviour is influenced by personal characteristics and specific transaction features. The development and outlook of payment behaviour in Germany are shown in the final chapter, Chapter V.

# II. Comparative analysis of cash and cashless payment instruments

In the following section, after an introductory explanation of the payment instruments that have been investigated in this study (Ch. II.1.), first of all their selection (Ch. II.2.) is studied. It is stated here what criteria are important in principle from the point of view of both retailers and customers in deciding whether to accept or acquire payment instruments. It is then investigated on the basis of what considerations customers opt for a specific payment instrument in an actual purchase situation.

## II.1. Explanation of the payment instruments investigated

It is necessary to distinguish between three categories of means of payment in Germany[1]: (1) cash, (2) deposit money, including account balances, as well as (3) electronic money in the form of electronic monetary units stored on payment cards and servers. The means of payment included in the first category are to be attributed to cash, and the other means of payment to cashless payment transactions.

**Cash**, that is to say banknotes and coins denominated in euro, continues to be regarded as the classical means of payment in Germany. It can be withdrawn at bank counters or at automated teller machines (ATMs), and since recently also at some retail outlets using the cashback procedure[2]. The fact that roughly 60% of all retail trade transactions are still made using cash reflects its predominant significance. Nonetheless, the transaction volume processed via cashless payment procedures has grown constantly, as is shown by the 18.3 percentage-point fall in cash turnover within 14 years.[3] The technical refinement and concomitant increases in efficiency in processing cashless payments may have led to changes in user conduct here. For instance, confidence in and experience of using new technologies have continually increased over time. Over and above this, the significance of internet trading, in which cash payment (by means of cash on delivery) does not play a major role in comparison to cashless payment instruments, has successively increased.[4]

Whilst cash is disposed of by physically handing over banknotes and coins, credit transfers, direct debits and card payment procedures, as well as electronic payment procedures, are used with cashless payment transactions. Here, access to cashless payment procedures and authentication of the payer takes place via dedicated instruments.[5] Their use – depending on the payment procedure used – is assisted or made possible in the first place by specific media such as point-of-sale terminals, the telephone or the internet. Although there are no separate payment instruments for cash as a means of payment, the term “payment

[1] i.e. objects or rights transferred to acquire goods or services

[2] The cashback procedure offers the possibility to withdraw a limited amount of cash as of a certain minimum purchase amount when paying with the girocard.

[3] See EHI Retail Institute, *Karten-Entwicklungen aus Handelssicht*, pp. 7 and 11, 2009. Measured in terms of the number of transactions, the cash share is much higher than the share of the transaction volume because of the special significance of the payment of small amounts.

[4] See University of Karlsruhe (TH), *internet-Zahlungssysteme aus Sicht der Verbraucher*, p. 26 ff, November 2008, as well as GfK, press release: *Über 17 Milliarden ins Netz gegangen*, 2008

[5] For linguistic simplification, these are summarised below using the term “payment instruments”.

instrument" also includes cash payments in addition to cashless instruments in the discussion below. The figure below provides an overview of the classification of cashless means of payment and instruments.

Figure 1: Overview of cashless means of payment and payment instruments

| Means of payment | Deposit money | | | Electronic money | |
|---|---|---|---|---|---|
| | | | | Card-based e-money | Server-based e-money |
| **Payment procedure** | Transfer procedure | Direct debit procedure<br>► debit authorisation procedure Collection<br>► authorisationproc incl.ELV | Card payment procedure<br>► with contact<br>► without contact<br>► without submitting the card(=card not present) | Electronic payment procedure (pre-paid systems) | |
| **Payment Instrument** | Credit transfer<br>► Paper-based<br>► electronic | Direct debit<br>► electronic | Debit Card<br>► bank card with payment function<br>► retail customer card with payment function<br>Credit card<br>► charge card with delayed debit<br>► with revolving credit<br>Pre-paid card | Payment card (e.g.Geldkarte) | Transfer of e-money<br>Authentification via:<br>► e-mail address (e.g. Paypal)<br>► Telephone number (e.g. Crandy)<br>► Scratch-Karten (e.g. Paysafe Card) |
| **Access to the payment Instrument** | ► Submission of slip<br>► Self-service terminal<br>► Telephone<br>► Internet | ► Telephone<br>► Internet | ► Point-of-sale terminal<br>► Telephone<br>► Internet | ► Point-of-sale terminal<br>► Internet | ► Telephone<br>► Internet |

[1] ELV =electronic direct debit procedure; creation of a direct debit with the aid of the account information stored on the magnetic strip of the girocard

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As is shown by Figure 1, the cashless disposal of deposit money traditionally takes place via **credit transfer and direct debit**[6]. Since this study primarily investigates payment behaviour

[6] Cheques which were frequently used in the past for payments lost a considerable amount of their significance with the abolition of the eurocheque guarantee at the end of 2001. The share of cheque

at the point of sale (POS), where these two payment instruments are only of subordinate significance, they will not be further explained here.

Additionally, customers have at their disposal a number of card-based payment procedures. It is necessary to distinguish first and foremost between payments using debit cards and credit cards. The German banking industry operates a joint card solution for **debit cards** entitled "girocard"[7] for use in retail outlets and at cash dispensers. Additionally, international card companies offer via their own acceptance logos such as Maestro and VPay the Europe-wide or global use and processing of debit card payments. All debit card payments have in common that the current account belonging to the card is debited directly, whilst the bank issuing the cards provides a payment guarantee to the retailers accepting the cards.

A certain special position among the payment procedures used in Germany is taken up by the **electronic direct debit procedure** (ELV). In this procedure, a direct debit is generated via the use of a debit card, the debiting of which the customer authorises with his/her signature.[8] Unlike in the case of a real debit card transaction, however, an electronic direct debit (ELV) payment is not guaranteed by the bank issuing the card, with the result that the retailer runs the risk of a possible payment default, against which he can, for instance, take precautions where necessary by taking out insurance or by consulting black lists. The popularity of the procedure among retailers is helped not lastly by the fact that they do not have to pay any additional system fees for using it. The share of electronic direct debits (ELV) measured in terms of the turnover of the German retail trade in 2007 was 12%, and it hence ranks second among cashless payment procedures behind payments with electronic cash (18.1%). Regardless of this, however, the negative development for electronic direct debits (ELV) which had already been observed in the previous years continued in 2007.[9]

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transactions among total payment transactions was less than 0.6% in 2007 in accordance with the payment transaction statistics drawn up by the Bundesbank. The cheque is therefore not investigated in this study.

[7] Girocard is the new joint acceptance logo for the electronic cash (ec) system for payments at the *point of sale* and the German ATM system. Over the years, the designation "ec card" has developed in the awareness of the cardholders as a synonym for the term "debit card". Since the introduction of the new girocard logo only took place shortly before start of the survey forming the basis of this study, it can be presumed that the girocard logo is not yet recognised as such; hence, the term "ec card" was used in the survey, whilst the text of the study already uses the term "girocard".

Furthermore, given that most card users are unlikely to be aware of the difference between the various debit card solutions used in Germany, it can also be presumed that only a very small number of answers refer specifically to the ec procedure, but speak in general terms of using the debit card. For this reason, the evaluation of the survey results below speaks in general terms of "debit cards".

[8] Even if an electronic direct debit (ELV) payment is legally a direct debit, it is classified as a card payment in the context of this study because the payment procedure is triggered by using a debit card. This is also supported by the fact that debit card users are frequently unaware that – depending on the place of deployment and on the service offered by retailers accepting the card – the use of their card gives rise to different payment procedures (eg girocard payment, electronic direct debit [ELV] payment or cross-border debit card payments via an international card system).

[9] See EHI Retail Institute, *Karten-Entwicklungen aus Handelssicht*, p. 11 ff, 2009; Retail trade volume in the narrow sense of the word (not including motor vehicles, mineral oil, chemists and mail order trade) amounted to €360 billion in 2008.

Unlike payments by debit card, the use of a **credit card** leads, as a rule, to a delayed debit to the account which takes place either as a total or in the shape of instalment payments. Hence, the actual credit card function – over and above the time delay of the debit – (i.e. granting a credit line and repayment by instalments) is only used quite reservedly with cards issued in Germany. A major reason for this is likely to be the considerable use of overdrafts, which are popular in Germany. Credit cards from international card companies (eg MasterCard, VISA, American Express, etc) are widely used in Germany. Just as with debit cards, credit card payments are guaranteed for the accepting retailer.

It is, however, becoming more and more difficult to clearly distinguish between debit cards and credit cards in light of the development of new card products. Thus, cards are being increasingly offered which unite typical characteristics of debit cards and credit cards, such as the direct account debit of the debit card together with the insurance services which are common with credit cards.

A further particularity is **customer cards and bonus cards with a payment function** issued by retailers, which have become increasingly widespread in recent years. These are payment cards which enable customers to use them both as a payment instrument (by generating a direct debit or credit card payment), and to collect bonus points. Bonus points are credited to customers depending on the card transaction amount, and can later be converted into premiums.

Electronic money can also be accessed via payment cards – if we are talking about card-based e-money. These are cards on which monetary values are stored in return for pre-payment in order to be able to use them to pay on a variety of occasions. A prominent example of this is card-based electronic money (**GeldKarte** in Germany). This electronic wallet is now available on the chip of a large number of girocards as an additional function. Furthermore, the GeldKarte is also available independently of an existing current account as a so-called “White Card”. Once they have been charged at a cash dispenser, at special terminals or on the internet, these pre-paid cards are suitable in particular for payments at ticket or cigarette vending machines, in car parks or for other small payments at retail outlets.

In addition to the GeldKarte, there are other types of pre-paid card which are issued by international card companies, for instance. Unlike the GeldKarte, these are included among the means of payment deposit money since the pre-paid credit is stored neither on the respective card, nor on servers. They are, however, not very widespread at present.

If one takes a look at the number of transactions (2007: debit cards: 1.7 billion, credit cards: 340 million) and at the transaction volume (2007: debit cards: €106 billion, credit cards: €30 billion),[10] it becomes clear that debit card transactions are dominant when it comes to card payments in Germany. Even if the share of credit card transactions has increased in recent years, this growth is however taking place at a relatively low level, so that no fundamental reversal of the ratio between debit cards and credit cards is to be expected.

[10] See Deutsche Bundesbank: Payment and securities settlement statistics in Germany 2007, Tables 6 and 7, 2008

In addition to the above payment procedures and instruments, a number of **innovative payment procedures** and instruments for disposing of deposit money and electronic money have been developed in recent years. This development took place at various levels: Firstly, there were technological advancements with the aid of which existing payment instruments, for instance, were to be made faster or more secure. Examples which can be mentioned at this point are contactless payment using payment cards,[11] as well as payment by means of fingerprint recognition. The actual payment process still takes place here in the conventional direct debit or card payment procedure.

The new payment procedures also cater for the growing demand for payments made when shopping on the internet. In particular, the creation of server-based e-money procedures, such as PayPal, is likely to have been caused by the increasing development of this market. A third approach for innovations is the identification of new media for accessing payment instruments. This applies, for instance, to online transfers initiated via the internet, as well as to the transfer of e-money via mobile phones.

In view of their significance, it can be noted that innovative payment procedures and instruments are becoming increasingly widespread. Their market share is, however, still very small.

The description below highlights the significance of the individual cashless payment instruments in Germany on the basis of transaction numbers.

## II.2. Selection of payment instruments

As was made clear by the previous section, customers have various payment procedures at their fingertips with a number of different payment instruments when acquiring goods and services today. Against this backdrop, it is necessary to investigate which criteria are generally significant in their selection and on the basis of which criteria customers opt for a payment instrument in a specific purchase situation.

Two aspects must be taken into consideration in this analysis: that of the retailer and that of the customer. There is a certain degree of interdependence between these two positions: A retailer will, as a rule, try to reach as large a group of customers as possible in the selection of payment procedures and payment instruments accepted by him/her, taking account of his/her own needs such as cost, efficiency and security aspects. This, however, requires at the same time that customer needs should be met, and these may run counter to his/her needs. Customers, by contrast, are limited in their own selection by the portfolio of accepted payment instruments defined by the retailer.

[11] These are card-based payment procedures where it is not necessary to insert the card in the card reading device at the cash desk (eg MasterCard PayPass and VISA payWave).

### II.2.1. Reasons determining the acceptance of payment instruments by retailers and other service providers

The decision of a retailer as to which payment instruments to accept depends on several conditions. A high level of customer acceptance and the rapid processing of the payment transaction are as significant here as cost[12] and security aspects. However, the origin of the customers or average turnover can also determine which payment instruments a retailer accepts since it is ultimately a matter of ensuring the strongest possible customer retention via a suitable mix of procedures.

All in all, euro cash is equally popular as a legal means of payment[13] with customers and retailers, and is accepted by (almost) all retailers (including many internet retailers via cash on delivery payment). Debit cards, roughly 95 million of which are in circulation, are somewhat less widespread and accepted in Germany. By contrast, only 14 million cards are equipped with a credit or delayed debit function.[14] In addition to the relatively high costs, this could also be one of the reasons for the reticence on the part of smaller retailers, in particular when it comes to accepting credit cards. All in all, roughly 35% of retail trade turnover was generated with payment cards (electronic direct debit [ELV]: 12%, debit card: 18%, credit card 5%), and only 3% by invoice.[15]

The question of customer retention is also closely linked to payment processing speed. It can be presumed that many customers are deterred by the bothersome waiting times at stores' cash desks, and that this leads to a loss of turnover for retailers. For this reason, they are likely to be especially interested in shops with a high customer turnover offering payment instruments which operate as quickly as possible. Interesting in this context, as well as cash payment, are also recent developments in the field of electronic payment procedures, and here in particular contactless payment procedures which aim to drastically reduce processing times.

The individual payment instruments vary considerably with regard to the costs that they entail. For instance, a retailer who would like to accept card payments must initially provide the corresponding infrastructure, which in addition to the cost of acquiring or renting a terminal and network operation, also entails transaction costs, for instance for authorising and processing payments. In principle, credit card acceptance entails higher costs than

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[12] Indirect costs and cross-subsidies of cash and cashless payments, as well as the free provision of cash as a basic infrastructure, are not taken into account in this study.

[13] In accordance with section 14 (1) of the Bundesbank Act (*Bundesbankgesetz*), banknotes denominated in euros are the only unrestricted legal means of payment in Germany. Hence, a creditor is obliged – unless otherwise effectively agreed – to accept payment of money owed in euro notes, whilst this applies to coins only up to an amount of 50 coins per payment and in the case of commemorative German coins up to €100.

[14] See Deutsche Bundesbank, Payment and securities settlement statistics in Germany 2007, p. 5, 2008

[15] See EHI Retail Institute, *Karten-Entwicklungen aus Handelssicht*, p. 11, 2009; Retail trade volume in the narrow sense of the word (not including motor vehicles, mineral oil, chemists and mail order trade) amounted to €360 billion in 2008.

accepting debit cards, whilst the retailer does not incur any additional system costs if an electronic direct debit (ELV) is used. However, even accepting cash entails costs for retailers in terms of acquiring and disposing of the cash, as well as for any possible insurance premiums.

When it comes to security, both the fastest possible receipt of payment of the payment instruments offered, and the most comprehensive protection possible against payment defaults, e.g. owing to fraud or insufficient account coverage, is of significance. This protection is lowest from retailers' point of view on delivery for an invoice and payment by direct debit. For this reason, depending on their degree of risk aversion, retailers tend to use electronic direct debits (ELV) without additional insurance with a more moderate risk of payment default (relatively small amounts, regular clientele). With larger amounts or increasing risks, by contrast, additional security measures are taken, such as using blacklists or taking out insurance coverage against the risk of loss. However, instead of making payments via the electronic direct debit procedure (ELV), payments may also be made using a debit card procedure with a payment guarantee (e.g. electronic cash). By contrast, with the acceptance of cash there is a very small risk of loss caused by accepting counterfeit money, which, however, can largely be ruled out by using simple test procedures and through staff training. Moreover, accepting cash also entails a risk of fraud and loss for a retailer, the cause of which may lie both inside and outside the company.

### II.2.2. Reasons determining the acquisition of payment instruments by customers

As was already stated in the previous chapter, the determinants are to be investigated below which are of general significance to customers when acquiring payment instruments. The survey results will be initially evaluated as to the question of how important the respondents find certain criteria in a payment instrument. Then, it will be investigated which payment instruments meet these criteria in the view of the respondents.[16]

#### II.2.2.1. Convenience and speed

Two major decision-making criteria in selecting the payment instrument to be used are convenience and speed, although there are no objective standards for these criteria. Rather, their definition depends on the respondents' subjective assessment. According to the survey results, 54% of respondents consider speed and convenience to be indispensable, and 41% consider it quite important; it is only unimportant for 5% of them. This assessment is largely independent of the respondents' gender and nationality, as well as of their household income

[16] As to the evaluation, it should be taken into account that the information regarding the degree of fulfilment of the criteria which have been investigated by the payment instruments observed for methodical reasons only relate to those respondents who own the payment instrument observed, or who are familiar with its functions. Whilst one may presume this to be true with cash for all respondents, the basis with card-based payment instruments is correspondingly smaller. With the girocard, these are, in the overall view, 95% of all respondents, with credit cards 46% and with the GeldKarte only 39%. For linguistic simplification, this context is not explicitly mentioned below. One should also bear in mind that multiple answers were possible.

and level of education. However, depending on the age of the respondent, there are marked differences in the evaluation in some respects. For instance, 58% of 45- to 54-year-olds consider the criteria to be indispensable, whilst only 43% of 18- to 24-year-olds hold this view. Furthermore, at 61%, many more respondents from the eastern federal states than from the western federal states (at 52%) state that speed and convenience are indispensable. What is more, an above average number of 60% of GeldKarte owners state that this characteristic is indispensable.

In response to the question as to which payment instruments meet these criteria, a clear majority of 88% of respondents states cash, as had been expected; the girocard follows far behind, at 60%. Behind this, credit cards, at 36%, and the GeldKarte, at 20%, meet these criteria to a significantly lesser degree. The result appears to be contradictory in the comparison between girocard, credit card and GeldKarte, given that a credit card payment is likely to take up virtually the same transaction time as paying with a girocard. As a matter of fact, a signature is given when paying by credit card, as is the case when paying via electronic direct debit (ELV), instead of entering a PIN as is customary with an electronic cash payment. The relatively poor evaluation of the GeldKarte is also remarkable, since here neither a PIN has to be entered nor a signature provided, meaning that the payment process takes less time in effective terms. The result of the survey might be due to the fact that respondents regard using the GeldKarte as inconvenient because it first has to be charged before it can be used. Additionally, users always have to keep an eye on the remaining balance since disposals can only take place on the basis of a credit balance. Even if this question was exclusively directed at respondents who have the respective payment instruments or are of the opinion that they are familiar with its functions, a lack of experience using the payment instruments may also have led to this evaluation.

Furthermore, it can be seen that more men than women are of the opinion that the speed and convenience criteria are satisfied by card payments. Women, by contrast, perceive these criteria to be met to a slightly greater degree by cash. Also, an above average number of older persons perceive these criteria to be met more by cash payments than by card payments. Whilst 72% and 46%, respectively, of 35- to 44-year-olds consider the criteria to be met with girocards and credit cards, this share falls markedly when it comes to over 64-year-olds, namely to 42% and 25%, respectively.

Moreover, an increasing number of respondents consider credit card or girocard payments to be convenient and fast with increasing household income[17] and level of education, whilst the share of those who consider cash to be fast and convenient runs counter to this development. This is made particularly clear by the example of the credit card. Whilst only 24% of respondents with an income lower than €1,500 consider the credit card to meet these criteria, this share is as high as 47% among those with a household income of more than €3,000; by contrast, the share of those who consider cash to be fast and convenient falls

[17] Respondents were classified into groups with a household income of less than €1,500, €1,500 to less than €3,000, as well as €3,000 and above.

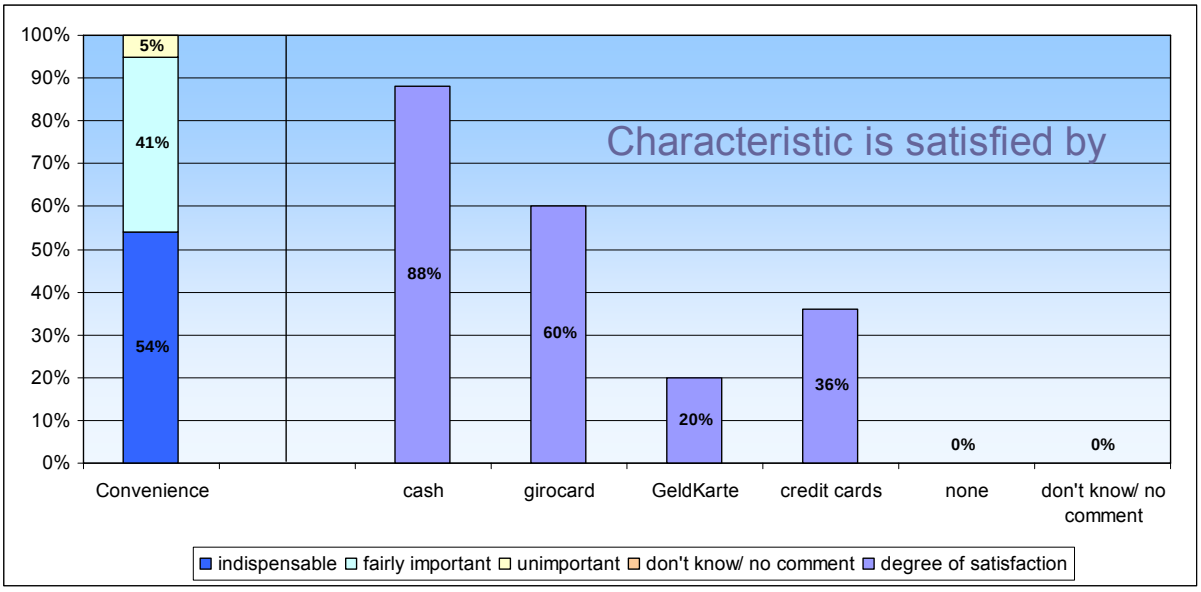
from 90% to 84%. This result is probably a consequence of the increasing familiarity of the group of individuals with a higher household income in respect of using credit cards. Depending on the ownership of individual payment instruments, it also emerges that credit cards and girocards are given the best evaluation by credit card holders in terms of the degree to which they satisfy the criteria of speed and convenience. As one might expect, an above average share of those who only pay in cash (96%) consider cash to meet these criteria.

With regard to the question as to whether cash or card payments take longer at the cash desk in a store, both those who prefer to pay with cash and those who like to take advantage of card payment are of the opinion that cash payments are completed faster than card payments.[18] Ultimately, the "perceived" duration of the payment procedure is vital to the evaluation of the payment instruments, even if, for instance, with cash the "counting" of the money and the handing out of change can take a considerable amount of time. Over and above this, the processing of card payments is becoming more efficient as technology develops further (e.g. girocard offline procedures).[19] In terms of convenience, it should also be taken into account that cash must first be obtained from cash dispensers or bank counters. However, the dense network of cash dispensers in Germany, which numbered approx. 54,000 in 2007, makes it easier to obtain cash. If, for whatever reason, the cash stocks are not replenished, those who only pay in cash may have to forego spontaneous purchases at times for lack of cash, whilst these are possible for persons who pay by card because cards are now widely accepted.

[18] See GfK, *Konsumentenverhalten beim Bezahlen mit Karte*, p. 34, 2008

[19] In this procedure, a certain credit limit is established by the card-issuing institution and set up on the card chip when the card is used for the first time. As long as this credit limit is not exhausted, payments do not have to be authorised by the agency issuing the card. Only when the remaining limit is no longer sufficient for the current payment is an authorisation carried out via an online data connection and the credit limit topped up. An increase in the number of offline transactions can be observed for the German girocard system. Whilst this share was 23.2% in the first half of 2007, it grew to 27.3% in the first half of 2008. See Source, *Electronic cash baut Marktanteil weiter aus*, p. 1, 2008

**Figure 2: Evaluation of the criteria "convenience and speed"**

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*Note: For methodical reasons, the information regarding the degree of fulfilment only relates to those respondents who are in possession of the respective payment instrument (cash 100%) or who are familiar with its functions. Multiple answers were also possible.*

### II.2.2.2. Acceptance

From the customers' point of view, the decision in favour of a payment instrument is also determined to a large degree by its acceptance among retailers. For instance, credit cards or debit cards are of little use if the opportunities to use them are restricted. Customers may, however, rely on cash for over-the-counter retail thanks to its function as a legal means of payment. However, the number of retailers accepting card payments has increased in recent years. Whilst around 496,000 payment terminals were in use in 2003, the number was as high as 566,000 in 2007, which is equivalent to an increase of approximately 14%.[20] In addition to established acceptance points, such as in the textile trade, in DIY stores, in department stores or at petrol stations, customers can increasingly also pay by debit card at major food discounters, drugstores or chemists. All in all, the share of cash payments dominates retail trade turnover; nonetheless, card-based payment procedures have now also achieved relatively broad market coverage.[21] This development might be the result, firstly, of the improved value for money offered by such transactions, but also of greater customer demand, for instance as a result of changes in payment habits.

[20] See Deutsche Bundesbank, Payment and securities settlement statistics in Germany 2007, p. 5, 2008

[21] See EHI Retail Institute, *Karten-Entwicklungen aus Handelssicht*, p.16 ff, 2009, Retail trade turnover = €360 billion (not including motor vehicles, mineral oil, chemists and mail order trade), reference year 2008. More than one-fifth of turnover is transacted via payment cards in supermarkets and at food discounters, whilst the share is much higher for instance in department stores (approx. 46%) or DIY stores (approx. 42%).

The major significance of the acceptance of payment instruments is also reflected in the survey results. For instance, 59% of respondents evaluate this criterion as indispensable, and 35% as quite important. Only 5% of respondents find a high degree of acceptance to be unimportant. This means that the share of respondents who consider the criterion to be indispensable is even 5 percentage points higher than in the case of the "speed/convenience" criterion. This evaluation also appears to be largely independent of nationality, household income or gender. It is, however, apparent that older people find a high level of acceptance more important than younger people. Whilst only 54% of 35- to 44-year-olds and 55% of 18- to 24-year-olds consider this criterion to be indispensable, the share of the over 64-year-olds is 65%. One reason for this might be the greater flexibility of younger people, who are more likely than older people to be in possession of more than one payment instrument.

When asked which payment instrument meets this criterion, 89% of respondents name cash, followed by the girocard, at 69%. Credit cards and the GeldKarte, by contrast, do much worse, at 33% and 15%, respectively. If one looks at the spread of the results in comparison with household income, it emerges that those on a higher income tend to affirm broad acceptance of debit cards and credit cards more often than those on lower incomes. That is, whilst only 57% of respondents with an income below €1,500 consider this criterion to be satisfied by the girocard, this share is 74% among those with an income of €3,000 and more. The situation is the same with credit cards. Whilst only 21% of those on a low income state that credit cards are widely accepted, this share is 38% among those on a higher income. This is presumably due to the fact that those on a higher income are more likely to have a credit card than those on a low income, and hence are likely to be more interested in the possibilities of using a credit card.

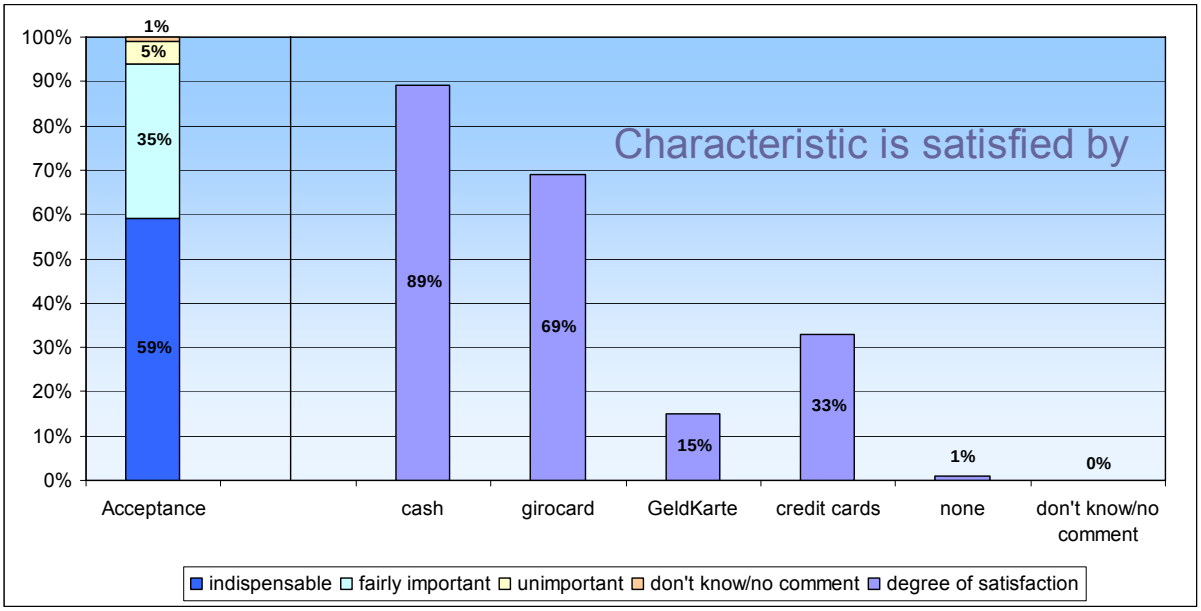
An above average number of respondents among the group of credit card holders themselves, at 41%, also state that credit cards are widely accepted, which could be the result of the deliberate acquisition and use of this payment instrument. What is more, in comparison to respondents from the western federal states (34%), a much smaller share of respondents from the eastern federal states (25%) state that credit cards are widely accepted in shops. Differentiated by the nationality of the respondents, it further emerges that 45% of persons with a migration background[22] are of the opinion that credit cards are widely accepted, whilst this assessment is only held by 32% of German respondents. This result might arise from the different payment habits of these two groups of respondents.

With regard to the age of the respondents, it is revealed that from the point of view of most older people (65 and older) cash has an above average level of acceptance (96%). With regard to the girocard, however, only 54% of respondents in this age group consider this to be the case. With younger people (25 to 34 years old), cash, at 85%, also comes first, but with much less differentiation as against the girocard; cash and the girocard are virtually

[22] This study is about persons with another nationality than German, as well as persons with German nationality who did not acquire it until later.

equivalent from this point of view. What is more, taking into consideration the level of education, it can be observed that people with a higher qualification (school leavers' certificate (*Abitur*) or university (of applied sciences) degree) more frequently consider debit cards and credit cards to be accepted than people with a lower qualification (in particular school-leaving certificate).

**Figure 3: Evaluation of the criterion "acceptance"**

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*Note: For methodical reasons, the information regarding the degree of fulfilment only relates to those respondents who have the payment instrument (cash 100%) or who are familiar with its functions. Multiple answers were also possible.*

The poor performance of the GeldKarte might be caused in particular by the fact that card payments in trade areas in which small payments are dominant are still not very widespread. Most bakeries and kiosks, for instance, still only accept cash. For this reason, the use of the GeldKarte, which is aimed directly at the small payment segment, has been falling short of expectations, with low turnover growth rates, despite being accepted at roughly 600,000 terminals all over Germany.[23] A significant part of the increase in its use is likely to have been caused by the introduction of the legally-required age verification at cigarette vending machines in 2007, which might also explain the one-off increase in the transaction values by 42% from 2006 to 2007. It also emerges from the survey results that the respondent smokers have not sustainably changed their cigarette-buying habits in favour of the GeldKarte as a result of the proof of age now required. Rather, only 2% actually use their GeldKarte at vending machines for payment. However, the positive development in the use of the GeldKarte appears to have an ongoing impact in the sense that the first users recruited in

[23] Transaction numbers and values increased twofold from 2000 to 2006, reaching 52.9 million and €148 million, respectively. See *Zeitschrift für Zahlungsverkehr und Kartendienstleistungen, GeldKarte: auch kontaktlos im Rennen*, p. 32 ff, 2008

2007 also continue to use the GeldKarte at car park or ticket machines.[24] Irrespective of this, it might be possible for acceptance to grow in future as new deployment areas are opened up. For instance, the GeldKarte can now also be recharged on the internet in a pilot scheme using special card readers; it can be used with a small amount of internet suppliers to pay for online purchases, and is used to perform an age check to access certain internet sites.

### II.2.2.3. Possibilities for use abroad

The usability of payment instruments abroad is now taken for granted by many people – at least within the euro area – given that it has been possible to effect transactions in the common currency in the euro area since the introduction of euro banknotes and coins on 1 January 2002. Furthermore, the euro is not only used within the countries which have officially introduced it as legal tender; euro cash payments are also frequently accepted in many other countries, such as Turkey or in Eastern Europe. Furthermore, the euro was unilaterally introduced as legal tender in Montenegro and Kosovo, that is without having concluded an accession agreement with the European Union.

Over and above this, cashless payment abroad is also largely problem-free. Almost all German girocards can currently also be used in other European countries on the basis of an agreement with one of the global card systems MasterCard or VISA. This is made clear by the cards also bearing the logo of maestro (MasterCard) or V-Pay (VISA), in addition to the girocard logo. Additionally, the cross-border use of the girocard is made possible through the cooperation of the German girocard system with payment systems in other European countries in the euro Alliance of Payment Schemes.[25] If, on the other hand, the intention is to pay without cash outside Europe, credit cards largely have to be used. By contrast, e-money is relatively insignificant abroad. For instance, the GeldKarte can only be used in Germany. Against this background, 8% of respondents who have a GeldKarte or consider that they are familiar with its function state that the GeldKarte can be used abroad.

In comparison to speed and a high degree of acceptance (95% each), far fewer respondents, only 76%, evaluate the possibility of use abroad as indispensable or quite important. Here, the answers differ considerably between men and women: Whilst this criterion is indispensable for 43% of men, only 33% of women share this view. Taking the nationality of the respondents into account, it does not come as much of a surprise that this possibility of use is much more important for persons with a migration background than for German nationals. For instance, only 36% of Germans state that the criterion is indispensable, whilst half of all respondents with a migration background consider it to be indispensable to be able to use it abroad. This result arises amongst other things from the fact that persons with a migration background more often rely on also being able to use the payment instruments which they have abroad, for instance when visiting family members. Over and above this, the

[24] See EURO Kartensysteme, press information: *GeldKarte wächst im zweiten Quartal*, 2008

[25] The euro Alliance of Payment Schemes (EAPS) is an alliance established on 7 November 2007 of initially six European debit card systems. In addition to the German girocard system, participants are the POS and cash dispenser systems PagoBancomat (Italy), MultiBanco (Portugal), EURO6000 (Spain), Link (United Kingdom), as well as the European cash dispenser association EUFISERV.

criterion is likely to be of considerable significance because of the regular remittances to family members abroad.[26] It was not possible to ascertain any differences between respondents from western and eastern federal states.

If one looks at the answers provided by the respondents in dependence on the payment instruments which they have, credit card holders differ significantly from holders of other payment instruments. At 52% and 41%, respectively, an above average number of respondents consider the possibility of being able to use the payment instrument abroad to be indispensable or quite important. This is probably because, as a result of the possibility of being able to use them all over the world, credit cards address the group of users for whom it is particularly important to have this option. The lowest significance is assumed by this criterion for those who pay in cash: Only 25% and 27%, respectively, state that the criterion is indispensable or fairly important.

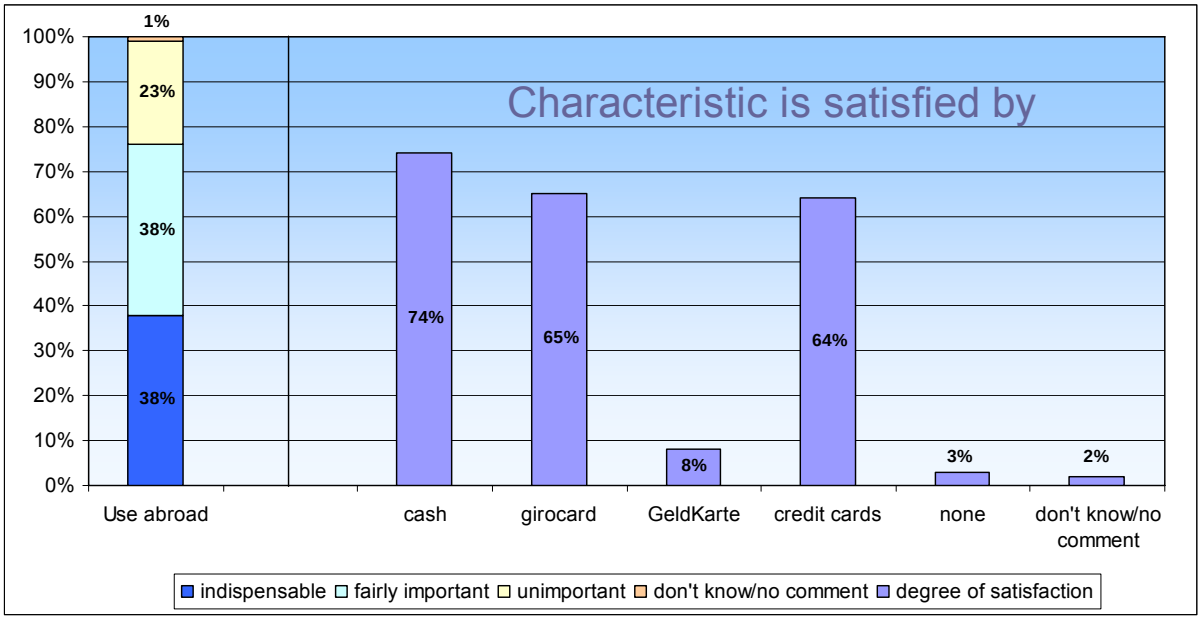
With regard to income, it can be stated that the possibility of utilisation abroad becomes more and more important for respondents with increasing income. Whilst the criterion is indispensable for only 24% of respondents with a household income of €1,500, this share doubles for respondents with a household income of €3,000 and more. The result can be explained by the fact that those on a higher income as a rule have greater opportunities to travel abroad, and hence to use payment instruments abroad, than those on a lower income. This finding is also confirmed by the evaluation of the survey results depending on the level of education. There is a general trend that the higher the level of education, and usually also household income, the greater the importance of being able to use the payment instrument abroad. It emerges from a comparative consideration of the results according to age groups that the possibility of utilisation abroad is much more important in particular for 45- to 64-year-olds than among elderly respondents (over 64) and very young respondents (18 to 24).

In response to the question as to which payment instruments satisfy this criterion, the majority of all respondents (74%) state cash, followed by the girocard (65%). It can be noted that, in this respect, cash is no longer so clearly dominant in relation to the degree of fulfilment of this criterion as against the other payment instruments. Furthermore, credit cards do better than average as compared to all other criteria investigated. An average of 64% of all respondents regard the possibility of utilisation abroad to be guaranteed with credit cards. This share rises to as much as 80% among the group of respondents in possession of a credit card. A comparison of the information provided by men and women furthermore reveals that men more strongly affirm the usability of credit cards abroad than women. Furthermore, it can be derived from the survey results that as household income increases, the share of people increases who consider debit cards and credit cards to have this characteristic. Furthermore, more respondents from the western federal states consider there to be greater opportunities to use the girocard and the credit card abroad than respondents from the eastern federal states. The results also vary considerably depending on the age of

[26] For instance, family members living abroad can be given access to an account held in Germany by issuing a debit or credit card.

the respondents. Whilst for instance 70% of 35- to 44-year-olds consider the criterion to be satisfied by credit cards, this only applies to 52% of 18- to 24-year-olds.

**Figure 4: Evaluation of the criterion "possibility of utilisation abroad"**




Deutsche Bundesbank

*Note: For methodical reasons, the information regarding the degree of fulfilment only relates to those respondents who have the payment instrument (cash 100%) or who are familiar with its functions. Multiple answers were also possible.*

### II.2.2.4. Possibilities for use on the internet

According to a publication by the *Gesellschaft für Konsum-, Markt- und Absatzforschung (GfK)*, consumers now increasingly use the internet to make purchases. Internet trade in Germany generated gross turnover extrapolated to approx. €17.2 billion in 2007. This corresponds to an increase of over 12% on the year, and almost three times more than in 2002.[27] The increase is due largely to a rise in the number of online buyers and to a higher frequency of purchases. The trade covers almost all product ranges. In addition to books, entrance tickets and music CDs, increasing numbers of high-price-tag articles, such as textiles, travel or furniture, are being acquired on the internet. It is interesting to note in this context that a not inconsiderable share of the transaction volume falls upon trade between private individuals. Exchange services and auction exchanges, especially eBay, are particularly popular here.

Unlike what one would presume to be the case given the growing internet trade, the results of the survey reveal that respondents currently do not consider the possibility to use a payment instrument on the internet to be particularly important. Hence, a majority of 69% of all respondents consider this to be unimportant. It can be found here that the criterion is much more important for younger people than for the elderly. Over and above this, women

[27] See GfK, Press release: Über 17 Milliarden Euro ins Netz gegangen, 2008

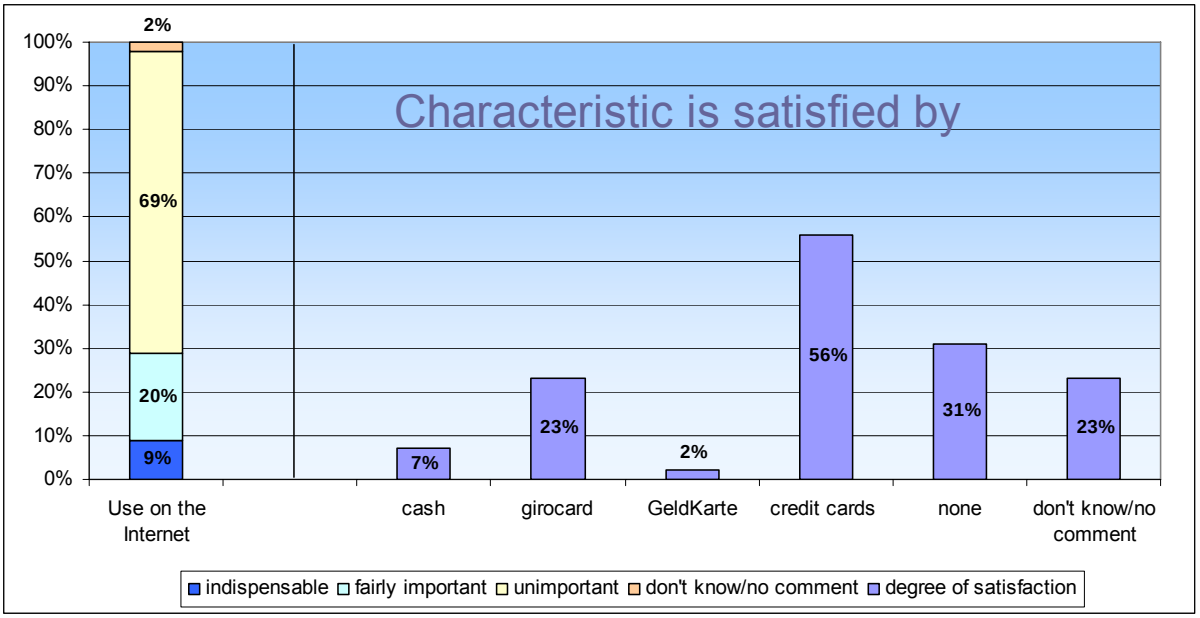
are more likely than men to consider the possibility of utilisation on the internet to be unimportant. If one looks at the significance of this criterion in relation to ownership of payment instruments, utilisation on the internet is clearly the most important for credit card holders. This means that, whilst the criterion is indispensable or fairly important for 50% of credit card holders, only 29% of girocard holders and 19% of those who only pay with cash (i.e. persons who are not in possession of a payment card) share this view. It also becomes clear that the criterion becomes more significant with an increasing level of education and household income: 50% of respondents with a university (of applied sciences) degree, and 42% of those with a household income of €3,000 and above, consider the option of being able to use a payment instrument on the internet to be fairly important or indeed indispensable. By contrast, 84% of general school graduates and 79% of respondents with a household income below €1,500 consider the possibilities linked to this to be unimportant. Nationality does not appear to be significant to the evaluation of the criterion.

When asked as to the payment instruments which can be used on the internet, a majority of 56% of respondents considers credit cards to possess this characteristic. This is followed, with 31%, by the response that none of the payment instruments investigated (cash, girocard, GeldKarte and credit card) meet this criterion. What is surprising is that as many as 23% of respondents are of the opinion that they can use the girocard on the internet. This is not possible, but the assessment could be caused in cases in which, in the context of an internet payment, the account number and bank code are read from the girocard, leading to confusion with the electronic direct debit (ELV) procedure. Furthermore, a significant share of all respondents (23%), do not make a statement or are not able to provide an answer to the question. Taking account of the already low level of relevance of the criterion, it can be concluded that a not inconsiderable number of people is not familiar or not sufficiently familiar with the customs in internet trading and with the possibilities offered by the payment instruments which they use. The GeldKarte achieves the poorest result, with 2% of all mentionings. This is presumably due to the fact that it is only offered by a very small number of internet suppliers.

A differentiated observation by age groups reveals that more younger people use credit cards on the internet, whilst a large number of older people consider the characteristic not to be met by any of the payment instruments or do not know how to assess it. This might also be caused by the fact that most elderly people do not make purchases on the internet.[28] What is more, it can be found that as respondents' level of education and household income increases, more people consider it possible to use credit cards on the internet.

[28] According to a Bundesbank survey, the share of respondents who do not buy on the internet at all is much higher among elderly persons than among younger ones. 56% of 45- to 55-year-olds, 71% of 55- to 64-year-olds and 90% of over 65-year-olds stated that they never made purchases on the internet. This share was 33%-39% in the case of 18- to 44-year-old respondents.

**Figure 5: Evaluation of the criterion "possibility to use on the internet"**

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*Note: For methodical reasons, the information regarding the degree of fulfilment only relates to those respondents who have the payment instrument (cash 100%) or who are familiar with its functions. Multiple answers were also possible.*

### II.2.2.5. Protection against financial loss

From the point of view of the customers, security is a further major criterion for the selection of a payment instrument. In principle, customers are exposed to both a risk of fraud and of loss regardless of the type of payment instrument used. However, the extent of these risks varies depending on the payment instrument used.

One characteristic of cash is that direct financial damage is incurred if it is lost or stolen. With regard to the risk of fraud, the danger exists of being confronted with counterfeit money. This risk however appears to be limited, not least because of the very low occurrence of counterfeit money in Germany. In statistical terms, there are approximately five counterfeit banknotes and nine counterfeit coins for every 10,000 inhabitants per year. Consumers are however only affected by this in very rare cases since the majority of counterfeits are detained by financial institutions, cash-in-transit companies or the Bundesbank and taken out of circulation.[29]

When it comes to cashless payments, fraudulent activities currently take place, in addition to classical card theft or unauthorised use of, for instance, lost cards, in the form of *skimming* and *phishing*.[30] Unlike in the case of cash or pre-paid cards which are not protected with a

[29] See Deutsche Bundesbank, *Falschgeldaufkommen im Jahr 2008, 2009*

[30] *Skimming* is understood to be reading bank data from the magnetic strip of the payment card and then copying them onto a false card (duplicate); typically, at the same time the PIN is clandestinely obtained. *Phishing* aims to entice the customer to reveal confidential data such as their credit card number by means of apparently official e-mails. A sub-type of this is *pharming*, where internet users are steered to false internet sites to capture their personal data there.

PIN (e.g. GeldKarte), these activities do not however necessarily entail a financial loss for debit card and credit card holders since it is necessary for the corresponding card transaction to enter the appropriate PIN or provide a signature. Nevertheless, the risk of financial damage to the cardholder can also be minimised if the cardholder has the card barred immediately after noticing its loss or theft and in the latter case reports this to the police.[31] As a rule, the card holder is not liable for any damage incurred as a result of card counterfeiting. In the electronic direct debit (ELV) procedure, card holders, in principle, have the possibility to contest account debits linked with unauthorised disposals.

Irrespective of this, both the banking industry, the card companies and retailers have taken a number of countermeasures in order to counter the threat of abuse. For instance, in KUNO,[32] a joint initiative by the police and retailers, all girocards registered as stolen are recorded on a central blacklist in order to prevent these cards being used, in particular in the electronic direct debit (ELV) procedure. This blacklist, as well as stepped up monitoring by retailers, most likely led in 2007 to a 30.4% decline in fraud cases using unlawfully-obtained debit cards for electronic direct debit (ELV) transactions.[33] Another preventive measure that can be mentioned is integrating the bank data stored on the payment card in the so-called EMV chip instead of the magnetic strip in order to protect cardholders against unauthorised reading and manipulation of the data.[34] This measure takes on particular significance against the background of the increased falsification of payment cards[35] and manipulation of cash dispensers in 2007. In order to protect the use of cards on the internet against fraudulent activities, credit card companies such as VISA and MasterCard are also offering to issue a personal password so that fraudsters are no longer able to do any damage if they only have an illegally-acquired credit card number. Independently of all the technical security measures, the creation of awareness among customers for possible dangers, as well as publishing targeted recommendations for conduct, also play a major role in preventing abuse.

As was expected, the major significance of protection against financial loss is also reflected in the survey results. For instance, 61% of respondents consider this characteristic to be indispensable, and another 34% to be fairly important. Depending on the gender of the respondents, it can be ascertained that security against financial loss is more important for

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[31] Provided that the card owner has not acted with gross negligence, he/she is not liable for any financial loss incurred after barring his/her card. Up until the point that the card has been reported as lost, credit card owners are liable for a maximum amount of €50.

[32] KUNO stands for combating crime in cashless payment transactions using non-police organisational structures.

[33] See Zeitschrift für Zahlungsverkehr und Kartendienstleistungen, *Kartenfälschungen nehmen weiter zu*, p. 18, 2008

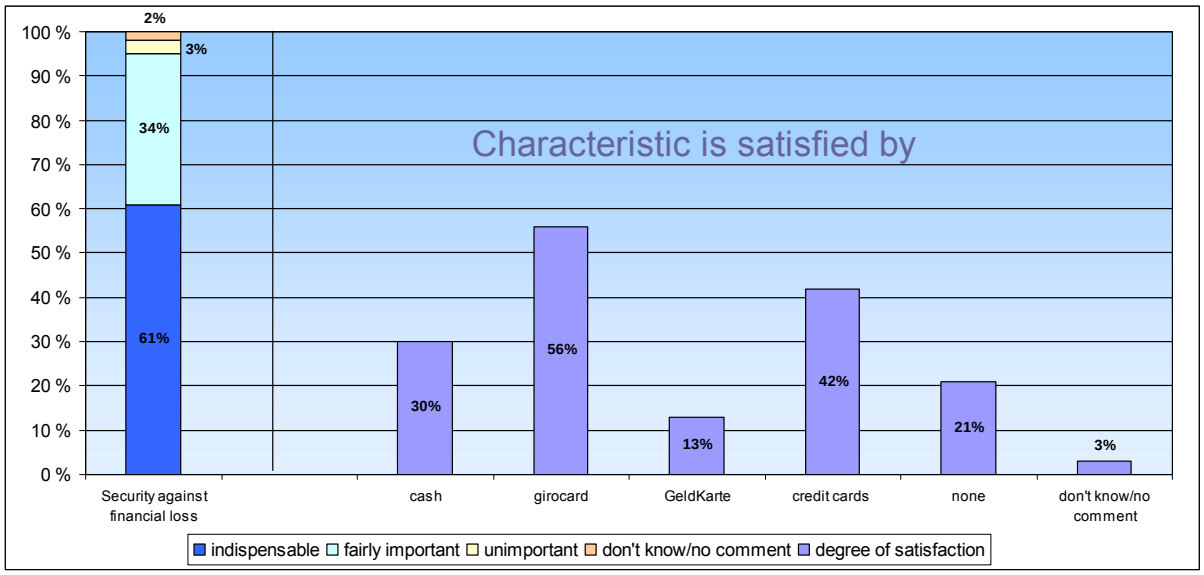
[34] EMV is an international standard for communication between the chipcard and the terminal, developed by europay International (today MasterCard Europe), MasterCard International and VISA International. In the course of the creation of a Single euro Payments Area (SEPA) for cards, all payment cards that have been issued are to have an EMV chip by the end of 2010.

[35] See Zeitschrift für Zahlungsverkehr und Kartendienstleistungen, *Kartenfälschungen nehmen weiter zu*, p. 18, 2008

women than for men. This can be seen by the fact that only 57% of men consider the criterion to be indispensable, whilst 65% of women gave this evaluation. As anticipated, the need for security increases with age. Whilst security is only indispensable for half of 18- to 24-year-olds, this applies to 68% of 45- to 54-year-olds. It is also noticeable that, at 69%, many more respondents from the eastern federal states consider the criterion to be indispensable than is the case for respondents from the Western Germany, at 59%. It is also interesting to note that, as income increases, protection against financial loss becomes more and more important, although one might suppose that people on a lower income would be more affected by a specific amount of financial loss than those on a higher income.

In response to the question as to which payment instrument meets the need for protection against financial loss, 56% of respondents name the girocard. This is followed by credit cards, at 42%, and at some distance by cash at 30%. Over and above this, however, 21% of respondents also state that the criterion was not met by any of the payment instruments. The positions of men and women do not differ widely with regard to this observation. Notable differences only become clear with regard to the evaluation of credit cards and the GeldKarte. Men, at 45%, stated more often than women (37%) that they feel protected against financial loss with credit cards, whilst the reverse applies with regard to the GeldKarte, at 10% of men against 16% of women. With regards household income, it can be concluded from this that as income increases, more respondents consider themselves to be protected against financial loss through the use of payment cards (girocard and credit card). By contrast, the feeling of protection provided by cash falls. If one compares the responses of respondents from the eastern federal states with those of respondents from the western federal states, one reaches the conclusion that in eastern federal states, at 43%, an above average number of respondents consider protection against financial loss to be guaranteed by cash, whilst only a below-average number of 30% of them consider this to be the case with credit cards in particular. Respondents from Western Germany reach a diametrically-opposite evaluation, such that 27% of them consider the criterion to be met by cash and 44% of them by credit cards. Over and above this, taking account of the level of education, it is possible to ascertain that the share of persons who consider cash to meet the protection criterion tends to fall as the level of education rises. Thus, 34% of general school graduates consider cash to offer protection against financial loss, whilst the estimation of respondents with a school leavers' certificate (Abitur) (25%) or university (of applied sciences) degree (19%) is much worse. There is a converse relationship when it comes to the evaluation of credit cards and level of education.

**Figure 6: Evaluation of the criterion "protection against financial loss"**




Deutsche Bundesbank

*Note: For methodical reasons, the information regarding the degree of fulfilment only relates to those respondents who have the payment instrument (cash 100%) or who are familiar with its functions. Multiple answers were also possible.*

### II.2.2.6. Overview of expenditure

Ensuring a good overview of expenditure is also significant for the selection of a payment instrument. It is necessary here to take account both of upstream monitoring of expenditure, that is direct monitoring and adherence to pre-set spending limits, as well as of downstream expenditure monitoring, which makes it possible to have an ex-post overview of spending.

It can be ascertained from the survey results that a good overview of expenditure is indispensable for 48% of respondents, whilst 44% consider it to be fairly important. An evaluation by gender reveals that this criterion is much more important to women than to men. 54% of women, but only 41% of men, state that a good overview of expenditure was indispensable. An equally marked difference emerges when comparing the information provided by respondents from eastern and western federal states. Whilst the criterion is indispensable for only 45% of respondents in the western federal states, this share is 56% in the eastern federal states. It is equally unambivalent that a good overview of expenditure is somewhat more important for German nationals than for persons with a migration background. In terms of household income, it can be ascertained that an overview of expenditure becomes less significant with rising income. This is likely to be caused by the fact that those on a higher income need to plan less precisely the financial resources at their disposal each month than those on a lower income.

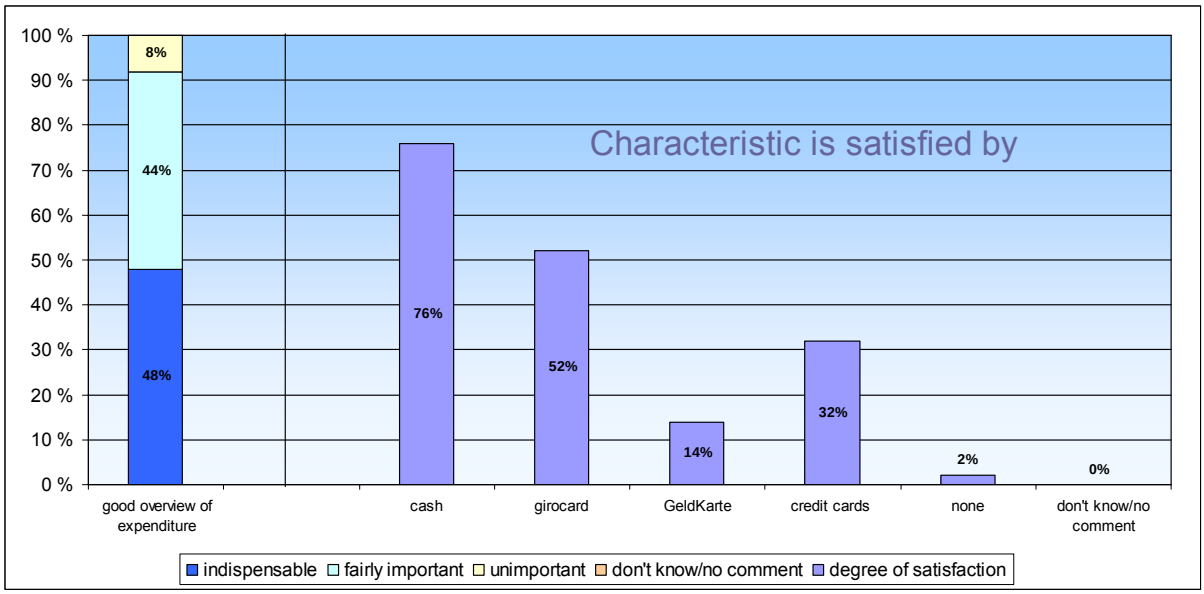
When asked as to the payment instruments which provide a good overview of expenditure, 76% of respondents named cash. This was followed at a considerable distance by the girocard, at 52%, and by credit cards, at 32%. This result is likely to arise from the frequently-stated view that with card payments the overview of the amount spent was quickly lost and that there was a lack of awareness of actually spending money. Due to the direct physical

handing over of an amount of cash that had been previously withdrawn in return for goods and services, cash payment by contrast was said to provide upstream monitoring of expenditure. It is however questionable to what extent individual cash transactions can actually be remembered ex-post. In order to ensure a real overview of the expenditure made, it would probably be necessary to keep a household account. On the other hand, many people are likely to appreciate the possibility offered by card payments to deliberately monitor expenditure ex-post using the bank statement or invoice from the credit card company. However, the frequently delayed debit from the account requires adequate self-discipline on the part of the consumer in planning expenditure of the available resources. All in all, upstream monitoring of expenditure appears to play a more important role in respondents' perception, as is shown by the better evaluation of cash with regard to an overview of expenditure.

A gender-specific observation reveals that cash also comes first among men, at 71%, but that this share is much smaller than among women (82%). In contrast to this, more men than women state that the girocard and credit cards provide them with a good overview of expenditure. It can further be ascertained that, as income increases, far fewer respondents consider cash to provide a good overview of expenditure. By contrast, the share of those who consider this criterion to be met by credit cards or the girocard increases, although cash is still held in the best estimation. The same result is reached by an evaluation of the results depending on the level of education, i.e. the higher the qualification, the fewer people consider cash suitable for obtaining a good overview of expenditure, and the more respondents rely on payment cards. To what degree payment cards provide a good overview of expenditure is also evaluated differently by Germans and persons with a migration background. The latter, across the board, consider this criterion to be more likely to be met with payment cards than Germans (approx. 10 percentage points more). Diverging views are also reached by respondents from eastern and western federal states. Among the latter, the share of those who consider that credit cards offer them a good overview of expenditure is eight percentage points higher than in the eastern federal states.

All in all, the better evaluation of cash across the board in comparison to cashless payment instruments indicates that, with regard to the overview of expenditure, upstream monitoring of expenditure is more significant in respondents' perceptions than ex-post monitoring.

**Figure 7: Evaluation of the criterion "overview of expenditure"**




Deutsche Bundesbank

*Note: For methodical reasons, the information regarding the degree of fulfilment only relates to those respondents who have the payment instrument (cash 100%) or who are familiar with its functions. Multiple answers were also possible.*

### II.2.2.7. Costs

What payment instruments a customer uses also depends to a great degree on the costs incurred by using them. For instance, from the point of view of the customers, the concrete time of debiting plays a primary role. With regard to this time, payment instruments are frequently broken down into three categories. In the first case, the customer is charged prior to the use of the payment instrument, i.e. the financial resources provided for payment are already ear-marked prior to the actual transaction. This applies for instance to the GeldKarte and to other pre-paid cards. However, cash must also be collected from a cash dispenser or counter prior to the actual purchasing transaction. When a debit card is used, the debit takes place at the time when the instrument is used or soon thereafter. The third category, in which the debit is effected a certain time after using the card, in principle includes credit cards. In this case, the customer may dispose of the corresponding amount of money otherwise, in particular with revolving credit cards, until the actual debit is carried out.

**Figure 8: Overview of the time of debiting of payment instruments**

| When debit takes place | **before** use of means of payment/payment instruments<br>**– pay before –** | **at time** of use of payment instrument<br>**– pay now –** | **after** use of payment instrument<br>**– pay later –** |
|---|---|---|---|
| **Selected means of payment/payment instruments** | Bank notes and coins<br>Geldkarte<br>pre-paid cards<br>Paysafecard | Transfer and direct debit<br>Debit card | Credit cards (charge card)<br>Credit cards (revolving credit card) |

Deutsche Bundesbank

A further important cost component is constituted by the bank charges incurred by customers, as well as by the fees linked with the use of payment transaction services of the bank administering their account (for instance annual card fees). The amount and structure of these fees are in principle the subject-matter of the commercial policy decision of the individual bank. Having said that, because of the high density of banks in Germany and of the substantial competitive pressure which this has exerted on the individual banks in recent years, there has been a trend towards cheap, and in some cases free services. Nonetheless, payment transactions are not available for free in Germany, given that the existing account models, in addition to the free service elements which they frequently contain, in many cases also include components which are subject to fees. Over and above this, credit institutions cover the costs which they incur in cashless payment transactions partly also by exploiting cross-selling potential or through cross-subsidies from other fields of business. As a result, this leads to significant differences in the banking charges payable.[36]

With regard to cash, from the point of view of the customer, in particular the cost of obtaining it must be taken into consideration. Cash can be withdrawn free of charge at counters of the bank administering the account, at their cash dispensers, as well as at the cash dispensers of the banks belonging to their association.[37] If, by contrast, money is withdrawn at cash dispensers belonging to non-associated banks, transaction fees are charged for this as a rule. Thanks to the broad availability of cash dispensers, most people have good opportunities to obtain cash today. This development can also be documented by the results of the survey. For instance, a total of 76% of respondents stated that the withdrawal point which they usually use could be reached from their home or place of work in fewer than

[36] See Finanztest, *Kleiner Schritt zum Gratiskonto*, p. 14 - 18 ff., 2008
When a uniform performance portfolio is applied (monthly basic price, transfer/direct debit, cash withdrawal, standing orders, girocard, credit card, bank statements), annual fees ranging from €0 to €255 may be incurred.

[37] The densest network of cash dispensers is that of the savings banks (*Sparkassen*), with roughly 24,000 dispensers nationwide. This is followed by the People's banks and Raiffeisen banks (*Volksbanken and Raiffeisenbanken*), with approx. 19,000 and far behind the cash dispenser associations Cash Group and Cashpool, largely including private banks, with a total of roughly 10,000 dispensers. See Finanztest, *Kleiner Schritt zum Gratiskonto*, p. 15, 2008

15 minutes. Over and above this, 86% of respondents stated that they did not pay any fees for withdrawing cash. Because of these conditions, a large share of respondents is not compelled to withdraw large amounts of cash at once.

Even if the use of payment cards at cash dispensers most likely only leads to fees being charged in a small number of cases, it is nonetheless necessary to take into account any annual or transaction fees that may be charged for the card itself, as well as for its utilisation for payment purposes. Whilst the issuance of a girocard at the moment as a rule is paid for via the account administration fee, or is altogether free of charge, an annual fee is frequently charged for credit cards.

Over and above this, those accepting payment instruments in Germany have the possibility on the basis of general contract law to charge their customers additional fees, depending on the payment instrument chosen, in the framework of so-called *surcharging*.[38] This enables them to compensate for the de facto considerably diverging costs which they incur when accepting different payment instruments. The advantage of such a solution is that differences in the actual transaction costs of individual payment instruments are made transparent to customers by virtue of the direct impact of the payment decision on the total price. However, this option is used relatively seldom in Germany because of the current competitive environment, and when it is, then more frequently in internet trade than in over-the-counter retail. Retailers prefer to include the costs incurred by accepting payment instruments in the general pricing, so that customers do not have an incentive to opt for the most cost-effective payment instruments because of a lack of transparency.

The current activities of the European Commission with regard to fee policy and Interbank fees also seek to create transparency with regard to the actual costs of a payment instrument incurred by customers.[39] For instance, in the view of the European Commission Interbank fees can be passed down to customers via retailers, even if these fees are intended to bring about revenue equalisation between the financial institutions involved in a card transaction, depending on the negotiation position of the banking industry. If retailers were to incorporate fees thus incurred in their cost calculation in the goods prices on a flat-rate basis, this would lead to additional costs being incurred by both cash and card payers. The position taken by the European Commission in this matter is likely to send out a signal, in particular if it is also applied to other card systems, as well as even to national transactions.

The significance of the costs of a payment instrument is also reflected in the survey results. More than half of respondents state that this criterion is indispensable, and 41% state that it is fairly important. Female respondents find this criterion somewhat more important than

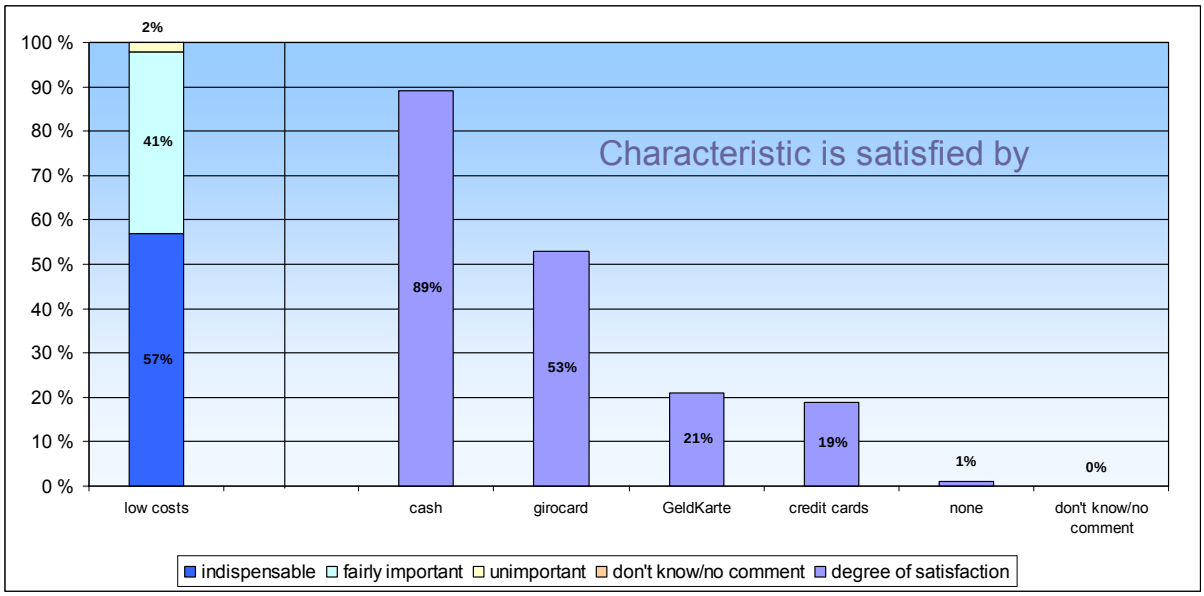
[38] One should however observe in this context the prohibition of *surcharging* included by some credit card companies in their conditions of business towards retailers accepting cards, which is however not undisputed in competition law terms.

[39] Most card systems provide for the bank accepting the card to pay a fee to the card-issuing bank. In the case of MasterCard, the European Commission prohibited the calculation of such a fee in its previous form for certain transactions. A new calculation model submitted by MasterCard was however accepted. See European Commission, press release, 2009

men. Related to age, the costs for over 64-year-olds take on the greatest, for 35- to 44-year-olds the least significance. Whilst no significant differences emerge with regard to nationality, when comparing between respondents from the western and eastern federal states, it can be ascertained that people in the eastern federal states are more sensitive to costs than in the western federal states. 63% of respondents from the eastern federal states consider low costs to be indispensable, compared with only 55% in Western Germany. Related to household income, the costs play the largest role for households with an income of less than €1,500.

Asked as to the payment instruments which cause no or only slight costs, 89% of respondents name cash, followed a long way behind by the girocard, at 53%. The fact that cash is considered to be the lowest-cost means of payment is likely to be particularly a result of the fact that most people avail themselves of the possibility to withdraw money free of charge at bank counters or via the cash dispenser association of their account-holding bank. An evaluation of the survey results by household income and level of education reveals that the share of respondents who consider cash to be cheap tends to fall as income and level of education increase, whilst the share of those who consider girocard or credit cards to have this characteristic increases. It can furthermore be observed that more respondents from the eastern federal states (58%) associate low costs with payment by girocard than is the case with respondents from the western federal states (51%). By contrast, payment with cash and with the GeldKarte are considered to be cheaper in the western federal states. The notions of which means of payment entail low costs vary depending on age, in some instances considerably. Whilst the share of respondents who consider this criterion to be met by cash is highest among 64-year-olds, the share of those who consider payment cards to be cheap is largest among 25- to 44-year-olds.

**Figure 9: Evaluation of the criterion “costs”**

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*Note: For methodical reasons, the information regarding the degree of fulfilment only relates to those respondents who have the payment instrument (cash 100%) or who are familiar with its functions. Multiple answers were also possible.*

### II.2.2.8. Anonymity

When selecting a payment instrument, the factor “anonymity” also plays a major role. Whilst cash transactions are virtually impossible to trace ex post, cashless payments such as card payments can be precisely traced because of the concomitant transmission and storage of the payment information.

The traceability of payments is particularly significant in connection with the prevention of money laundering and terrorist financing. However, these needs are frequently opposed to data protection aspects. Over and above this, the traceability of payments and the storage of customer information also entail a risk of abuse if inadequate security precautions are taken.

It emerges from these survey results that the maintenance of privacy is indispensable for more than half of respondents. This view appears to be largely independent of household income and level of education, as well as of nationality. Differences occur, by contrast, depending on the gender of the respondent. Women consider anonymity to be more important than men do. Whilst 57% of female respondents state that the criterion was indispensable, this applies to only 49% of male respondents. It also comes to note that anonymity is more important for respondents from the eastern federal states than for those from the western federal states. For instance, 58% of respondents from the eastern federal states are of the opinion that the maintenance of privacy is indispensable, whilst 5% find this criterion to be unimportant. In the western federal states, 52% and 14% of respondents, respectively, consider this to be the case. When it comes to age, a slight increase in the significance of the characteristic is shown with increasing age.

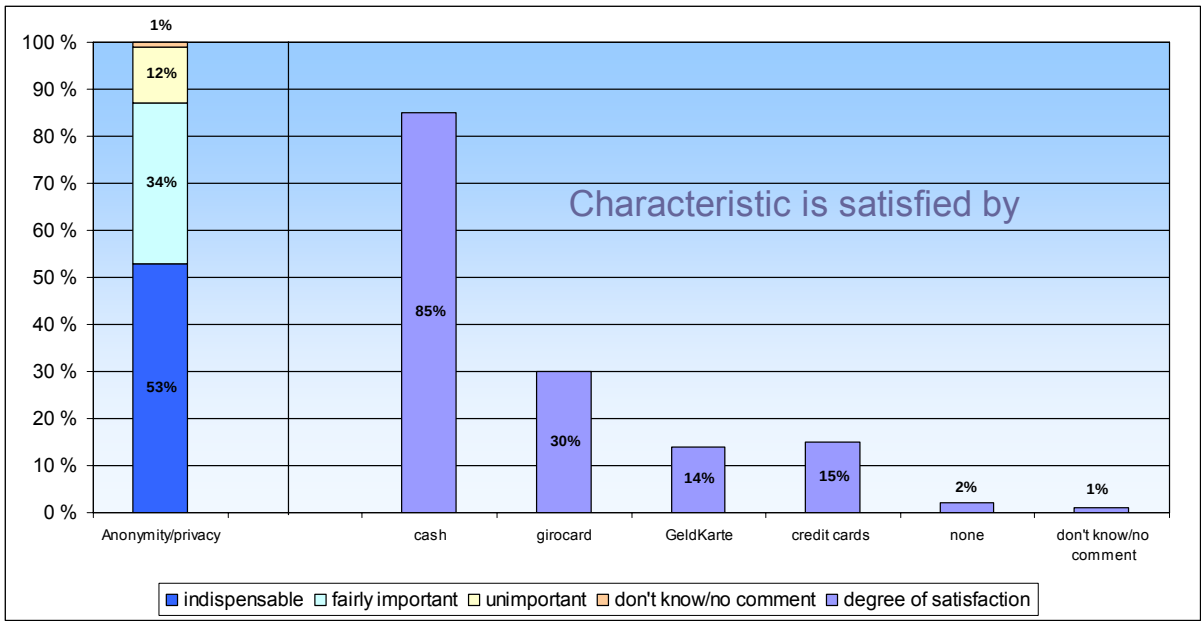
When asked as to the payment instruments during the use of which respondents consider their anonymity to be guaranteed, cash is clearly dominant at 85%. The girocard, at 30%, as well as credit cards, at 15%, clearly lag behind in this respect. The poor performance of the GeldKarte, at 14%, appears not to be plausible at first, given that personal data regarding the purchasing conduct of the card holder cannot be directly ascertained when the GeldKarte is used, unlike when using the girocard or credit cards.[40] This result however confirms the hypothesis that the state of information of payment transaction users with regard to the GeldKarte is still in need of improvement. It nonetheless emerges from a study by the GfK that those who pay by card do not have any major reservations when it comes to using their debit cards. Also when it comes to those who do not pay with cards, security reservations do not appear to be the decisive reason for not using cards for payment.[41]

Furthermore, an evaluation of the results depending on nationality shows that significantly more persons with a migration background consider their anonymity to be maintained when using payment cards than is the case with Germans. Also, many more respondents from the eastern federal states than from the western federal states consider payments with the girocard and credit card to be anonymous. Moreover, the share of respondents who consider anonymity to be guaranteed by cash falls with increasing household income. The reverse trend can be ascertained with debit cards and credit cards. There are also significant distortions in the evaluation of credit cards and debit cards depending on age. Whilst only 4% of 18- to 24-year-old respondents consider credit cards to be anonymous, the figure is 22% for 35- to 44-year-olds. The girocard performs worst among over 64-year-olds, at 23%, and again best among 35- to 44-year-olds, at 36%.

[40] With an account-related money card, it would be necessary for this to attribute the data on the account holder to the information on the utilisation of the card, which is not possible as a rule. When using an account-related card, anonymity is comparable with that of a cash payment provided that, when acquiring the card, the seller does not make any record of the attribution of the card to the card holder.

[41] See GfK, *Konsumentenverhalten beim Bezahlen mit Karte*, p. 27, 2008

**Figure 10: Evaluation of the criterion "anonymity"**

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*Note: For methodical reasons, the information regarding the degree of fulfilment only relates to those respondents who have the payment instrument (cash 100%) or who are familiar with its functions. Multiple answers were also possible.*

### II.2.2.9. Familiarity and experience

Experience with using a payment instrument is also relevant as a criterion for selecting it. Here, cash is undisputedly regarded as the payment instrument with which people have the longest and greatest familiarity. By contrast, the major developments in the field of cashless payment transactions have taken place within the past few decades. A major benchmark is formed here by the introduction of the “electronic cash” debit card system for cashless payment at automated cash desks by the German banking industry. This may explain why, despite the advancement of cash payment technology in Germany, roughly two-thirds of all retail trade turnover is made in cash even today.[42]

One possible explanation for the considerable significance of cash in over-the-counter retail is that, as a rule, existing patterns of conduct only change very slowly. For instance, it is already possible today with some financial institutions to open a current account for children from the age of eight as a so-called pocket money account, enabling them to gain experience at an early age in using money and selected cashless payment instruments, such as transfers or a debit card. By contrast, the generation of today’s pensioners only came into contact with electronic payment instruments at a later age. This might explain why, from the point of view of this population group, the use of such payment instruments is less familiar than in younger generations. Over and above this, experiences which have been gained with the payment instruments used to date may also be significant: If positive experience is

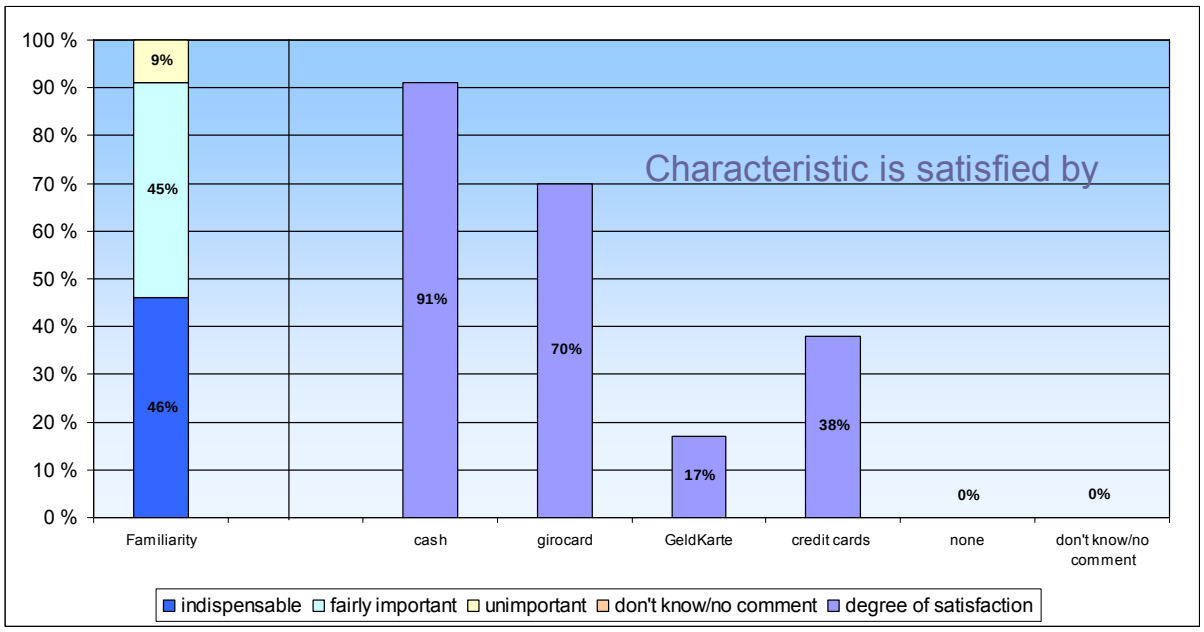
[42] See EHI Retail Institute, *Karten-Entwicklung aus Handelssicht*, p. 11, 2009; Retail trade turnover=€360 billion (not including motor vehicles, mineral oil, chemists and mail order trade).

associated with a specific instrument, a special incentive is necessary to deviate from the habitual pattern of conduct. As long as this is not the case, it is likely that people will remain reserved or sceptical towards new and unknown payment procedures.

From an evaluation of the survey results that familiarity with using a payment instrument is indispensable for 46% of respondents. An equal number of respondents consider this criterion to be fairly important. Dependent on the age of the respondents, it emerges that experience becomes more and more important to the respondents as they age. For instance, this criterion is indispensable for 35% of 18- to 24-year-olds, as compared to as many as 55% of over 64-year-olds. Depending on the level of education and household income, it is found that familiarity with a payment instrument becomes less significant with increasing level of education and household income. The criterion is also evaluated differently by respondents from eastern and western federal states. Whilst familiarity is indispensable for only 43% of respondents from the old Federal *Länder* in using a payment instrument, this applies to 55% of respondents from the new Federal *Länder*.

When asked as to the payment instruments with which the respondents are familiar with using, 91% stated cash. This was followed at a great distance by the girocard, at 70%, the credit card, at 38%, and the GeldKarte, at 17%. An evaluation differentiated by household income reveals that familiarity increases by a total of roughly 30 percentage points both with the girocard and with credit cards, as household incomes increase, over all income classes included in the survey. With regard to the credit card, the issuing practice of the credit institutions might provide an attempted explanation since, as a rule, they only issue credit cards if there is corresponding credit worthiness. A comparable result is shown with regard to the level of education. Here too, familiarity with the girocard and credit cards increases in line with the level of education. When it comes to gender, it can be recognised that men feel much more familiar in using payment cards than women. With regard to age, it emerges that in particular the group of over 64-year-olds, at 97%, is familiar with cash to a higher-than-average degree. By contrast, an above average share of members of the middle age groups state that they have experience in using payment cards. Differentiating by the origin of the respondents also reveals that respondents from the western federal states consider themselves to be much more familiar with using card products than respondents from the eastern federal states.

**Figure 11: Evaluation of the criterion "familiarity and experience"**

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*Note: For methodical reasons, the information regarding the degree of fulfilment only relates to those respondents who have the payment instrument (cash 100%) or who are familiar with its functions. Multiple answers were also possible.*

### II.2.2.10. Receiving benefits

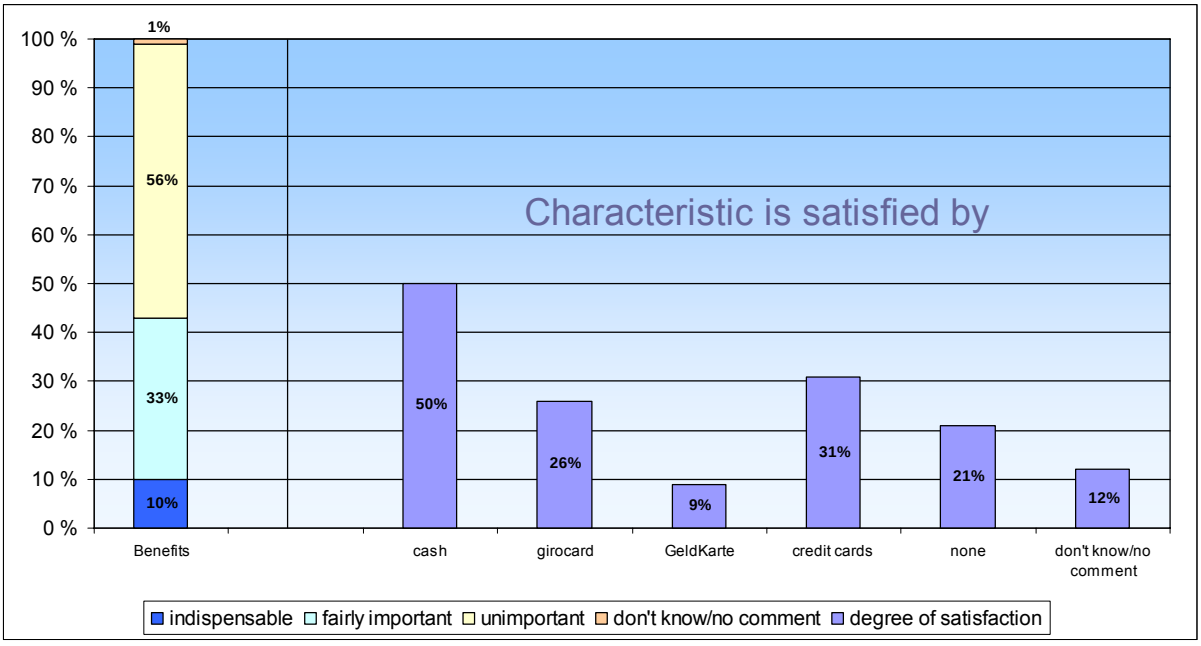
A further determining factor in the selection of a payment instrument could be receiving benefits. On submission of a customer card, an instrument being intensively used at present for customer retention, the customer is given access to various benefits or additional services. Bonus cards are particularly significant in this context, on utilisation of which the customer, depending on the transaction value, is initially credited with bonus points and these are transformed into vouchers, discounts or premiums in kind at a later date. A distinction needs to be made here between various types of bonus cards. Firstly, cards are issued which serve exclusively to collect bonus points. Secondly, there are cards which are equipped with a real payment function and which, depending on their specific features, can even be used in some cases at retailers outside the bonus programme.

For reasons of data protection, customer and bonus cards are however not undisputed since enterprises use this instrument amongst other things to analyse their customers' consumption behaviour on the basis of transaction data.

Although roughly one respondent in five states that they have at least one customer or bonus card with a payment function, receiving bonus points plays a minor role when it comes to selecting the payment instrument according to the survey results. For instance, 56% of respondents state that receiving benefits is not important for them. Major differences emerged in the response depending on the origin of respondents. Whilst this criterion is unimportant for 60% of respondents in the western federal states, only 44% of respondents in the eastern federal states share this view. Furthermore, the characteristic is less important for persons with a migration background than for German respondents. It also emerges with

regard to household income that as income increases, the significance of benefits declines. When asked as to the means of payment offering benefits for using them, half of respondents name cash, whilst, at 31%, relatively few respondents name credit cards. The good performance of cash might be caused, firstly, by discounts granted for cash payment. Respondents might however also associate receiving benefits, and bonus points in particular, with cash payment because the currently widespread bonus programmes grant their benefits on presentation of the bonus card regardless of the payment instrument actually used, in other words also with cash payments. Depending on the level of education and on household income, it can be ascertained that as the levels of education and household income increase, the number of respondents increases who state that they receive benefits when they use credit cards, whilst the share of those who consider this criterion to be met by cash falls.

**Figure 12: Evaluation of the criterion "receiving benefits"**

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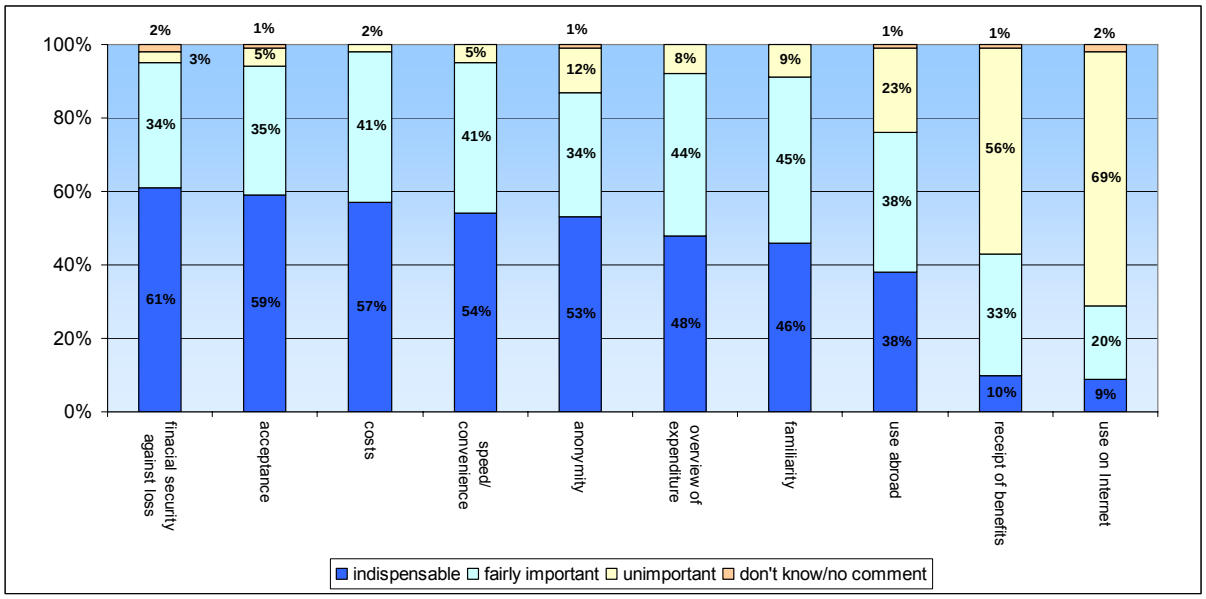
*Note: For methodical reasons, the information regarding the degree of fulfilment only relates to those respondents who have the payment instrument (cash 100%) or who are familiar with its functions. Multiple answers were also possible.*

### II.2.2.11. Summary

***Protection against financial loss, as well as a high degree of acceptance, are most important to respondents***

All in all, it is shown that half of the characteristics that were investigated are highly significant for the respondents. Hence, five out of ten criteria are indispensable for more than 50% of respondents. The most important ones are protection against financial loss, as well as a high degree of acceptance in shops. The lowest level of significance attaches to the possibility to use them on the internet, as well as to receiving bonus points and discounts.

**Figure 13: Significance of the criteria of payment instruments from the users' point of view**

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***Cash achieves the best results when it comes to the degree of fulfilment of the criteria.***

Apart from the criteria "protection against financial loss" and "usability on the internet", cash is the means of payment with regard to which the largest number of respondents consider the criteria investigated to be satisfied. This result is likely to originate from the fact that people's payment habits only change slowly despite the availability of alternative payment instruments. The GeldKarte appears to meet customers' requirements least well, and respondents state that it has the lowest level of satisfaction with regard to all criteria investigated, with the exception of the cost criterion. This is probably caused by the rather low level of awareness with regard to the functioning of and possibilities to use the GeldKarte.

***Level of education and household income influence the assessment of the payment instruments.***

Respondents with a higher level of education and household income consider the criteria investigated to be met better by card-based payment instruments than do respondents with a lower level of education and household income. This might be caused by more intensive use of the instruments, and the greater familiarity this entails.

***Men have a closer affinity to cards than women do.***

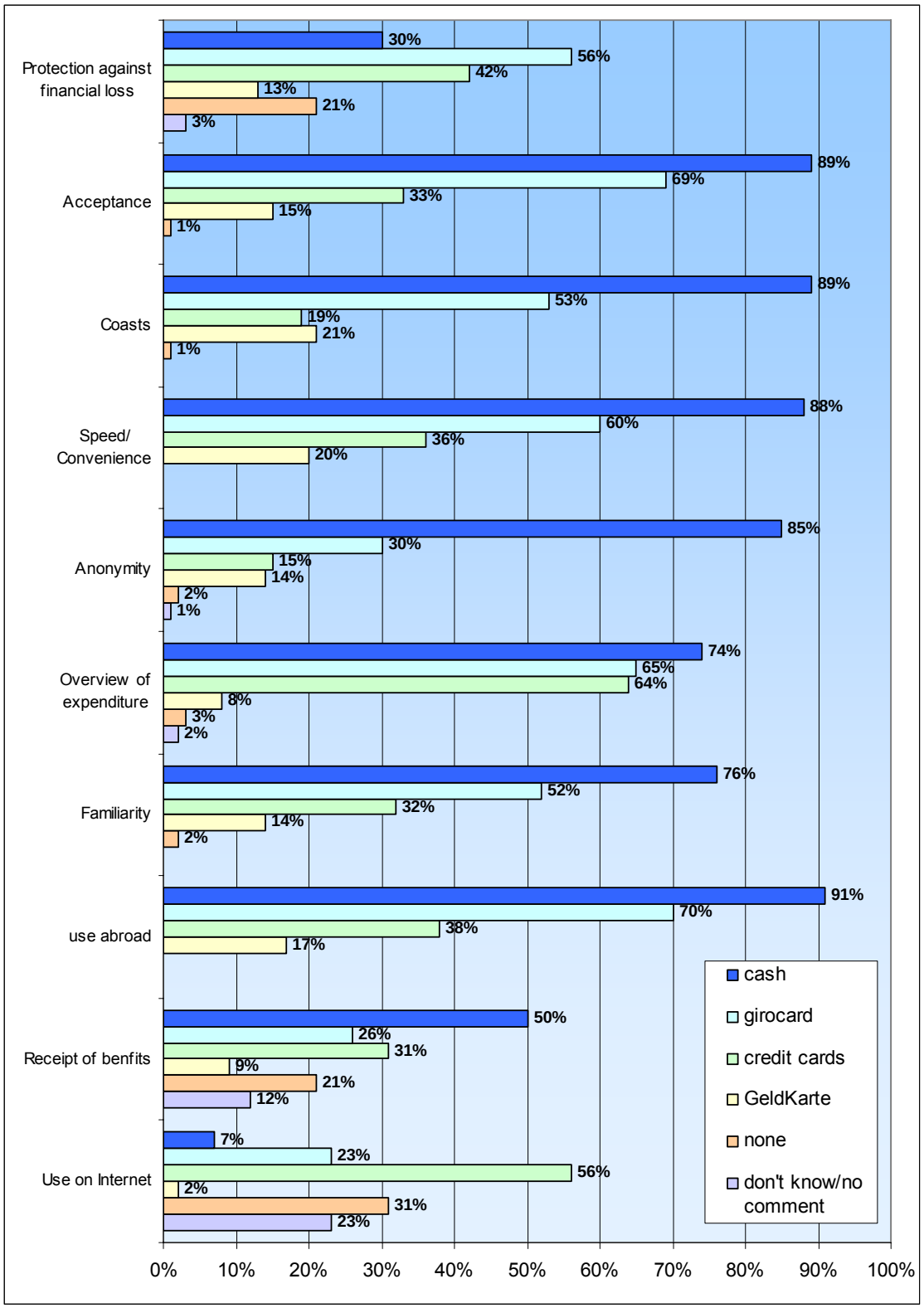
As to the criteria analysed for the individual payment instruments, in all aspects more men than women consider the criterion analysed in each case to be met by the girocard[43] and by credit cards.

***Payment cards receive a more positive evaluation from younger respondents than from older ones.***

Card-based payment instruments, in particular the girocard, also do relatively well in the evaluation of the older respondents. Older respondents are nonetheless more reserved in comparison to younger respondents in the assessment of whether the criteria investigated are met by payment cards: They consider the criteria investigated to be better met by cash. This result could be especially a result of the fact that respondents of today's older generation were only introduced to cashless payment instruments relatively late on in their lives.

[43] Girocard is the new joint acceptance logo for the electronic cash (ec) system for payments at the *point of sale* and in the German cash dispenser system. Over the years, the designation "ec card" has become a synonym for the term "debit card" in the awareness of card holders. Since the introduction of the new girocard logo only took place shortly before the beginning of the surveys on which this study is based, it can be presumed that the girocard logo does not yet have any corresponding recognition value, so that ec cards were still asked about in the survey, whilst the text of the study already uses the term "girocard".

**Figure 14: Fulfilment of the criteria by payment instruments from the users' point of view**

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*Note: For methodical reasons, the information regarding the degree of fulfilment only relates to those respondents who have the payment instrument (cash 100%) or who are familiar with its functions. Multiple answers were also possible.*

### II.2.3. Customers' situational selection at the point of sale

After the previous chapter's investigation of the criteria which are important when deciding on acquiring a payment instrument from the customers' point of view, and of the degree to which certain payment instruments meet these criteria in their estimation, this chapter will analyse which specific criteria are vital to the selection of the payment instrument at the point of sale (POS).[44]

In this context, the question arises, amongst others, as to whether customers take their decision for a payment instrument spontaneously or prior to making the respective purchase. A study carried out by the GfK reaches the conclusion in this respect that the majority of card holders customarily have a certain amount of cash with them and pay by debit card when it comes to larger amounts or spontaneous purchases. What is more, in advance of a purchase decision, only a small number of card payers plan exactly what they purchase, and hence do not always have the appropriate amount of cash with them. [45]

According to the results of this survey, half of the respondents make the situational selection of a payment instrument conditional on whether they still have sufficient cash with them. Hence, **the current amount of cash** is the most important selection criterion. With regard to age, it emerges here that this criterion is important for an ever smaller number of respondents with rising age. This can be seen from the fact that 63% of 18- to 24-year-olds are of the opinion that their decision depends on the amount of cash available, whilst this is stated by only 41% of over 64-year-olds. In relation to household income, it is revealed over and above this that the amount of cash among respondents who are on a higher income is much more significant for taking a decision than with respondents on a lower income. Also depending on the level of education, the results differ considerably from one another in some cases. The amount of cash available influences the decision of only 43% of general school graduates, whilst it does so with 62% of those with a university (of applied sciences) degree. What is more, Germans and foreigners also rate this criterion differently. Whilst the selection of the payment instrument depends only on the level of cash available for 36% of foreigners, this is the case for 52% of German respondents.

The second most important criterion for the selection of a payment instrument at the POS is, at 46%, the **amount payable**. Hence, with increasing household income and level of education the share of respondents increases for whom this aspect is relevant to taking the decision. Furthermore, this criterion is more significant for men than for women. Depending on age, the amount is taken into account in their decision-making most frequently by the group of 35- to 44-year-olds, and least by the group of 18- to 24-year-olds. Broken down by the possession of payment instruments, at 56%, more credit card holders than holders of other payment instruments make their decision in favour of a payment instrument conditional

[44] For methodical reasons, only persons were asked on this who have a girocard, credit card and/or GeldKarte in addition to cash, and hence have an option at all to choose between various payment instruments. Furthermore, multiple answers were possible with regard to this question.

[45] See GfK, *Konsumentenverhalten beim Bezahlen mit Karte*, p. 9, 2008

on this criterion. That the amount payable influences the decision-making of almost half of all respondents also appears to be plausible with regard to the statements made on the payment instruments which respondents customarily use depending on the amount payable. It can thus be ascertained that smaller amounts tend to be paid in cash and larger amounts more with the girocard or with credit cards.

Far behind the two criteria mentioned above, 20% of respondents state that they opt for the **payment instrument with the lowest costs**. Cost sensitivity in this instance tends to increase in line with household income. Depending on the origin of the respondents, it can also be ascertained that, at 24%, respondents from the eastern federal states somewhat more frequently take the cost of a payment instrument into account in decision-making than respondents from the western federal states, at 19%. It furthermore emerges that men's decisions for a payment instrument tend more to be influenced by the cost than women's.

Much slighter significance in terms of the selection decision, at only 14%, attaches to the **type of shop** where the purchase is made. Differences in assessment emerge here in particular depending on household income. The share of respondents who state that this criterion influences their decision in favour of a payment instrument increases in line with household income. Moreover, whilst 17% of male respondents state that they choose the payment instrument depending on the type of shop, this criterion is only relevant for 12% of women. What is more, the decision of credit card holders also appears to be more strongly influenced by this criterion than among owners of other payment instruments.

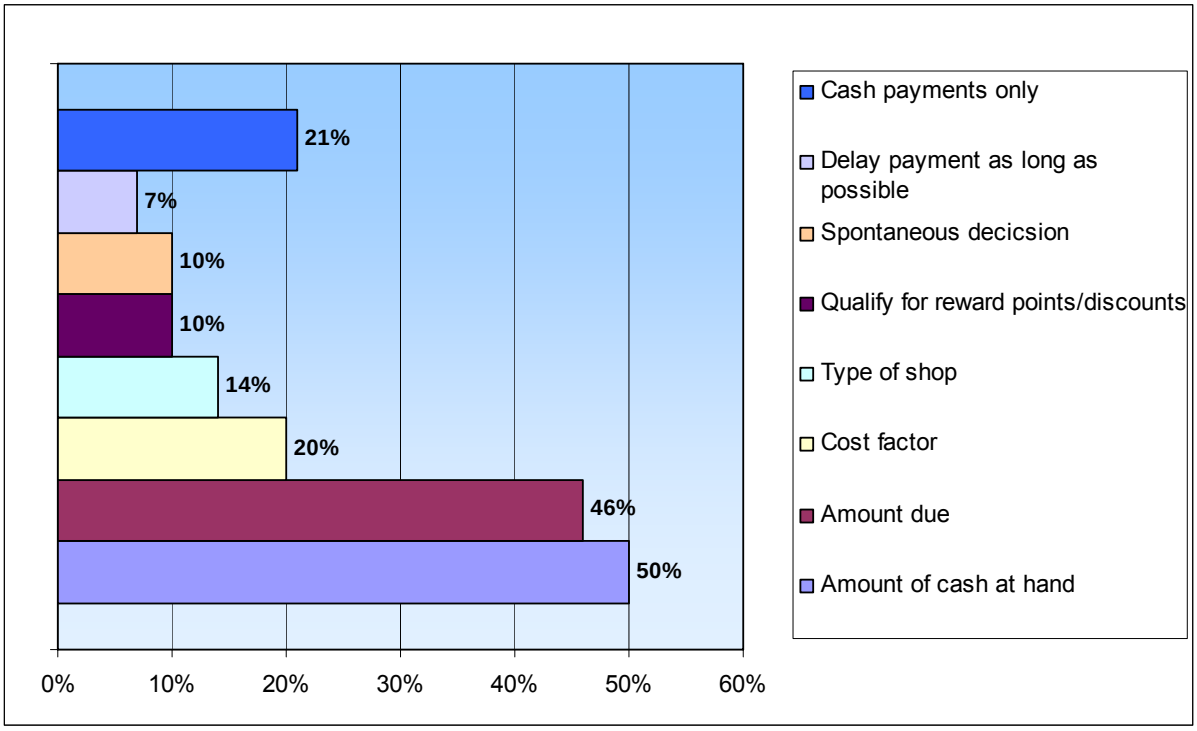
At 10%, the **receipt of benefits** also appears to be of relatively slight significance in terms of decision-making. This corresponds to the finding that the receipt of benefits plays a relatively subordinate role in the structure of payment instruments in the view of the respondents.

Furthermore, at also 10%, a relatively small number of respondents state that they take their **decision for a payment instrument spontaneously**. Moreover, only 7% state that they use the payment instrument with which the debit takes place as late as possible. It comes to note here that the group of 25- to 34-year-olds, as well as respondents with a higher household income, are most likely to take their decisions spontaneously. Special importance is attached to payment as late as possible, in particular by respondents with a university (of applied sciences) degree, the group of credit card holders, as well as respondents with a higher household income.

It is striking that 21% of respondents state that they pay **exclusively with cash** at points of sale, even though they have payment cards. An evaluation broken down by ownership of payment instruments shows that, at 20% and 18% respectively, holders of girocards and of the GeldKarte are more likely to only pay in cash than is the case, at 4%, with the group of credit card owners. This makes it clear that the option to acquire a credit card is taken deliberately in order to actually use it. This is likely to be a result, not least, of the fact that a credit card is applied for separately and, as a rule, an annual fee is also charged. By contrast, girocards are usually issued without charging a separate fee directly on opening a current account.

What is more, it becomes clear that the share of those who only pay in cash falls with increasing household income and level of education. Whilst 39% of respondents with a household income below €1,500, as well as 34% of general school graduates, respond that they only pay in cash. This is the case with only 8% of respondents with a household income of €3,000 and above, as well as 7% of those with a university (of applied sciences) degree. Moreover, the share of those who exclusively pay in cash varies considerably depending on age. For instance, only 12% of 25- to 34-year-olds state that they pay exclusively in cash, whilst this is the case, at 38%, with an above-average number of over 64-year-olds. This result corresponds to the finding that older respondents react more reservedly as to whether the criteria are met by card-based payment instruments than younger respondents do, and instead consider the criteria under review to be met better by cash.

**Figure 15: Criteria for the selection of a payment instrument at the POS**

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*Note: For methodical reasons, the information regarding the degree of fulfilment only relates to those respondents who have the payment instrument (cash 100%) or who are familiar with its functions. Multiple answers were also possible.*

# III. Utilisation of cash and cashless payment instruments

After the previous chapter's investigation of how consumers perceive and judge the various payment instruments (Ch. II.2.2) and what reasons influence the selection of payment instruments at the cash desk (Ch. II.2.3), ownership of payment instruments and specific payment habits are analysed in the next step. In the context of a payments diary, respondents noted at the beginning their cash stock in their wallets broken down by denomination. Then they noted over a period of a week for each expenditure item the amount, the place and purpose of payment, as well as the payment instrument used. One example of such notations would be purchasing goods for a value of €53.15 at a petrol station in cash. In addition to this diary, survey participants stated in the questionnaire which payment instruments they customarily used, depending on the amount and the place and purpose of payment. The results of the diary (specific payment habits) can therefore be compared with those of the questionnaire (notion of own conduct).

## III.1. Ownership and utilisation of payment instruments

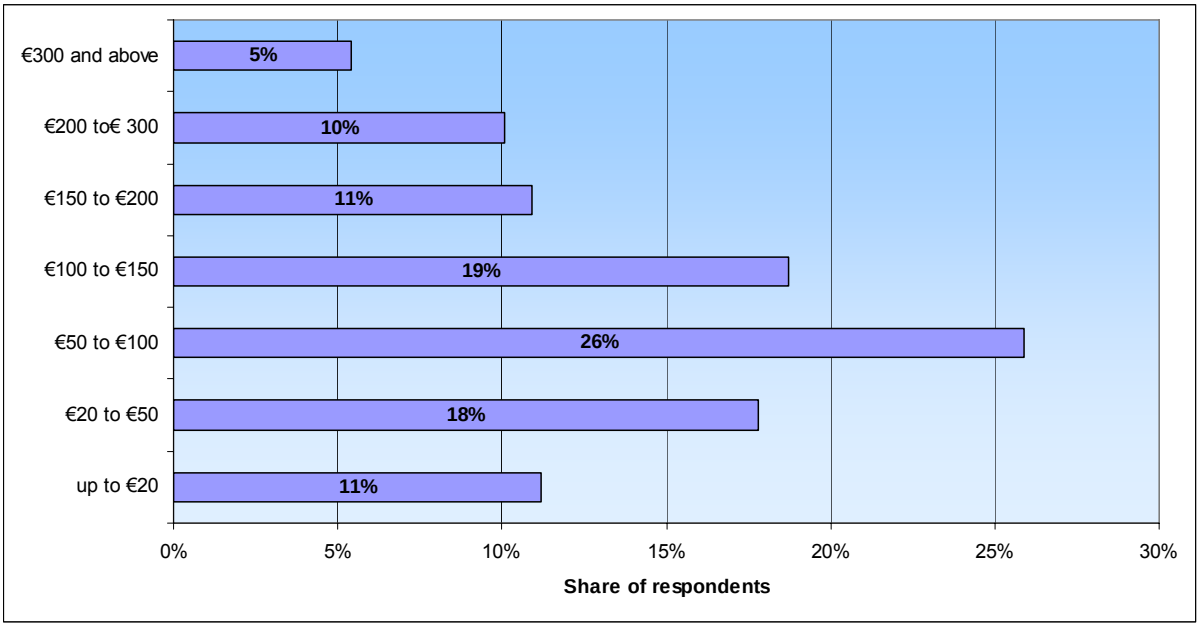
In the next section, the cash stocks in people's wallets are described according to the notes made in the payments diary. The goal is to ascertain the denomination structure and the average amount of cash held, and to analyse conduct depending on socio-demographic factors (Ch. III.1.1). Furthermore, the question is focused on what percentage of the population holds which payment cards and whether these are actually used (Ch. III.1.2). To this end, data on payment card ownership obtained from the questionnaire are linked to information from the payments diary. The precondition for this is that these payment cards were used at least once during the one-week period during which the diary was kept.

### III.1.1. Cash stock in people's wallets

The survey of cash stocks ("transaction cash funds") revealed that respondents carried an average of approx. €118 in their wallets. Approx. €6.70 of this was accounted for by coins, constituting an increase as against the result of the coins study of 2003. At that time, an average amount of only €5.60 was recorded per respondent. In comparison to the arithmetic mean of €118, the median, that is the cash stock above and below which 50% of all respondents fall, is only roughly €90.[46] The higher arithmetic mean is explained by the very large cash stock of a relatively small number of respondents. The following table shows the amount of cash carried by individuals as a proportion of those surveyed.

[46] See Deutsche Bundesbank, *Münzgeldentwicklung in Deutschland*, p. 90, 2003

**Figure 16: Cash stock in people's wallets**

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The amount of cash in people's wallets differs considerably in some cases, depending on the various socio-demographic characteristics. For instance, men have more money in their wallets on average (€129) than women (€108), and people living in the western federal states (€121) have more than those living in the eastern federal states (€103). People with a migration background (€144) have more cash on average than the rest of the respondents (€115).

It can be observed that as income increases, the more cash is carried in wallets on average. Cash carried increases from €102 in the lower income class (below €1,500) to €132 in the highest income class (€3,000 and above). The relationship between the cash carried and income might be one reason why women and citizens from the eastern federal states carry smaller amounts with them. No such connection can be recognised among individuals with a migration background. Other explanations, such a cash preference determined by traditions, might be more likely to apply.

Just as with increasing income, the amount of cash carried also increases in line with age. Whilst the age class of "18 to 24", at €64, have the least amount of cash in their wallets, persons between 55 and 64, at €138, have the most. However, this value falls back down to €126 in the older marginal age group from 65 onwards. This is probably a result of the lower disposable income after retirement.

If one evaluates the cash stock in people's wallets according to employment status, this is much higher than the average of all respondents with full-time employees (€129), pensioners (€126) and persons working exclusively in the household (€123). The high level of cash among full-time employees is presumably caused by the greater financial scope resulting from income. By contrast, among those working exclusively in the household, the reason most likely lies in the significantly higher average cash payment amounts (according to the

payments diary) in comparison to the other groups. The least amount of cash is kept according to this breakdown by those in training[47] (€55) and job seekers (€83). This is likely to have most to do with age (78% of all individuals in training are aged between 18 and 24) and the smaller amounts of funds which they have at their disposal in comparison to others.

The structure and the average number of coins and banknotes carried in people's wallets is summarised in Table 1. All in all, an average of approx. 16 coins and 5 notes are in each respondent's wallet. The number of the individual coins is relatively balanced, the one-cent coin being the most common, with an average of 2.8 per respondent. When it comes to banknotes, this place is taken up by the €10 note, with a mathematical average of 1.5 per person; there are virtually no banknotes with a nominal value of €100 and above.

**Table 1: Structure of the cash stock in people's wallets**

| Coins | min. 1 coin in wallet | Ø per respondent | Median |
|---|---|---|---|
| **1 cent** | 67% | 2,8 | 2,0 |
| **2 cent** | 64% | 2,2 | 2,0 |
| **5 cent** | 88% | 2,0 | 1,0 |
| **10 cent** | 71% | 2,2 | 2,0 |
| **20 cent** | 69% | 2,0 | 2,0 |
| **50 cent** | 66% | 1,5 | 1,0 |
| **1 euro** | 74% | 2,0 | 2,0 |
| **2 euro** | 71% | 1,6 | 1,0 |
| **Total** | 93% | 16,2 | 14,0 |

| Banknotes | min. 1 note in wallet | Ø per respondent | Median |
|---|---|---|---|
| **5 euro** | 64% | 1,3 | 1,0 |
| **10 euro** | 72% | 1,5 | 1,0 |
| **20 euro** | 68% | 1,2 | 1,0 |
| **50 euro** | 53% | 1,0 | 1,0 |
| **100 euro** | 10% | 0,1 | 0,0 |
| **200 euro** | 1% | 0,01 | 0,0 |
| **500 euro** | 0% | 0 | 0,0 |
| | | | |
| **Total** | 93% | 5,2 | 4,0 |

Deutsche Bundesbank

*Note: All respondents were included in the calculation of the arithmetic mean and the median (middle value), including those who did not have the corresponding denomination on them at the time.*

### III.1.2. Ownership and utilisation of payment cards

The girocard holds a prominent position among payment cards: 91% of respondents state that they have at least one girocard. According to respondents' own information, only 27% have a credit card. The much broader spread of the girocard among the respondents in comparison to credit cards corresponds to the Bundesbank's payment transaction statistics from 2007.[48]

However, with regard to ownership of the GeldKarte, the responses acutely contradict their actual distribution. According to official information, approx. 79% of all girocards (that is approx. 73 million cards) are equipped with a GeldKarte function. However, only 21% of respondents state that they have a GeldKarte. 60% of respondents state that they are not aware of the GeldKarte or know of it only by name. A very large number of those who have such money cards are therefore unaware that the girocard which they use has such a function. Over and above this, roughly one respondent in five now has a customer or bonus card with a payment function issued by a retailer. These, as well as other cards presented in Chapter II.1, are no longer dealt with at this point since they are hardly used in practice.

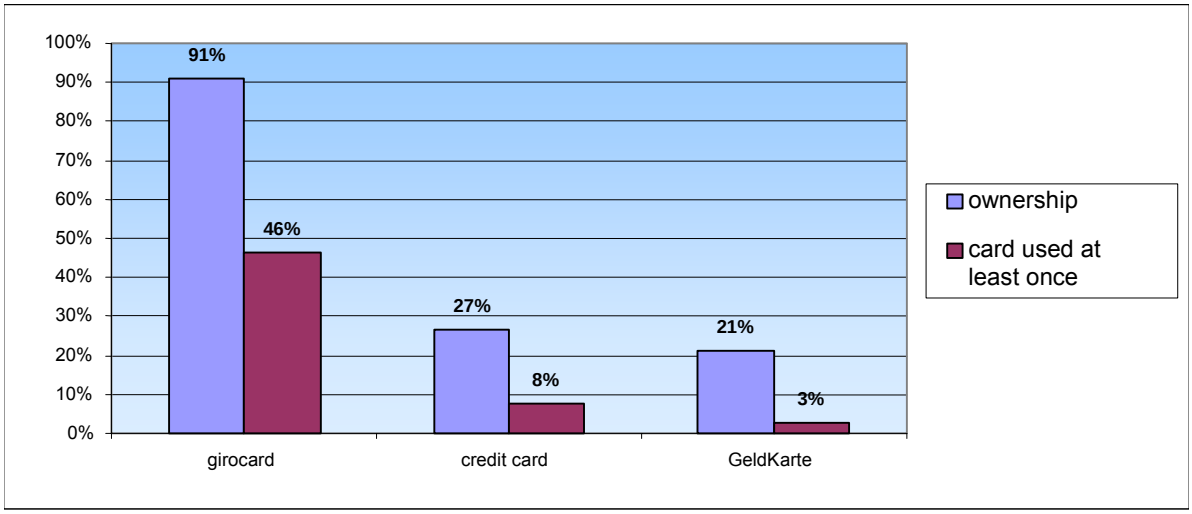
[47] Persons in school, in an unpaid internship, in vocational training, as well as studying

[48] See Deutsche Bundesbank, Payment and securities settlement statistics in Germany 2007, p. 5, 2008

Against the backdrop of the wide-scale distribution of the girocard, it comes to note that only half of those who have a girocard have used the card for payment at least once within the one-week observation period. The other payment cards were used even less frequently; just under one-third of those who have a credit card and only 14% of those who have a GeldKarte used it for payment.

The data above on the GeldKarte are identical to a self-estimate by respondents, according to which almost two-thirds of those who have a GeldKarte state that they did not use the card at all (47%) or that they used it less than once per month (15%). The main reasons stated for this were a lack of information and opportunities to use it. However, also the lack of protection of the balance stored on the card if it is lost and the fact that it is not possible to check the balance everywhere receives a negative assessment in many cases. Only 9% of those who have a GeldKarte state that they used the card more than five times per month as a rule.

**Figure 17: Ownership and use of payment cards**




Deutsche Bundesbank

*Note: The percentage values (%) relate to all respondents, e.g. 27% of respondents have a credit card and 8% of all respondents have paid with it at least once, which corresponds to 33% of those who have a credit card.*

When it comes to the influence exerted by socio-demographic factors on card ownership and use, some particularities have emerged which are presented below. With regard to the GeldKarte, a further more precise examination of these questions is not carried out due to the plausibility problems described above with regard to holding and using them.

### Age

The girocard is very widespread among individuals of all age groups. Only in the marginal age groups (under 25 and above 64), girocard ownership is somewhat below average. Apart from the highest age group, at least 50% of girocard holders do indeed use the card.[49] Among girocard owners aged 65 and above, the actual use is lower than one-third. The spread of credit cards is greatest in the middle “working” age groups (29%-35%). In the lower

[49] Based-on the one-week observation period

and upper marginal age groups, credit card ownership, by contrast, is only 12% and 19% respectively, of all individuals. The share of credit card owners who have used the card within the period under observation is between 24% and 33% for all age groups.

**Gender**

Whilst no noteworthy differences can be observed between men and women with regard to ownership and use of the girocard, clear deviations are found with regard to the credit card. For instance, men have almost twice as many credit cards as women (35% as against 19%), and indeed use them more frequently than women (31% as against 15% of credit card owners).

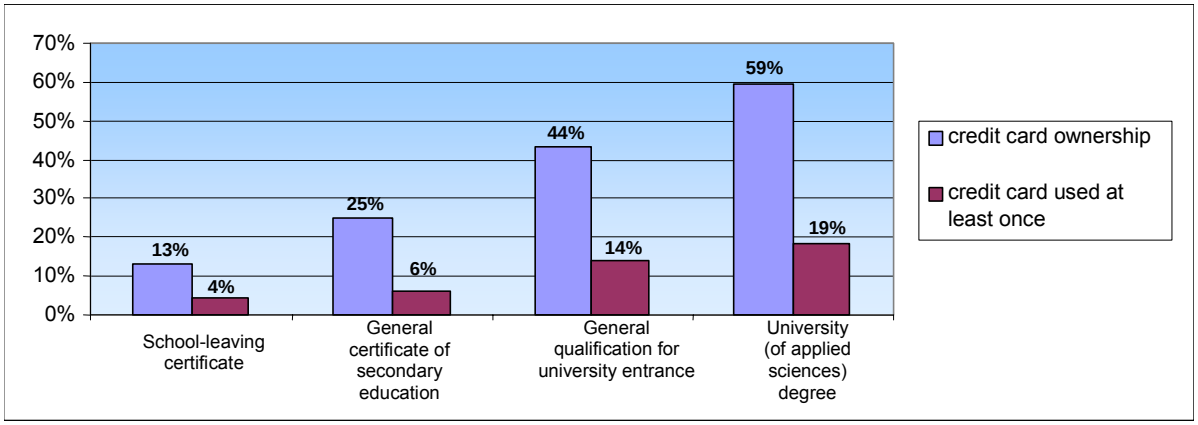
**Migration background**

The evaluation of the data of persons with and without a migration background only leads to noteworthy differences when it comes to the girocard. Whilst a large majority of 85% of respondents with a migration background owns a girocard, the share among other persons is however much higher, at 92%. Roughly half of the card holders in both groups has indeed used them at least once.

**Education**

When it comes to the breakdown of respondents by educational qualification, it can be observed that ownership of a girocard and of credit cards tends to increase with the level of education. However, this tendency is much less pronounced with the girocard, as a payment instrument which is accessible to large sections of the population, than with credit cards. Ownership of a girocard is significantly below average only with individuals who have a school–leaving-certificate (86%), whilst the other respondents account for shares of between 93% and 95%. The difference is much greater with credit card ownership, where the share ranges from 13% to 59%, depending on the group (see Figure 18). With regard to the use of credit cards, the empirical data also indicate differences in line with the respondents' educational qualification. The share of respondents who used the card at least once within the period under observation increases with the level of education in absolute terms. The ratio of card ownership to its use, by contrast, remains almost constant.

**Figure 18: Credit card ownership and use by level of education**




Deutsche Bundesbank

*Note: The percentage values (%) relate to all respondents, e.g. 44% of respondents with a general qualification for university entrance have a credit card and 14% have paid with it, which corresponds to a share of approx. 32% of credit card owners with a general qualification for university entrance.*

### Income

Income-dependent analysis of the ownership and use of girocards and of credit cards tends to show a similar picture to the breakdown by level of education. The connection can be traced back essentially to the fact that, as a rule, income tends to increase with a higher level of education. The distribution of the credit card increases, in particular, with net household income. For instance, the share of credit card owners triples from the lowest (below €1,500) to the medium income group (€1,500 – €3,000) and doubles once more on entering the highest income group (€3,000 and above). Accordingly, the use of credit cards also increases, albeit not as strongly as the share of ownership. Whilst ownership of a girocard only increases slightly with income, utilisation of the card increases disproportionately high in comparison to this. The share of those girocard owners who have used the card to make a payment increases from 22% in the lowest, to 49% in the medium and to 65% in the highest income brackets. This is comprehensible since, as income increases, more funding is available for girocard transactions tending towards higher amounts.

### Employment status

When it comes to evaluating girocard ownership by employment status, as is already the case with other socio-demographic characteristics, a comparably smooth spread is shown among respondents. Full-time employees have the most girocards, with a share of 95%. The lowest number of them is owned by persons in marginal employment, those seeking employment and in the group of “school pupils, those in training and students” (hereinafter referred to as “persons in training”) (between 82% and 84%). It is these very groups of persons who are also underrepresented when it comes to credit card ownership – albeit to a much greater degree. For instance, their share of credit card ownership is between four and five times lower than among full-time employees, 41% of whom have at least one credit card. Despite the low share of ownership, as many as 61% of girocard owners in training use the card for payment purposes. The relatively intense utilisation is at roughly the same high level

as that of card owners in full-time employment. The girocard is used most seldom by those looking for work (27% of card holders).

## III.2. Evaluation of payment behaviour according to the payments diary

The following analysis of payment behaviour in Germany is based on a large number of records in the payments diary which was kept by respondents over a period of one week. This asked for places where consumers normally shop: retail trade, petrol stations, chemists, the internet, etc. The use of services with the place of payment in and outside the home was also recorded. Over and above this, respondents were asked to record specific transactions such as pocket money payments and payments to private individuals (for instance on flea markets). Finally, it was asked how much cash the participants in the questionnaire saved during this week in piggy banks or tins/bottles/drawers or the like. In addition to the common forms, such as cash, girocard[50], GeldKarte and credit card, participants also had "exotic" response categories for the payment instruments used at their disposal, such as payments by mobile phone or by fingerprint recognition. This was to ascertain the degree to which innovative payment instruments are used in practice.

### III.2.1. General benchmarks/overviews

The payments diary was completed by 2,204 individuals[51] who spent a total of €700,438 (24,437 transactions). This corresponds to an average of 1.6 transactions per person per day. Although the figure is low, it corresponds to the result of other diary studies. Respondents presumably did not record all the transactions in full. It can be presumed that in particular micropayments, for instance for newspapers or at car park ticket machines, were forgotten. The average payment value, amounting to €318 per person per week, on the other hand, permits one to conclude a representative and largely complete recording of the major expenditure items.[52]

The payment amount of the transactions recorded in the diary fluctuates considerably. The smallest amounts stated are in the lower one-digit Cent area. The intended purpose stated by respondents was "saving cash", i.e. the Cent coins were presumably removed from people's wallets and hoarded. The largest individual expenditure item, at more than €10,000, was recorded in retail trade for longer-term acquisitions. Whilst the mean value of all transactions is €28.70, the median is €10.40. This indicates that, on the whole, respondents spent a large number of small to medium-sized and a small number of very large amounts.

When evaluating the expenditure stated in the payments diary, cash, with a turnover share of 57.9%, emerges as the preferred payment instrument in Germany. This is followed at a great distance by girocard payments, with a turnover share of 25.5%, and by transfers, at 8.9%. On the whole, credit card payments (3.6%) and direct debits (1.9%) are of subordinate

[50] Girocard is the new acceptance logo for the electronic cash system (previously: ec card). See Ch. II.1.

[51] Another 13 persons only provided information on cash ownership.

[52] See also Mooslechner, P., Stix, H., Wagner, K.: *Zahlungsverhalten in Österreich*, p. 127, 2006

significance. The GeldKarte, which when it was introduced in Germany in 1996 was expected to displace cash to a significant degree, accounts only for a share of 0.5% of expenditure. More recent innovative forms of payment, such as internet payment procedures (e.g. Paypal) and payment by fingerprint recognition, play virtually no role in view of the extremely low level of utilisation or are not used at all, such as payment by mobile phone. They are therefore largely not dealt with in detail.

In comparison to the turnover-related values discussed above, the share of cash payments in terms of the number of transactions, at 82.5%, is much higher. By contrast, the shares of payments by girocard (11.9%), transfers (1.8%) and credit card payments (1.4%) are much lower than the shares calculated in terms of turnover.

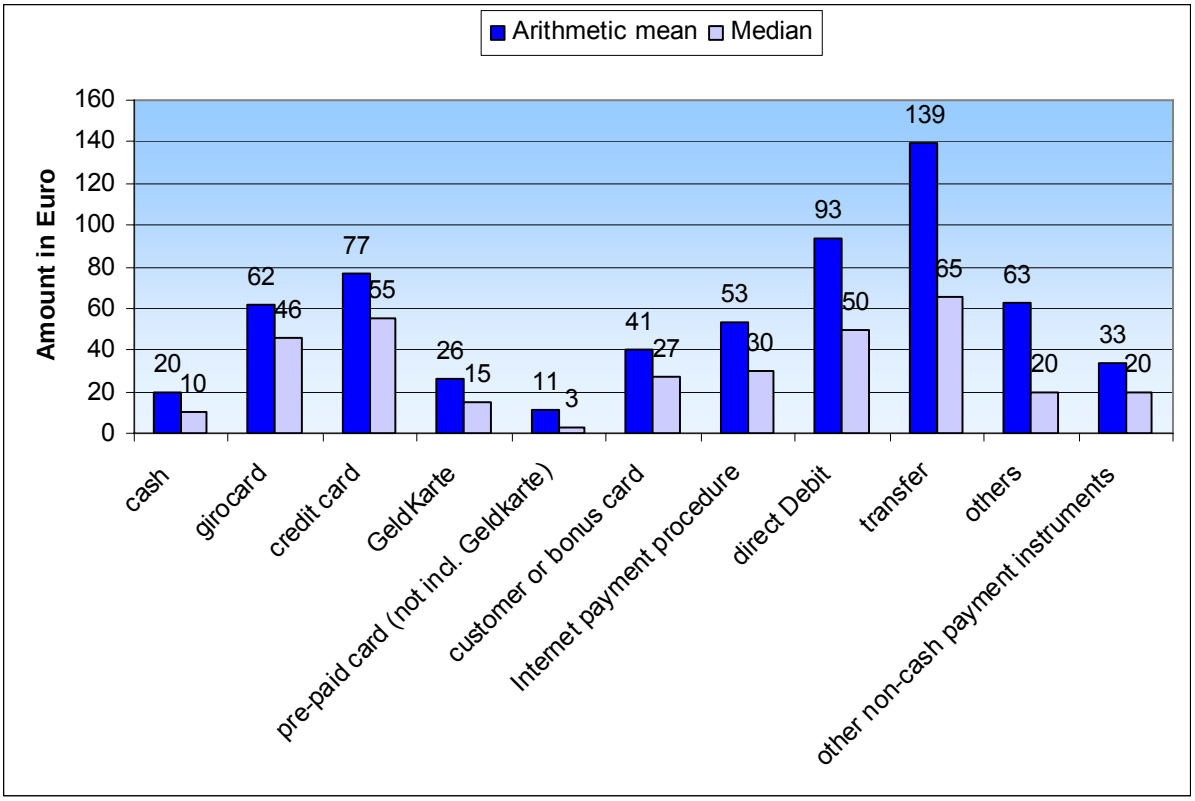
**Table 2: Share of payment instruments by turnover and number of transactions**

| Payment instruments | Distribution by turnover | | Distribution by transaction volume | |
|---|---|---|---|---|
| | Turnover in € | % share | No. Transactions | % share |
| Cash | 405.486 | 57,9 | 20.161 | 82,5 |
| girocard | 178.829 | 25,5 | 2.907 | 11,9 |
| Credit card | 25.538 | 3,6 | 333 | 1,4 |
| GeldKarte | 3.186 | 0,5 | 122 | 0,5 |
| Pre-paid card (not incl.GeldKarte) | 551 | 0,1 | 49 | 0,2 |
| Customer/bonus card | 1.390 | 0,2 | 34 | 0,1 |
| Internet payment procedure | 1.939 | 0,3 | 36 | 0,1 |
| Direct debit | 13.024 | 1,9 | 140 | 0,6 |
| Credit transfer | 62.199 | 8,9 | 447 | 1,8 |
| Other | 2.948 | 0,4 | 44 | 0,2 |
| Cashless, no payment instrument stated | 5.349 | 0,8 | 161 | 0,7 |
| Total | 700.438 | 100,0 | 24.437 | 100,0 |

Deutsche Bundesbank

The following section focuses on the connection between the payment amount and the payment instrument used. To this end, for each payment instrument both the arithmetic mean (average amount paid per transaction) and the median (turnover value above and below which 50% of all transactions fall) is stated in Figure 19. The first thing one notices is that the corresponding payment instruments differ considerably from one another in this regard. Furthermore, the respective arithmetic mean is higher with all payment instruments than the corresponding median (in some cases much higher). This is caused by the steep leftward distribution of the payment amounts, i.e. a relatively small number of large expenditure items distort the arithmetic mean upwards, although the majority of transaction amounts is below this.

**Figure 19: Average payment amount per payment instrument**



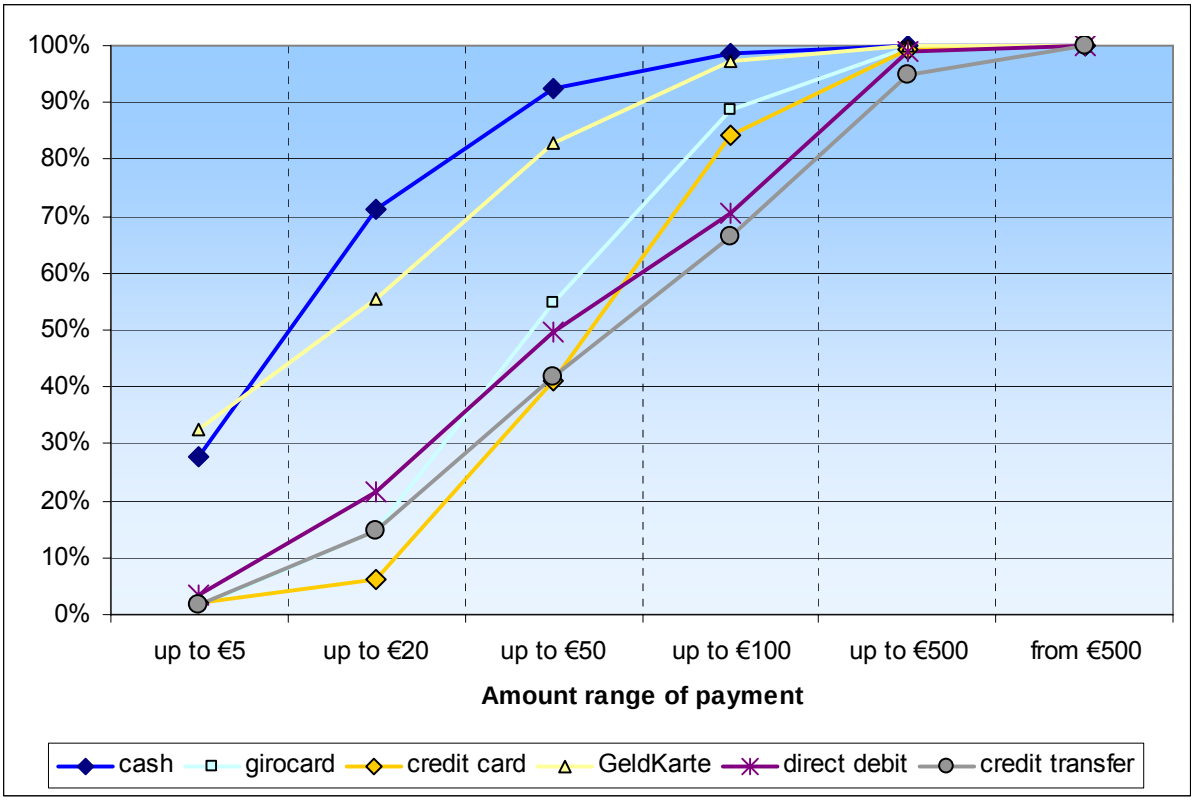

Deutsche Bundesbank[53]

In accordance with the transactions recorded in the payments diary, cash is primarily used for small payments averaging €20 with in each case half of the payments being below or above €10 (median). This strong concentration of the use of cash for small amounts is made clear by Figure 20, which shows for each payment instrument the spread of the transactions among the various amount ranges. It is worth noting the relatively steep increase in the cash curve. Accordingly, 92% of all cash payment transactions are in the amount range of up to €50; 99% of all payments are below a value of €100. The GeldKarte also has its focus of utilisation with low payment amounts, half of all transaction amounts being up to €15 (See footnote 51). In contrast, respondents largely use girocards and credit cards for settling much larger amounts. With regard to the girocard, the average turnover paid was €62, and with the credit card it was as much as €77. The curve shown below, starting flat for payments with the girocard and credit card, shows that these have virtually no role to play with transactions up to €5. The focus lies on turnover in the medium and high amount ranges, so that as many as 45% of all girocard payments have a value of €50 and more, whilst with credit cards this share is as high as 59%. Direct debits and credit transfers tend to be used for payments

[53] The unexpectedly high average payment amount with the GeldKarte is surprising (mean value: €26, median: €15), given that the focus of deployment (cigarettes, car parks, etc.) is more in the small amount range when it comes to vending machine payments. It can hence be presumed – also against the background of the insufficient knowledge of the GeldKarte (See III.1.2) – that respondents accidentally attributed girocard payments to the GeldKarte in the payments diary.

averaging €93 and €139, respectively, in other words above all for larger payment amounts. In comparison to the median value of €50 and €65, respectively, the customary purchase value is, however, roughly at the level of the girocard and credit card.

**Figure 20: Spread of the payments across the amount ranges**

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*Note: The cumulated share of the payments per amount range and payment instrument is stated; for instance 71% of cash transactions have a value of up to €20.*

Given that the general public prefers specific procedures depending on the transaction amount, the share of payment instruments as measured by the number of transactions is investigated below for each amount range. As can be clearly seen in Table 3, small payments are almost exclusively made in cash. This is likely to reflect the fact that the current cash stock – in other words the question of whether the transaction to be made can be made with the cash available – is the most important criterion for the selection of the payment instrument at the POS (See Ch. II.2.3). A further important reason for the small share of cashless transactions when it comes to small payments is presumably that retailers frequently only accept payment by girocard or credit card from a certain minimum amount upwards (e.g. €10). Secondly, many people probably also have an inhibition towards paying for small amounts by card. What is more, acceptance points for the GeldKarte, which is designed for small payments, are not very widespread. As the amounts increase, the cash payment share decreases considerably up to the amount range of up to €500. 97% of payments up to €5 are made in cash, whilst this share falls to 32% for amounts between

€100 and €500. One reason for this tendency might be respondents' security perception of not wanting to keep larger amounts of cash in their wallets.[54] The cash share surprisingly increases once more above €500. One explanation for this might be that cash is partly used with very large amounts because card payments are no longer possible because of the disposal limit applied. As a rule, such disposal limits are set by the institution issuing the card, for instance for reasons of security or credit worthiness. However, given that there are relatively few observations in this amount range, the corresponding figures should be interpreted with caution. All in all, it is, however, apparent that cash is the most frequently used payment instrument in almost all amount ranges.

Unlike in the case of cash, cashless payment instruments become more significant, as one would expect, as the amounts increase. Within this group, the girocard, which does not become relevant until payments from euro 5 upwards, and reaches a maximum share of approx. 38% in the amount range between euro 50 and 500, is used most frequently. Credit transfers and credit cards did not take on major importance until amounts reached €50 and upwards, direct debits with payments between €100 and €500. With GeldKarte payments, no significant utilisation preference can be ascertained in a specific amount category – presumably owing to the relatively small number of observations. In any case, it cannot be used for large payments because of the maximum charging amount of €200. In the case of amounts from €500 upwards, the considerable increase in the share of credit transfers to approx. 35% of all transactions to the detriment of the other cashless payment instruments, is surprising. This development is presumably, first and foremost, a result of the disposal limits already mentioned with card payments in the case of very large transaction amounts. Having said that, the shares shown are only informative to a certain degree in the amount range from €500 because of the small number of observations made. Owing to the very small number of cases and thus the limited informative value, all other cashless forms of payment have also been summarised in the category "Other cashless payment instruments".

**Table 3: Share of payment instruments in different amount ranges**

| Share per amount range | up to€ 5 | €5 to €20 | €20 to €50 | €50 to €100 | €100 to €500 | From €500 |
|---|---|---|---|---|---|---|
| cash | 96,6% | 93,7% | 73,2% | 48,4% | 32,2% | 38,6% |
| girocard | 0,8% | 4,1% | 20,0% | 38,2% | 37,8% | 20,1% |
| credit card | 0,1% | 0,1% | 2,0% | 5,6% | 6,0% | 3,8% |
| GeldKarte | 0,7% | 0,3% | 0,6% | 0,7% | 0,4% | 0,0% |
| direct debit | 0,1% | 0,3% | 0,7% | 1,1% | 4,7% | 2,3% |
| credit transfer | 0,1% | 0,6% | 2,1% | 4,2% | 15,1% | 34,8% |
| other cashless payment instruments | 1,6% | 0,8% | 1,4% | 1,8% | 3,8% | 0,5% |
| Total: | 100,0% | 100,0% | 100,0% | 100,0% | 100,0% | 100,0% |

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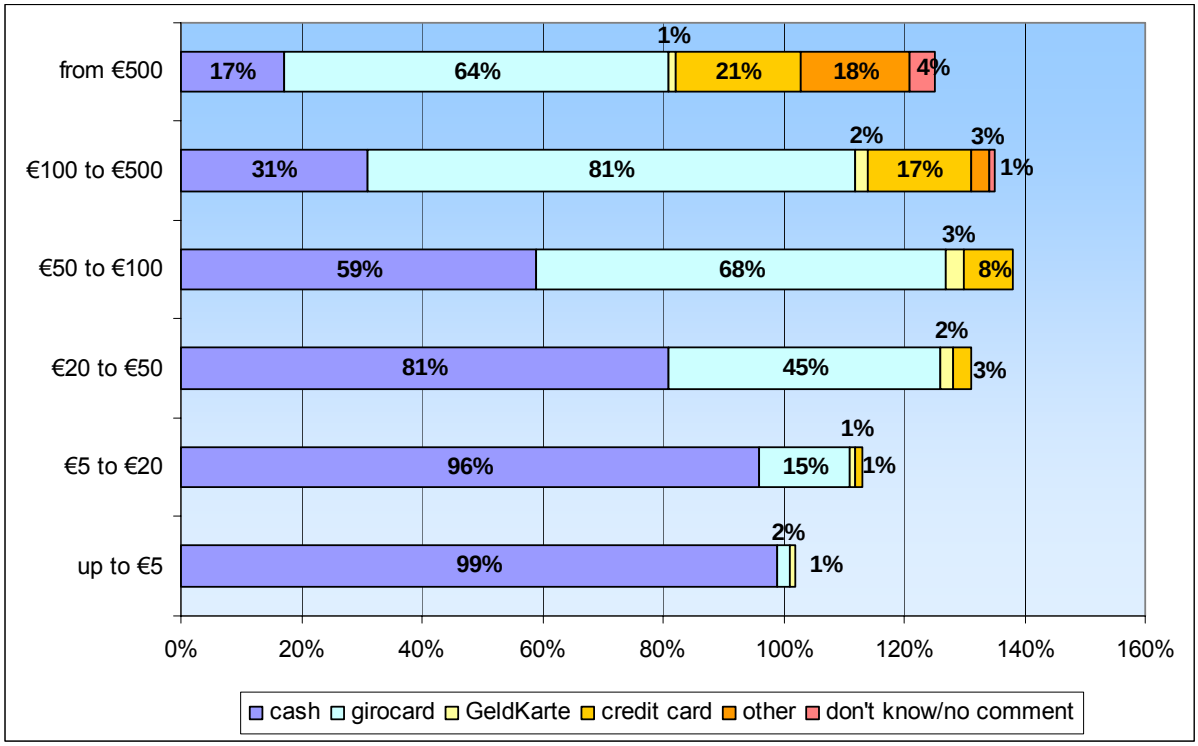
*Note: The table shows the shares of the payment instruments used in the respective amount range, measured in terms of the total transaction volume. This means, for instance, that 96.6% of all payments up to a value of €5 were made with cash. The shares shown largely correspond to the respective turnover shares per amount category.*

[54] According to the data, an increasing share of respondents feels unsafe with an increasing amount of cash in their wallets; only 19% of respondents never feel unsafe even if they have large amounts of cash in their wallets.

In addition to the payment habits actually observed according to the payments diary, the respondents were asked in the questionnaire to assess their own payment behaviour in each amount range. The interviewees were asked already prior to keeping the household diary which of the payment instruments from which they could select (max. 2) they customarily used for which amounts when shopping/in shops. Since the focus was primarily on the selection decision and competition between use of cash and payment cards, individuals who had previously stated that they did not have any payment cards and/or that in any case they only paid in cash, were not asked about this (25% of respondents).

**Figure 21: Self-assessment of cash and card use per amount range**

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*Question: Which of the following means of payment do you customarily use when shopping for what amounts? (max. 2)*

In the decision as to whether cash or payment cards are used, cash is clearly preferred up to amounts of €50. It is only with amounts above this that the majority of respondents state the girocard as their preferred payment instrument. The significance of the girocard and also of the credit card – unlike cash – increases gradually in the view of respondents as payment amounts increase. Whilst, however, 15% of respondents state that they already use the girocard for relatively small amounts, from €5 upwards, credit cards are not used to any significant degree until an amount of €50 is reached. In comparison to this, the GeldKarte is only an alternative to cash or other cards for a very small number of people. All in all, the tendency revealed is similar to the transactions recorded in the payments diary.

### III.2.2. Evaluation of payment behaviour by socio-demographic characteristics and card ownership

It is generally presumed that the use of cash and other payment instruments depends on various socio-demographic characteristics such as age, gender, etc. This chapter therefore aims to show and interpret any existing links on the basis of the information held in the payments diary.[55]

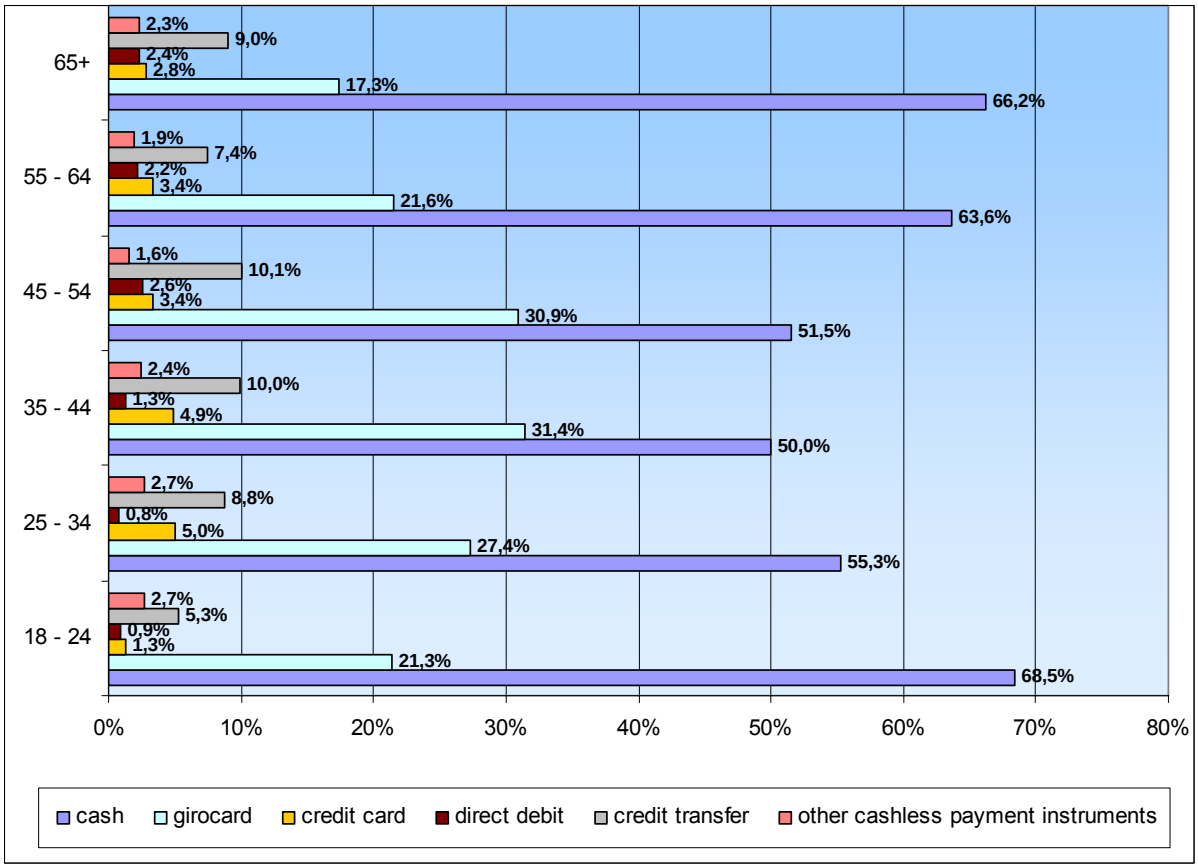
#### Age

If the utilisation of payment instruments is analysed in connection with the age of the respondents, it initially emerges that cash is the most popular form of payment in each age group, followed by the girocard (See Figure 22). Younger respondents up to the age of 24 and respondents aged 55 and above have the greatest tendency to pay by cash. In the age ranges between these, the tendency to pay by cash reduces, and the girocard becomes proportionally more popular. As a result, the diagram shows a kind of “sandglass form” related to the share of payments by cash and girocard.

The large share of cash payments among older respondents tallies with the above-average positive evaluation of cash throughout with regard to major criteria of payment instruments, such as convenience or familiarity with their use (See Ch. II.2.2). Although the over 65s virtually have the same amount of girocards as those in the medium age ranges (yet significantly fewer credit cards), they use them much less frequently. They may lack the willingness to adjust to new payment forms and technologies. Very young people, aged up to 24, make a relatively large amount of payments up to the value of €20. Transaction amounts in this range are settled almost exclusively in cash. By contrast, the share of payments with values above this (up to €500) is below the average of the other age groups. This is probably due primarily to the lower personal net income. Thus, 41% of 18- to 24-year-olds are in the income group below €500, whilst this share is only 14% to 17% among the more elderly respondents. Connected with this is probably also the fact that the youngest age group of respondents investigated have significantly fewer credit cards at their disposal than persons aged 25 and upwards (See Ch. III.1.2). This explains the small share of credit card payments among overall expenditure.

[55] The shares of payment instruments ascertained below are aggregated values (eg cash payment share: total of cash payments divided by the total of overall expenditure of all respondents).

**Figure 22: Use of payment instruments according to age group**

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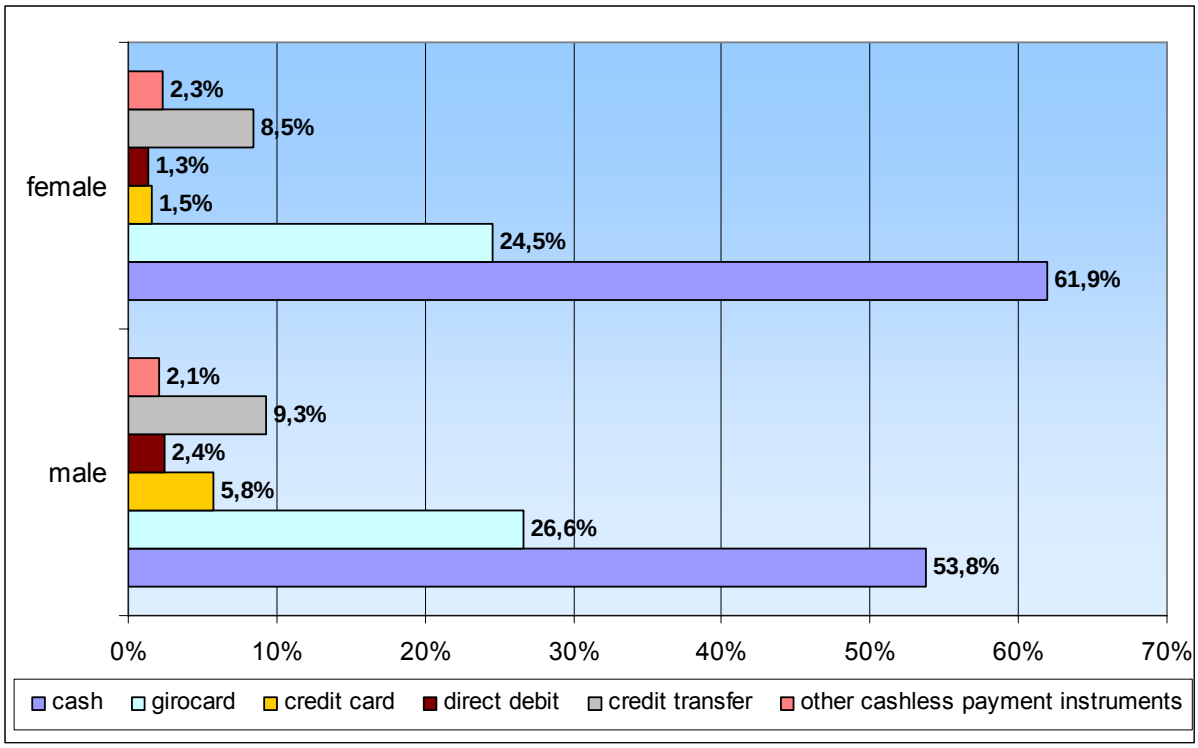
*Note: The respective share of total expenditure is stated (e.g. cash payments of all 18- to 24-year-olds/overall expenditure of 18- to 24-year-olds)*

## Gender

The differences between men and women when it comes to the use of payment instruments consist above all in the fact that women prefer cash payments more than men do, whilst men use credit cards much more frequently than women do (See Figure 23). This is presumably due to the fact that women own significantly fewer credit cards than men (See Ch. II.1.2.). Women also make more payments in the small and medium amount range up to €50, which is dominated by cash. Men, by contrast, spend between €50 and €500 more than women; the credit card is more popular in this range, if only for reasons related to the amount.

**Figure 23: Use of payment instruments according to gender**

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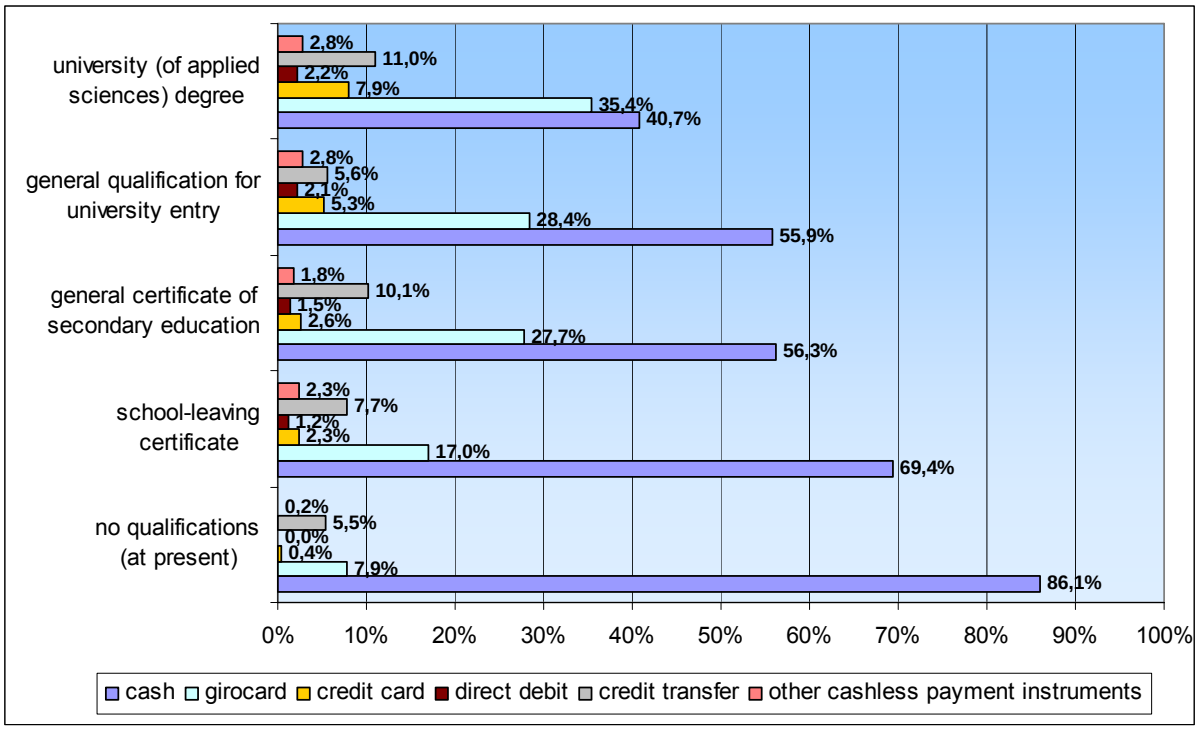
*Note: The respective share of total expenditure is stated (e.g. cash payments by all men/total expenditure by men)*

### Education

With regard to the use of payment instruments, there is a link between the level of education attained by the respondents and their utilisation of cash. As is revealed by the “pine tree” shape in Figure 24, the share of cash among the total payment volume tends to be lower as the level of education increases. The trend with regard to girocard and credit card payments is quite the opposite. Whilst, for instance, 69% of all expenditure is paid in cash in the group of individuals who graduated from a general school, persons with a university (of applied sciences) degree only use cash for 41% of their overall expenditure. The comparatively large share of cash payments, at 86%, made by persons without any qualifications, confirms the link that was described. Since, however, only 30 respondents fell within this socio-demographic group, no further interpretation of their payment behaviour is carried out below.

**Figure 24: Use of payment instruments according to level of education**

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*Note: The respective share of total expenditure is stated (e.g. cash payments of all respondents with a general qualification for university entry/total expenditure of persons with a general qualification for university entry)*

There are a number of reasons for the different utilisation of payment instruments as described above. With regard to the group of persons with a school-leaving certificate, the above average age of these individuals comes to note; 42% are 65 years of age and above. For this reason, as already explained above, the greater propensity of older people towards cash is likely to be primarily responsible for the large share of cash payments in this category. Across all groups, the distribution of payment cards, which increases with rising level of education, especially in the case of credit cards, might also explain the deviations in payment habits (See Ch. III.1.2). One of a number of reasons for this might be better knowledge of and familiarity with the characteristics and possibilities of using cashless payment instruments in general, as well as a greater affinity to technology.[56] Accordingly, the assessment as to whether the girocard or credit cards meet major criteria, such as quick, convenient payment, is increasingly affirmed as educational qualifications rise (See Ch. II.2.2.1.). With regard to the link observed between education and share of cash payments, a major role is also played – as described below – by the fact that income tends to increase in line with the level of education.

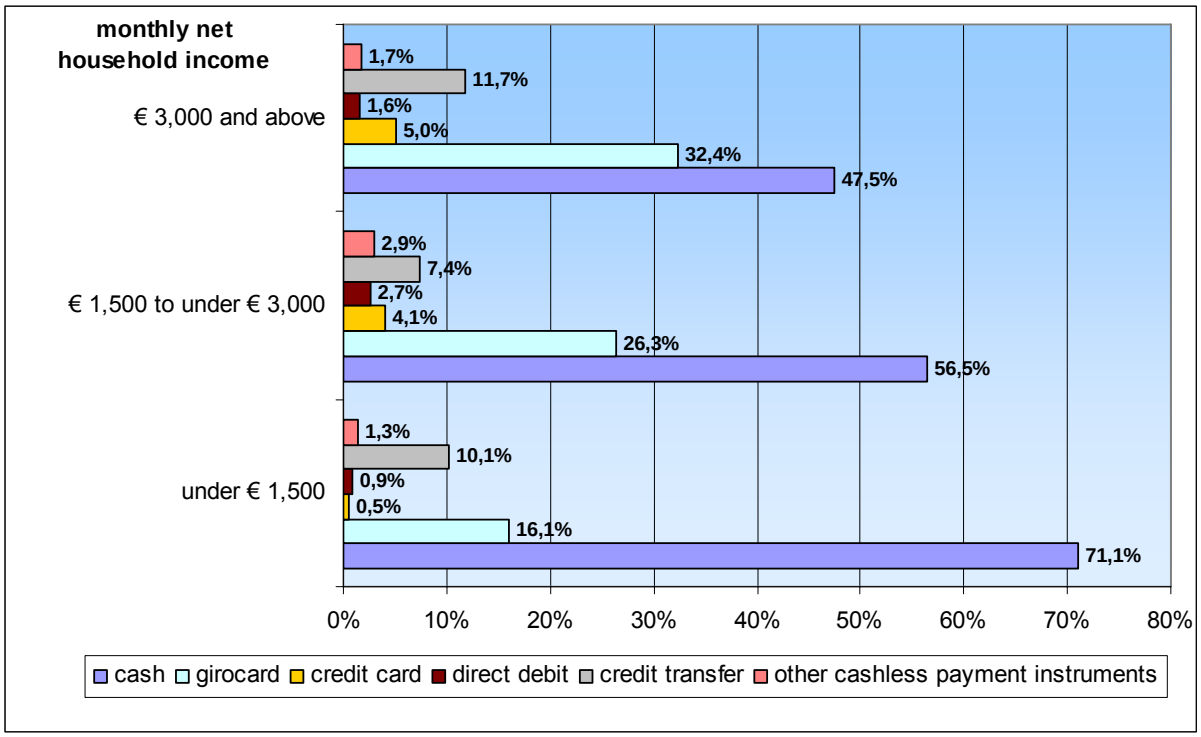
[56] The frequency of purchasing on the internet can be used as a proxy for the degree of affinity to technology. According to the survey results, this increases in line with a higher educational qualification.
See also Forschungsgruppe Wahlen, *internet-Strukturdaten*, 2009

**Income**

The question as to whether respondents' net household income exerts an influence on payment behaviour is answered by Figure 25. The share of cash payments among total expenditure falls with increasing income, whilst the share of girocard and credit card payments increases. Here too, the "pine tree" pattern mentioned above is found in the distribution of cash and card payments in the graph. In view of the link already mentioned between (higher) educational qualification and income, this trend was to be expected. As the financial position improves, as a rule the number of large expenditure items also rises. This is also shown by the evaluated data, according to which the share of transactions from a value of €50 upwards grows as income increases – an amount range in which the significance of cash payments falls (See Table 3). The larger cash share with lower income is, however, also likely to be linked to the disproportionately rising share of older persons in retirement, who generally prefer to pay in cash. Furthermore, as income falls, a good overview of expenditure becomes more and more important – a criterion which is particularly well fulfilled by cash (See Ch. II.2.2.6).

When it comes to card payments, the increase in the share of credit cards appears to be particularly marked, rising tenfold from 0.5% in the income group below €1,500 to 5% with incomes from €3,000 upwards. Since credit card ownership also increases in line with income (See Ch. III.1.2), it can be presumed that persons with a comparatively higher income are more likely to be able to afford credit cards or to want to do so, and that they are more likely to be offered cards by their bank. This is confirmed by the survey results, according to which credit cards receive an increasingly negative evaluation in terms of the "cost" criterion as income falls (See Ch. II.2.2.7). Furthermore, the role of the credit card as a status symbol could promote its use in line with rising income.

**Figure 25: Use of payment instruments according to income groups**

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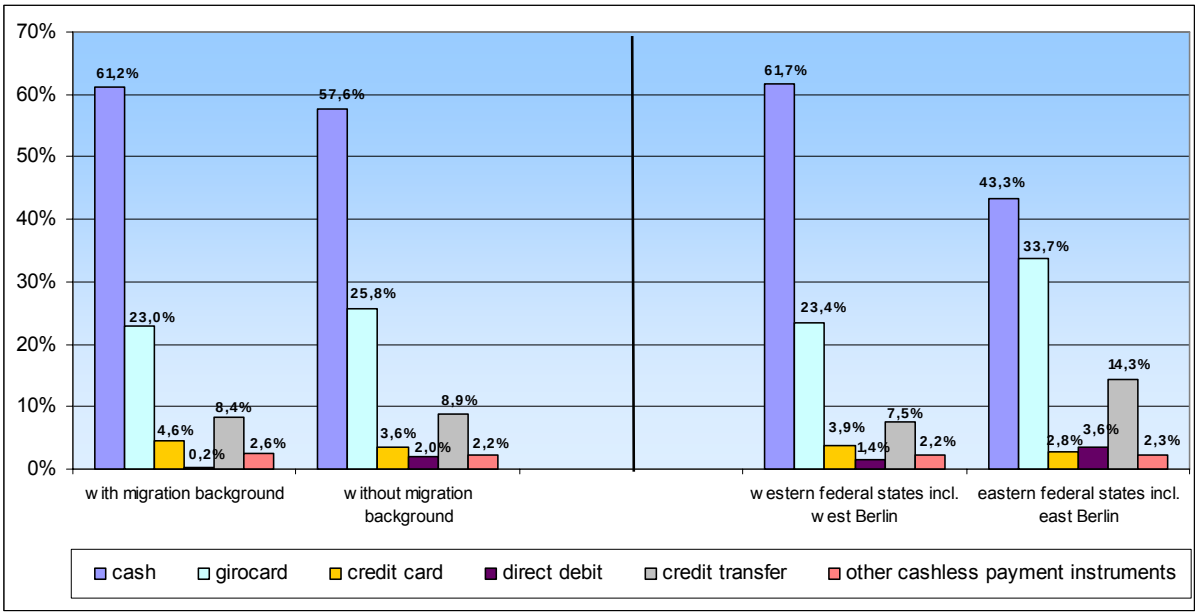
*Note: The respective share of total expenditure is stated (e.g. cash payments by all respondents with an income below €1,500/total expenditure of respondents with an income below €1,500)*

### Origin

In order to reveal any origin-related differences in the use of payment instruments, the sample group has been sub-divided into persons with and without a migration background, and into persons from the western and eastern federal states. When evaluating by the characteristic “migration background”, there are only relatively slight differences in the utilisation of cash or cashless payment instruments. With regard to persons with a migration background, the cash share, at 61% of expenditure, is only 3 percentage points higher than that of respondents who have no migration background (See Figure 26). The shares of the other payment instruments are similarly close together. The slightly higher share of cash might, amongst other things, result from the fact that persons with a migration background have somewhat more restricted access to girocards, as is shown by the below-average share of girocard owners (85%) in comparison to other respondents (92%) (See Ch. III.1.2). To sum up, a pronounced preference for cash, which persons with a migration background are often said to have, cannot be confirmed by the figures at hand.

With regard to regional distribution, there are clear differences between the western and eastern federal states in the way in which the payment instruments are used. As is shown by Figure 26, cash is used much more frequently in the western federal states, with a share of 62% of all expenditure, than in the eastern federal states, where the cash share is only 43%. Accordingly, the ratio of the use of the girocard and credit transfers is reversed, with shares reaching above average levels in the eastern federal states, at 34% and 14 % respectively.

**Figure 26: Use of payment instruments according to origin (migration background and western/eastern federal states)**

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*Note: The respective share of total expenditure is stated (e.g. cash payments of all respondents with a migration background/overall expenditure of persons with a migration background)*

### Employment status

Somewhat pronounced differences can also be ascertained when it comes to the use of cash depending on the employment status of the survey participants. Its share of overall expenditure is highest, at 79% and 72%, respectively, among job-seekers and among persons who exclusively look after the household. By contrast, cash is used least by those in full-time employment, with a share of 48%.

Among job-seekers, the large share of cash payments is presumably connected to the comparably small monthly income; 65% of all respondents fall into the category below €1,500 in respect of net household income. Girocard and credit card ownership, at 83% and 8%, respectively, is also well below average in this group (See Ch. III.1.2). Furthermore, one might presume that an above-average number of expenditure items are paid for in cash in order to avoid an examination of the personal economic background by state agencies (e.g. in connection with granting Hartz IV benefits[57]).

Moreover, the above-average use of cash among persons who exclusively look after the household is more difficult to interpret since no characteristics come to note that are related either to age or to net household income. Equally, girocard and credit card ownership (87% and 20%, respectively) does not deviate from the average of all respondents in such a away as to explain the higher cash payment share (See Ch. III.1.2). In contrast to the situation with

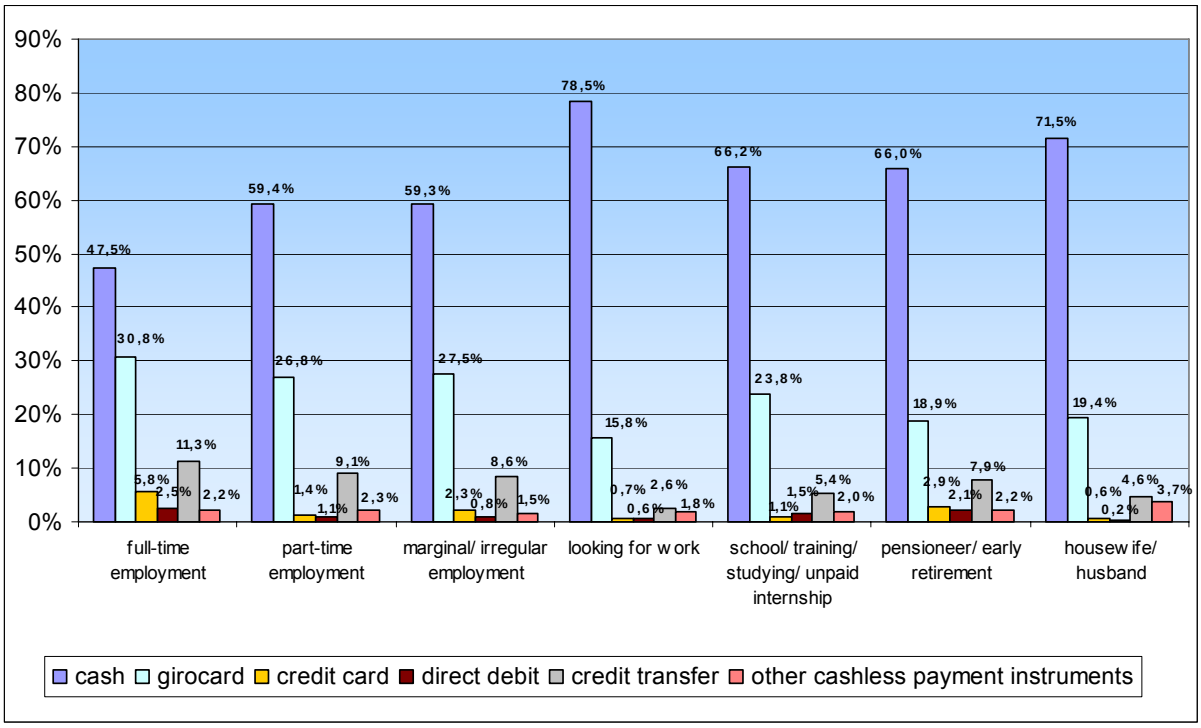
[57] According to a fundamental judgment of the Federal Social Court, Hartz-IV recipients have to disclose their bank statements if they are called on to do so. (judgment of 19 September 2008, ref.: B 14 AS 45/07 R)

net household income, however, the personal net income of persons who look after the household is at a very low level, or they have none at all. It can therefore be presumed that cash is used disproportionately often for payment because, in many cases, this group of individuals is only provided with cash for housekeeping purposes by the respective income-earning partner.

The above-average cash payment share of 66% observed among pensioners is, of course, largely connected with the more mature age of this group of individuals and their preference for cash, as described above. However, those in training (school pupils, trainees, students and interns) also settled 66% of their overall spending with cash. This can be partly explained by the fact that this group of individuals has the lowest level of girocard ownership (81%) and a distribution of credit cards which is also in the lower range. At the same time, however, a relatively large share of them paid with the girocard at least once in the period under observation (See Ch. II.1.2.). The large cash payment share hence appears to be caused by the fact that the majority of 91% of those in training only have a net personal monthly income of below €1,000 at their disposal, and 53% have even less than €500. In line with the lower level of income, a larger number of transactions took place in the period under observation at values of up to €50 – an amount range in which the cash payment share is generally particularly large (See Table 3).

As was already mentioned, those in full-time employment only pay for 48% of their expenditure with cash, whilst a much larger transaction volume (31% and 6%, respectively) is transacted with girocards, and particularly credit cards, than in the comparison groups. This is likely to be related to the higher income resulting from full-time employment and from the concomitant greater card ownership (See Ch. III.1.2). The share of full-time workers with a net monthly household income of €3,000 and above, at 34%, is therefore roughly twice as high as with other respondents. As a result, card ownership with the girocard and credit card, at 95% and 41%, respectively, also reaches the highest value of all groups of respondents. The share of those who have used the cards at least once in the period under observation is also above the average of persons with another employment status with the girocard, at 60%, and particularly with the credit card, at 14%.

**Figure 27: Use of payment instruments according to employment status**

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*Note: The respective share of total expenditure is stated (e.g. cash payment total of all full-time workers/overall expenditure of full-time workers)*

## Card ownership

It is also of relevance to assess the influence that card payment ownership exerts on people's cash payment behaviour. The presumption that the payment cards available (partly) replace cash payments is confirmed by the empirical data. Persons who have no payment cards pay for 89% of their expenditure in cash, which is significantly more than in the case of payment card owners, where cash payments account for a share of 57%.[58]

The cash payment share is largely dependent on girocard ownership. If no girocard is available, the average cash payment share accounts for 82% of expenditure, compared with 56% if a girocard is present. If one is in possession of two or more girocards, the cash payment share falls to 52%. If one is in possession of at least one credit card, the average share of cash payments falls further to roughly 46%, and to 41% if two and more credit cards are available. However, also in the case of persons without a credit card, the cash share accounts for just 65% of expenditure because many respondents have at least one girocard, which they actually use. (See Ch. III.1.2).

[58] Payment card holders are those individuals who own either a girocard, credit card or GeldKarte.

### III.2.3. Evaluation of payment behaviour by place and purpose of payment

As was mentioned at the outset, respondents recorded their expenditure and the corresponding places and purposes of payment in a payments diary for a period of one week. The following chapter will start by describing how frequently respondents visited the places in question on average while keeping the diary and what share of the total transactions and turnover were accounted for by them. Following this, the utilisation of the most important payment instruments will be investigated in greater detail, depending on the place and purpose of payment.

#### III.2.3.1. Place and purpose of payment

The transaction figures and turnover volumes deviate considerably from one another in the period under observation with regard to the various places and purposes of payment. As might be anticipated, the evaluations of the figures in Table 4 show that the greatest amount of purchases is made (10,831 transactions) and the largest payment volume (€241,530.00) is transacted in "retail trade for daily needs". This corresponds to a share of 44% of the total number and 35% of the total value of all expenditure items entered in the payments diary. Each person accordingly visits and shops in a retail store an average of five times per week, and, in doing so, spends approx. €22 per transaction. The points of sale "café/pub/snack bar/fast food restaurant" follow far behind, accounting for a share of 11% (2,703 transactions) of the total number of transactions. With regard to the payment value, however, "retail trade for longer-term purchases" takes second place, at 16% of total turnover (€108,710.00). The reason for this is a much larger average amount per payment, which, at approx. €71, by far exceeds the value of approx. €9 spent in cafés, etc. Third place is occupied by petrol stations, which account for 8% of transactions and 10% of turnover. By contrast, all other places and purposes of payment account for shares of approx. 5% and below, with the exception of "out of house services". The average number of transactions carried out per person is also correspondingly low.

As anticipated, the average transaction value is also very different depending on the place and purpose of the purchase. The lowest amount is spent at vending machines, with an average of €7, whilst the greatest amount is spent on hotels, at €149. The differing average amounts, depending on location, are also shown in the evaluation by individual payment instruments frequently used, the level of the amounts being lowest with cash and highest with credit cards.

**Table 4: Number and value of transactions by place and purpose of payment**

| Place/ purpose of payment | No. Transactions | | Value of transactions | | Ø value per transaction in € | Ø no. trans. per respondent |
|---|---|---|---|---|---|---|
| | No. | share in % | amount in € | share in % | | |
| Retail trade for daily needs | 10,831 | 44.3 | 241,530 | 34.5 | 22 | 4.9 |
| Retail trade for longer-term purchases | 1,525 | 6.2 | 108,710 | 15.5 | 71 | 0.7 |
| Petrol station | 1,906 | 7.8 | 71,566 | 10.2 | 38 | 0.9 |
| Chemist | 1,005 | 4.1 | 17,252 | 2.5 | 17 | 0.5 |
| External services | 951 | 3.9 | 61,839 | 8.8 | 65 | 0.4 |
| Services in household | 231 | 0.9 | 20,078 | 2.9 | 87 | 0.1 |
| Vending machines | 1,179 | 4.8 | 8,299 | 1.2 | 7 | 0.5 |
| Internet shopping | 311 | 1.3 | 22,826 | 3.3 | 73 | 0.1 |
| Mail order | 222 | 0.9 | 18,668 | 2.7 | 84 | 0.1 |
| Restaurant | 870 | 3.6 | 31,391 | 4.5 | 36 | 0.4 |
| Cafés, pubs, snack bars, fast food restaurants | 2,703 | 11.1 | 24,341 | 3.5 | 9 | 1.2 |
| Leisure activities | 886 | 3.6 | 16,393 | 2.3 | 19 | 0.4 |
| Hotels, guesthouses | 73 | 0.3 | 10,909 | 1.6 | 150 | 0.0 |
| Payments to private individuals | 686 | 2.8 | 22,115 | 3.2 | 32 | 0.3 |
| Pocket money for children | 409 | 1.7 | 7,261 | 1.0 | 18 | 0.2 |
| Saving cash | 431 | 1.8 | 10,286 | 1.5 | 24 | 0.2 |
| Other | 8 | 0.0 | 243 | 0.0 | 31 | 0.0 |
| No place of payment stated | 210 | 0.9 | 6,730 | 1.0 | 32 | 0.1 |
| Total | 24,437 | 100.0 | 700,438 | 100.0 | 29 | 11.1 |

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### III.2.3.2. Utilisation of payment instruments according to place and purpose of payment

The payment instruments are used to differing degrees at the different places of payment. This connection will be investigated in greater detail below.[59]

#### Places and purposes of payment with a large cash share

The share of cash turnover is particularly high at the place of payment “café/pub/snack bar/fast food restaurant”, at 96%. Also higher than average, cash is frequently used for payments to private individuals (88%), pocket money payments (83%) and at chemists (82%). In addition, cash is frequently used to pay for leisure activities (80%), such as for sport, music and culture. The high cash turnover shares correspond in each case with small average amounts per transaction – typical of the place and purpose of payment (See Table 4). What is more, with pocket money payments or with payments between private individuals, the personal handing over of the money is simplest in most cases, or there are no alternatives. Measured in terms of their share across all respondents, payments to private individuals (e.g. private purchases, flea market expenditure) is disproportionately high among job seekers and those on a low income, as well as among women. The large share of cash payments made at chemists is also linked to the age structure; approx. 64% of all expenditure is made by individuals aged 55 and above. Conversely to the large amount of cash payments made, cashless payment instruments are used correspondingly infrequently. It is interesting that as many as 16% of pocket money payments are transferred to bank accounts. The recipients are likely to be minors who are able to dispose of their own current accounts.

[59] The payment purpose “saving cash” is not further described below because of the exclusive use of cash. Shares always relate to turnover.

**Places and purposes of payment with an average/medium share of cash**

More than two-thirds of all expenditure is paid for with cash in restaurants, at vending machines (e.g. cigarettes, tickets) and in retail outlets for daily needs (e.g. food, stationery). The share accounted for by cash payments in restaurants (76%) is a little surprising, despite the fact that relatively large average payment amounts are incurred and card payments are offered as an alternative in many cases. One explanation is presumably the share of older persons aged 55 and above, who account for approx. 50% of all expenditure in restaurants. The relatively large cash share might also be due to tips, which are frequently handed over to the waiter in cash with the payment amount.

In the case of vending machines, however, the cash share of 69% of expenditure is, at a first glance, lower than expected since, ultimately, the average transaction amount of all places of payment is lowest here. At the same time, the cash share in relation to the number of transactions is, however, at a very high level (90%).[60] The major difference between the share by turnover and the number of transactions is due to the concentration of cash payment on small amounts. Whilst, for instance, 65% of cash payments are below €5, only 17% of the girocard payments in vending machines are in this low amount range. With regard to higher amounts in particular, the use of cashless payment instruments at vending machines could be due to the frequent lack of cash stocks and the perception that looking for cash in a wallet is unsafe and inconvenient. The functioning of the vending machines can also be impaired by the means of payment and/or the sensors installed in the machine being in a poor condition, with the result that, for example, alternatives means of payment, such as the girocard, have to be used instead. Additionally, the GeldKarte has its main area of application here – even if only with a very small share of 3% of vending machine turnover – in comparison to all other places of payment.

The focus is also on cash in the most frequented retail trade for daily needs, with a turnover share of 69%. This value is a result, *inter alia*, of the fact that half of the payments, at €12 (median value), cover an amount range which is dominated by cash. The habit of paying in cash at the till in retail outlets is, however, also likely to play a major role in many cases.

**Places and purposes of payment with a low cash share**

As expected, the utilisation of cash is less important at purchasing locations where the focus is on cashless payment instruments, either of necessity or for technical reasons (e.g. internet trade) or comparably large transaction amounts are customary (e.g. hotels, retail trade for longer-term acquisitions). For instance, more than half of the turnover in service operations outside the home (e.g. travel agencies, workshops), is paid on a cashless basis, whereby girocards and bank transfers are the most important, at approx. 22% each. The girocard is used much more intensively, with a turnover share of 44%, in retail trade for longer-term acquisitions, such as furniture or home electronics purchases. Thus, its share is on a par with that of cash (45%).

[60] See Annex 2, Share of transaction volume (weighted) by place and purpose of payment, p. 87.

Petrol stations, which are frequented by men in particular (62% turnover share) and by those in full-time employment (57% turnover share) are part of a sector in which card payments have been common for a long time. This is also shown by the data according to which the girocard, with a turnover share of 46%, is used most, before cash. This constitutes the largest value for all places of payment. However, credit card payments at petrol stations (11% turnover share) are also very popular.

If the customary payment amounts, such as with services in the household (e.g. workmen, domestic aid), become even larger on average, the share of transfer payments jumps to 52% of turnover. Girocards are hardly used (4%) because no technical facilities are available in situ as a rule (e.g. mobile scanner) or are taken along. Furthermore, elderly persons from the age of 55 and above made the greatest use of services in the household. Their share of turnover in this segment is 52%.

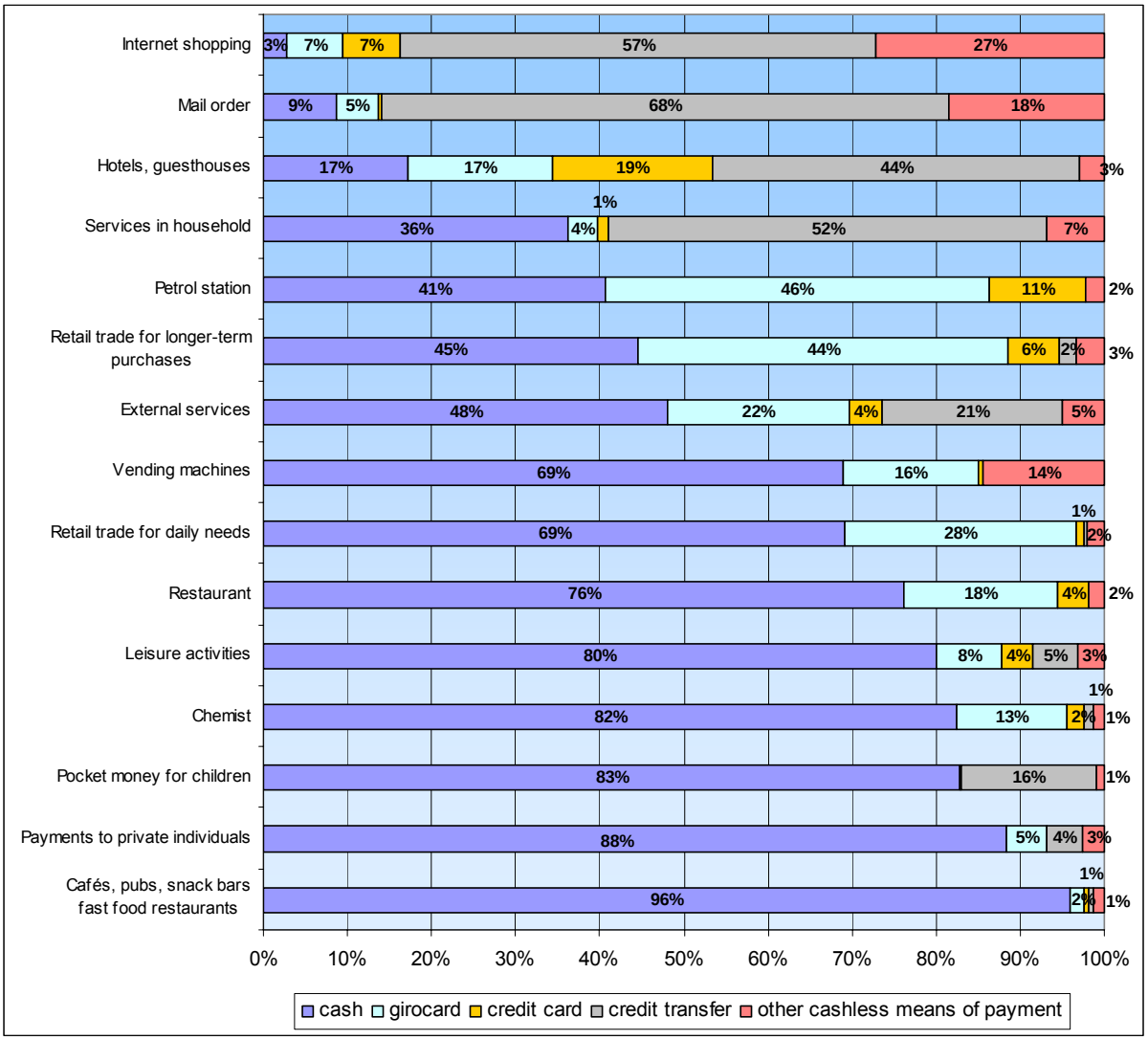
The majority of expenditure in hotels or guesthouses is paid for by bank transfer (44%).[61] Over and above this, the above average significance of credit cards comes to note, which, with a turnover share of 19%, are used more frequently than cash and girocard, both of which account for a share of 17% each. Thus, hotels and guesthouses are the place of payment with the largest credit card share. On the one hand, the highest average transaction value, at €149, is likely to play a major role here, whilst, on the other hand, persons with a net household income of €3,000 and above, in particular – among whom credit card use is very common (See Ch. III.1.2) – spend a relatively large amount of money (61% turnover share) in hotels and guesthouses.

As anticipated, the lowest cash usage in the shape of cash on delivery, at 9%, is observed with mail orders, and at 3% with purchases on the internet. Whilst mail order companies are an attractive shopping location above all for women, with a turnover share of 63%, purchases on the internet are largely made by men and younger people aged up to 44, with an approximate turnover share of 65% each. The main reason for the dominating role of cashless payment instruments is the distance between the seller and the buyer, whereby cash payments are either not possible at all or only at a higher cost (by means of cash on delivery). The most popular payment instrument by far here is bank transfer, accounting for a share of 57% (internet) and as much as 68% (mail order). The second most frequent payment method is by direct debit, the turnover share of which is 20% for internet purchases and 13% for mail order purchases. Credit cards are virtually never used for mail order payments, and only account for 7% of expenditure on the internet. This is less than one would presume. There are obviously inhibitions among the population when it comes to divulging credit card data on the internet because of repeated reports of cases of misuse. A particular role in internet trading is played by innovative internet payment procedures, such as PayPal or Click & Buy, which specifically target the needs of internet purchasers. However, given a payment share of just 5%, such procedures, which above all took place in

[61] These are presumably payments and deposits for booked holiday hotels.

the amount range of up to €50, have not caught on against classical cashless payment instruments.

**Figure 28: Utilisation of payment instruments according to place and purpose of payment**[62]

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*Note: The respective share of total expenditure is stated (e.g. total of cash payment at petrol stations/overall expenditure at petrol stations)*

The informative value of the payments diary is emphasised by means of a direct comparison with the figures collected by the EHI on payment behaviour in the German retail trade (includes daily needs and longer-term acquisitions). The data obtained by interviewing retail trade enterprises in 2008 are largely identical to the results of the payments diary.[63] For instance, the turnover share of cash payments is largely identical, at about 61%, and also the

[62] Further detailed evaluation (also by the number of transactions), see Annex 1/2

[63] See EHI Retailinstitute, *Karten-Entwicklungen aus Handelssicht*, p. 16 ff., 2009, Retail turnover=€360 billion (not including motor vehicles, mineral oil, chemists and mail order trade)

girocard share according to EHI figures, at 30%, is only slightly lower than the value measured in the payments diary (33%).[64]

If one compares the results of the diary (actual payment behaviour) with the conceptual self-assessment[65] from the questionnaire, one notices broad concurrence as to the specific utilisation of cash at different places of payment. By contrast, the subjectively-perceived use of girocards and credit cards at all places of payment and for all payment purposes (apart from credit card payment in hotels and guesthouses) is much higher than the actual use. This shows that large numbers of individuals – for whom card payment is a potential alternative – ultimately do favour cash. Actual payment behaviour largely also concurs with the self-perception with internet orders, and only the credit card is used much less in practice than respondents think.

### III.2.4. Summary

The evaluation of the payments diary has shown that cash is the most important payment instrument for the general public in Germany, accounting for a share of 58% of all expenditure. This is followed far behind by the girocard (approx. 26%), credit transfers (approx. 9%) and credit cards (approx. 4%). In contrast to other payment instruments – with an average transaction value of approx. €20 – cash is used above all for payments in the small and medium amount range (up to €50). This is likely to reflect the fact that the current cash stock – that is whether a given transaction can be settled using the available cash – appears to be the most important criterion for the selection of the payment instrument at the POS (See Ch. II.2.3). Another reason for the small share of cashless forms of payment for small payment amounts might be that card payments are frequently accepted only from a certain minimum purchase amount. Furthermore, the habit of paying small amounts in cash should not be neglected. However, the higher the purchase value, the more often cashless payment instruments are used. This is because many respondents presumably consider it too dangerous to carry large amounts of cash with them.

With regard to socio-demographic considerations, it is immediately apparent that cash is the most frequently used payment instrument across all segments of the population. With regard to age, persons under 24 and over 55 have the greatest preference for cash. Furthermore, a greater use of cash can be ascertained among women than among men, whilst the latter use credit cards much more frequently. Cash is used much less frequently for payments in the eastern federal states than in the western federal states, which means that the share of girocard payments is correspondingly higher in the eastern federal states. Furthermore, as levels of education and income increase, the cash share falls, whereas in particular the girocard and credit cards gain ground. An evaluation by employment status shows above all

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[64] In order to compare the shares acc. to the payments diary with the EHI figures, a total value has been calculated from the place “retail trade for daily needs” and “retail trade for longer-term acquisitions” on the basis of the respective turnover-weighted individual shares.

[65] The respondents were asked to state which payment instruments they used as a rule for the respective places/purposes (max. 2 entries). These figures were compared with the corresponding shares by number of transaction acc. to payments diary.

among job-seekers an extraordinarily large amount of cash payments, and an above average use of cashless payment instruments for those in full-time employment.

With regard to the payment location and payment purposes that respondents were requested to note in their payments diary, notable differences in payment behaviour can be observed. In “retail trade for daily needs”, which all in all is visited most by respondents, the cash turnover share, at 69%, is in the upper range; 28% of turnover is accounted for by the girocard. On the whole, cash has the highest value at the place of payment “café, pub, snack bar, fast food restaurant”, where small transaction amounts are predominant, with a turnover share of 96%. By contrast, when shopping on the internet or by mail order, as anticipated only 3% and 9%, respectively, of turnover is paid in cash (by means of cash on delivery), which is due primarily to the geographical distance between buyers and sellers. Bank transfers are dominant at these places. The girocard is used most at petrol stations, with a turnover share of 46%, whilst credit cards do best in hotels and guesthouses (19% turnover share).

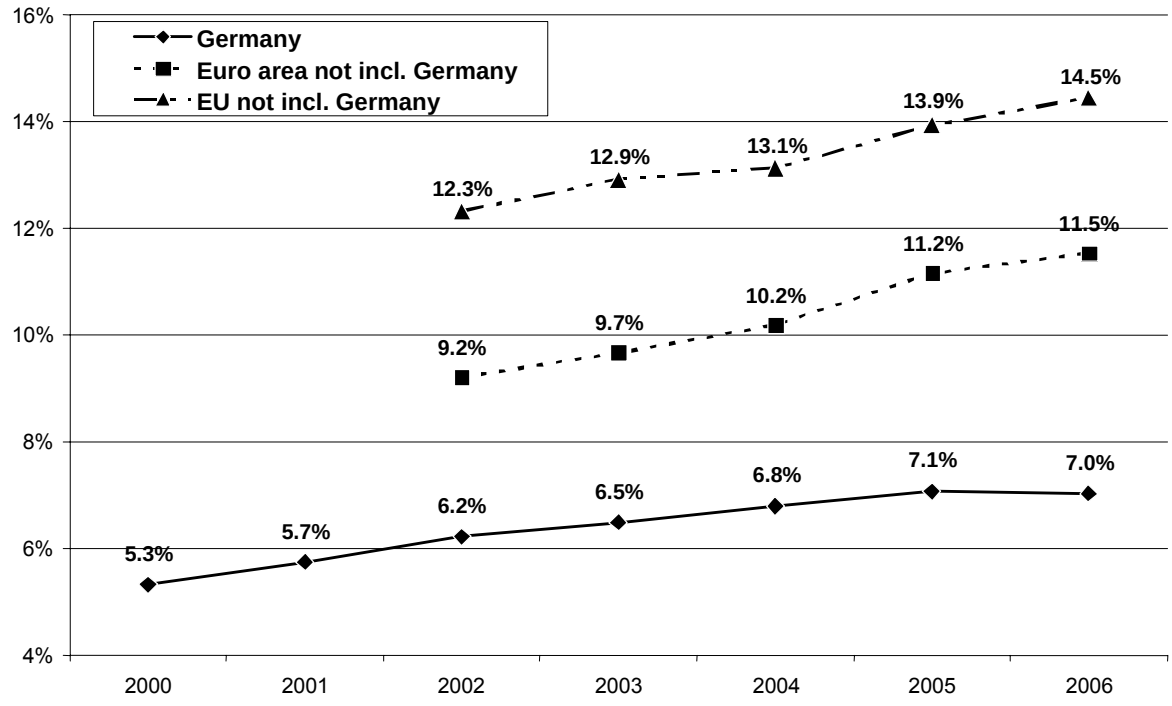
# IV. Choosing between payment instruments and their usage – a microeconometric analysis on the consumer level

The payment behaviour of the general public in Germany was described in the previous chapters and analysed using extrapolated aggregates. This chapter will now investigate the influence of socio-demographic characteristics, preferences and properties of transactions on the propensity of using cash. The survey takes place at an individual level.

## IV.1. Questions and introductory remarks

Since the introduction of the euro, it has become increasingly difficult to statistically trace the development of cash payment transactions in Germany. In addition to the use of survey data (See Ch. III), the still considerable significance of cash payments in Germany is also indirectly traceable via the spread of card payments in Germany, the euro area and the European Union (See Figure 1). The graph shows the value of all card payments (credit cards and debit cards) as a share of gross domestic product. This makes it clear that card payments are less significant in Germany than on an average of the other euro-area and EU member states. The flat growth path could also suggest that card use in Germany may be approaching saturation. Card use is at a high level in the rest of Europe and continues to grow.

**Figure 29: Value of all card payments as a share of gross domestic product (as a percentage)**




Own calculations based on ECB data (2008)[66]

[66] See ECB, Payment Statistics, 2008

There are various conceivable reasons for the high and relatively stable cash payment share in Germany: There could, for example, be well-founded preferences for the use of cash. Consumers might also be subject to habit persistence or act irrationally. Furthermore, cash payments offer cost advantages in many cases as opposed to other types of payment. Finally, there may be restrictions on the supply side for cashless transactions, i.e. the network for card payments may not yet be sufficiently dense. All these explanations appear plausible, yet little is known about their actual relevance.

The central question to be investigated in this chapter is hence as follows: Are the low card payment shares in Germany the result of inertia or of entrenched habits[67], or do individuals make deliberate, economically-rational decisions reflecting their personal preferences for different payment instruments and/or the relative cost of using them compared with other means of payment? If cash payment conduct is caused not by rational behaviour, but rather by inertia or habit persistence, one would expect a decline in the significance of cash payments by private individuals over time, not least because younger people are more used to cashless payment instruments than older people. If individuals are acting rationally with regard to their payment behaviour, a reduction in the cash share would only then to be expected if the relative costs or the circumstances of the use of cash and of cards were to undergo considerable change.

To answer the question, microeconometric analyses are carried out to analyse individuals' payment behaviour. The theoretical framework for the analysis is formed by a multi-tier decision-making model: The individuals decide first which payment instruments they would like to obtain. The payment infrastructure of an individual, i.e. the range of payment instruments available, emerges as a result of this selection and of any rejected applications (e.g. for credit cards). On the basis of their payment infrastructure, the individuals then choose a specific payment instrument for a specific transaction. In doing so, they must take into account which payment alternatives are offered at the respective point of sale.

In view of the spread of individual payment instruments in Germany, the sample is restricted to individuals who already have a girocard. This is because the vast majority of adults in Germany belong to this group and there is almost no one who has a credit card but who does not have a girocard. The very wide spread of girocards makes it difficult to create an empirically sensible model of the decision for its acquisition.

The empirical model describes both the decision on the acquisition of a credit card, and the determination of the individual share of cash payments based on this. The following factors are accommodated here:

a) transaction characteristics and demographic characteristics of a person, as well as their expenditure structure,

b) the costs of the use of cash compared with other payment instruments,

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[67] Habit and inertia mean in this context that individuals continue to pay in cash although changed framework conditions, such as a denser POS network, a greater distribution of girocards or the introduction of innovative payment instruments, offer incentives to make more cashless payments.

c) preferences for certain characteristics of payment instruments (e.g. desire for anonymity).

This comprehensive approach permits an empirical investigation to be carried out of whether the existing high cash intensity in Germany can be explained by rational behaviour on the part of individuals. The section below starts by briefly describing the framework for the empirical analysis before the results of the multivariate analysis are discussed.

## IV.2. Analytical framework

The decision-making problem of individuals can be described in the framework of a transaction cost approach.[68] An individual selects his/her payment structure such that his/her overall transaction costs are as low as possible. The transaction costs here are a function of the payment structure and of various individual characteristics. For instance, the relative costs of using cash and credit cards also depend on whether an individual likes to eat out or places orders over the internet. The use of a certain cashless payment instrument is not worthwhile precisely if the first transaction made with this payment instrument is already more expensive than a cash payment. Otherwise, at least some payments are carried out with the aid of this cashless payment instrument. Hence, the decision on the use of cash or other payment instruments is the result of a cost minimisation problem.[69]

In addition to the variable costs of an individual payment, the use of certain payment instruments may also entail fixed costs, such as credit card fees, bureaucratic expenditure, learning costs or other restrictions such as lending restrictions. Over and above this, unobserved variables are able to exert an influence, on the one hand, on the decision regarding the acquisition of a payment instrument and, on the other hand, on its utilisation in various ways which correlate with one another. In the empirical analysis, estimation methods are called for which allow for both decisions to influence one another, but also permit independent influences to be exerted by individual factors.

The dataset described in the introduction (See Ch. I.) permits the (at least indirect) measurement of a selection of the fixed costs mentioned above, and consequently their consideration in the empirical model. Furthermore, different measures may be included in the analysis for the significance of cash payments. The payments diary thus contains on the one hand information regarding individual payments over a brief period (one week). On the other hand, the questionnaire recorded self-evaluations with regard to the utilisation of cash and of certain cashless payment instruments broken down by the place and purpose of payment. Furthermore, ownership of different payment instruments was recorded here.

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[68] For a detailed description of the theoretical model, see von Kalckreuth, U., Schmidt, T., Stix, H., Choosing and using payment instruments, 2009.

[69] A number of actively-used payment instruments emerge as a solution for each person, as does their significance. The demand for certain payment instruments and the scope in which the payment instruments are used are, in fact, only different aspects of the same decision.

## IV.3. The measurement of cash payment rates – dependent variables

The first step of the decision-making model is the decision whether to obtain a credit card. In a second step, two different types of dependent variables are considered for the decision between cash or cashless payment instruments, each measuring the cash payment intensity of an individual. These differ in several ways, and permit payment behaviour to be observed from various points of view.

The first dependent variable targets the payment behaviour observed in the short term, and is based on individual transactions which were recorded in the payments diary. The cash payment share (by number of transactions) among a week's entire transactions is calculated for each person. Here, the cash share is ascertained only for those transactions where the respondent has a choice between various payment options. Transactions where only cash was accepted by the retailer are therefore excluded.[70]

By contrast, the second set of dependent variables focuses on longer-term payment behaviour. The respondents were to make general statements in the interviews regarding their customary payment behaviour for certain transactions in different payment situations, and in doing so were to select between several payment instruments from a prescribed list (e.g. "cash", "ec card", "credit card")[71]. Using this information, an indicator variable is constructed which takes on the value 'one' if a person pays "exclusively cash"[72], and the value 'zero' if a person also or exclusively uses cashless payment instruments. Given that it can be anticipated that payment behaviour depends very strongly on the place and purpose of payment, specific transaction types are taken as a basis in the analysis, that is day-to-day purchases and payments at petrol stations, since these are the two most frequent types of transaction.

Both approaches complement one another: They differ not only by virtue of their time horizon, but also as to their significance (actual conduct as opposed to self-evaluation) and the data source on which they are based (outcome derived from the payments diary as opposed to responses from the questionnaire).

## IV.4. Variables to measure potential influencing factors on the cash payment rate

The most important variables are briefly described below, including their anticipated impact on the decision whether to acquire a credit card or whether to pay in cash or by means of a cashless payment instrument.[73]

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[70] Roughly 50% of all transactions recorded fall into this category according to information provided by the respondents.

[71] The respondents could in each case only choose among the payment instruments which they have. A maximum of two payment instruments could be named per place and purpose of payment.

[72] The group of "exclusively cash" also includes those individuals who have stated that they only pay in cash, regardless of the place and purpose of payment.

[73] A detailed description of the variables can be found in Annex 3, p. 88 ff.

The empirical model contains measurements of income, the structure of the consumption expenditure recorded in the diary, the relative costs of using cash, preferences for certain characteristics of payment instruments, the network density with regard to cashless payment opportunities, as well as several socio-demographic variables.

Income should exert a major influence on the probability of the ownership of a credit card. It carries out a dual function. First, household income is a measurement of the scope of transactions and the structure of the expenditure, and is likely to be positively correlated with the benefit accruing from card ownership. Second, income should influence the willingness of the banks to give their customers a credit card or to proactively offer them one. Here, the part of the income which can be directly observed by the banks is likely to be of particular significance for the evaluation of credit worthiness. A further variable therefore measures the personal income observed by the banks in the shape of incoming payments if an individual current account is held. Household income is taken as a basis if there is a joint account. The willingness to issue credit cards could also differ from one type of bank to another. For instance, direct banks do not operate any branches, and may therefore be more willing to offer their customers credit cards than banks with a dense network of branches or cash dispensers. A variable is therefore included in the model stating whether the main account is held with a direct bank. It is presumed that the following characteristics influence the decision relating to cashless payment not directly, but only indirectly, that is via credit card ownership: The income observed by the bank, the existence of an individual or joint account, and the fact that the main account is held with a direct bank.[74]

The structure of the consumption expenditure is a further potential influencing factor. Even if income is equal, the composition of the consumption expenditure can be highly heterogeneous. For instance, the benefit of the utilisation of a credit card for persons who frequently carry out transactions on the internet may be greater than among consumers who do not have internet access. As a result, a higher share of cashless expenditure would be expected for internet users. This aspect is relevant particularly with regard to the cash shares calculated from the diary. Since these transaction data cover a period of only one week, the average values and payment structures obtained at respondent level contain a relatively high level of coincidental distribution. The average value of the transactions and the relative significance of individual places of payment in the week are hence contained in the econometric model as additional explanatory variables.

The costs of using cash and cards influence both the demand for credit cards and the decision regarding the means of payment. The dataset facilitates the observation of three categories of cash-related costs:

- the time (in minutes) which a respondent requires in order to get to the source of cash which they usually use (bank counter or cash dispensers),
- the subjective risk of being robbed or stolen from by a pick-pocket,

[74] This presumption is important in connection with the microeconometric estimation procedures used.

- a variable on the frequency of use of cash dispensers.

The latter variable is a highly-important indirect measure of the high costs of holding cash. If someone tries to reduce the average amount of cash held by making frequent withdrawals, it is possible to conclude that the interest costs and personal inconvenience related to keeping large amounts of cash are particularly important to these individuals.[75] Furthermore, individuals who frequently withdraw small amounts always need to have their girocard with them.

The density of the POS terminal network differs from region to region. A higher density of POS terminals makes it easier to use cards, and is hence likely to increase the share of cashless expenditure. In order to take account of this effect the data from the payments diary for individual regions are therefore used to ascertain the share of transactions with which payment cards could have been used.[76]

Furthermore, preferences for certain characteristics of payment instruments (see also Ch. II.2.2.) are considered to be a major determining factor for credit card ownership and the cash share. It is possible to derive several measurements for preferences from the answers to a question relating to important criteria in the selection of a payment instrument.[77]

The following important criteria are included:

- the payment instrument facilitates the maintenance of privacy/anonymity,
- the payment instrument can be used for payments abroad and on the internet,
- the payment transaction is convenient and fast with the payment instrument,
- the payment instrument makes it possible to keep a good overview of expenditure,
- the respondent is familiar with the payment instrument and he/she has years of experience with it.

The indicator variables take on the value of 'one' if the respondent categorises the respective criterion as "indispensable". If, by contrast, the criterion is only evaluated as "fairly important" or "unimportant", it takes on the value 'zero'. Exceptions to this are the variables on usability abroad and on the internet. They already take on the value of 'one' if they have been categorised as "fairly important", since the highest category ("indispensable") was only very seldom selected.

[75] See also the classical work of Baumol, W. J., The Transaction Demand for Cash, pp. 545-556, 1952; Tobin, J., The Interest Elasticity of Transactions, pp. 241-247, 1956

[76] Care was taken in the construction of the variable to ensure that a sufficiently large number of individuals were questioned in each region. Here, the fact can be used that the design of the sample taken is clustered at regional level, i.e. the respondents do not live spread evenly over the country, but several persons are always asked in each region.

[77] The wording of the relevant question relates to payment instruments in general, and not to a specific payment instrument.

Finally, a number of socio-demographic characteristics also flow into the empirical models: gender, level of education, as well as an indicator of whether an individual is currently in employment or not. Also, age could influence the decision for a payment instrument and its utilisation via various channels, for instance willingness to adapt to new technologies, or the structure of expenditures. In order to account for the age of the respondent at the time of the survey in the analysis, respondents are broken down into younger persons (< 58) and elderly persons (≥ 58). Descriptive statistics show that the cash share (by number of transactions) only differs slightly within the age groups formed, but does so more clearly between the groups.[78]

## IV.5. Results

This section describes the most important results of the econometric analysis. A detailed table of results can be found in Annex 4. This table contains the results of an estimate for the probability that a person has a credit card (probit estimate). Furthermore, the results for the cash share from the payments diary are portrayed. For this, the results of an ordinary least squares estimation and of an instrument variable estimation are shown. Whilst the first estimation method does not take account of the feedback effect of the cash share on credit card ownership (so-called "endogeneity"), the second explicitly accounts for this retroactive impact. Finally, the table also contains the results of the multivariate probit estimate for the importance of cash payments at individual places of payment, as emerges from the questionnaire.

***Cash payment as a rational decision?***

This chapter started with the question of whether the payment behaviour observed follows rules which concur with rational decisions. The results of the estimate suggest that they do, and in several ways. The estimation equations were developed from a model of rational behaviour, and the high power of prognosis of the estimated equations[79] suggests that the variables used in the empirical model explain a lion's share of the payment behaviour. At the same time, it is found that the direct measurement of habits in using payment instruments is insignificant in all of the equations used.

Almost all groups of explanatory variables (socio-demographic factors, expenditure structure, relative price of the use of cash and preference for certain characteristics with payment instruments) influence the probability of owning credit cards and the long-term payment behaviour (according to the self-evaluation). A restriction must be made with regard to the results regarding the cash share using data from the payments diary (columns II and III in the

[78] The analyses in this chapter only distinguish between young and old persons. A detailed analysis of the influence of age on cash payment behaviour at the individual level can be found with von Kalckreuth, U., Schmidt, T and Stix, H. Choosing and using payment instruments, 2009. For the aggregated cash shares, a more detailed sub-division of the age structure is portrayed in Chapter III.2.

[79] For 78% of individuals, credit card ownership is correctly classified. For 71% and 74% of individuals, respectively, the model correctly predicts whether they exclusively pay in cash at retail outlets and at petrol stations or not.

results table in Annex 4). The main contribution towards an explanation is made here by the transaction characteristics, that is the significance of individual places of payment in the week under assessment and the average transaction value. Only to a slight degree, however, do the relative costs of the use of cash, the socio-demographic variables and the preference indicators influence the cash share calculated from the diary data. A significant influence is exerted here only by the frequency of utilisation of cash dispensers and the possibility to use payment instruments on the internet.[80] This, however, does not contradict the presumption that cash payment behaviour is consistent with rational behaviour. The value and the place of payment of a transaction, for instance, also exert an influence on the relative costs of a payment.

***Relative costs of the use of cash***

The results of the microeconometric study indicate that the relative costs of the use of cash and cards help determine cash payment behaviour in retail outlets and at petrol stations. It shows that individuals who regularly use cash dispensers tend to make fewer cash transactions than other individuals. This also applies to the cash share across all places of payment, as it emerges from the diary. As was already mentioned above, frequent withdrawals are consistent with higher costs of keeping cash. Furthermore, such individuals also have their girocard to hand in most cases. Moreover, they know how to use it and how to enter their PIN number at a dispenser. They are therefore familiar with cashless payment instruments.

The density of the network of POS terminals plays a major role when it comes to cash payment behaviour in retail trade, and has the anticipated negative effect on cash payments at this place of payment. The density of the network also has a negative impact on the probability of owning a credit card. This is surprising since a dense network of POS terminals should entail the possibility to pay with credit cards more frequently.[81] This particularly applies because the POS terminals used today facilitate both credit card and girocard payments, and the number of retailers who only permit credit card payments is presumably very low.

The average value of the transactions recorded in the payments diary exerts a major influence on the share of cashless payments: It emerges from the point estimate that the more cashless payments are carried out, the greater is the average value of the transactions. This corresponds to the results of the theoretical and empirical literature.[82]

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[80] See also Whitesell, W. C., Deposit Banks and the Market for Payment Media, pp. 483-498, 1992; Boeschoten, W. C., Cash Management, pp. 117-142, 1998; Bounie, D and Abel, F., The Effects of Transaction Characteristics, 2006; Hayashi, F. and Klee, E., Technology adoption and consumer payment, pp. 175-189, 2003

[81] Further analyses show that the variable is not merely a proxy for different expenditure structures (such as high significance of payment at petrol stations) or income in the different regions.

[82] See Whitesell, W.C., Deposit Banks and the Market for Payment Media, pp. 483-498, 1992; Boeschoten, W.C., Cash Management, pp. 117-142, 1998; Bounie, D and Abel, F., The Effects of Transaction Characteristics, 2006; Hayashi, F. and Klee, E., Technology adoption and consumer payment, pp. 175-189, 2003

***Preferences for characteristics of payment instruments***

As anticipated, preferences for certain characteristics of payment instruments are closely linked with credit card ownership. An interesting result in this context is that consumers, for whom the possibility of being able to use a payment instrument for transactions on the internet or abroad is significant, less frequently pay in cash at retail outlets and petrol stations. This may be the result of learning effects; the experience collected on the internet or abroad with electronic payments can be transferred to other payment situations.

***Socio-demographic factors***

Socio-demographic factors play a major role in the decision for the use of cards and the ownership of a credit card. As expected, a relatively high income and a high level of education significantly increase the probability of owning (at least) one credit card. Socio-demographic characteristics also exert a strong influence on long-term payment behaviour (according to the self-evaluation) at retail outlets and petrol stations. A higher level of education, being employed and a high income each reduce the probability of paying in cash at petrol stations and retail outlets. It is shown that men account for a higher share of cash transactions at retail outlets (by number of transactions) than women.

***The influence of age***

The influence of age is difficult to quantify. It is shown in the probit estimation that there is a weak, positive link between age and the probability of owning a credit card. This, however, disappears in the more efficient multivariate estimations. This applies in a similar form to the cash shares: There is a slightly significant positive effect of age on the cash share calculated on the basis of information from the payments diary. This indicates that everything else equal, older people tend to pay in cash. A corresponding effect cannot be found in the equations for cash conduct in retail outlets for day-to-day purchases and at petrol stations.

A more comprehensive analysis of the age effect (with the aid of interaction terms), which is not portrayed here, shows major differences between old and young individuals with regard to their cash conduct.[83] Older persons carry out a larger share of their transactions in cash (see Ch. III.2.2.). They differ from younger individuals not only in their age, but also in many characteristics associated with age, such as employment status, income, feeling of insecurity with large amounts of cash in their wallets, etc. It is possible to investigate to what extent the greater use of cash is determined by age itself, and what part is explained by the other differences between the age groups.[84] It is ultimately shown that 58% of the difference in the overall cash share between young and old individuals can be traced back to different characteristics. Different characteristics also explain 84% of the spread between the two

[83] Details can be found in von Kalckreuth, U, Schmidt, T. and Stix, Choosing and using payment instruments, 2009.

[84] In the experiment, the conduct of old and young individuals is initially modelled separately. An attempt is then made to predict the payment behaviour of both groups of individuals with the aid of uniform coefficients. The differences emerging here between the groups are then only caused by differences in the characteristics.

groups in the share of those who only pay in cash at retail outlets and 83% of the corresponding difference at petrol stations. If, therefore, today's young consumers were to take on the characteristics of today's old consumers in future, the cash share should not fall by much. This naturally applies only if the framework conditions for payment behaviour remain constant.

***Summary of the most important results***

The results of the multivariate analyses support the view that the selection of payment instruments constitutes a complex, multi-tier, multi-layered decision-making problem. The results can be summarised as follows:

Transaction characteristics, socio-demographic properties of individuals, the relative costs of the use of cash and cards, as well as individual preferences, are major determining factors for the use of cash. It can be concluded from this that the payment behaviour which is observed follows rules which are compatible with rational economic behaviour.

The analysis further confirms that payment behaviour differs between individual places and purposes of payment. This corresponds to the findings obtained in previous studies.[85] Over and above this, correlations are found which might be caused by learning effects: For instance, purchases on the internet, which require experience with using cashless payment instruments, increase the probability that payments made at retail outlets or at petrol stations are made on a cashless basis.

The results of the estimate also show that ownership of credit cards (in addition to a girocard) does not significantly influence the use of cash in payments in Germany (columns III and IV in the table of results in Annex 4). This, however, is not made clear in the least squares estimation (which shows a seemingly strong effect), but only when adequate consideration is given to the fact that there is not only an effect of card ownership on the cash share but also an effect in the opposite direction. This finding indicates that credit cards for use in payments within Germany are less of a substitute for cash than a replacement for other cashless payment instruments.

A further fundamental result of the analyses is connected to the latter result. The acquisition and utilisation of payment instruments can largely be explained by the same variables, which means that a combined modelling is indispensable. Neglecting this simultaneity leads to biased estimates, and the conclusions drawn as to the impact of the ownership of payment cards on the use of cash would be misleading.

## IV.6. Conclusions

The payment behaviour of private households appears to be based on systematic decisions: It can be explained by the nature of the transactions, the characteristics of payment instruments and of individuals. Given the existing technology, and assuming the other

[85] See Boeschoten W.C., Cash Management, pp. 117-142, 1998; Bounie, D and Abel, F., The Effects of Transaction Characteristics, 2006

determining factors continue to apply to the decision on payment behaviour, the share of cash payments among all transactions should not be expected to fall considerably in the foreseeable future. Changes to the framework conditions, such as new technologies or changed strategies on the part of retailers and payment system suppliers, might however lead to further behavioural adjustments. Also a shift towards places of payment where typically there is a tendency to pay on a cashless basis (e.g. the internet) could reduce the cash share.

A further important outcome of the econometric analyses is that credit card ownership does not impact the share of cash transactions where the fact is taken into account that the demand for credit cards and the decision on the manner of payment influence one another. The decisions with regard to the acquisition and intensity of utilisation of a payment instrument appear to be hierarchical in structure: It is first of all decided whether a payment is to be made in cash. If this is not the case, the decision as to which payment instrument the cashless payment is made with depends on other variables. Regardless of the context in which the respective payment decision is taken, there appears to be only a small cost difference between the utilisation of the girocard and the credit card from the point of view of individuals.

If this explanatory approach is correct, in the view of the users, both competing cashless payment systems appear to be close substitutes when it comes to card use in Germany. Thus, overdrafts are widespread in Germany, and these can be used both with girocards and with credit cards. Furthermore, with most credit cards issued in Germany the account balance is settled on a monthly basis. The credit card is therefore used as a payment instrument, and not as a loan facility. Against this backdrop, it may not make much difference from the user's point of view which of the two systems is used.

The analysis above focussed on the overall cash payment share. Another question concerns the decision on which each individual transaction is based. The significant link between the average value of the transactions and the cash share, as well as the different coefficients when it comes to various places and purposes of payment, already indicate that the specific transaction characteristics are likely to influence the selection of the payment instrument in every single case. These questions are to be addressed in future studies.

# V. Development and outlook of payment behaviour in Germany

The current use of cash and cashless payment instruments was presented in the previous chapters. By contrast, a brief outline will be firstly provided below of past developments in payment behaviour, and secondly an attempt will be made to estimate the future outlook for payment behaviour in Germany on the basis of various influencing factors.

**Share of cash transactions in the retail trade roughly twice as high as the share of debit cards – although this trend is slowly on the decline**

An assessment of a trend of the past years can be derived from the turnover shares recorded by the EHI of various payment procedures in German retail trade (in the strict sense of the word).[86] The turnover share of cash in retail trade consequently fell from 79% to 60% between 1994 and 2008. This decrease can be primarily explained by the displacement of cash by debit card payments (electronic cash and electronic direct debit [ELV] transactions) which have expanded their turnover share from approx. 3% to 30% during this same period. However, in the first seven years of the observation period, in addition to the supplanting of cash payments, a large part of the increase in debit card turnover was due to the substitution of other cashless payment procedures, such as cheque payments and invoice payments by bank transfer. Since 2003, however, the cash share in retail trade has been falling by approx. one percentage point each year, whilst the debit card share has been increasing by almost the same amount. Nonetheless, the cash needed in retail trade did not fall in absolute figures, but was compensated for by (nominal) turnover increases.

**Credit card use still at a low level**

Unlike in the case of debit cards, credit cards have not gained any particular importance in the German retail trade and, according to the EHI, credit cards only managed to attain a comparatively small increase (3% - 5%) in the share of sales revenue from between 1994 and 2008. This is attributable, among other factors, to the widespread use of overdraft facilities in Germany, which makes owning or using a credit card largely redundant. With an average transaction value of €77, credit cards compete more with girocards than with cash, the latter being used primarily for payments with an average transaction value of €20 (see Ch. III.2.1.).

**Geldkarte unable to meet expectations**

The Geldkarte, which was developed for paying for small amounts – and is thus placed in direct competition with cash – has hardly gained in importance since its introduction and is used, first and foremost, for niche applications, such as parking meters and ticket machines. Not even the change in legislation (whereby proof of age is now required when purchasing

[86] Time series on the basis of earlier studies by the EHI Retail Institute, Karten-Entwicklung aus Handelssicht, 1994 -2008, Retail trade turnover 2008 = €360 billion (not including motor vehicles, mineral oil, chemists and mail order trade). The delimitation of retail trade by the EHI is not identical to the definition of retail trade selected in this study.

cigarettes from a vending machine by means of a GeldKarte) was able to bring about any long-term growth in the use of this payment instrument (see Ch. II.2.2.2).

**Further displacement of cash relatively unlikely in the short term.**

In the past, debit card payments have benefited greatly from technological advancements, especially in terms of processing speed. Furthermore, the number of retail outlets accepting direct debit payments has increased (from approx. 496,000 to 566,000 POS terminals between 2003 and 2007) as sharply as the number of direct debits in circulation in Germany (from approx. 90 million to 95 million cards between 2003 and 2007).[87] A saturation point does now seem to have been reached, however. For example, the increase in the number of POS terminals by 14% over the last four years has led to a decline of just 4.6% in the share of cash transactions. At the same time, given that 91% of those surveyed own at least one girocard, the distribution of these cards among the German public has already reached a very high level (see Ch. III.1.2.). Furthermore, payment with the girocard is now possible in most trade sectors; most recently there was a marked increase in the number of acceptance points up to 2007 with their extensive introduction in food discounters. Only in relatively few areas (such as bakeries, kiosks, cafés, etc.), in which small payments are mostly predominant, is debit card payment usually not yet possible. However, since these sectors only generate a small turnover share, it appears to be unlikely that there will be a further displacement of cash by debit cards in the short term.

**Further slight decline in the share of cash payments possible in the medium to long term**

It is unlikely that there will be a further displacement of cash payments by debit cards in the medium to long term unless there is an increase in the number of acceptance points, together with a change in the behavioural pattern of the general public, with the effect that, for example, existing cards would be used more frequently than at present for paying smaller amounts and that the cards could be used at a greater number of locations. In this point, familiarity with a payment instrument takes on a major role, 91% of respondents consider this criterion to be indispensable or fairly important (see Ch. II.2.2.9.). For this reason, there is much in favour of cash; first, users have been familiar with it since childhood and have been using it as a payment instrument ever since. Second, it can be presumed that, over time, the population groups which are familiar with card technology from a young age, and who come to account for an increasingly large share of the overall population, will also use payment cards into old age. In principle, it should also be taken into account that characteristics occur in old age which are typical and which favour the use of cash, such as a lower income or more frequently visiting purchasing locations with a comparably high cash share (such as retail trade for daily needs and chemists). If, therefore, today's youth people in future take on the characteristics of today's elderly, the cash share is unlikely to fall significantly (see Ch. IV.5.). Irrespective of this, the future significance of cash payment also depends on whether the threshold which many customers probably have when it comes to paying small

[87] See Deutsche Bundesbank, Payment and securities settlement statistics in Germany 2007, 2008

amounts (up to approx. €10) by card will continue to fall in future. Under these assumptions, there might be a further fall in the share of cash payments in the medium to long term – albeit somewhat more moderate if the framework conditions remain unchanged.

**The displacement of cash could be accelerated by a further increase in internet trade. Specialised internet payment procedures have the potential to displace classic cashless payment instruments.**

A further influential factor to be taken into account when considering payment behaviour is the developments in the area of goods and services sold via the internet and the classic mail order trade. While the classic mail order trade (excluding the internet) has been stagnating over the past few years or has even declined slightly[88], internet sales have recorded strong growth, even though the annual growth rates declined recently at 12% (see Ch.II.2.2.4). All in all, online trading has been the most dynamic sales channel in retail trade for years, the strong growth having to be evaluated against the background of a comparably low starting level. Also, the share of the turnover volume most recently achieved, measured by total retail trade turnover, is only in the medium single-digit range. If the current trend continues – up to a certain point – one would have to presume a further displacement of over-the-counter retail by internet sales since an ever larger population share of all age classes will come to use this medium over time.[89] On the other hand, however, it can also be anticipated that having a "real" shopping experience at the point of sale remains highly significant.

Unlike over-the-counter retail, payments on the internet are largely settled on a cashless basis, whilst cash payment (e.g. by means of cash on delivery) is virtually negligible. The question therefore arises as to whether cash payment volumes could fall significantly in the future in view of the development in online trade presented. This is countered by the fact that significant goods and services (e.g. fuels or catering) are virtually or indeed completely unsuited for sale on the internet. In other areas for which the internet constitutes an alternative (e.g. hotels/guesthouses, classical mail order), the cash payment share is in any case already at a comparably low level. By contrast, new innovative internet payment procedures (e.g. Click&Buy or Paypal) could in future also lead to a displacement of the cashless procedures which have so far dominated internet sales (credit transfers, direct debits and credit cards).

[88] See bvh, *Versandhandel und e-commerce*, 2008. A turnover of approx. €15 billion was made in 2008.

[89] Furthermore, the blanket broadband internet connection adopted by the Federal Government tends to favour online sales.

**Displacement of cash owing to widespread use of innovative cashless payment procedures in the retail trade not likely at present.**

The payment behaviour of the general public will, in future, also depend on which – if any – new payment instruments are offered by retail outlets. Consumers are more likely to use new payment systems if a sufficient number of acceptance points are available. Retailers, by contrast, still have a number of further decision-making criteria in addition to the question of a sufficiently large number of users. For instance, the increase in customer satisfaction (e.g. by reducing waiting times at tills) and/or saving costs (e.g. by increasing cashdesk throughput) could offer incentives for offering a new payment procedure.[90] In this regard, the focus is currently on contactless payment by mobile phone or credit card, in particular, as well as on payment by fingerprint recognition. The latter competes both with cash and card payments, and is already offered in almost 900 supermarkets (above all Edeka). Customers who wish to use the system must first register with the respective retailer, giving bank account details. When paying, the fingerprint is compared with the stored data using a scanner and if this matches, a direct debit is generated. The advantages of rapid, convenient payment are, however, countered by data protection reservations. For instance, the storage of fingerprints – linked to account numbers – could lead to uncertainty among the population. Furthermore, there is no uniform technical standard for fingerprint systems as yet, so that a spread of the payment procedure across the board is rather unlikely in the near future, both from the point of view of the customer and of retailers.

As a further innovative payment procedure, contactless payment by chip card has been rolled out on the market in Germany since spring 2008 by the credit card companies Mastercard and Visa under the names “PayPass” and “PayWave”. The cards are equipped with a chip and an antenna. For payment, the card is held a few centimetres away from a suitable reading device and the payment data is then transmitted to the reading device via an audio frequency signal. No further authentication is required for small payments (up to a maximum of €25); with larger amounts, additional PIN entry or a signature is necessary.[91] With this rapid and convenient payment procedure, the credit card companies intend to open up the market for small payments. This technology is therefore in direct competition with cash, which in the main is used in this amount range. The new payment procedure is currently only in use in a small number of pilot projects. Whether contactless payment will catch on all over in future and will be able to displace cash is doubtful from today’s perspective. It is also likely to be vital to a breakthrough with this form of payment whether it is adequately accepted by retailers and by the population. Retailers must assess whether they are willing to pay the high disagio normally due for credit card payments, in addition to high investment costs (scanners), in return for fast payment transactions and possible savings in cash handling. From the point of view of the users, the payment of small amounts (max. €25) with no authentication whatsoever could give rise to reservations.

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[90] See EHI Retail Institute, *Kassensysteme*, p. 20 ff., 2008

[91] See EHI Retail Institute, *Innovative Bezahlverfahren*, 2008

No matter how the new payment procedures are designed, there is, however, the fundamental drawback that a significant proportion of the general public will only slowly, if at all, depart from the methods of payment which they are accustomed to, as they may feel unsafe about using new procedures. Moreover, from the point of view of traders, implementing a wide range of competing payment procedures would increase investment and settlement costs and would probably make it more difficult to achieve economies of scale.

**Tight-knit network of (free-of-charge) ATMs is promoting the use of cash.**

Credit institutions can, in principle, influence the payment behaviour of the general public by restricting or improving access to cash (primarily ATMs)[92], as well as by gearing their support to cashless payment instruments. In weighing up the options, on the one hand the cost and proceeds of the various payment procedures are looked at, whilst secondly customer satisfaction and retention play a major role. With regard to the costs, the Central Credit Committee (ZKA) estimates in the National Cash Plan Germany (2009)[93] that banks, retailers and customers consider cash to be "the cheapest payment instrument" in both economic and commercial terms. Over the past few years and decades, the banking industry has considerably reduced the costs of cash handling by introducing a nationwide network of ATMs and simultaneously making cash available 24 hours a day, 7 days a week. Roughly 54,000 ATMs are currently in operation in Germany.[94] These can be found not only in bank branches, but also in shopping centres, for instance. This development ultimately reflects customer demands for the free supply of cash in all places and, as far as possible, at all times. The number of own cash dispensers and those operated in associations (see Ch. II.2.2.7.) at which cash can be withdrawn free of charge is a major competitive factor for banks in order to recruit new customers and retain existing ones. Some banks even offer free withdrawals by credit card anywhere in the world. It can therefore be expected that the availability of cash will remain at a high level. Nonetheless, the banking industry will continue to attempt to optimise cash processes, for instance by using cash-recycling machines, or by cooperating with retailers. In line with this, the Postbank is planning to offer its customers as of mid-2009 the possibility to withdraw cash free of charge, initially at all 1,300 Shell petrol station cashpoints, using their girocards.[95]

**SEPA opens doors for a new range of cashless payment procedures.**

As described above, banks can also influence the share of cash payments by introducing and/or specifically promoting cashless payment instruments. This was already done in the

[92] In addition to the traditional supply of cash at banks over the counter or via ATMs, the so-called cash back procedure is becoming more significant at retail outlets. Here, customers at retail outlets (primarily Rewe at present) can use their girocard to withdraw a maximum cash amount of €200 in addition to their shopping. The population therefore has considerably more opportunities to obtain cash.

[93] See ZKA, National Cash Plan Germany, 2009

[94] See Deutsches Geldautomatensystem, *Geldautomatenzahl*, 2009

[95] See Postbank, press release, 2009

past with varying rates of success. Whilst, today, the girocard is widespread and used relatively frequently, credit cards, with a share of approx. 4% of expenditure, are only used in a highly-targeted manner and in selected market segments (see Ch. III.2.1.). By contrast, the use of the GeldKarte, which is offered by the banking industry, has been much lower than originally anticipated since it was introduced in 2002.

It remains to be seen to what extent new developments in the area of cashless payments, such as the creation of a single euro payments area (SEPA) and the corresponding range of new harmonised payment instruments based on this platform, will lead to a change in payment behaviour. However, it is likely that, in the medium term, the development of the SEPA credit transfer and SEPA direct debit schemes will pave the way for further electronic and mobile payment procedures.

**Cash likely to remain the most commonly used payment instrument in future as well**

In view of the aforementioned comments, it can be concluded that cash is likely to remain the most commonly used payment instrument in future, even though its share of total payment transactions presumably will decrease further in the medium to long term. The same important reasons for using cash as a means of payment will, however, remain. For example, for most people, cash is a quick and familiar form of payment which is particularly suited for paying small amounts. The anonymous character of paying in cash also prevents the fraudulent use of personal data. Furthermore, cash is the only payment instrument which can be used without any recourse to (information) technology and is therefore suitable for emergency and crisis situations as well. In this respect, a cashless society is unlikely to become reality in the future.

# Annex

## Annex 1: Turnover shares (weighted) of payment instruments according to place and purpose of payment

| Place/purpose of payment | | Total | Cash | Giro card | Credit card | GeldKarte | Customer/ bonus card with pay. funct. | Internet paym. procedure | Dir. debit | Trans- fer | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Retail trade for daily needs | Expenditure in € | 241,530 | 166,758 | 66,877 | 2,132 | 1,602 | 474 | - | 736 | 835 | 2,116 |
| | Turnover share | 100% | 69.0% | 27.7% | 0.9% | 0.7% | 0.2% | - | 0.3% | 0.3% | 0.9% |
| Retail trade for longer-term purchases | Expenditure in € | 108,710 | 48,489 | 47,878 | 6,472 | 631 | 354 | 90 | 201 | 2,377 | 2,218 |
| | Turnover share | 100% | 44.6% | 44.0% | 6.0% | 0.6% | 0.3% | 0.1% | 0.2% | 2.2% | 2.0% |
| Petrol stations | Expenditure in € | 71,566 | 29,119 | 32,699 | 8,131 | 464 | 96 | - | 369 | 42 | 646 |
| | Turnover share | 100% | 40.7% | 45.7% | 11.4% | 0.6% | 0.1% | - | 0.5% | 0.1% | 0.9% |
| Chemists | Expenditure in € | 17,252 | 14,210 | 2,261 | 368 | 7 | - | - | 62 | 187 | 156 |
| | Turnover share | 100% | 82.4% | 13.1% | 2.1% | 0.0% | - | - | 0.4% | 1.1% | 0.9% |
| External services | Expenditure in € | 61,839 | 29,669 | 13,371 | 2,472 | 8 | 266 | - | 2,488 | 13,253 | 312 |
| | Turnover share | 100% | 48.0% | 21.6% | 4.0% | 0.0% | 0.4% | - | 4,0% | 21.4% | 0.6% |
| Services in household | Expenditure in € | 20,078 | 7,261 | 728 | 268 | 55 | - | 117 | 783 | 10,464 | 403 |
| | Turnover share | 100% | 36.2% | 3.6% | 1.3% | 0.3% | - | 0.6% | 3.9% | 52.1% | 2.0% |
| Vending machines | Expenditure in € | 8,299 | 5,719 | 1,344 | 35 | 244 | - | 364 | 569 | - | 23 |
| | Turnover share | 100% | 68.9% | 16.2% | 0.4% | 2.9% | - | 4.4% | 6.9% | - | 0.3% |
| Internet shopping | Expenditure in € | 22,826 | 652 | 1,498 | 1,580 | 2 | - | 1,030 | 4,668 | 12,913 | 482 |
| | Turnover share | 100% | 2.9% | 6.6% | 6.9% | 0.0% | - | 4.5% | 20.5% | 56.6% | 2.0% |
| Mail order | Expenditure in € | 18,668 | 1,627 | 935 | 46 | - | 75 | - | 2,380 | 12,619 | 985 |
| | Turnover share | 100% | 8.7% | 5.0% | 0.2% | - | 0.4% | - | 12.8% | 67.6% | 5.3% |
| Restaurants | Expenditure in € | 31,391 | 23,914 | 5,722 | 1,192 | - | 110 | - | - | - | 454 |
| | Turnover share | 100% | 76.2% | 18.2% | 3.8% | - | 0.3% | - | - | - | 1.5% |
| Cafés, pubs, snack bars, Fast food restaurants | Expenditure in € | 24,341 | 23,352 | 421 | 126 | 33 | 12 | - | 88 | 116 | 194 |
| | Turnover share | 100% | 95.9% | 1.7% | 0.5% | 0.1% | 0.1% | - | 0.4% | 0.5% | 0.8% |
| Leisure activities | Expenditure in € | 16,393 | 13,113 | 1,273 | 628 | 27 | 3 | 74 | 211 | 869 | 195 |
| | Turnover share | 100% | 80.0% | 7.8% | 3.8% | 0.2% | 0.0% | 0.5% | 1.3% | 5.3% | 1.1% |
| Hotels, guesthouses | Expenditure in € | 10,909 | 1,882 | 1,869 | 2,081 | - | - | - | 163 | 4,749 | 164 |
| | Turnover share | 100% | 17.3% | 17.1% | 19.1% | - | - | - | 1.5% | 43.5% | 1.5% |
| Payments to private individuals | Expenditure in € | 22,115 | 19,538 | 1,072 | 7 | 83 | - | 263 | - | 937 | 216 |
| | Turnover share | 100% | 88.3% | 4.8% | 0.0% | 0.4% | - | 1.2% | - | 4.2% | 1.1% |
| Pocket money for children | Expenditure in € | 7,261 | 6,018 | 14 | - | - | - | - | 37 | 1,165 | 28 |
| | Turnover share | 100% | 82.9% | 0.2% | - | - | - | - | 0.5% | 16.0% | 0.4% |
| Saving cash | Expenditure in € | 10,286 | 10,286 | - | - | - | - | - | - | - | - |
| | Turnover share | 100% | 100.0% | - | - | - | - | - | - | - | - |
| Other | Expenditure in € | 243 | 93 | - | - | - | - | - | - | - | 150 |
| | Turnover share | 100% | 38.1% | - | - | - | - | - | - | - | 61.9% |
| No place of payment stated | Expenditure in € | 6,730 | 3,787 | 867 | - | 31 | - | - | 268 | 1,672 | 104 |
| | Turnover share | 100% | 56.3% | 12.9% | - | 0.5% | - | - | 4.0% | 24.8% | 1.5% |

## Annex 2: Shares of numbers of transactions (weighted) according to place and purpose of payment

| Place/purpose of payment | | Total | Cash | Giro card | Credit card | GeldKarte | Customer/ bonus card with paym. fun. | Internet paymt. procedure | Dir. debit | Trans-fer | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Retail trade for daily needs | No. of transactions | 10,831 | 9,356 | 1,285 | 34 | 35 | 13 | - | 20 | 8 | 79 |
| | Share of trans. no | 100% | 86.4% | 11.9% | 0.3% | 0.3% | 0.1% | - | 0.2% | 0.1% | 0.7% |
| Retail trade for longer-term purchases | No. of transactions | 1,525 | 952 | 464 | 51 | 10 | 6 | 1 | 1 | 17 | 23 |
| | Share of trans. no | 100% | 62.4% | 30.4% | 3.3% | 0.7% | 0.4% | 0.1% | 0.1% | 1.1% | 1.4% |
| Petrol stations | No. of transactions | 1,906 | 1,044 | 677 | 144 | 16 | 2 | - | 5 | 1 | 19 |
| | Share of trans. no | 100% | 54.8% | 35.5% | 7.5% | 0.8% | 0.1% | - | 0.2% | 0.0% | 1.1% |
| Chemists | No. of transactions | 1,005 | 939 | 53 | 7 | 1 | - | - | 1 | 1 | 3 |
| | Share of trans. no | 100% | 93.5% | 5.3% | 0.7% | 0.1% | - | - | 0.1% | 0.1% | 0.2% |
| External services | No. of transactions | 951 | 756 | 122 | 9 | - | 4 | - | 6 | 48 | 7 |
| | Share of trans. no | 100% | 79.5% | 12.8% | 0.9% | - | 0.4% | - | 0.6% | 5.1% | 0.7% |
| Services in household | No. of transactions | 231 | 177 | 13 | 2 | 0 | - | 2 | 4 | 30 | 2 |
| | Share of trans. no | 100% | 76.8% | 5.8% | 0.7% | 0.2% | - | 0.7% | 1.8% | 13.1% | 0.9% |
| Vending machines | No. of transactions | 1,179 | 1.060 | 59 | 1 | 47 | - | 3 | 3 | - | 7 |
| | Share of trans. no | 100% | 89.9% | 5.0% | 0.1% | 4.0% | - | 0.2% | 0.2% | - | 0.6% |
| Internet shopping | No. of transactions | 311 | 22 | 18 | 25 | 1 | - | 27 | 58 | 151 | 10 |
| | Share of trans. no | 100% | 6.9% | 5.9% | 8.2% | 0.2% | - | 8.6% | 18.6% | 48.5% | 3.1% |
| Mail order | No. of transactions | 222 | 36 | 10 | 1 | - | 1 | - | 26 | 138 | 10 |
| | Share of trans. no | 100% | 16.2% | 4.7% | 0.3% | - | 0.5% | - | 11.8% | 61.9% | 4.6% |
| Restaurants | No. of transactions | 870 | 731 | 95 | 23 | - | 1 | - | - | - | 20 |
| | Share of trans. no | 100% | 84.0% | 10.9% | 2.7% | - | 0.2% | - | - | - | 2.2% |
| Cafés, pubs, snack bars, Fast food restaurants | No. of transactions | 2,703 | 2,613 | 21 | 3 | 7 | 6 | - | 2 | 2 | 49 |
| | Share of trans. no | 100% | 96.7% | 0.8% | 0.1% | 0.3% | 0.2% | - | 0.1% | 0.1% | 1.7% |
| Leisure activities | No. of transactions | 886 | 806 | 37 | 13 | 1 | 1 | 3 | 7 | 10 | 8 |
| | Share of trans. no | 100% | 90.9% | 4.2% | 1.4% | 0.1% | 0.1% | 0.4% | 0.8% | 1.1% | 1.0% |
| Hotels, guesthouses | No. of transactions | 73 | 24 | 19 | 18 | - | - | - | 2 | 8 | 1 |
| | Share of trans. no | 100% | 33.3% | 26.1% | 25.2% | - | - | - | 2.2% | 11.6% | 1.6% |
| Payments to private individuals | No. of transactions | 686 | 645 | 19 | - | 3 | - | 1 | - | 11 | 7 |
| | Share of trans. no | 100% | 94.0% | 2.7% | - | 0.4% | - | 0.2% | - | 1.5% | 1.2% |
| Pocket money for children | No. of transactions | 409 | 393 | 1 | - | - | - | - | 3 | 10 | 3 |
| | Share of trans. no | 100% | 96.0% | 0.3% | - | - | - | - | 0.6% | 2.3% | 0.8% |
| Saving cash | No. of transactions | 431 | 431 | - | - | - | - | - | - | - | - |
| | Share of trans. no | 100% | 100,0% | - | - | - | - | - | - | - | - |
| Other | No. of transactions | 8 | 5 | - | - | - | - | - | - | - | 3 |
| | Share of trans. no | 100% | 65.8% | - | - | - | - | - | - | - | 34.2% |
| No place of payment stated | No. of transactions | 210 | 171 | 13 | 4 | 1 | - | - | 3 | 13 | 5 |
| | Share of trans. no | 100% | 81.3% | 6.3% | 1.8% | 0.5% | - | - | 1.5% | 6.0% | 2.6% |

## Annex 3: Description of the variables used

| Name of variable | Type of variable | Description |
|---|---|---|
| *Variables to be explained* | | |
| Credit card | Indicator variable | 1 if a person has at least one credit card.<br>0 if a person does not have a credit card. |
| Cash share | Share (0 to 1) | Share of cash payments (by number of transactions) – which the respondent could also have settled on a cashless basis – among all payments where an option exists. Calculated on the basis of the information contained in the diary. |
| Cash payment behaviour Retail trade for daily needs | Indicator variable | 1 if, as a rule, the person exclusively pays in cash in retail outlets for day-to-day items or, as a rule, pays in cash regardless of the place and purpose of payment.<br>0 if, as a rule, the person also or exclusively pays by cashless means in retail outlets for day-to-day items. |
| Cash payment behaviour Petrol stations | Indicator variable | 1 if, as a rule, the person exclusively pays cash at petrol stations or, as a rule, pays in cash regardless of the place and purpose of payment.<br>0 if, as a rule, the person also or exclusively pays by cashless means at petrol stations. |
| *Explanatory variables* | | |
| MALE | Indicator variable | 1 if the person is male.<br>0 if the person is female. |
| EDU OTHER | Indicator variable (reference category) | 1 if the person has no degree at all, a Hauptschulabschluss (ISCED 0,1) or an othe degree not included in any of the other EDU variables.<br>0 other qualifications. |
| EDU_MEDIUM | Indicator variable | 1 if the person has a general certificate of secondary education (“Mittlere Reife”), school-leaving certificate from an intermediate secondary school (“Realschulabschluss”), certificate from a commercial college, certificate from a higher polytechnic college, or has graduated tenth grade (ISCED 2).<br>0 other qualifications. |

**Annex 3: Description of the variables used (continued)**

| Name of variable | Type of variable | Description |
|---|---|---|
| EDU_HIGH | Indicator variable | 1 if the person has entitlement to attend a University of Applied Sciences (Fachhochschule), entitlement to attend a university (Hochschule), school leavers' certificate (Abitur) or has graduated from a specialist college (ISCED 3 and 4).<br>0 other qualifications. |
| EDU_UNI | Indicator variable | 1 if the person has graduated from a higher education institution (including Fachhochschule, doctorate and post-doctoral studies).<br>0 other qualifications. |
| EMPLOYED | Indicator variable | 1 if the person is currently in full-time or part-time employment.<br>0, currently not in full-time or part-time employment. |
| NOT EMPLOYED | Indicator variable<br>(reference category) | 1 if the person is currently not in work. This includes persons who are on maternity or parental leave, have been off sick or on leave for a longer period, are seeking work, at school, in an internship, studying or in an apprenticeship. Furthermore, pensioners, those serving national or alternative service, those unable to work in the long term and housewives/husbands.<br>0 if the person is currently in full-time or part-time employment. |
| OLD | Indicator variable | 1 if the person is aged 58 or above.<br>0 if the person is aged between 18 and 57. |
| HH INC | Natural logarithm | Natural logarithm of monthly household income (net) in euro. Monthly net household income only asked at intervals. The middle of the interval was logarithmised for the calculation. |
| ATM_USER | Indicator variable | 1 if the person withdraws money at a cash dispenser at least once per week.<br>0 if the person withdraws money at a cash dispenser fewer than once per week or only makes withdrawals at a bank counter. |

**Annex 3: Description of the variables used (continued)**

| Name of variable | Type of variable | Description |
|---|---|---|
| DIST_WITHDR | Natural logarithm | Natural logarithm of the time in minutes needed to cover the distance to the cash dispenser or bank counter customarily used by the person from the person's home or place of work. |
| RISK_THEFT | Exponentially transformed<br>0 to 1 | Exponentially-transformed amount in people's wallets in euro as of which the person would feel insecure. **Inverted** in order to link large amounts with a low value of the variable. The persons who, according to their own information, never feel insecure receive the value 0. |
| POS_DENSITY | Share (0 to 1) | Share of transactions which could have been carried out either in cash or on a cashless basis, and which were carried out on a cashless basis, as opposed to all transactions in a region. Regional indicator, ie a value per "postcode region" (first two digits of the postcode). |
| P_COSTCONTR | Indicator variable | 1 if the person states that the characteristic of a payment instrument to facilitate a good overview of expenditure is indispensable for them.<br>0 if the characteristic is unimportant or fairly important. |
| P_TIME | Indicator variable | 1 if the person states that the characteristic of a payment instrument of being fast and convenient in a payment transaction is indispensable for them.<br>0 if the characteristic is unimportant or fairly important. |
| P_ANONYMITY | Indicator variable | 1 if the person states that the characteristic of a payment instrument of protecting privacy and facilitating anonymous payments is indispensable for them.<br>0 if the characteristic is unimportant or fairly important. |

**Annex 3: Description of the variables used (continued)**

| Name of variable | Type of variable | Description |
|---|---|---|
| P_ INTERNET | Indicator variable | 1 if the person states that the characteristic of a payment instrument of being able to use it on the internet is indispensable or fairly important for them.<br>0 if the characteristic is unimportant. |
| P_ABROAD | Indicator variable | 1 if the person states that the characteristic of a payment instrument of being able to use it abroad is indispensable or fairly important for them.<br>0 if the characteristic is unimportant. |
| P_ HABIT | Indicator variable | 1 if the person states that familiarity with a payment instrument and many years of experience with using it is indispensable for them.<br>0 if the characteristic is unimportant or fairly important. |
| ACCOUNT_INC | Natural logarithm | Natural logarithm of the monthly net income of a person in euro if the person has their own account.<br>Natural logarithm of the monthly net income of the household in euro if the person has a joint account together with another household member. |
| JOINT_ACCOUNT | Indicator variable | 1 if the person does not have an account of their own, but has access to an account held together with another household member.<br>0 if the person has an account of their own. |
| DIRECTBANK | Indicator variable | 1 if the person has the current account which they mainly use with a direct bank.<br>0 if the person does not have the current account which they mainly use with a direct bank. |
| AVG_VAL_TRANS | euro | Average value of a person's transactions for whom there was an option between cash and cashless payment. |

**Annex 3: Description of the variables used (continued)**

| Name of variable | Type of variable | Description |
|---|---|---|
| FRQ RETAIL (DAILY) | Share in % (Reference Category) | Share of a person's transactions in retail trade for day-to-day items among all the person's transactions in the diary. |
| FRQ RETAIL (LONG) | Share in % | Share of a person's transactions in retail trade for longer-term acquisitions among all the person's transactions in the diary. |
| FRQ. GAS | Share in % | Share of a person's transactions at petrol stations among all the person's transactions in the diary. |
| FRQ RESTAURANT /HOTEL/CAFE | Share in % | Share of a person's transactions in restaurants, cafés, pubs, snack bars, fast food restaurants, hotels or guesthouses among all the person's transactions in the diary. |
| FRQ INTERNET/MAIL-ORDER | Share in % | Share of a person's transactions on the internet or in mail order among all the person's transactions in the diary. |
| FRQ SERVICES (AWAY) | Share in % | Share of a person's transactions at external service providers among all the person's transactions in the diary. |
| FRQ SERVICES (AT HOME)/ POCKETM./PRIVATE PERS | Share in % | Share of a person's transactions for services in the household, pocket money or payments to private individuals among all the person's transactions in the diary. |
| FRQ DRUGSTORES/ VENDING MACHINES/LEISURE | Share in % | Share of a person's transactions at chemists, at vending machines or in leisure activities among all the person's transactions in the diary. |
| FRQ OTHER | Share in % | Share of a person's transactions at places of payment not mentioned above among all the person's transactions in the diary. |

## Annex 4: Results of the multivariate analysis – Reading aid

The results of the estimations are summarised in the table below. The first column presents the results of the probit estimate for credit card ownership. The other columns contain the results for the share of cash transactions. Columns II and III refer to the cash share which is calculated on the basis of the data from the diary for all transactions where there is a choice. The share emerges from the number of transactions. The results for the share based on the transaction value are similar in qualitative terms. Column II reflects the results of an ordinary least squares estimation which does not take account of the feedback effects of the cash share on credit card ownership (so-called “endogeneity”). By contrast, these retroactive effects are explicitly taken into account in the instrument variable estimation (results in column III). Column IV lists the results of the estimation for the significance of cash payments at individual places of payment, as emerges from the questionnaires. It should be taken into account here that the empirical analysis in column IV can only be carried out for those households which shop both at retailers for day-to-day items and at petrol stations. This restriction does not apply to the analysis of the cash payment share from the diary.

A positive coefficient in the credit card equation is an indication of a positive influence of the variable on the probability of owning a credit card. In the equations on the cash share, a positive coefficient is equivalent to a positive influence being exerted on the cash share (columns II and III) and to a higher probability of paying exclusively in cash (column IV) if the coefficient is significant. Because of the different estimation approaches, the point estimates are not directly comparable with one another.

The dataset is not imputed, i.e. all analyses are in each case carried out for the sample of respondents for whom all variables used in the model can be calculated.

**Annex 4: Results of the multivariate analyses**

| | (I) | (II) | (III) | (IV) | | |
|---|---|---|---|---|---|---|
| | Credit card (dummy) | Cash share (No. of transactions) | Cash share (No. of transactions) | Cash payment behaviour in retail trade for day-to-day items | Cash payment behaviour Petrol stations | Credit card (dummy) |
| | PROBIT | Least square estimate | Instrument variable estimate | MULTIVARIATE PROBIT | | |
| ***Socio-demographic variables*** | | | | | | |
| MALE | 0.082 | 0.013 | 0.013 | 0.265*** | 0.021 | 0.063 |
| | [0.080] | [0.016] | [0.017] | [0.078] | [0.077] | [0.085] |
| EDU_MEDIUM | 0.179* | -0.025 | -0.026 | -0.312*** | -0.249*** | 0.201** |
| | [0.095] | [0.019] | [0.019] | [0.088] | [0.085] | [0.099] |
| EDU_HIGH | 0.434*** | -0.032 | -0.034 | -0.349*** | -0.501*** | 0.460*** |
| | [0.121] | [0.026] | [0.030] | [0.129] | [0.128] | [0.128] |
| EDU_UNI | 0.647*** | -0.046* | -0.050 | -0.349** | -0.430** | 0.682*** |
| | [0.135] | [0.026] | [0.040] | [0.168] | [0.169] | [0.139] |
| EMPLOYED | 0.170* | -0.016 | -0.019 | -0.251*** | -0.416*** | 0.118 |
| | [0.099] | [0.019] | [0.021] | [0.092] | [0.088] | [0.106] |
| OLD | 0.189* | 0.043** | 0.041* | 0.165 | 0.088 | 0.112 |
| | [0.111] | [0.022] | [0.023] | [0.102] | [0.099] | [0.116] |
| ***Relative costs of cash*** | | | | | | |
| HH_INC | 0.454*** | -0.027* | -0.029 | -0.202** | -0.389*** | 0.476*** |
| | [0.078] | [0.014] | [0.020] | [0.087] | [0.080] | [0.085] |

**Annex 4: Results of the multivariate analyses (continued)**

| | (I) | (II) | (III) | (IV) | | |
|---|---|---|---|---|---|---|
| | Credit card (dummy) | Cash share (No. of transactions) | Cash share (No. of transactions) | Cash payment behaviour in retail trade for day-to-day items | Cash payment behaviour Petrol stations | Credit card (dummy) |
| | PROBIT | Least square estimate | Instrument variable estimate | MULTIVARIATE PROBIT | | |
| ***Relative costs of cash*** | | | | | | |
| ATM_USER | -0.075 | -0.069*** | -0.072*** | -0.268*** | -0.277*** | -0.105 |
| | [0.077] | [0.016] | [0.016] | [0.075] | [0.077] | [0.079] |
| DIST_WITHDR | -0.162*** | -0.002 | -0.004 | -0.011 | 0.002 | -0.171*** |
| | [0.057] | [0.011] | [0.013] | [0.058] | [0.057] | [0.057] |
| RISK_THEFT | -0.122 | -0.041 | -0.040 | 0.361*** | 0.027 | -0.102 |
| | [0.124] | [0.026] | [0.026] | [0.117] | [0.118] | [0.125] |
| POS_DENSITY | -1.041*** | 0.083 | 0.095 | -0.835** | -0.525 | -0.920*** |
| | [0.321] | [0.070] | [0.074] | [0.325] | [0.332] | [0.352] |
| ***Preferences*** | | | | | | |
| P_COSTCONTR | -0.100 | 0.001 | 0.002 | 0.136* | 0.007 | -0.085 |
| | [0.082] | [0.017] | [0.017] | [0.079] | [0.080] | [0.085] |
| P_TIME | 0.058 | -0.018 | -0.016 | -0.125* | -0.083 | 0.057 |
| | [0.078] | [0.016] | [0.016] | [0.075] | [0.076] | [0.082] |
| P_ANONYM | -0.071 | 0.028* | 0.023 | 0.215*** | 0.065 | -0.057 |
| | [0.079] | [0.016] | [0.016] | [0.076] | [0.078] | [0.083] |
| P_INTERNET | 0.579*** | -0.061*** | -0.063** | -0.387*** | -0.314*** | 0.558*** |
| | [0.079] | [0.018] | [0.027] | [0.103] | [0.102] | [0.084] |

**Annex 4: Results of the multivariate analyses (continued)**

| | (I) | (II) | (III) | (IV) | | |
|---|---|---|---|---|---|---|
| | Credit card (dummy) | Cash share (No. of transactions) | Cash share (No. of transactions) | Cash payment behaviour in retail trade for day-to-day items | Cash payment behaviour Petrol stations | Credit card (dummy) |
| | PROBIT | Least square estimate | Instrument variable estimate | MULTIVARIATE PROBIT | | |
| ***Preferences*** | | | | | | |
| P_ABROAD | 0.683*** | -0.032* | -0.031 | -0.399*** | -0.562*** | 0.710*** |
| | [0.118] | [0.019] | [0.025] | [0.116] | [0.106] | [0.121] |
| P_HABIT | 0.083 | -0.011 | -0.012 | 0.021 | 0.117 | 0.127 |
| | [0.080] | [0.017] | [0.017] | [0.081] | [0.082] | [0.086] |
| ***Infrastructure of means of payment*** | | | | | | |
| CREDIT_CARD | | -0.086*** | -0.072 | -0.271 | -0.254 | |
| | | [0.019] | [0.118] | [0.405] | [0.399] | |
| ***Instruments: credit card equation*** | | | | | | |
| ACCOUNT_INC | 0.316*** | | | | | 0.318*** |
| | [0.072] | | | | | [0.075] |
| JOINT_ACCOUNT | -0.598*** | | | | | -0.635*** |
| | [0.189] | | | | | [0.211] |
| DIRECTBANK | 0.724*** | | | | | 0.547** |
| | [0.227] | | | | | [0.225] |

**Annex 4: Results of the multivariate analyses (continued)**

| | (I) | (II) | (III) | (IV) | | |
|---|---|---|---|---|---|---|
| | Credit card (dummy) | Cash share (No. of transactions) | Cash share (No. of transactions) | Cash payment behaviour in retail trade for day-to-day items | Cash payment behaviour Petrol stations | Credit card (dummy) |
| | PROBIT | Least square estimate | Instrument variable estimate | MULTIVARIATE PROBIT | | |
| ***Transaction characteristics*** | | | | | | |
| AVG_VAL_TRANS | | -0.098*** | -0.099*** | | | |
| | | [0.027] | [0.016] | | | |
| FRQ RETAIL (LONG) | | -0.239** | -0.254*** | | | |
| | | [0.095] | [0.097] | | | |
| FRQ GAS | | -0.448*** | -0.433*** | | | |
| | | [0.100] | [0.083] | | | |
| FRQ RESTAURANT /HOTEL/CAFE | | -0.140** | -0.155*** | | | |
| | | [0.058] | [0.055] | | | |
| FRQ INTERNET/MAIL-ORDER | | -1.368*** | -1.374*** | | | |
| | | [0.157] | [0.153] | | | |
| FRQ SERVICES (AWAY) | | -0.041 | -0.048 | | | |
| | | [0.118] | [0.119] | | | |
| FRQ SERVICES (AT HOME)/POCKETM./ PRIVATE PERS | | -0.184* | -0.200** | | | |
| | | [0.103] | [0.102] | | | |

**Annex 4: Results of the multivariate analyses (continued)**

| | (I) | (II) | (III) | (IV) | | |
|---|---|---|---|---|---|---|
| | Credit card (dummy) | Cash share (No. of transactions) | Cash share (No. of transactions) | Cash payment behaviour Retail trade for day-to-day items | Cash payment behaviour Petrol stations | Credit card (dummy) |
| | PROBIT | Least square estimate | Instrument variable estimate | MULTIVARIATES PROBIT | | |
| FRQ DRUGSTORES/ VENDING MACHINES/ LEISURE | | -0.265*** | -0.278*** | | | |
| | | [0.071] | [0.066] | | | |
| FRQ OTHER | | 0.169 | 0.162 | | | |
| | | [0.170] | [0.158] | | | |
| CONSTANT | -6.995*** | 1.103*** | 1.143*** | 2.862*** | 3.875*** | -7.250*** |
| | [0.768] | [0.130] | [0.155] | [0.679] | [0.648] | [0.825] |
| Altroh (2/1) | | | | | 1.008*** | |
| | | | | | [0.074] | |
| Altroh (3/2) | | | | | -0.113 | |
| | | | | | [0.240] | |
| Altroh (3/1) | | | | | -0.235 | |
| | | | | | [0.235] | |
| Sargan test (p value) | | | 0.378 | | | |
| No. of observations | 1.721 | 1.599 | 1.583 | | 1.552 | |
| logl | -792.7 | | | | -2.269 | |
| Chi2 | 373.4 | | 459.2 | | 715.6 | |
| Pseudo R2/R-squared | 0.230 | 0.230 | 0.234 | | | |
| Count R2 | 78% | | | 71% | 73% | 78% |

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