Cash and card payments – recent results of the Austrian payment diary survey

Codruta Rusu,
Helmut Stix[1]

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Vienna University of Business and Economics

This contribution presents the main findings of a recent survey on payment behavior in Austria. The results indicate that the predominant role of cash, which is currently used for 82% of all direct payment transactions, has not changed in the past 20 years. In concordance with the results of prior studies, the share of cash payments varies with the payment amount, the payment location, and over sociodemographic groups. Apart from this descriptive analysis, we present possible explanations for the high level of cash use in Austria: the partially low acceptance of payment cards, the size of cash balances, and consumer preferences. Notably, 55% of respondents stated that they preferred to use cash in shops (even if card use is possible); 30% choose to pay by card. Sociodemographic factors alone, such as age or income, cannot fully explain the preference for cash or cards. Preferences for one instrument over the other depend strongly on the attributes that people demand of payment instruments. The survey results indicate that the share of cash payments is high in Austria above all because cash meets most respondents' demands on a payment instrument better than payment cards do.

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The continued expansion of established and familiar payment methods and the accelerated technological change in relatively new payment innovations is transforming consumer payments. Established technologies that are gaining ground include near field communication (NFC) payments (also referred to as contactless payments), the increase in the number of card terminals as well as growing acceptance of credit card payments, e.g. among food retailers. Payment innovations include new online payment methods and the increased use of mobile

[1] *Oesterreichische Nationalbank, Economic Studies Division, helmut.stix@oenb.at (corresponding author), Equity Interest and Payments Management Division, codruta.rusu@oenb.at.* *Opinions expressed in this contribution do not necessarily reflect the official viewpoint of the OeNB or of the Eurosystem. The authors would like to thank Gizem Yildirim for valuable research assistance and the participants of an internal OeNB seminar for helpful comments.*

phones to make payments. This article explores the impact of these changes on Austrians' payment behavior.

To this end, the Oesterreichische Nationalbank (OeNB) conducted a payment diary survey among Austrians at end-2015 into early 2016. The survey results are presented below. Before we look into the results, we briefly explain why the OeNB performs such studies and why it chooses surveys.

As the OeNB is responsible for supplying Austrians with cash efficiently, it needs to know about current cash use and future trends. The amount of cash in circulation has risen noticeably since the outbreak of the 2007/2008 economic and financial crisis. With cash circulating freely, only approximate estimates of domestic and foreign cash use, hoarding and cash transactions are possible. In addition, just like any other payment instrument, cash involves costs (Schmiedel et al., 2012). These costs must be seen in the context of the use of a given payment instrument – the cost per transaction, not total cost, is decisive. To determine such costs, the central bank requires quantitative information about cash use.

Hence, a growing number of central banks sought to obtain sound empirical information by fielding so-called payment diary surveys (e.g. the European Central Bank, the Deutsche Bundesbank, the Federal Reserve System and the Bank of Canada) in which participants recorded information on expenditures, payment instruments and other payment transaction details. The Austrian surveys provide a detailed picture of aggregate payment behavior among Austrians. Researchers can also use the micro data thus obtained to examine a great number of relevant issues: What are the reasons for consumers' payment instrument choices? How high are cash holdings, and what is the connection between cash holdings and payment behavior? What impact does e.g. a rise in noncash payments have on cash demand?

This article cannot cover the full range of issues; rather, it provides an overview and examines some key questions more closely. Section 1 relates the main features of the 2016 payment diary survey; section 2 goes into the results of the payment instrument shares. One result ex ante is that the share of cash payments has remained very high. Section 3 analyzes some factors that are considered the main drivers of high cash use. Preferences are found to play an important role. Many people choose to use cash even if they could use a card. Conversely, the share of respondents who prefer to pay by card is sizeable as well. Section 4 reviews the differences between respondents who prefer cash and those who prefer cards. Section 5 concludes.

1 The OeNB's 2016 payment diary survey

We derived the payment instrument shares shown here from data obtained in the OeNB's 2016 payment diary survey. The OeNB has been performing such surveys since 1996, allowing for a representation of payment behavior in Austria over time. The sample design of the survey was adapted substantially to allow for cross-country comparisons with harmonized data stemming from a similar survey conducted by the European Central Bank (ECB). The recent OeNB survey is very similar to the ECB's payment diary survey.

1.1 New survey design and comparability with predecessor OeNB payment surveys

We describe the structure of the 2016 payment diary survey of the OeNB in detail in the annex, so that only the most salient differences compared with the previous OeNB surveys will be highlighted below:

- The participants kept records of their payments over a period of three days rather than seven days. This change reflects the effort to strike a balance between the burden on respondents and the information content of the survey. In the ECB's study, transactions during one day were recorded.
- The survey mode differs from that of the preceding OeNB surveys. The OeNB's 2016 payment diary survey uses mainly data from respondents who filled in the payment diary online. Additionally, a separate sample was drawn for respondents aged above 55, who filled in a paper-based payment diary.
- Hence, the sample was drawn from online access panels consisting of persons willing to participate in an online survey. By definition, this part of the sample cannot be considered a random sample. The additional sample of over-55-year-old respondents, who filled in their payment diary in writing, was randomly selected from the addresses provided by the institution commissioned with executing the survey.
- The target population consists of persons aged 18 and above. By contrast, earlier OeNB surveys questioned persons aged 15 and over. To establish comparability of respondents in terms of age over time, we recalculated all results of previous surveys to include only persons aged 18 and over.

The annex contains a comparison of some key figures from the recent sample with the results of previous OeNB surveys. We find that the results of the recent OeNB survey are comparable with older results only to a limited extent, in particular with regard to payment instrument shares. Therefore, the then-and-now results are compared only to a limited degree; we concentrate on examining the results of the latest survey.

1.2 Methodological observations on payment instrument shares

Two introductory remarks should help to correctly interpret the payment instrument share shown below. First, the basis for the respective shares must be clearly defined, and second, the population to which the given figures apply must be taken into account.

We will briefly discuss both issues. Participants in the OeNB's 2016 payment diary survey were asked to record all their payment transactions with the narrowly defined exception of "regular automatic debits" on their accounts. By contrast, earlier OeNB surveys more broadly excluded "regularly recurring payments" that are generally noncash payments or account debits. Although the definitions overlap, the payments covered may differ considerably, for example inclusion or exclusion of the payment of insurance premiums by bank transfer, which complicates comparability over time. Additionally, the possible random occurrence of individual large-value payments in the sample may distort payment instrument shares. If the sample is large enough, such big payments usually do not distort the results. However, the shorter recording period in the 2016 payment diary survey makes for a noticeably smaller sample size than that in previous OeNB surveys, which additionally complicates comparisons over time.

In previous payment behavior studies by the OeNB, we computed payment instrument shares directly from the survey responses. As the surveys were representative of the Austrian population in terms of age, gender and federal province, the payment instrument shares could be considered representative of the respective groups.

Research results on payment instrument use have shown that apart from age, gender and place of residence, a number of other factors have a significant impact on the choice of payment instrument, such as income, education, Internet and mobile phone use, an affinity for technical developments and the like. Because the survey results published so far were not representative with respect to these factors, it was not possible to determine the extent to which the results truly reflected the payment behavior of the Austrian population as a whole. With the sociodemographic composition of the samples remaining relatively homogeneous over time, we could interpret the results as having explanatory power at least with respect to changes over time.

The OeNB's 2016 payment diary survey changed this continuity as well. The new sampling method used in the 2016 survey no longer allows for simple comparisons of sample results over time because the composition of the samples has become very different. Whereas the survey results remain representative in terms of age, gender and federal province, the fact that the lion's

share of the sample consists of web-savvy participants who are willing to keep records online (and that these participants were not randomly selected) suggests a change in the unobserved factors listed above, factors which were not considered for the computation of survey weights. This is the main reason why it is difficult to compare the results of the latest survey with those of earlier surveys.

1.3 A brief description of the method for calculating payment instrument shares

We use a method that enables a comparison over time and thus makes it possible to draw at least broad conclusions about the changes over time despite the caveats pointed out above. This method is explained in detail in the annex and is sketched out briefly below: Payment statistics provide data on the daily volume of debit card payments in Austria. These figures can be compared with the estimates derived from the survey. As a case in point, the payment statistics show daily debit card expenditures per person of EUR 7.38 (for persons over 18); at EUR 6.20 per day, the results derived from the survey underestimate these expenditures. In a first step, we replace the survey estimates of daily expenditures per payment instrument with their measured counterparts (i.e., we use EUR 7.38 instead of EUR 6.20 for debit cards). In a second step, the average daily expenditure values derived from the survey are scaled to the estimated daily average expenditures in the national accounts.[2] Essentially, the gap amount between the survey values and the national accounts values is proportionally divided up among those payment instruments for which we do not have information on daily expenditures. The OeNB's 2011 payment diary survey was retroactively adjusted using this method as well. The findings show that debit card payments were noticeably overestimated in the 2011 survey (with respect to the general population, not to the sample), so that some 2011 values had to be adjusted considerably.

To sum it up, this method may be seen as an effort to make the payment instrument shares estimated from the survey representative of the general population in Austria (and thus to disconnect them from the sample). The results shown hence represent adjusted survey results. These estimates are subject to statistical fluctuations and were generated based on various assumptions. A number of related robustness tests are described in the annex. We stress that independently of the exact method used, the results of these tests show that cash remains by far the most important payment instrument.

[2] The values are hypothetical averages calculated based on annual consumption figures.

2 Shares of payment instruments

Table 1

Cash versus noncash payment shares in 2011 and 2016

%	Value share		Volume share	
	2016	2011	2016	2011
	%			
Cash	64.9	73.2	81.8	85.9
Debit card	17.3	15.6	10.9	9.5
Credit card	6.1	5.6	2.7	1.9
NFC contactless	0.8		1.2	
Direct debit payments/transfers	8.2	4.2	1.7	1.5
Internet/mobile	1.9	0.2	0.8	0.2
Other	0.9	1.2	0.9	1.0

Source: OeNB 2011 and 2016 payment surveys and authors' calculations.

Note: The table shows the share of the relevant payment instruments as a percentage of the overall payment volume and value that the survey respondents recorded in the seven-day (2011) and in the three-day payment diary (2016). Person-to-person payments were excluded. A breakdown of how those shares were compiled is given in the annex.

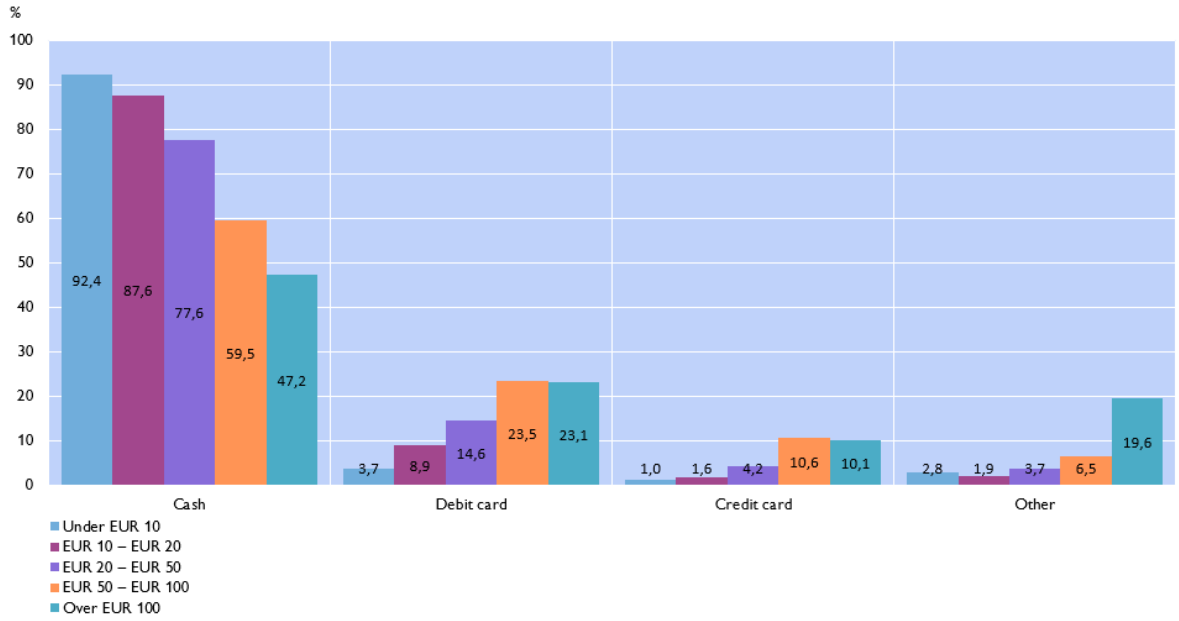
Table 1 confirms the dominant role cash plays in direct payment transactions: 82% of all payments made in 2016 were cash payments. Debit cards were used to pay for 10.9% of all purchases, credit cards for 2.7%. Some observers may regard the share of cash payments at Austrian retail stores as very high, but a closer look shows that the respective amounts are usually quite low. The value of 50% of all payments covered by the survey is below EUR 12.4, and 90% of payments are for amounts of less than EUR 51.4. The high share of cash in the transactions recorded signals that cash remains the payment instrument of choice for low-value payments. Moreover, while the transaction share of cash is high, the share of cash in overall payment values is much smaller: Whereas 82% of all payments were in cash, these payments accounted for only 65% of the total transaction value.

Three changes stand out in a comparison with the 2011 survey – though, as indicated earlier, this comparison can convey only a rough estimate of changes. First, the cash share is decreasing. Second, as expected, the share of payments made with debit and credit cards is rising further, a rise that remains continuous rather than abrupt. Third, transfers/direct debit payments have increased sharply. However, a small number of large-value payments drove this rise, which also has a direct impact on the payment value shares. If, for example, all payments exceeding EUR 800 are factored out, the cash share only drops from 73.2% to 67.2% between 2011 and 2016 and the share of transfers only goes up from 4.2% to 6.4% (rather than the 8.2% recorded for all payments). Nevertheless, this result confirms that the share of transfers has risen over time in the sample even if we exclude large-value payments.

Chart 1 shows the shares of payment instruments by value categories. Cash accounts for 92% of all payments up to EUR 10 and still holds a 47% share of payments higher than EUR 100.[3] The share of card payments rises in tandem with the payment amount and becomes significant at a volume of about EUR 50. This pattern is in line with expectations. Astonishingly, cash still accounts for a high share of payments over EUR 100.

Chart 1

Payment instrument share by transaction value



Source: OeNB 2016 payment survey and authors' calculations.
Note: The shares refer to transactions within specific value categories, e.g. 92.4% of all transactions under EUR 10 are effected in cash.

2.1 NFC contactless payments

The fact that card payments account for only a minimal share of low-value payments is interesting in light of the introduction of contactless payments using near field communication (NFC) technology. NFC payments currently represent the most dynamic product in the market, boasting very high growth rates and growth potential: Nearly three-quarters of all NFC payments involve amounts of less than EUR 25.

The survey shows that NFC payments account for only 1.2% of all payment transactions (table 1). However, we need to bear in mind that the survey was conducted from November 2015 through February 2016 – since then NFC figures have shot up, recording a remarkable year-on-year increase of 160% in the second quarter of 2016.

[3] Wherever disaggregated payment instrument shares are used below, these shares are based on unadjusted values taken directly from the survey, as disaggregated values cannot be adjusted.

Table 2

Use of contactless payments twice a month or more often

% of respondents

Overall		37
Age	18–34	47
	35–54	39
	55+	27
Gender	female	36
	male	38
Household net income	low	34
	medium	35
	high	46
Size of place of residence	up to 2,000 inhabitants	34
	up to 5,000 inhabitants	37
	up to 20,000 inhabitants	34
	more than 20,000 inhabitants	40
Region	east – Lower Austria, Vienna, Burgenland	36
	center – Upper Austria, Styria, Carinthia	37
	west – Vorarlberg, Tyrol, Salzburg	40
Labor status	employed	43
	unemployed	34
	retired	24
	student/in education	37
Household size	1 to 2 persons	35
	more than 2 persons	41

Source: OeNB 2016 payment survey.
Note: This table shows the percentage of respondents who reported that they used contactless payment for payments of up to EUR 25 (without a PIN code) twice a month or more often by sociodemographic features.

The questionnaire part of the survey included a general question on whether and how often respondents make contactless payments. As table 2 shows, 37% of participants already use NFC payments twice a month or more often. This share may seem relatively high, but another survey conducted in the third quarter of 2016 (the OeNB Q3/2016 barometer survey) confirms this value. The acceptance of NFC payments by sociodemographic groups follows the same pattern as the acceptance of technological innovations in general: Acceptance is considerably higher among younger persons, persons with higher incomes, persons living in cities, students/persons in education and employed persons.

2.2 Payment behavior by the point of sale and sociodemographics

Considered over the entirety of payments, the predominant role of cash has not changed in the past 20 years. We analyze payment behavior below, in particular examining the differences between various sectors or points of sale and within sociodemographic structures. The cash payment shares shown below were calculated directly from the survey responses (unadjusted). Hence, when interpreting the results, the calculated shares must be considered only a rough approximation; the explanatory power of the relative differences is greater than that of the absolute figures. This is also the reason why we do not present any changes over time.

Table 3

Payment behavior by location

%	Overall		Cash		
	Volume share	Value share	Volume share	Value share	Average transaction value
	(1)	(2)	(3)	(4)	(5)
Shop for daily goods	43.2	33.0	85.7	76.1	20.6
Shop for durable goods	7.0	18.1	71.1	49.1	67.2
Gas station	6.4	7.4	65.2	57.4	29.7
Street market	4.4	1.5	98.8	99.3	9.9
Restaurant, bar or café	16.1	8.9	95.7	94.5	15.3
Hotel, guest house, camping	0.7	1.0	77.4	78.0	39.4
Public authority (taxes, fines, fees for documents)	0.3	0.4	56.7	54.8	33.6
Venue for arts, entertainment or recreation	2.4	2.5	87.7	75.5	26.9
Vending or ticketing machine	3.4	1.1	85.8	65.2	9.2
Household services	1.4	1.4	87.3	81.2	27.5
Charity	2.8	5.2	93.6	95.9	46.4
Online	1.8	5.3			77.5
Other	8.3	12.0	85.1	63.5	39.9
Don't know/no answer	2.0	2.3			

Source: OeNB 2016 payment survey.

Note: Columns 1 and 2 show the overall transaction shares (in both volume and value) accounted for by different payment locations. Columns 3 and 4 denote the share paid for in cash in the respective locations. Column 5 shows the average transaction value per location in EUR.

Table 3 summarizes the cash shares of the individual sectors or points of sale. Payments for *daily goods* (42%), at *restaurants, bars, cafés* (16%), for *other* items (8.3%), for *durable goods* (7%) and at *gas stations* (6%) accounted for the largest transaction shares.

As expected, over 90% of person-to-person transactions (purchases on street markets, purchases in restaurants, bars or cafés, and payments to persons or charities) were in cash. 85% of all daily goods were purchased with cash. The cash transaction share is substantially lower for acquisitions of durable goods; it is lowest for payments to public authorities (taxes, fines, etc.).

Apart from person-to-person payments, payments in restaurants, bars and cafés, and to authorities, the cash share again depends on the size of the average payment amount.

Table 4

Cash share by sociodemographic group
%

		2016	
		Volume share	Value share
		in %	
Age	18–34	84	71
	35–54	85	69
	55+	88	76
Gender	female	87	71
	male	86	75
Household net income	low	87	83
	medium	88	73
	high	81	59
Size of place of residence	up to 2,000 inhabitants	87	78
	up to 5,000 inhabitants	89	77
	up to 20,000 inhabitants	87	70
	over 20,000 inhabitants	83	68
Region	east – Lower Austria, Vienna, Burgenland	85	70
	center – Upper Austria, Styria, Carinthia	87	76
	west – Vorarlberg, Tyrol, Salzburg	85	72
Labor status	employed	85	67
	unemployed	90	82
	retired	88	80
	student/in education	85	73
Household size	1 to 2 persons	87	76
	More than 2 persons	84	66

Source: OeNB 2016 payment survey.

Note: This table shows the volume and value shares of cash in total payment transactions according to sociodemographic features.

Table 4 summarizes the cash shares by sociodemographic groups. With regard to volume (transaction) shares, the surprisingly small differences between the groups are striking: The largest difference is between persons with high incomes (cash share: 81%) and persons with mid-range incomes (cash share: 88%). The differences are somewhat more distinct with regard to value shares. Here, the patterns found correspond to the results of international studies (Bagnall et al., 2016). Nevertheless, the cash shares are very high across the board in all sociodemographic groups: Older persons use cash more frequently than younger cohorts (76% versus 71%), persons with lower incomes prefer cash payments more than persons with higher incomes (83% versus 59%), and unemployed persons choose cash for payments more often than employed persons (82% versus 67%).

3 Some thoughts on the high level of cash use in Austria

The aggregate perspective confirms the assumption that cash use levels are high in Austria. This holds across all sociodemographic groups, independently of the point of sale and – this is important considering the degree of estimation inaccuracy – independently of the sample analyzed (online or paper-based diary, see annex). As Bagnall et al. (2016) show, the cash share is similarly high in Austria and Germany. While the cash share in Austria and in Germany does not appear to be exceptionally high by international standards, several countries exhibit a far lower cash share (Australia, Canada, France, the Netherlands, Sweden, Norway and the United States).

Although the reasons for the international differences have not been fully researched, the relevant literature has identified some explanatory factors: (1) The acceptance of payment cards, (2) consumer preferences for particular payment instruments and (3) the cost of holding cash or of cash withdrawals influence payment behavior markedly. We discuss these factors in detail below. [4]

3.1 Partly low acceptance of payment cards

The literature cites one important reason for the use of cash as being the low acceptance of payment cards (e.g. Huynh, Schmidt-Dengler and Stix, 2014).

[4] As the literature shows, payment behavior depends on many factors, and identifying the main factors is complex. Apart from personal characteristics, whose effects can frequently be interpreted in economic terms (e.g. persons with higher incomes have less time, therefore they choose card payments; when they do withdraw cash, they withdraw a larger amount than other cohorts), preferences play an important role (see, e.g., Arango, Huynh and Sabetti, 2015; Schuh and Stavins, 2010; von Kalckreuth, Schmidt and Stix, 2014). How preferences are formed in turn depends on many unobserved factors: Relevant factors include personal behavioral traits like an aversion to debt, habit, subjective control of one's own behavior, and social norms. Additionally, a strong circumstantial aspect plays a role: The propensity to use cash depends on how much cash persons have in their wallets as well as on the payment situation itself (are there long lines at the cash register, what payment method does the retailer expect customers to use, how safe is the area or the situation). The large number of factors influencing a consumer's payment behavior is compounded by the difficulty that most of these factors are in turn influenced by other factors, meaning that they are endogenous, which makes it hard to establish a causal relationship. Apart from the isolated view of the consumer, the views of retailers and of other consumers play an important role. The incentive to accept a payment instrument rises as the share of consumers who use this instrument grows (Bounie, van Hove and François, 2016), and the incentive to use a payment instrument rises as the share of retailers who accept this instrument grows. Given this complex interaction, a descriptive presentation like the one chosen for this article can provide only a rough overview of the relevant explanatory factors.

Table 5

Perceived acceptance of payment cards

% of respondents

Overall		72
Location	shop for daily goods	87
	shop for durable goods	93
	gas station	94
	street market	14
	restaurant, bar or café	51
	hotel, guest house, camping	66
	public authority (taxes, fines, fees for documents)	71
	venue for arts, entertainment or recreation	46
	vending or ticketing machine	59
	household services	27
Payment amount	up to EUR 5	56
	EUR 5 – EUR 10	68
	EUR 10 – EUR 25	76
	EUR 25 – EUR 50	85
	over EUR 50	87
Size of place of residence	up to 2,000 inhabitants	73
	up to 5,000 inhabitants	72
	up to 20,000 inhabitants	71
	over 20,000 inhabitants	72

Source: OeNB 2016 payment survey.
Note: This table shows the share of transactions (in terms of overall transaction numbers) for which card payments were feasible. The shares are broken down by point of sale (payment location), payment amount and size of place of residence. The values represent the respondents' subjective assessment. "Don't know" answers are disregarded.

Table 5 shows a breakdown by selected variables of the share of transactions where payment by card principally would have been feasible. Note that the acceptance of payment cards is recorded as perceived by participants: For every cash transaction, respondents recorded whether payment by card would have been possible.[5]

Overall, respondents stated that card payment would have been possible for a total of 72% of recorded payments. However, striking differences by location emerge: Card payments were perceived as possible for only 14% of street purchases, and at the other end of the scale for 94% of purchases at gas stations. At shops for daily goods, which are the most important location in terms of the number of transactions recorded, this share comes to 87%. Respondents considered 51% of restaurants, bars or cafés as willing to accept noncash payments. Just like in the 2011 survey, there were marked differences by payment amounts, with 87% of all transactions over EUR 50 perceived as being payable by card but only 56% of amounts up to EUR 5 being perceived as noncash payable (compare Mooslechner, Stix and Wagner, 2012). Hardly any differences resulted from the size of respondents' place of residence. While the above figures may be slightly distorted because they reflect participants' perceptions, they do convey a picture that is largely consistent with reality. Especially for small amounts and particular types of payments, participants often have no alternative to cash.

As discussed in Bagnall et al. (2016), similar statistics are available for Canada and Germany. Whereas the perceived acceptance is defined somewhat differently than in the Austrian survey, the results nevertheless show that above all for amounts up to about EUR 25, acceptance of card payments is seen as lower in Germany and Austria than in Canada. The difference between the countries is not as striking for higher amounts. Payment statistics confirm the survey response figures. Germany and Austria feature by far the lowest payment terminal density per inhabitant of the seven countries examined in Bagnall et al. (2016), the other countries being the U.S.A, Canada, Australia, France and the Netherlands.

[5] The reality of a situation is distorted especially if a participant who principally uses cash for payments states that it would not have been possible to pay by card because this participant does not take note of whether noncash payment would have been possible.

The high share of cash may certainly be partly attributed to the limited acceptance of payment cards in some sectors and for some transactions amounts. Yet the results also show that payment by card would be possible for the bulk of large transactions for which the share of cash is nevertheless high.

What impact would greater acceptance of payment cards have on payment behavior? In answering this question, it must be noted that card acceptance may have direct and indirect effects. The direct channel is obvious – if card payments are not feasible, consumers have to use cash. The indirect channel is just as important, though. First, consumers who are uncertain whether an expected payment can be made by card have higher amounts of cash on hand. Higher cash holdings thus lead to more cash payments, which the literature confirms (Alvarez and Lippi, 2015, Eschelbach and Schmidt, 2015). Second, greater acceptance of cards may change consumers' behavior, causing them to use cards for transactions for which they formerly preferred cash.

Table 6

Cash share assuming full acceptance of payment cards
% of payment values

		Overall	Cash share for respondents who own a payment card and only for those payments for which noncash payments would have been possible	
			% of the payment value	*Difference in percentage points*
Age	18–34	72	64	8
	35–54	67	60	7
	55+	70	58	13
Gender	female	66	56	10
	male	73	63	10
Household income	low	73	63	11
	medium	75	66	8
	high	59	49	10
Size of place of residence	up to 2,000 inhabitants	74	65	10
	up to 5,000 inhabitants	74	65	9
	up to 20,000 inhabitants	67	58	9
	over 20,000 inhabitants	64	53	11
Labor status	employed	66	57	9
	unemployed	80	77	3
	retired	73	61	13
	student/in education	67	60	7
Payment amount				
	EUR 10 – EUR 25	87	81	6
	EUR 25 – EUR 50	77	71	6
	Over EUR 50	53	42	11

Source: OeNB 2016 payment survey.
Note: The table shows the cash share (in % of payment volumes) assuming full acceptance of payment cards according to sociodemographics and payment amount categories. The first column shows the results for all respondents, while the second column shows the cash share for just the subset of respondents who own a payment card and only for those payments for which noncash paymens would have been possible. The third column shows the difference between those two groups in percentage points.

As estimating the overall effect of payment card acceptance is complex, we try to establish at least an order of magnitude for the direct effect (table 6). To this end, we calculate the cash transaction share (in % of the value of all payments) only for respondents who own a payment card as well as only for those transactions where noncash payment would have been possible.[6] The results show that while the cash payment share of transactions where noncash payment is possible is partly markedly below the cash share for all transactions, it remains conspicuously high. Two cases serve to illustrate this: Cash payments account for 59% of all payments in the highest income tercile. The share comes to 49% for

[6] The difference between shares calculated using this method and shares for all transactions (with or without card acceptance) mainly reflects the acceptance effect (especially as nearly 97% of all respondents own a payment card).

transactions allowing payment by cards. The difference is somewhat larger for transactions over EUR 50. The cash share (in % of the payment value) declines from 53% to 42% for transactions where cards are fully accepted.

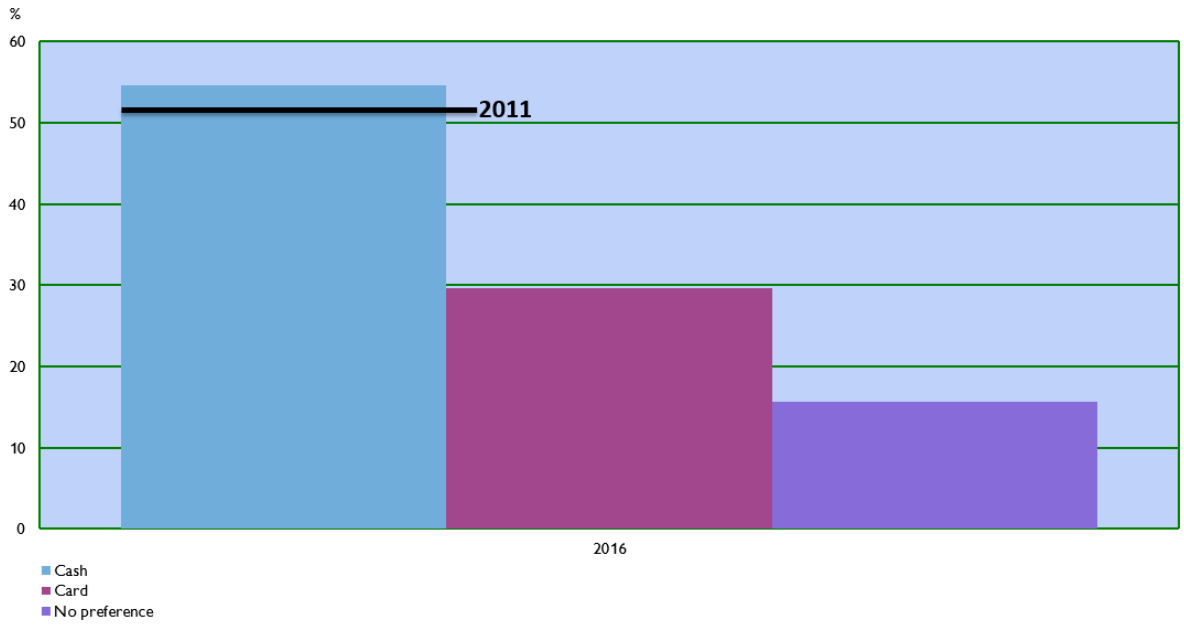
The analysis produces two results. First, full card acceptance has quite a significant quantitative influence and second, cash payments account for a considerable share of transactions even if alternative payment methods are possible. Thus, the high share of cash transactions cannot be ascribed just to the relatively low degree of card acceptance.

3.2 Most consumers prefer to use cash

Consumer preferences provide an additional explanation for the high degree of cash use: Consumers simply choose their favorite payment method. To confirm this assumption, the OeNB's 2016 payment diary survey included a question on the preferred payment method in stores, hypothetically assuming that respondents had sufficient cash in their wallets and that cards were definitely accepted.

Chart 2

Preferred payment instrument if given a free choice



Source: OeNB 2011 and 2016 payment surveys.

Note: This chart indicates the percentage of respondents who reported that they had a preference for either cash or cards or for neither payment instrument when paying in a store.

Slightly over half (55%) of the respondents stated that cash was their preferred payment instrument; an additional 30% favored payment by card. The remaining 16% did not express a preference. A comparison of actual payment behavior (as recorded in payment diaries) with the stated preferences confirms that the survey responses are consistent with the declared preferences.

This result signals that the high share of cash payments in Austria can be largely attributed to consumers' preferences. The results of a matching question in the 2011 survey are very similar to those of the 2016 survey (chart 2).[7] This result raises the questions of how to explain respondents' strong preference for cash payments and of what distinguishes these respondents from those who prefer to pay with cards. We examine these issues in greater depth in section 4, where we label these groups "cash payers" and "card payers." The classification is based exclusively on a hypothetical question about payment behavior in stores. Thus, the term "cash payer" ("card payer") does not signify that such respondents use cash (cards) every time and everywhere. Despite the consistent behavior described above, the cash share of cash payers is not 100%, nor is it 0% for card payers (in the payment diary, cash payers account for a cash share of 81% in value terms, card payers for 49%). Cash payers simply start to use their cards at higher amounts than card payers do. Questioned about the amount at which they would start to use their cards, cash payers stated an average of EUR 102 (median: EUR 50), card payers started at EUR 37 (median: EUR 15).

The high share of cash payers emerging from the survey can be validated using external data. Abele and Schaefer (2016) examined the actual usage data of debit cards issued in Austria and found that 31% of cards were not used to make payments within a period of one year (2013). 16% of payment cards were used from 1–12 times. If these two categories are combined to represent "cash payers," the percentage is similar to the high survey result. Conversely, 31% of cards issued were used to make payments once a week or more frequently.

Table 7

Cash balances by sociodemographic group

		Mean	Median
		% of respondents	
Overall		90.78	60.00
Age	18–34	54.07	32.60
	35–54	82.18	51.24
	55+	125.54	95.42
Gender	female	83.58	58.40
	male	98.53	62.29
Household net income	low	90.66	60.35
	medium	86.98	60.40
	high	99.33	62.53
Size of place of residence	up to 2,000 inhabitants	97.44	67.24
	up to 5,000 inhabitants	104.19	78.12
	up to 20,000 inhabitants	92.32	65.40
	over 20,000 inhabitants	76.24	50.00
Region	east – Lower Austria, Vienna, Burgenland	86.85	55.90
	center – Upper Austria, Styria, Carinthia	101.44	70.50
	west – Vorarlberg, Tyrol, Salzburg	78.35	50.00
Labor status	employed	83.07	51.50
	unemployed	74.50	53.70
	retired	123.95	90.00
	student/in education	35.81	27.35
Household size	1 to 2 persons	95.47	64.00
	more than 2 persons	82.10	50.20

Source: OeNB 2016 payment survey.
Note: This table shows the average (both mean and median) amount of cash the diary respondents were carrying at the beginning of the first day of the diary by sociodemographic features.

3.3 Cash holdings

The relatively high levels of cash holdings also reflect heavy cash use in Austria. In a cross-country comparison, Bagnall et al. (2016) show that the average cash

[7] The question was formulated somewhat differently in the 2011 survey. At the time, about 52% of respondents stated that they would prefer to use cash for lower-value payments even if cards were accepted, an additional 25% would use their card, and 23% of respondents would choose one or the other method in roughly equal measure.

balances in wallets are three times as high in Austria as in the Netherlands, where card use is high.

On average, the respondents stated that their cash holdings at the beginning of the first survey day came to a bit over EUR 90. The median amount, EUR 60, was lower. Examining cash holdings in wallets by demographics, a clear difference between older and younger cohorts emerges, much as in the case of the share of cash payments. As expected, the oldest cohort (55+) and retired persons have the most cash in their wallets (averages of EUR 125 and EUR 123, respectively) whereas respondents in the age category from 18 to 24 and students have the lowest holdings (EUR 56 and EUR 36, respectively). Additionally, the amount of cash in wallets varies strongly by gender – female respondents hold an average of just over EUR 84, men EUR 99.

Table 8

Cash as a store of value

Some people like to keep cash outside a bank account as a precautionary reserve or as an alternative way of saving. Do you personally keep an extra amount of cash at home or at a safe place e.g. safety deposit box?

	All	Cash payer	Card payer
Yes	35.3	42.6	23.0
No	63.0	55.3	76.2
Don't know/no answer	1.6	2.1	0.8
Appoximate amount of cash kept at home (% of respondents who answered yes)			
EUR 100 or less	8	8	8
More than EUR 100 to EUR 250	20	18	25
More than EUR 250 to EUR 500	20	20	21
More than EUR 500 to EUR 1,000	17	17	16
More than EUR 1,000 to EUR 5,000	11	11	15
More than EUR 5,000	4	4	6
Refused to answer	20	23	10
Average amount of cash kept in wallet			
Mean	90.8	100.6	74.0
Median	60.0	70.7	45.7
Average amount of cash kept at home			
Mean	1082.4	1089.0	1249.2
Total amount of cash kept			
Mean	479.6	574.3	363.9

Source: OeNB 2016 payment survey.

Note: The table shows the share of respondents who kept an extra amount of cash at home or at a safe place as well as the approximate amounts for those who indicated they did. The resulting average amount of cash kept at home and the average amount of cash kept in the wallet (see table 7) add up to the total average amount of cash kept per person (over the age of 18).

The recent survey included a question on cash holdings at home (or at a safe place). This delicate question must also be seen in the context of whether the survey was filled in or held by an interviewer. Accordingly, the refusals to answer are shown in table 8. Some 35% of respondents indicated that they had cash holdings at home, with the share coming to 42% among cash payers compared to a much lower 23% among card payers. The median cash holdings at home ranged from EUR 500 to EUR 1,000. By inference, half of the 35% of respondents with cash holdings at home thus had higher holdings at home than the median.

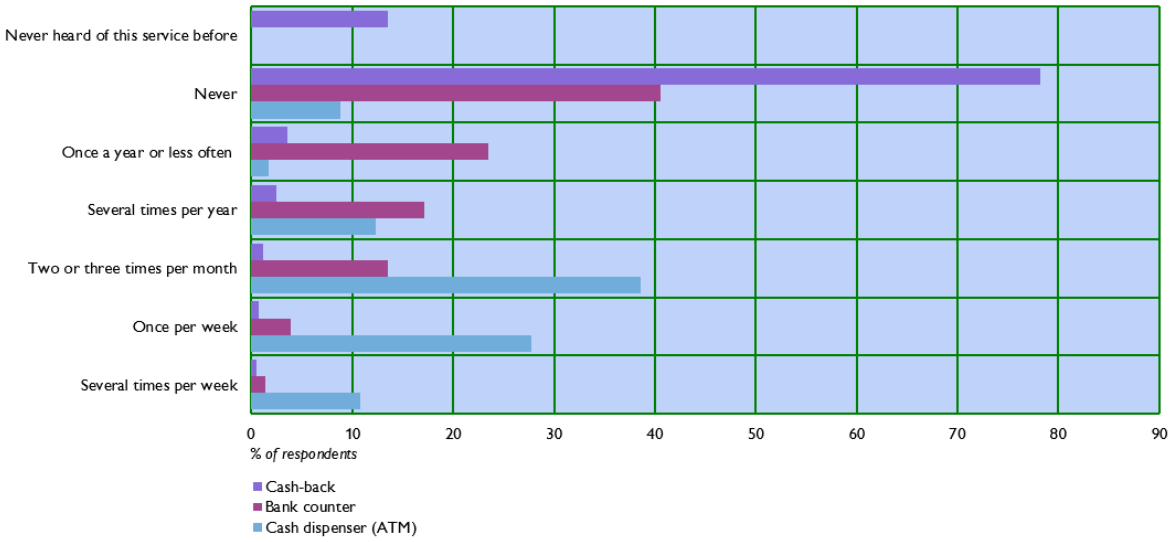
The answers permit us to calculate average cash holdings as a total of cash in wallets and cash held at home. To do this, some assumptions are required, but their plausibility is difficult to corroborate. Consequently, the result of this calculation can be interpreted only as a rough

approximation.[8] According to the calculation, Austrians (over 18) have average total cash holdings of EUR 480. This calculation was also run separately for persons who preferred cash payments and those who preferred card payments. The average cash holdings of the former group (EUR 574) are substantially higher than those of the latter group (EUR 364), above all because a larger share of cash payers have cash holdings at home than card payers. By contrast, the difference between the categories is much smaller for cash held in wallets (EUR 100 for cash payers versus EUR 74 for card payers).

In connection with cash holdings at home, we also asked respondents whether they had had a EUR 200 or EUR 500 banknote in their possession over the preceding 12-month period. A total of 38% respondents stated in the 2016 survey that they had possessed a EUR 200 or EUR 500 banknote over that period.[9]

Chart 3

Frequency of use of cash dispensers (ATMs), bank counters and cash-back as a means of withdrawing cash



Source: OeNB 2016 payment survey.

Note: The chart shows how often the survey participants used cash dispensers (ATMs), bank counters and cash-back at the supermarket to withdraw cash. Since the latter is currently not very prevalent in Austria, the answer "never heard of this service" was added as an option.

Chart 3 confirms that ATMs are the most frequently used method of cash withdrawals. 39% of respondents stated that they made two to three withdrawals at ATMs every month, and an additional 28% withdrew cash once a week. The majority of respondents obtained cash from

[8] 20% of respondents refused to say how much cash they were holding at home. We assume that these 20% have similar amounts of cash holdings at home as all other respondents. Moreover, the cash holdings at home are attributed to the respondents themselves, thus disregarding the fact that these holdings could also belong to other persons in a respondent's household.

[9] We would like to point out that a nearly identical question in the OeNB barometer survey had drawn a share of only 22%. This quite substantial difference could result from the interviewing technique of the OeNB barometer survey, where the interviewer personally queries respondents. In any event, the difference highlights the large degree of uncertainty surrounding survey results on cash holdings.

bank tellers at most once a year (24%) or never (41%). The results also indicate that retailers' cash-back at the supermarket plays only a very small role in Austria.[10] 78% of respondents specified that they never used cash-back, and an additional 14% had never heard of such services before.

Incomes in cash represent a further aspect of cash holdings. About 90% of respondents noted that they did not receive any cash income, so that this aspect is unlikely to have an impact on the aggregate. However, surveys of the type used here cannot cover incomes from undeclared labor and tax avoidance.

4 What distinguishes cash payers from card payers?

Although nearly all respondents possess (at least) one card or more, although noncash payment is often possible especially for high amounts, and although most respondents were drawn from an online sample of internet users, many respondents prefer cash to card payments. This gives rise to several questions. What are the typical features of cash payers? Are all cash payers older people, while younger people tend to use cards to pay? Do people who prefer to use cash live in rural areas, card payers in urban areas? Do cash payers have fewer options to make noncash payments? Do those who prefer to use cards feel unsafe when they carry cash? We explore these questions below.

4.1 High share of cash payers in all sociodemographic groups

Chart 4 shows the share of cash payers and card payers by sociodemographics. One result is conspicuous: Although the size of the share varies noticeably within the individual categories, each category displays a high share of cash payers overall.

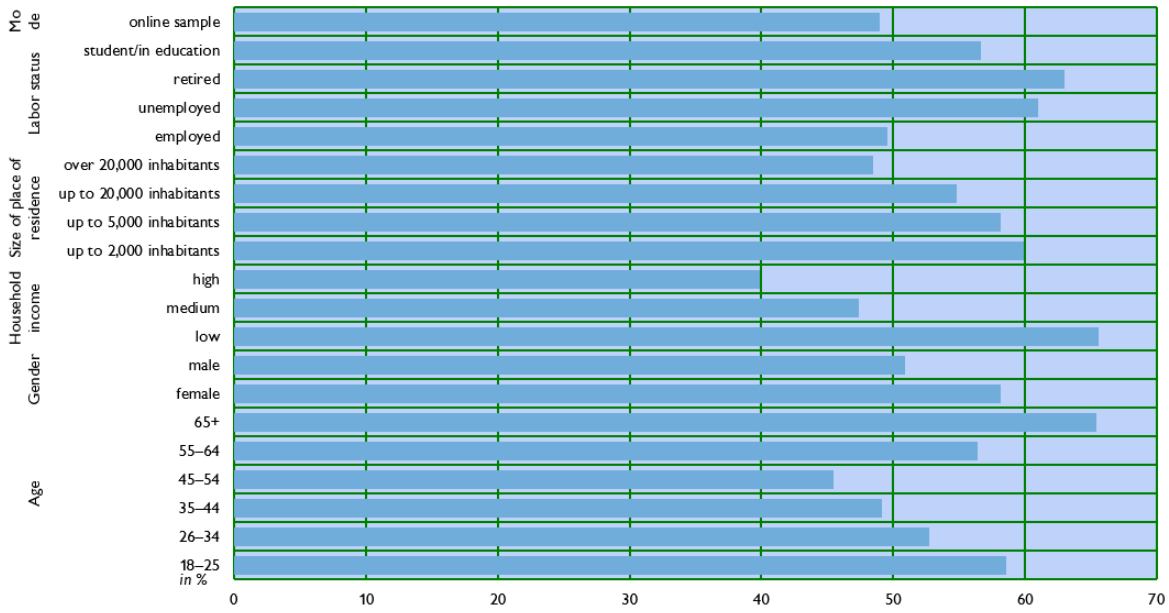
By way of example, we look more closely at the categories age and income. The share of cash payers is highest among the oldest and the youngest respondents. 59% of 18- to 25-year-olds indicated that they preferred to use cash. The share of cash payers drops in the next categories and is lowest for 45- to 55-year-old respondents. Subsequently, the share of cash payers picks up again in the higher age categories and reaches its peak among persons aged 65+. By income, the share of cash payers declines from 66% for persons in the first income tercile to 40% for persons in the top income tercile. This is also the only sociodemographic category in which the share of card payers equals that of cash payers. In all other groups, the share of respondents who prefer cards to cash is lower (in some groups by far) than the share of cash payers. Chart 4

[10] Cash-back denotes withdrawal services that some retailers offer to customers who make purchases at their store. In Austria, only one food retailer currently (as at December 8, 2016) offers such a service, namely Billa ("Bargeld 2 go") up to an amount of EUR 100 https://www.billa.at/Vorteils-Club/Ihre_Vorteile/Bargeld_2_go/Bargeld_2_go/dd_bi_channelpage.aspx (retrieved on December 14, 2016; information in German only).

also shows that the share of cash payers in the online sample (i.e. among respondents who filled in the questionnaire online) is astonishingly high at 49%.

Chart 4

Cash payers by sociodemographic featuress



Source: OeNB 2016 payment survey.

Note: The chart shows the share of respondents who prefer to pay cash in shops by sociodemographic features.

The results of our analysis do not allow us to distinguish between cash and card preferences on the basis of sociodemographic features alone.

4.2 Cash and card payers perceive the characteristics of cash differently

Respondents' preferences might be a reason why they tend to use cards or cash. Therefore, we analyzed what features of payment instruments are important to *cash payers* and to *card payers* (table 9).[11]

[11] Again, we use data from the OeNB Q3/2016 barometer survey. As the barometer survey does not include a dedicated question, we classified cash and card payers using a somewhat different method. In particular, we asked the following question: "How to you pay for your more comprehensive weekend shopping (usually grocery shopping)? We define cash payers as respondents who answered "more cash than by card" or "exclusively cash." Card payers are respondents who answered "more by card than cash" or "exclusively by card." Respondents in the middle category paid "about in equal measure cash or by card." In the barometer survey using the above definition, the share of cash and of card payers comes to about 40% each.

Table 9

Importance of properties of payment instruments according to cash payers/card payers

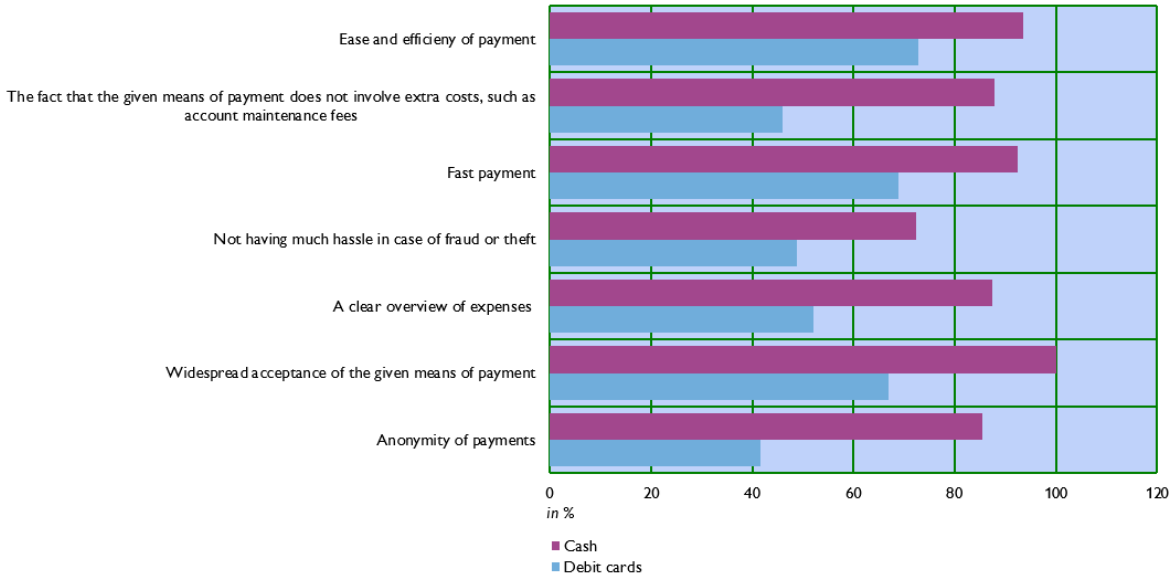
	cash payers	card payers	difference
	% of respondents		*in percentage*
Payment is easy and efficient	78	76	3
Payment is fast	73	70	3
In case of fraud or theft, I don't have much hassle	73	64	9
I have a clear overview of my expenses (e.g. via account statement entries)	72	66	6
The given means of payment does not involve extra costs, such as account maintenance fees	74	63	11
Payment is anonymous	66	45	21
I am kept from spending more than intended	60	47	13
I get a discount or other reward for using the given means of payment	47	38	9
The given means of payment is widely accepted	68	73	-4
Larger expenses are debited to my account later	29	31	-2
I don't have to check whether I am carrying enough cash	43	62	-19
I don't have to check whether I can pay with a card	56	53	3

Source: OeNB Q3/2016 barometer survey.
Note: The table show how the respondents, subdivided by cash payers and card payers, assess the importance of different properties of payments instruments. The percentage denotes the respondents who deemed the respective property "very important" or "important." We define cash payers as respondents who claimed that they paid "exclusively cash" or "more cash than by cards" while doing their more comprehensive weekend shopping, whereas card payers claimed that they paid "more by cards than cash" or "exclusively by cards." Each group accounts for roughly 40% of the share of all respondents.

Cash and card payers consider the features "payment is easy and efficient" and "payment is fast" about equally important in absolute terms; in relative terms, both groups consider these the crucial features a payment instrument must display. Cash payers additionally name the cost of payment instruments as a key aspect. The two types of payers rank other features differently, however. Cash payers consider additional costs, having a clear overview of their spending and preserving anonymity much more important than card payers. Especially the two last aspects are key arguments in favor of cash also in less cash-intensive countries (Bagnall and Flood, 2011).

Chart 5

How do cash payers rate cash and debit cards in terms of...

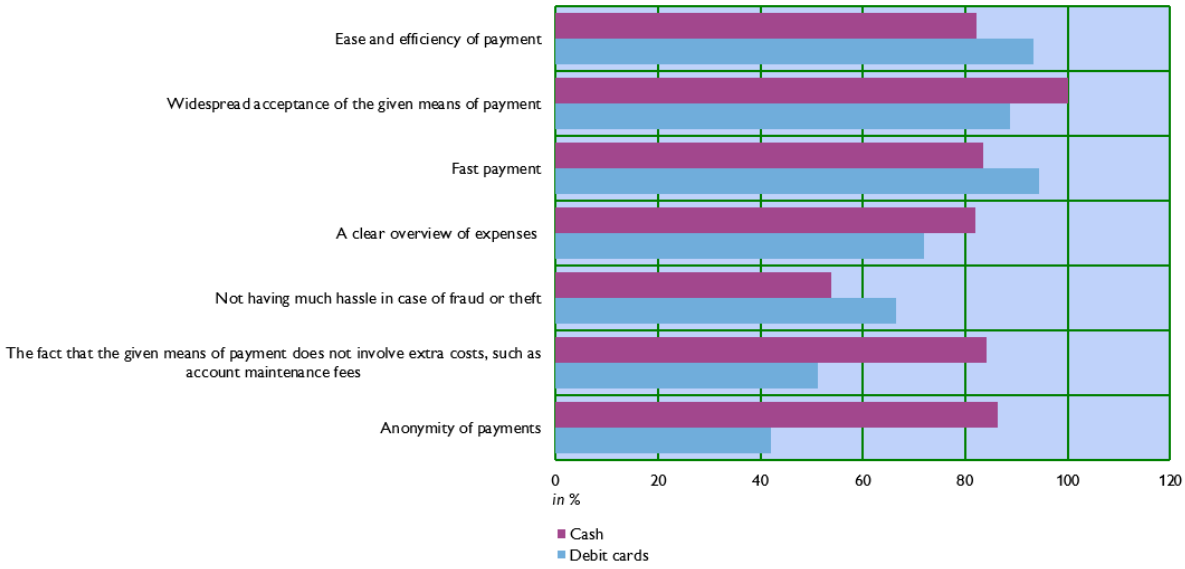


Source: IFES, OeNB Q3/2016 barometer survey.
Note: The chart shows how cash payers rate the ability of cash and debit cards to fulfill the seven most important properties of a payment instrument. The properties are ranked from the top to the bottom by importance. The chart shows the percentage of respondents who considered the respective requirements as "very much" or "much" fulfilled.

Chart 5 summarizes how *cash payers* rate cash and debit cards, chart 6 how *card payers* rate cash and debit cards. The six key features in each group (plus anonymity) are ranked from top to bottom by importance.[12] In keeping with their payment behavior, cash payers consistently indicate that cash more strongly displays these key features than debit cards; card payers rate debit cards as better. Interestingly, card payers concede that cash does better than cards in some respects – anonymity, an overview of expenses, no additional costs. The crux of the matter, however, is that card payers do not rank these features as highly as the features where they give cards a higher score than cash.

Chart 6

How do card payers rate cash and debit cards in terms of...



Source: IFES, OeNB Q3/2016 barometer survey.

Note: The chart shows how card payers rate the ability of cash and debit cards to fulfill the six most important properties of a payment instrument. For reasons of comparison, we added the property "anonymity of payments." The properties are ranked from the top to the bottom by importance. The chart shows the percentage of respondents who considered the respective requirements as "very much" or "much" fulfilled.

In rating the features of payment instruments, marked differences between people who prefer cash and those who prefer card thus emerge. The two groups expect different things from different payment instruments and choose the payment instrument whose features meet their needs best.

4.3 Perceived card acceptance and expenditure structure similar for cash and card payers

The OeNB Q3/2016 barometer survey contained the following question: "How often would it be possible for you to pay (for regular shopping) by card (even if you do not intend to use your card to pay)? Cash payers said that they could use their cards for an average of 7.6 of 10 regular shopping trips (the median is 8). Card payers specified 8 out of 10 shopping trips, which is both

[12] We focus on the ranking of debit cards and disregard credit cards.

the average and the median. Given the similarity between the two groups' answers, we conclude that the different card preferences cannot explain the differences in payment behavior.[13]

In this connection, another analysis also shows that the expenditure structure of the two groups displays hardly any differences. Whereas cash payers exhibit a marginally higher transaction share for daily purchases than card payers (and a somewhat lower transaction share at restaurants, bars and cafés), the overall differences are too small to explain why someone prefers cards or cash.

4.4 Cash payers have a slightly greater subjective feeling of being safe

A striking result, also in an international comparison, is that cash payments also predominate for larger payments in Austria. In all seven countries analyzed by Bagnall et al. (2016), i.e. including countries where card use is high, like the U.S.A., cash predominates for amounts up to about EUR 15. Only above this amount do shares of noncash payment means begin to increase. Cash retains its predominant position only in Austria and to a somewhat lesser extent in Germany. This result directly implies that cash payers have to be willing to carry larger amounts of money in their pocketbooks. One question was designed to find out how high the amount of cash in pocketbooks would have to be to make respondents feel uneasy or insecure (table 10).

[13] Using the perceived acceptance from payments recorded in the OeNB's 2016 payment diary survey, no difference can be identified, either: The percentage of payments where cards are perceived to be accepted comes to 73% for cash payers and to 71% for card payers.

Table 10

Some people feel uneasy when carrying too much cash. Above which amount of cash in your wallet, purse or pockets would you become insecure or uneasy?

EUR

	Total	Cash payer	Card payer
Mean	1419.5	1539.0	1261.6
p25	180	200	150
p50	300	400	300
p75	1000	5000	1000
N	1591	782	522

Source: OeNB 2016 payment survey.
Note: The table summarizes survey responses on the average amount of money in wallets or pockets above which respondents feel insecure or uneasy. These amounts are shown for all respondents, for cash payers and for card payers, respectively.

The mean value for all respondents was a bit over EUR 1,400.[14] As in previous surveys, we observe marked differences between men and women in this respect. 50% of women feel insecure or uneasy carrying an amount of EUR 200 or higher, 25% if they carry more than EUR 600. By comparison, men feel uncomfortable at amounts of EUR 500 (median), 25% feel uncomfortable carrying more than EUR 5,000.

Could personal safety concerns be a reason for someone to prefer cards to cash? The answer might well be yes, especially for those who feel uncomfortable even when carrying smaller amounts in wallets (anecdotal evidence says that this is the case e.g. in the U.S.A.). The results in table 10 confirm that cash payers in fact feel safe carrying higher amounts of cash than card payers do (e.g. the median for cash payers is EUR 400 versus EUR 300 for card payers). This aspect could be important to some respondents. However, the values are fairly high for card payers as well. It is thus improbable that feeling safe is an important factor in making Austrian respondents lean toward cash or cards.

To conclude, we also investigated differences in subjective opinions of how hard it is to find an ATM or a bank to withdraw cash. We found no significant differences between the views of cash payers and of card payers. As a rule, respondents consider it very simple to find an ATM.

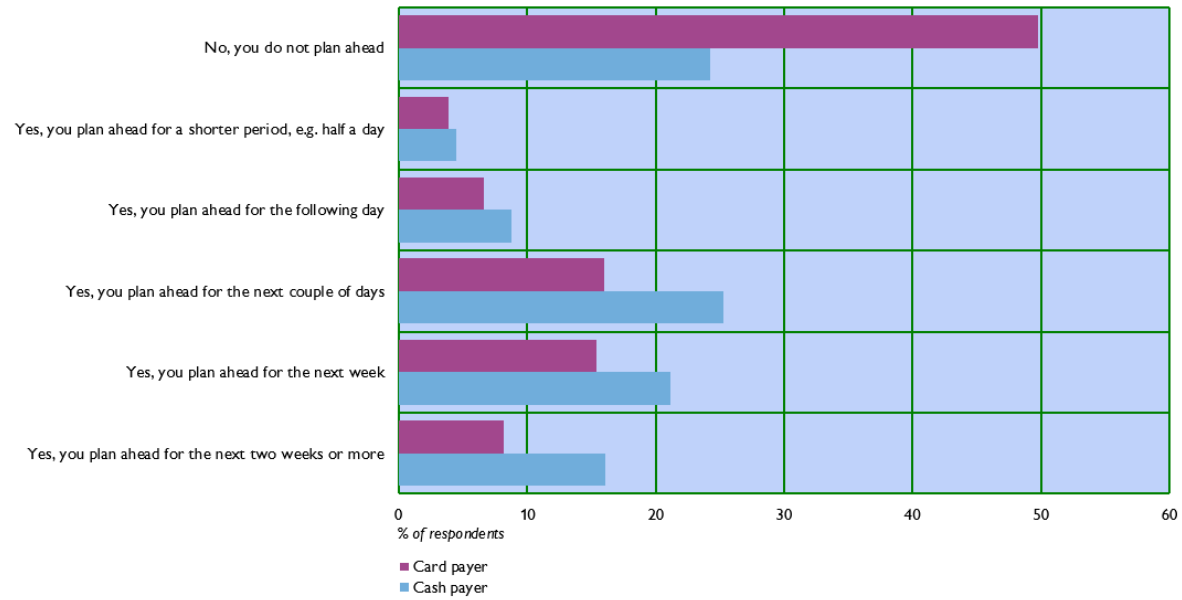
4.5 Cash payers tend to plan their cash expenditures

Planning is an area where cash payers and card payers behave very differently. Queried whether they knew in advance how much cash they would need for shopping, about 62% of cash payers said that they planned ahead at least for the next few days. As expected, at 40%, this share is noticeably lower for card payers (chart 7).

[14] About 20% of survey participants stated that there was no limit to the amount that would make them feel insecure or uneasy. To put a number on it, we used a value of EUR 5,000 for this group. Additionally, three responses with values exceeding EUR 5,000 were reclassified to the EUR 5,000 group.

Chart 7

Thinking about your cash needs, do you usually plan ahead for the amount of cash you need or not?



Source: OeNB 2016 payment survey.

Note: The chart shows how far ahead cash payers and card payers plan cash needs.

50% of card payers do not plan ahead at all, deciding on their cash needs on the spur of the moment. This share is only half as large among cash payers.

The surveyed planning behavior may be seen as both a cause and a consequence of payment behavior. Of course, a certain amount of planning will be in order if a person mostly uses cash to pay. On the other hand, people who consider it very important to keep track of their expenses will plan more, and they will use cash more often to make payments. Hence, the different planning behavior of *cash payers* and of *card payers* cannot be interpreted causally. In any event, the large share of respondents who do not plan ahead bears witness to the high banking and ATM density in Austria.

5 Summary and outlook

According to the OeNB payment diary survey conducted from November 2015 through February 2016, the cash share of Austrian consumers' payments remains high.

At the same time, most Austrian adults have payment cards, and payment by card is possible, in particular for large-value purchases. Although Austria is hardly different from other countries in terms of cardholders and card payment options, the share of cash payments is high by international standards (Bagnall et al., 2016). This raises the question of why the share of cash payments by Austrians is still relatively high. This article provides a descriptive presentation of payment behavior and discusses some factors that influence the choice of payment instruments.

In our opinion, the partly low acceptance of payment cards for low-value payments as well as at some payment locations plays a role in the high share of cash payments. Partly low acceptance could to some extent be a reason why cash is also used for payments that could be effected with cards, with the transmission channel working indirectly through cash balances: Lower acceptance of cards for some payments necessarily results in higher cash balances in wallets overall (Huynh, Schmidt-Dengler and Stix, 2014). Higher cash holdings in wallets in turn increase the share of cash payments (Alvarez and Lippi, 2015). Although the literature has not fully clarified the quantitative impact of card acceptance, the results of this study strongly suggest that partly low acceptance of cards is not the only reason for Austrians' propensity to use cash.

The fact that Austrians feel relatively safe even when they are carrying large amounts of cash is one important finding of this survey and is a direct prerequisite for cash payments of higher amounts. Additionally, a clear majority of respondents consider it easy to obtain cash.

Consumers' cash preference is a key reason for the high cash share. A share of 55% of respondents stated that they preferred to use cash when shopping (even if they could use a card). By contrast, the share of respondents who prefer to use a card when shopping comes to some 30%. This raises the question of what distinguishes *cash payers* from *card payers*.

The distinction between *cash payers* and *card payers* cannot be made according to sociodemographic structures. Each of the discussed sociodemographic groups contains a high share of cash payers. The picture that emerges is thus heterogeneous. To understand why cash use is high in Austria, the factors that could explain this heterogeneity need to be identified.

The results of our research indicate the importance of respondents' subjective perception of the "ideal" characteristics of a payment instrument. Cash has attributes that some people rate very highly, whereas cards have attributes that others rate very highly. For some people, cash meets the key requirement of being "easy, efficient and quick"; for others, cards meet this requirement. Overall, the degree of cash use is high because for a majority of people, cash meets their requirements best.

A major difference is the importance that is attached to the possibility to keep track of one's expenses. In this area, cash offers easier possibilities than all other common payment instruments. A simple look into one's wallet shows how much one has spent (if one remembers the withdrawn amount) and how much is left for future expenditures (compare von Kalckreuth,

Schmidt and Stix, 2015). The survey results show that while cash payers appreciate this feature, it is far less important to card payers.[15]

Payment behavior thus depends on external circumstances. In a safe country like Austria, it does not cost a lot of time to withdraw cash, making cash "easy, efficient and quick." Thus, Austrians by and large pay according to their preferences, which is mainly cash.

This finding should also be seen in the context of the current debate about reducing or eliminating cash (e.g. Rogoff, 2016). One line of argument of those in favor of reducing or eliminating cash is that cash is used mainly for shadow economic and illegal activities whereas consumers use cash less and less for legal payments. These arguments definitely do not apply to Austria, as our results show. Moreover, our survey results show that the majority of Austrians certainly do not follow the line of argument that cash is inefficient and that it should be used less. Consumers' view of cash payments as being quick is confirmed by Abele and Schäfer (2016), who found that payment transactions of up to EUR 30 are faster on average with cash than with cards.

Of course, the strong preference for cash in Austria did not come out of nowhere; it reflects incentives and relative costs: Cash withdrawals for the most part do not result in direct costs or cause only low indirect costs (dense ATM and banking network), and there are few financial or nonfinancial incentives for card payments. On the one hand, card payers do not get cash back for sales, like credit card payers do in Canada; on the other hand, cash payers may e.g. be offered a discount, and cash is readily accepted for higher payments. Furthermore, economic behavior (Austrians are quite risk averse and might not be especially open to innovation) as well as the extent of underground economic activity could play a role. In the past, many retailers had little incentive to influence the choice of payment instruments to reduce cash use (the cost of cash was relatively low and the cost of card transactions for small amounts was relatively high).

Cash preferences are not set in stone; they can change over time. Habit persistence, however, may cause preferences to change less quickly, which could also be seen as one important reason for the persistence of cash. The survey results paint an ambivalent picture with respect to habit. The pronounced preference for cash among older people could be attributable to the importance

[15] Many people also have a clear overview of their expenses with cards, or even a better overview than with cash, but this presupposes that these respondents are able to aggregate information from various sources (such as cash spending and card spending) without making major errors (or it does not matter if they miscalculate and overdraw their accounts). According to this logic, state von Kalckreuth, Schmidt and Stix (2015), this feature of cash is important to people on a tight budget (or who do not want to exceed their budget) and who consider it fairly complicated to aggregate information from different sources.

of habit in this cohort. However, the high share of younger people who prefer cash speaks against the force of habit.

The dynamic growth of contactless payments will provide important insights on the significance of habit persistence. This payment method has great potential, notably because the acceptance of payment cards for small amounts is currently low, nearly three-quarters of all payments are below EUR 25 (28% of the value of all payments covered), and because contactless payment is just about as fast as cash payment. The share of persons who regularly use NFC payments (only a small share of respondents) already use contactless payments for one-quarter of their payment transactions. Hypothetically assuming that all Austrians used contactless payments very often and that 50% of payments below EUR 25 were NFC payments, the share of cash would contract sharply. The transaction share of cash would decline by 33 percentage points and its value share would drop by 12 percentage points. Nevertheless, cash would remain the most important payment instrument in Austria in the near future.

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Annex

A.1 Surveys used

This article is based on three surveys: The OeNB 2016 payment diary survey, the OeNB Q3/2016 barometer survey and the OeNB 2011 payment diary survey. While all three data sources are representative surveys among Austrians, some of their fundamental features differ. All three surveys contain post-stratification weights, with the results being representative of the Austrian population as a whole in terms of age, gender and federal province. Methodological details of the OeNB 2016 payment diary survey are explained in detail below. The annex to Mooslechner, Stix and Wagner (2012) summarizes details on the OeNB 2011 payment diary survey. The OeNB Q3/2016 barometer survey was not geared specifically toward payment behavior, but it included a set of questions on payment behavior.

The OeNB Q3/2016 barometer survey and the OeNB 2011 payment diary survey were conducted using personal interviews, with the sample drawn using stratified multistage clustered random sampling. Stratification was performed by federal province, political district and size (category) of municipality. The net sample size was about 2,000 persons aged 15+. To enable a comparison with the OeNB 2016 payment diary survey, only participants aged 18+ were taken into account, however. For the most part, the OeNB 2016 payment diary survey consists of an online sample. Additionally, part of the sample was generated based on personal interviews.

A.2 Details on the OeNB's 2016 payment diary survey[16]

The purpose of this survey is to establish the value and volume of cash and noncash transactions at the various points of sale in Austria using a three-day diary. In order to achieve these objectives, TNS Opinion carried out a survey consisting of a payment diary and a questionnaire across two survey modes with the general population aged 18 and over and residing in Austria.

[16] For reasons of scientific comparability, the methodological part of the study was formulated in English from the outset.

More specifically, the study was conducted using internet panels where respondents were asked to keep a three-day payment diary. All respondents who participated in the three-day diary survey were asked to fill in an additional questionnaire. In addition, respondents aged 55 and over were contacted by phone and recruited to participate in a three-day diary study; the diary and annex questionnaire were sent by surface mail to their reported address. After the diary was completed, an interviewer picked up the diary from respondents and checked its consistency.

The two most important rationales for having recruited respondents aged 55 via a random sample method were the following:

- Respondents aged 55 and over are more challenging to reach when using online access panels, and the approach chosen ensures that a sufficient proportion of people aged 55 and over are represented in the overall sample;
- Respondents aged 55 and over are prone to different behaviors when compared to other age cohorts. These respondents were also asked about the frequency with which they use the Internet, which in effect enables us to have access to a target which might behave differently from the representative sample of respondents interviewed via online panels.

Another important feature of this study is that it entailed an element of pre-recruitment. All respondents, regardless of the survey mode, were asked to participate to the survey with pre-recruitment instructions in place to ensure that respondents understood the exercise for which they were signing up. Moreover, this pre-recruitment was used as an opportunity to set out the necessary instructions for respondents with regard to the information they needed to record to be able to report the transactions they had made on the previous day. Respondents were reminded to maintain their usual behavior and were encouraged to participate in the survey regardless of whether they had made transactions or not. The OeNB provided a cover letter that laid out the importance of participating in the payment diary survey.

Fieldwork started on November 13, 2015, and was put on hold on December 4, 2015, so as not to capture the holiday season. Fieldwork was then resumed on February 9, 2016, and ended on February 25, 2016.

Overall, the full three-day sample consisted of 1,731 people; the sample excluding outliers (69 respondents with negative cash balances, essentially meaning that some payments were not recorded) consists of 1,662 people. Among this sample, 409 persons aged 55 or more were interviewed face-to-face, and 1,253 were drawn from online panels.

Some properties of online panels

The online panels used in this study strictly adhere to the International Organization for Standardization (ISO) definition, which states, "An active panel member is one who has participated in at least one survey, or has updated his/her profile data, or has registered to join the panel, within the last 12 months." The quality scheme of panels is centered on the following aspects:

All panelists are, at a minimum, double opted-in. The double opt-in allows us to be sure the prospective panelist truly wishes to join the panel. Each panelist must provide demographic and household information, pass through data quality checks to help to prevent "fraudsters" from joining the panel, and agree to the country-specific website Terms and Conditions and Privacy Policy.

Furthermore, the panel composition and variables needed for sample selection by collecting household and demographic information from every panelist was monitored. Through a range of screener surveys, the sociodemographic profile information was collected. Each computer was tagged with a unique ID to ensure that only one respondent per computer could participate in the survey.

The following three online providers were used for the online sample: Bilendi, Lightspeed, Meinungsraum.at. Overall, the incentive for participating averaged around EUR 2. The online panel participants received an invitation to this study via e-mail, which included first, instructions on what they needed to do should they opt in to participate in the diary exercise and second, the cover letter of the OeNB.

Weighting

The online panels used in this survey were not constructed using probability-based recruitment. Moreover, the online panels used for this study were opt-in panels for which participants volunteered and agreed to participate. The best estimates of Internet access indicate that as much as one-third of the EU population does not use the Internet; thus, all nonprobability online panels have inherent and significant coverage errors.

Another layer of complexity is given by response rates, as there are no widely accepted metrics that can be used to accurately quantify or characterize the nonresponse that occurs at the recruitment stage for nonprobability online panels. This is because the base (denominator) against which the number of people who joined the panel (numerator) can be compared is often unknown.

This combination of undercoverage and nonresponse presumably results in bias in surveys using nonprobability panels, bias that thus far is not well understood in the literature. Moreover, the pre-recruitment could generate a third type of bias.

As the underlying sample frame is not probability based, post-stratification was calculated, i.e. the weights rely solely on post-stratification adjustments to external population targets. The weighting applied in this study consists of three variables: gender, age and region; Internet use is nested under the 55+ age category. Respondents coming from the face-to-face mode are weighted by gender and region.

A.3 A comparison of sample features in the OeNB 2016 payment diary survey with previous OeNB surveys

Table A1

Properties of payments recorded in the payment diaries

	1996	2000	2005	2011	2016	2016 Online	2016 F2F	Online 55+
Days recorded	7	7	7	7	3	3	3	3
Mode	Paper	Paper	Paper	Paper	Online/Paper	Online	Paper	Online
Age	15+	15+	15+	15+	18+	18+	55+	55+
Number of transactions[1, 2]	16535.34	14313.59	13546.49	12784.07	7342.40	5095.73	2246.67	1000.67
Persons	1086.00	1186.00	1165.00	1136.00	1584.00	1178.00	406.00	391.00
Transactions per person per day [1, 2]								
Mean	2.18	1.72	1.66	1.61	1.55	1.44	1.84	0.85
Median	1.71	1.71	1.57	1.43	1.33	1.33	1.33	1.67
Total expenditures per person per day in euro[1, 2]								
Mean	69.79	52.88	52.65	45.82	38.26	32.64	54.56	22.76
Median	40.65	40.88	39.31	31.79	24.73	21.00	35.33	27.55
Number of persons with zero transactions (%) %[1]	0.00	0.10	0.26	0.76	5.29	6.87	1.01	3.63
Expenditures recorded relative to national accounts (%)[3]	111	126	114	95	85	N/A	N/A	

Source: OeNB 2016 payment survey.

[1] For reasons of comparability, direct debits and credit transfers were not included in 2011 and 2016.

[2] For reasons of comparability, persons under 18 years of age were not included in the payment diary surveys from 1996 to 2005.

[3] To compare the survey data with national accounts data, we substracted expense categories that are usually paid for via direct debit or credit transfer from national accounts comsumption expenditure. Moreover, we assumed the persons under the age of 15 have no consumption expenditure and that the daily consumption expenditure of persons aged from 15 to 17 is one-quarter of that of persons over 18.

Note: All nominal values are in 2015 prices. All calculations refer to unweighted survey results.
Abbreviations used: F2F = face-to-face sample; N/A = not available.

Table A1 summarizes the main features of the samples, allowing us to draw conclusions about the comparability of the recent survey with its predecessors. The OeNB 2016 payment diary survey contains noticeably fewer transactions than the previous surveys (to allow for comparisons, we excluded transactions made by way of transfers). Overall, the transaction mean per person per day was 1.62 transactions, roughly the same as in the 2011 survey. We noted a decline in overall (mean and median) expenditure per person per day.

If we break down these results further, we see that the online participants recorded far lower consumer expenditures per day overall (median: EUR 23) than the face-to-face participants (median: EUR 37.5). This result may have been caused by the different age structure of the two samples. For this reason, the last column of table A1 lists the expenditures of online respondents

aged 55+. Median expenditure per day rose to EUR 27.6 for this subsample, which is still nearly EUR 10 below the median of the face-to-face sample.

To some degree, the quality of the survey may be gauged on how high its coverage is compared to consumption expenditure as recorded in the national accounts. To this end, an approximate calculation of the average daily consumption expenditure from the national accounts was compared with the average daily consumption from the survey. The coverage degree calculated came to 85% for the 2016 survey. However, as the calculation is only approximate, no metrics exist to classify the survey. A coverage degree of 85% is comparable to that of similar surveys, but at 95%, the 2011 survey had a higher coverage. In the 1996, 2000 and 2006 surveys, total consumption spending was overestimated.

Table A2

Descriptive statistics of payments recorded in the payment diaries (excluding credit transfers)

	1996	2000	2005	2011	2016	2016 Online	2016 F2F
Mean	31.9	31.5	32.7	28.8	25.9	24.6	29.3
Minimum	0.3	0.4	1.2	0.2	0.1	0.1	0.1
p5	1.6	1.9	2.4	2.1	1.6	1.5	2.1
p25 (first quartile)	6.2	7.0	7.3	6.9	5.3	5.0	7.3
Median	14.4	15.6	15.8	16.1	12.4	11.2	15.2
p75 (third quartile)	30.8	34.1	35.2	35.4	27.5	25.0	32.0
p90 (ninth decile)	58.5	61.1	60.6	65.3	51.4	50.0	56.0
p95	88.2	96.0	97.0	93.5	75.0	74.0	79.0
Maximum	4358.0	6528.6	4242.8	889.6	3017.9	3017.9	2080.0
N	13903.0	14801.0	13792.0	12448.0	8033.0	5731.0	2302.0

Source: OeNB 2016 payment survey.
Note: For reasons of comparability, direct debits and credit transfers were not included in 2011 and 2016. All calculations are unweighted.
Abbreviations used: F2F = face-to-face.

Apart from total spending, the structure of individual transactions also plays an important role for the comparability of surveys over time (table A2). Here, too, the transactions recorded in the 2016 survey differ from the previous samples. Both the median and the overall distribution are lower than in the 2011 survey. When we analyze the distribution of payments by subsamples, we find lower values above all in the online sample.

A.4 Explanatory notes on the correction of payment instrument shares

As explained in the main body of the study, the payment instrument shares in the 2016 payment diary survey are not comparable with those in predecessor OeNB surveys. To establish comparability, we adjusted the payment instrument shares. For reasons of transparency, we summarized the adjustment method in table A3. Additionally, we showed various adjustments

that produce different payment instrument shares. These differences illustrate the degree of uncertainty surrounding the interpretation of the payment instrument shares used in the study.

Table A3

Adjustment of payment shares – average spending per person per day

Type of adjustment	Shares according to survey		Adjusted hypothetical shares			
	Survey adjusted	adjusted by actual debit and contactless payment shares	Daily spending as in survey	Daily spending as in the national accounts		
			proportional distribution to all payment instruments excluding debit card and contactless payments	proportional distribution to all payment instruments excluding debit card and contactless payments	proportional distribution to cash payments	proportional distribution to credit transfers
A. Spending per person per day (in euro)	(1)	(2)	(3)	(4)	(5)	(6)
Cash	23.95	23.95	22.89	27.77	28.77	23.95
Debit card	6.20	7.38	7.38	7.38	7.38	7.38
Credit card	2.23	2.23	2.13	2.59	2.23	2.23
NFC	0.22	0.36	0.36	0.36	0.36	0.36
Credit transfers/direct debits	3.01	3.01	2.88	3.50	3.01	7.84
Internet/mobile	0.70	0.70	0.67	0.81	0.70	0.70
Other	0.27	0.32	0.26	0.37	0.32	0.32
Sum of spending per day	36.6	38.0	36.6	42.8	42.8	42.8
B. Payment shares (%)						
Cash	65.5	63.1	62.6	64.9	67.2	56.0
Debit card	16.9	19.4	20.2	17.3	17.3	17.3
Credit card	6.1	5.9	5.8	6.1	5.2	5.2
NFC	0.6	1.0	1.0	0.8	0.8	0.8
Credit transfers/direct debits	8.2	7.9	7.9	8.2	7.0	18.3
Internet/mobile	1.9	1.9	1.8	1.9	1.6	1.6
Other	0.7	0.8	0.7	0.9	0.8	0.8
Sum	100	100	100	100	100	100

Source: OeNB 2016 payment survey, payment statistics and national accounts (Statistics Austria).
Note: Column 1 shows the average daily expenses of a respondent (according to the survey, panel A) as well as the resulting payment shares (value, panel B). Column 2 uses debit card and contactless sales according to payments statistics. Columns 3 to 6 show different correction methods. See annex for a detailed description.

Column 1 in table A3 (panel A) shows the average daily spending of all participants (EUR 36.6) by individual payment instruments. Direct payments to other persons were excluded, the remaining transaction values were added up (applying survey weights) and divided by the number of survey participants (and by 3, because the survey took 3 days). Accordingly, respondents spend an average of EUR 23.95 in cash, which corresponds to 65.5% of the spending value (see panel B).

Now the values obtained from the survey can be compared with the measured values. The payment statistics give us total transaction figures and total debit card transactions (excluding NFC payments) as well as NFC payment figures. We used the whole-year values for 2015 for debit card payments. As contactless payments are expanding sharply, we used the values for the third and fourth quarter of 2015 and the first quarter of 2016 for NFC payments. In obtaining

daily average card spending (by analogy to the survey), we must take into consideration that the survey includes people aged 18 and above, whereas card transaction values apply to card owners of all ages. For this reason, we assumed that persons below the age of 15 do not own debit cards and that persons aged from 15 to 17 have one-quarter of the expenditure of adults. Using these assumptions and the population shares by age (source: Statistics Austria), we can calculate average daily debit card transactions and NFC transactions for persons over the age of 18. The respective values (EUR 7.38 and EUR 0.36) were inserted in column 2 of table A3. The comparison of the debit card transactions calculated in this fashion with the survey-based estimates shows that the survey underestimates debit card payments. Thus, if we use the measured values, the debit card share rises from 16.9% to 19.4% (column 2, panel B).[17]

This first adjustment leads to an artificial increase in daily spending by survey participants from EUR 36.6 to EUR 38, which could be caused by the circumstance that debit card transactions for whole-year 2015 include spending e.g. for Christmas or holidays, spending that is represented to a much lower extent in the sample. Column 3 makes adjustments for these higher expenditures. In detail, all spending is proportionally allocated to payment instruments excluding debit card and contactless payments by proportion to their distribution in the survey such that total spending again comes to EUR 36.6 (as originally determined in the survey). The payment share of debit cards then comes to 20.2%.

Columns 4 through 6 present alternative adjustment methods. Column 4 bases adjustment on daily spending as recorded in the national accounts. Spending in those COICOP (Classification of Individual Consumption According to Purpose) categories where payments are usually made by regular bank transfer (rent, insurance, financial services, communication and the like) is deducted from daily spending. In addition, the same adjustment for age as described above is performed, bringing total average daily spending to EUR 42.8 per Austrian above the age of 18. This result shows that the survey reflects about 85% of daily spending recorded in the national accounts. This daily spending value of EUR 42.8 served as the calculation basis for column 4. In a breakdown, EUR 7.38 (EUR 0.36) of this total was attributable to debit card (contactless) transactions. The remaining spending was proportionally distributed among the

[17] Although payment statistics also record credit card payments, we cannot use these figures because credit cards are also used to make regular payments (such as mobile phone bills). It is not certain whether the survey includes such regular credit card payments, so that the respective payment statistics figures and the survey results can be compared only to a limited extent. We would like to point out that at EUR 2.23, the value for average daily credit card transactions in the payment statistics nevertheless comes very close to that in the payment diary survey (EUR 2.13, column B). A further reason why we do not use credit card payments as provided in payment statistics is because before 2014, these statistics did not allow credit card payments made in Austria to be separated from those made abroad.

remaining payment instruments such that the total comes to EUR 42.8. We prefer this adjustment method and use it as the basis for the values cited in the main body of the study.

As spending is higher according to the national accounts but debit card spending in euro remains the same as according to the survey, the debit card share logically contracts under this scenario (to 17.3%). Of course, the results in column 4 are based on daily spending of *Austrians over the course of one year* compared to the results in column 3, which are based on daily spending of *all survey respondents*. In other words, column 4 includes out-of-the-ordinary spending, e.g. for holidays or to purchase a car. We implicitly assume in column 4 that this spending is distributed exactly proportionally in the same way as the spending covered by the survey.

Columns 5 and 6 are similar to column 4. Once again, we assume that spending corresponds to the figures in the national accounts. However, the payment instruments are not distributed proportionally in line with the survey results (like in columns 3 and 4). Much rather, we assume in column 5 that all payments making up the gap between spending in the survey the national accounts data are cash payments (which appears rather unlikely). Finally, in column 6 we assume that all payments making up the gap are exclusively credit transfers. In our opinion, the scenarios in columns 5 and 6 are extreme scenarios that represent opposite ends of a possible spectrum.

Table A3 illustrates the uncertainty involved in estimating payment instrument shares. What is more, the table does not factor in the impact of individual large payments on payment instrument shares. This thought is relevant because the sample size in 2016 was much smaller than that of previous OeNB payment diary surveys. Yet independently of these considerations, the results signal that cash predominates in value terms. Depending on the scenario chosen, its share fluctuates between 56% and 67.2%. If we disregard the two extreme scenarios in columns 5 and 6, the cash share runs to between 62.6% and 65.5%.