Where does the cash in your wallet come from?

An empirical study of the cash withdrawal behaviour of the German population at ATMs and bank counters in Germany

Deutsche Bundesbank

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0 Management summary

The Bundesbank study on payment behaviour in Germany, which was published in 2009, showed that **cash continues to be an extremely popular method of payment** and that no significant changes in payment behaviour in Germany are expected in the short to medium term. There are essentially two ways of withdrawing that most important of payment instruments "cash" – namely from bank counters or from ATMs. This paper analyses the withdrawal behaviour of Germans based on place,[1] amount and frequencies of withdrawal.

The **amount of cash held by households for transaction purposes** in Germany can thus be calculated based on the amount withdrawn and the amount of cash remaining before the next withdrawal. It amounts to **approximately €14.5 billion**. Less than 5% of all banknotes in circulation are therefore held by households to spend on everyday purchases.

The paper then asks whether it is possible to identify different groups within which people exhibit the same withdrawal behaviour. To do so, respondents are assigned to homogenous user groups by means of a cluster analysis. **Four major, almost identical clusters** emerged: **"traditionalists", "normal mixed users", "older progressives" and "younger modernists"**. One of the best ways of distinguishing between these groups proved to be the relationship between **age and place of withdrawal**. While "traditionalists" prefer to withdraw cash at the counter and have the highest average age, the other three groups use ATMs to withdraw cash more frequently ("normal mixed users") or exclusively ("older progressives" and "younger modernists"). **ATMs** are now the **dominant place** to withdraw cash for transaction purposes, while the importance of bank counters has been declining for years.

This study also provides a detailed analysis of cash withdrawal behaviour based on various variables. The detailed examination of socio-demographic variables (eg age and income) and the effect of external factors (eg bank affiliation and distance to the nearest cash source) confirm the **key role of age** with regard to withdrawal behaviour. Older respondents over the age of 65 withdraw larger amounts of cash from the bank counter more often and carry larger amounts of cash on their person. They generally prefer to use cash, which is often their only method of payment. Whether this is borne of **age effects** (because of their age, over-65s enjoy a certain routine to their day) or **cohort effects** (those born before the mid-1940s behave in this way), will be the subject of future research and investigated in planned future cash studies. This will reveal whether the same clusters still exist or whether the cluster structure has changed.

Generally speaking, the **development of withdrawal behaviour is closely linked to the use of cash**. If payment behaviour changes in favour of cashless payment instruments, cash withdrawal behaviour will also be affected. **Supply-side changes**, such as the cash-back procedure and consolidation of branch networks in connection with increased process automation at German banks, will also have an effect on cash withdrawal behaviour. Finally, the study proposes the **hypothesis** that the **importance of bank counters will become less significant**

[1] "Place" is defined as bank counters or ATMs for the purpose of this study. For more information, see section 1.

as the older users of counters become more of a minority, and that the next generation will not change their habitual cash withdrawal behaviour at ATMs.

1 Issues and study design

Cash is still by far the most popular method of payment in Germany and will probably remain so for some time to come. This was the conclusion reached by the Deutsche Bundesbank in its study entitled "Payment behaviour in Germany", which was published in July 2009.[2] This study examined the cash and cashless payment habits of Germans, but did not address the issue of where consumers withdraw the money they spend at the point of sale (POS). There are essentially two main options, namely automatic teller machines (ATMs) or bank counters.[3] Cash withdrawal behaviour differs not only with regard to the preferred place of withdrawal (counter or ATM),[4] but also with regard to the amount and frequency of withdrawals. The aim of this paper is to analyse cash withdrawal habits in Germany in greater depth.

Most of the data used for this analysis is taken from the empirical survey used for the study "Payment behaviour in Germany". More than 2,000 people were interviewed for this survey in the spring of 2008. Each respondent completed a questionnaire as part of a computer-assisted personal interview (CAPI) and kept a payments diary for one week. All interviews were conducted between early April and June 2008. The basic population was deemed to be German-speaking individuals over the age of 18 living in households in the Federal Republic of Germany. On the basis of the master sample of the Association of German Market Research Institutes (*Arbeitskreis Deutscher Marktforschungsinstitute e.V.* or ADM), a representative random sample was taken from this population. A total of 2,272 interviews were conducted (2,217 of which with payment diary), which constitutes a response rate of approximately 63%. As part of a sample adjustment, the sample of households was also transformed into a sample of individuals and the unweighted sample structure adjusted to the official statistics using weightings.

This analysis addresses the following issues.

Section 2: How much cash do Germans hold for transaction purposes?

This section examines the amount and frequency of withdrawals at both bank counters and ATMs as well as the amount remaining in a person's wallet before the next cash withdrawal.

Section 3: Are there groups of respondents with similar cash withdrawal habits?

Multivariate analytical methods are used in this connection to identify different groups within which respondents exhibit the same cash withdrawal behaviour.

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[2] See Deutsche Bundesbank, Payment behaviour in Germany, Frankfurt am Main, Germany, 2009.

[3] Another cash withdrawal source is, for example, the cash-back procedure. Here, the amount due is paid cashlessly at the point of sale and, at the same time, the customer receives a cash payment. The total amount is then debited from the customer's account. Since this procedure is not yet widespread in Germany, it is not taken into account in this study, however.

[4] "Place" within the meaning of this study means possible cash withdrawal sources, ie ATMs or bank counters. These may be under the same roof, as is generally the case in German banks. Conversely, these sources of cash may be physically separate – for instance, ATMs can be removed from the actual banks in shopping centres. Likewise, direct banks often have no branches at all, and therefore no bank counters. They are completely reliant on ATMs.

Section 4: What factors influence the cash withdrawal behaviour of respondents in detail?

Here, socio-demographic variables play a role, as do other contributory factors, such as fees or the distance from the place of withdrawal usually used. Various hypotheses are presented and tested.

The work is rounded off with a summary and conclusions in ***section 5***.

2 Amount held for transaction purposes in Germany

In order to pay cash for retail or other purchases, Germans regularly withdraw cash from ATMs or bank counters. In doing so, the habits of different people vary: some withdraw a large amount once or twice a month and keep the money, or at least some of it, in a wallet, while leaving the rest temporarily at home. Others go to the bank more often and withdraw smaller sums. The total amount available to the population for everyday cash transactions is known as the amount held by households for transaction purposes. It comprises the amount withdrawn from ATMs or bank counters and the amount remaining in people's wallets. The definition can be extended to include amounts used for larger purchases and long-term consumer goods (eg TVs or cars). However, since respondents were asked only to provide information about the average amounts they withdraw regularly, this aspect is not included in our analysis. The amount stated as being held by households for transaction purposes should therefore be seen as the lower limit of this amount.[5]

In order to calculate the amount held by the German population for transaction purposes within the narrower sense, the following aspects are taken into consideration.

- Frequency and amount of withdrawals (separated according to withdrawals at ATMs or counters)
- Amount of cash remaining in people's wallets before the next withdrawal

2.1 Frequency and amount of withdrawals

An analysis of frequency shows that respondents visit ATMs far more often than bank counters (see Figure 1). Approximately 2 out of every 5 people withdraw cash from an ATM once a week or more (weekly use).[6] Likewise, over 40% of respondents use an ATM once or twice a month (monthly use). Only 12% of respondents do not use ATMs to withdraw cash at all, while over 50% never withdraw cash from the bank counter. A quarter of respondents withdraw cash from the counter at least once a month, if not more. Banks' efforts to encourage customers to use self-service terminals instead of counters are clearly paying off.

[5] A complete analysis would also include the cash stocks of enterprises and commercial banks, thus providing the total macroeconomic amount held for transaction purposes. This is not the subject of this study, however.
[6] For the sake of clarity, the term "user" applies to both men and women throughout this study. No further distinction is made by gender. If the male and female forms are not used for any other concepts in the German text, this is also only for reasons of simplification.

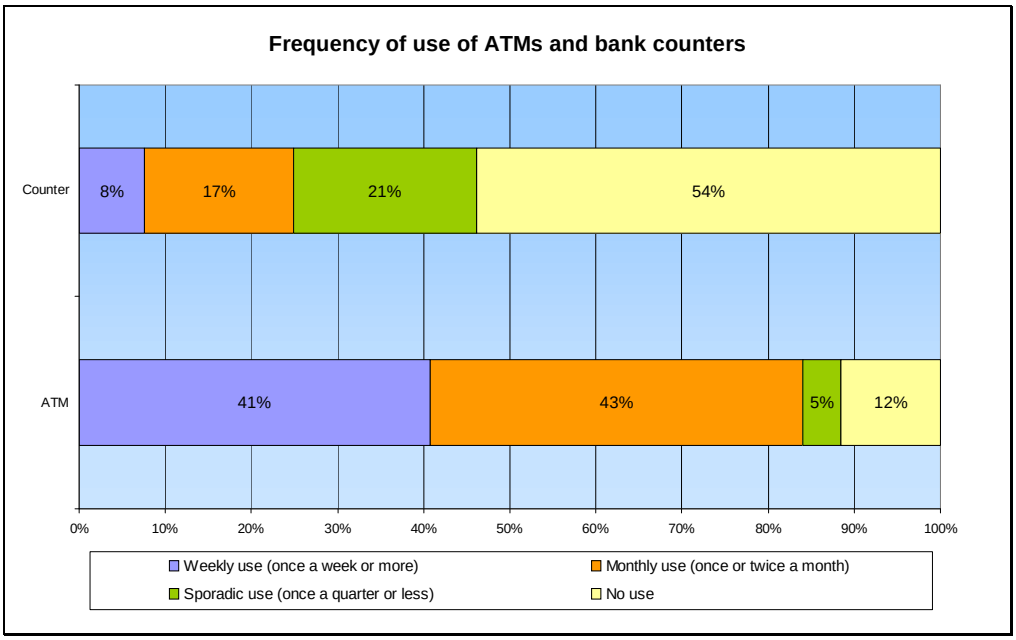


Figure 1: Frequency of use of ATMs and bank counters

As the frequency of use of both places of withdrawal varies, so does behaviour with regard to the amounts withdrawn. It can be assumed that those who withdraw cash regularly withdraw relatively small amounts, while those who rarely visit the bank counter or ATM withdraw large amounts. Figure 2 shows the amounts withdrawn by place of withdrawal.

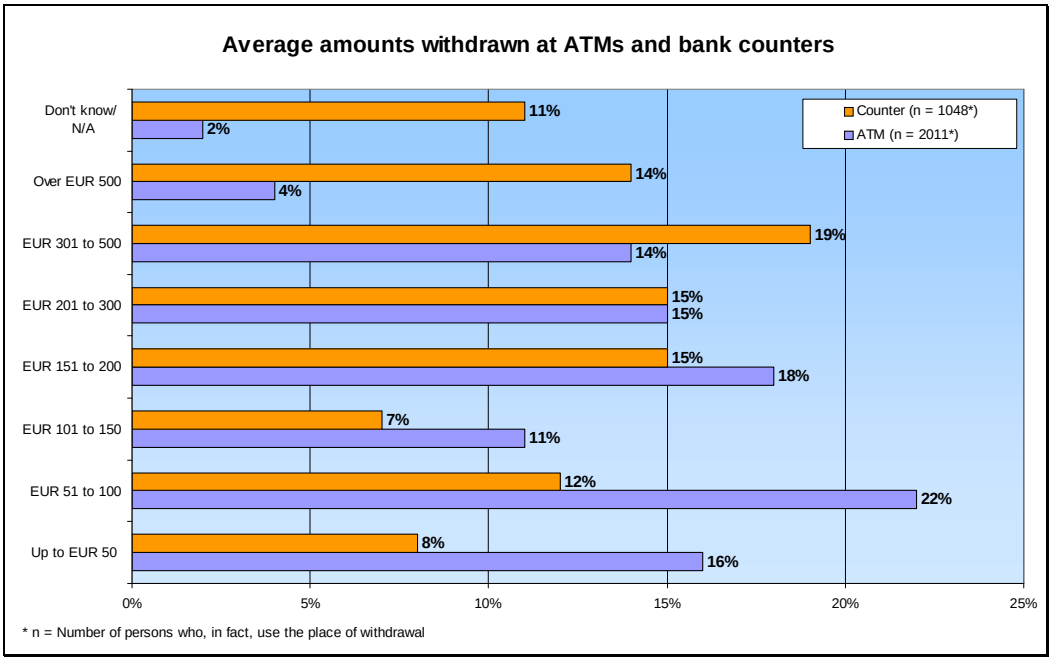


Figure 2: Average amounts withdrawn at ATMs and bank counters

The amounts withdrawn from bank counters are clearly higher than those withdrawn from ATMs. Amounts of up to EUR 200 are withdrawn from ATMs more frequently than from counters, but from EUR 300 upwards, bank customers would rather be paid at the counter. This is especially evident for amounts in excess of EUR 500. Only 3% of all ATM users withdraw an average of EUR 500 or more per transaction, while 14% of counter users do so. The average

withdrawal amount from ATMs is EUR 215; the median – ie the withdrawal amount exceeded or undershot by 50% of all respondents – is EUR 200. Overall, withdrawal behaviour at counters is more heterogeneous than that at ATMs. There are people who regularly use bank counters to withdraw smaller amounts, while noticeably large amounts are rarely withdrawn there. The average value withdrawn from counters is EUR 376 and the median value EUR 250. The major discrepancy between the mean and median values is due to the very large amounts which are also withdrawn from counters, thus pushing up the average.

11% of counter users are unable to provide any information about the amounts they withdraw. These are primarily respondents who make sporadic withdrawals from counters, ie less than once a month. They do not visit the counter regularly as a general rule, doing so only when they require large amounts, eg to buy a car. This heterogeneity is also reflected in the standard deviation between withdrawal amounts, with counter transactions being more than twice as high (EUR 525) as ATM withdrawals (EUR 195).

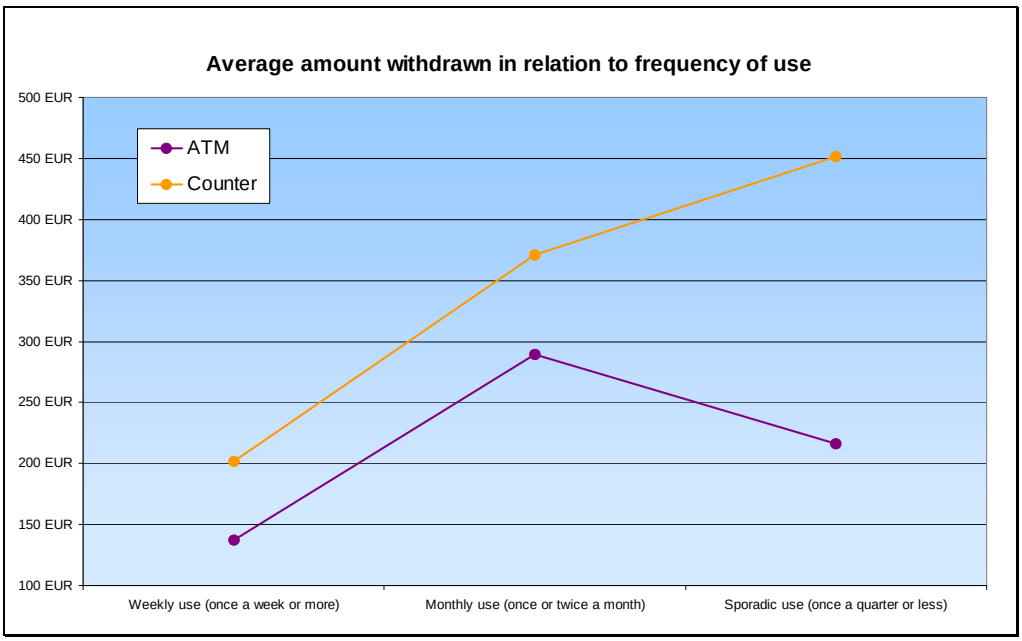


Figure 3: Relationship between amount withdrawn and frequency of use

The relationship between frequency of use and the amount withdrawn is shown in Figure 3. The less frequent counter visits are, the higher the amounts withdrawn. For ATM users, this relationship applies only with regard to the difference between monthly and weekly withdrawals. The average amount withdrawn then falls again for respondents who pay only sporadic visits to ATMs. This can be explained by the fact that less than 5% of respondents withdraw cash from ATMs less than once a month (by comparison, 21% of respondents are sporadic counter users).[7] Moreover, the sporadic user group includes a noticeably high number of people over the age of 65. This age group tends to favour counters, only uses ATMs under excep-

[7] If case numbers are low, average values have little meaning as they can be strongly influenced by extreme values.

tional circumstances (eg if they unexpectedly require cash at the weekend) and thus withdraws correspondingly low amounts.[8]

2.2 Amount of cash remaining before next withdrawal

In order to determine the amount of cash held by the German population for transaction purposes, it is necessary to calculate the basic amount of cash left in people's wallets before their next cash withdrawal. This value should be seen as a liquidity preference which is held in reserve at all times to meet unexpected expenditure.

Most answers were within the range of EUR 10 to EUR 50. The mean value of EUR 36 also falls within this range. The median is EUR 20. Comparing the mean and median values, it is clear that some respondents hold much more than the mean value in stock before their next withdrawal. 51 people said that the carry at least EUR 200 in stock. By contrast, just under one-third of respondents said that they do not go to the bank until their cash stocks are down to EUR 10 or less.

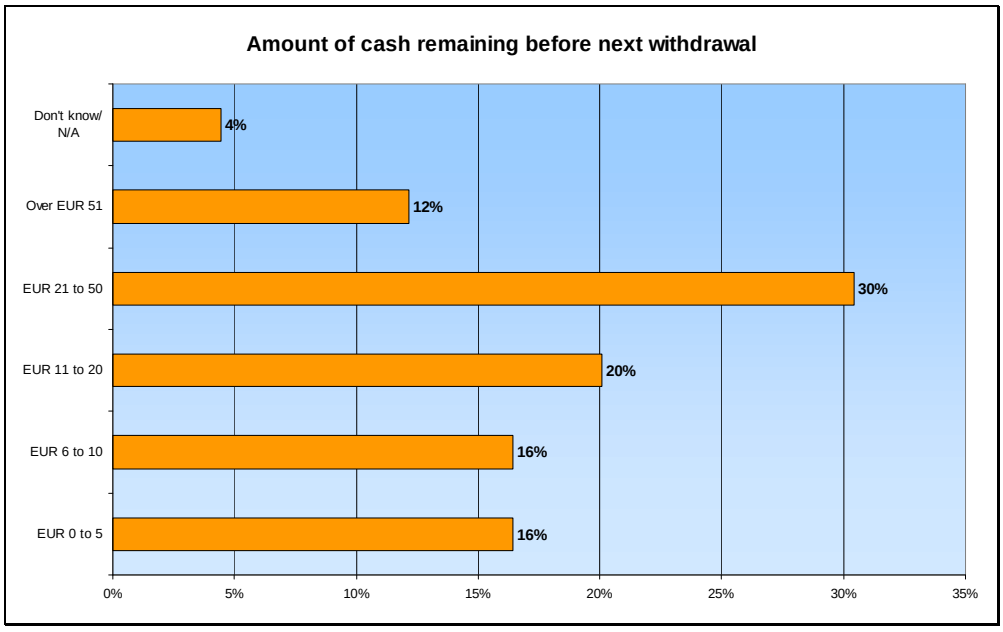


Figure 4: Amount of cash remaining before next withdrawal

2.3 Calculating the amount of cash held for transaction purposes in Germany

The above-mentioned results can be used to calculate the amount of cash held for transaction purposes in Germany. The following variables are factored into the calculation. [9]

[8] The mean (EUR 242) and median (EUR 200) values for the group of sporadic ATM users over 65 are lower than those for monthly users of the same age group (mean: EUR 355, median: EUR 300).

[9] The sum of the amounts withdrawn by all respondents is halved to determine average cash stocks in people's wallets, whereby it is assumed that the amount withdrawn is spent linearly before the next withdrawal. (See Baumol, W J, The Transaction Demand for Cash: An Inventory Theoretic Approach, Quarterly Journal of Economics 66, pp 545-556, 1952.) The basic amount of cash respondents specified in the questionnaire as having left in their

- Amount withdrawn at ATMs and bank counters
- Amount of cash remaining in people's wallets before next withdrawal

The average amount held by respondents totalled EUR 466,405. Extrapolated to the entire population of Germany, the average amount held for transaction purposes is around EUR 14.5 billion (see Table 1).

Table 1: Calculating the amount held for transaction purposes in Germany

Survey results	Basis for extrapolation (Those who "don't know" or gave no answer are not included)	Extrapolated to the entire adult population: 68,318,799 people (Source: Federal Statistical Office, 31 December 2008)
Average cash stocks based on ATM withdrawals: EUR 211,323	2,226 respondents	EUR 6,485,768,762
Average cash stocks based on counter withdrawals: EUR 175,343	2,157 respondents	EUR 5,553,652,274
Amount of cash remaining before next withdrawal: EUR 79,739	2,171 respondents	EUR 2,509,282,144
Average amount of cash held for transaction purposes in Germany:		**EUR 14,548,703,180**

Thus, less than 5% of banknotes in circulation in Germany are held by households for transactions purposes.[10] That said, the following factors must be taken into account.

- The amount of cash held for transaction purposes was calculated for persons over the age of 18. Nonetheless, the amount calculated includes the largest share of cash held by children and young people, as pocket money is usually paid in cash and parents have to withdraw this money beforehand.[11] Some parents also transfer money to their underage children who then withdraw the cash themselves. However, this survey takes no account of such transactions. Some young people also earn their own money (traineeships/summer jobs etc), with their salary or wages paid by bank transfer, which they then withdraw from ATMs or counters themselves. These cash stocks are likewise not included. The above value should therefore be understood as the lower limit.

- Furthermore, the calculations were based on the assumption that withdrawals are made at equal intervals and the amounts withdrawn are spent linearly. Realistically, however, many people replenish their wallets on the same days, usually at the weekend. This is confirmed

wallets before their next withdrawal ("stock") is added to this average cash stock. The results are then extrapolated to the entire population.

[10] If the cash stocks of credit institutions and enterprises were now added to the equation, this would give the amount of cash held for transaction purposes in the wider sense, which represents around 10% of banknotes in circulation in Germany. The remaining 90% is presumably in circulation abroad or being hoarded. See Deutsche Bundesbank, The development and determinants of euro currency in circulation in Germany, Frankfurt am Main, June 2009, pp 48-50.

[11] See Deutsche Bundesbank, Payment behaviour in Germany, 2009, page 62.

by the temporal distribution of inpayments and outpayments at the Deutsche Bundesbank (see Figure 5). On days before the weekend, especially Thursdays, an outpayment surplus is recorded, ie more cash is paid out at the Bundesbank than is paid in. This happens in order to fill ATMs before the weekend. During the first half of the week, money then flows back to the Bundesbank and there is an inpayment surplus. Thus, the amount of cash held for transaction purposes is not static. It does not remain constant at EUR 14.5 billion. Instead, it "develops" alongside the purchasing habits of the population.

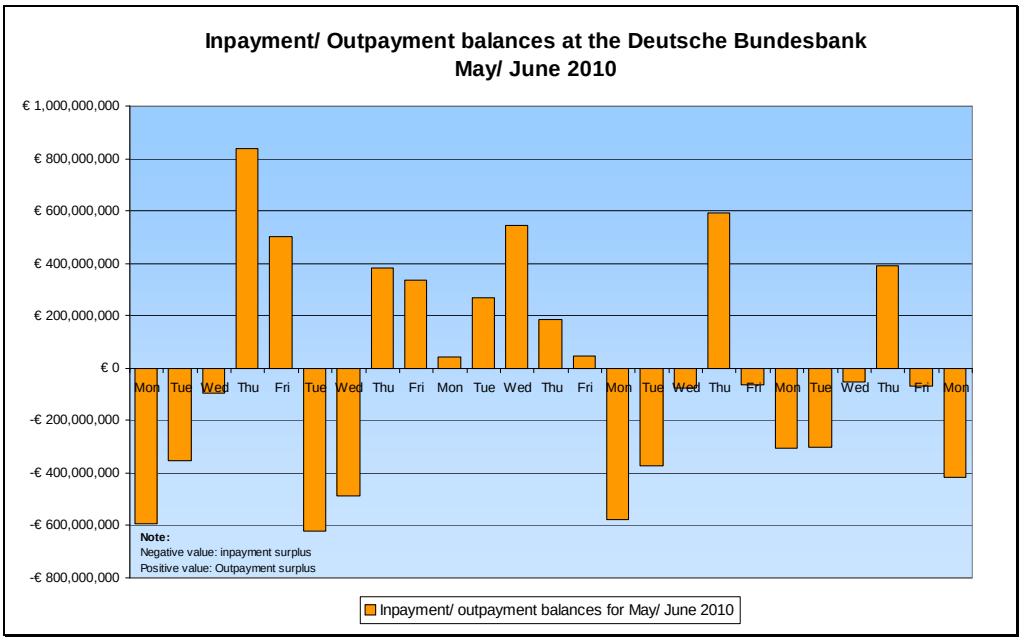


Figure 5: Inpayment and outpayment balances at the Deutsche Bundesbank

Finally, it should be noted that the cash withdrawn from ATMs or counters can also be used for other purposes. Cash amounts withdrawn can be hoarded or, for instance, taken abroad and kept there for the duration by migrant workers. Some of the amounts withdrawn can therefore be attributed to other purposes, thus reducing the amount of cash held for transaction purposes.

However, in the interviews, respondents were asked how often they "usually" visit the ATM or bank counter and how much cash they withdraw "on average". The questions were worded this way intentionally so that respondents would focus on repeat withdrawals for normal transaction purposes, thus excluding withdrawals for store of value reasons or special occasions – in this case, to be sent abroad.

Two other factors confirm that hoarding and external demand have no major impact on households' withdrawal behaviour, and thus the amount held for transaction purposes. First, money is hoarded for particular reasons and does not conform to the normal denominational structure of withdrawals.[12] Second, in addition to individuals taking cash abroad, external de-

[12] See Deutsche Bundesbank, Demand for banknotes during the financial crisis, June 2009, pp 52-53.

mand for euro banknotes is satisfied to a very large extent through international foreign exchange dealers.[13] For the purposes of this study, all amounts withdrawn are therefore included in the amount held by households for transaction purposes.

Box: The amount of cash held by households for transaction purposes from the perspective of cash stocks and flows

According to the definition provided in section 2, the amount of cash held by households for transaction purposes comprises the amount withdrawn at ATMs and bank counters and the amount of cash remaining in people's wallets. The amount of cash held for transaction purposes is turned over once within one withdrawal interval. It is the **stock of cash** used to cover recurring everyday expenditure during a cycle – for example, for the weekly shop or leisure activities. If people frequently pay in cash, it follows that they must visit the ATM or counter more regularly to replenish their cash stocks for transaction purposes. This does not affect the amount held for transaction purposes, however. This amount only rises if persistently higher amounts are withdrawn at the respective places of withdrawal (see Figure 6).

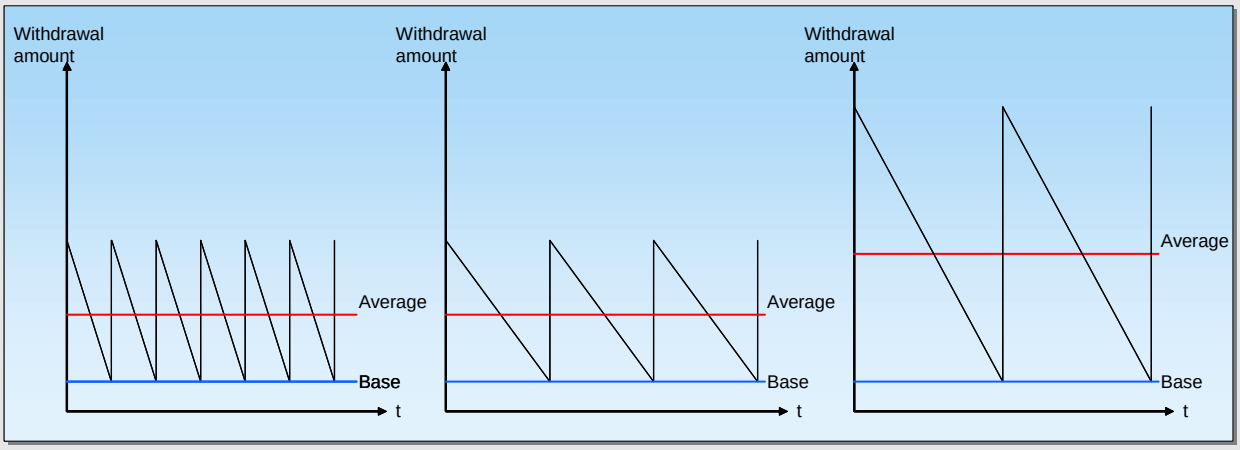


Figure 6: Amount of cash held by households for transaction purposes depending on amount withdrawn

As part of the study on payment behaviour, participants were also asked to keep a payments diary in which, for one week, they listed all expenditure by place of payment and type of payment. Extrapolating this value enables an estimation of cash expenditure in Germany in one year and thus a **flow analysis** of the amount of cash held by households for transaction purposes. If the stocks held for transaction purposes described in the first part of this box are then divided by annual cash expenditure in Germany, this gives the average **cash turnover** of the amount of cash held by households for transaction purposes (see Table 2).

[13] See European Central Bank, The international role of the Euro, Frankfurt am Main, 2010, pp 35-37.

Table 2: Calculating the turnover of total cash expenditure

Total weekly cash spent based on payment diary	**405,486 €**
./. cash savings	10,286 €
./. expenditure vis-à-vis individuals	19,538 €
./. Pocket money for children	6,018 €
= weekly cash payments total for transaction purposes	**369,644 €**
(memo item: No. of respondents: 2,219)	

Extrapolation to entire population and year	
No. of persons over the age of 18	68,318,799
Annual cash expenditure in Germany according to payment diary	591,793,138,870 €

Calculation of cash turnover	
Annual cash expenditure in Germany according to payment diary	591,793,138,870 €
Cash held for transactions in Germany (Table 1)	14,548,703,180 €
= Cash turnover	**41**

The resulting value of 41 indicates that each euro of the amount of cash held for transaction purposes is used to purchase goods and services 41 times. Thus, each euro is spent an average of once a week. Assuming also that commercial enterprises deposit their sales revenues at the Deutsche Bundesbank on a regular basis, the resulting return frequency is around eight days.

The plausibility of the specified value can be checked against other data sources. For example, the data from this study can be used to extrapolate annual withdrawals at ATMs and bank counters. This verifies the value of cash expenditure according to the payments diary as the amount of cash spent must be obtained from ATMs and bank counters. Extrapolating annual withdrawal amounts gives a total of EUR 558 billion. The questionnaire focused on regular withdrawal amounts and takes no account of withdrawals for special purposes (eg at the bank counter to finance larger purchases, which are included in the payments diary). Furthermore, since 2007, the Deutsche Bundesbank, as part of its payment and securities statistics, has been collecting data on outpayments at both places of withdrawal. At EUR 699.1 billion in 2008, this value is much higher than annual cash expenditure according to the payments diary. However, in addition to the amount of cash held by households for transaction purposes, this amount also includes withdrawals for hoarding and other purposes, eg to be taken abroad.
The cash expenditure calculated fluctuates within the following range and can therefore be considered plausible, as can the conclusions derived on the basis thereof:

EUR 558 billion	**< EUR 591 billion <**	**EUR 699 billion**
(Annual withdrawal amounts at ATMs and counters according to the study, excluding large purchases, hoarding and withdrawals, to be taken abroad)	Cash expenditure according to the study	(Annual withdrawal amounts at ATMs and counters according to payment and securities statistics, including large purchases, hoarding and withdrawals to be taken abroad)

3 Withdrawal behaviour in Germany

3.1 Identification of user types

As described in the previous section, the required amount of cash held for transaction purposes finds its way into people's wallets in various ways, as different people have different withdrawal habits. Some use ATMs frequently, while others withdraw cash less regularly at bank counters. With regard to survey respondents, this allows us to identify certain types of users. 10% of respondents only withdraw cash at the bank counter, approximately 52% only use ATMs and 36% use both places of withdrawal (mixed users).[14] The table below provides a detailed overview of survey respondents' withdrawal frequencies at both places of withdrawal.

Table 3: User types

		Bank counter				
		Weekly use (1x per week or more)	Monthly use (1-2 x per month)	Sporadic use	Not used	∑
ATM	Weekly use (1x per week or more)	1.9%	3.6%	10.7%	24.4%	40.7%
	Monthly use (1-2 x per month)	1.5%	5.0%	9.6%	27.2%	43.3%
	Sporadic use	1.1%	2.0%	0.7%	0.8%	4.6%
	Not used	3.1%	6.6%	0.3%	1.4%	11.4%
	∑	7.6%	17.3%	21.4%	53.7%	100%

Legend:
Counter users only (∑ 10.0%)
Mixed users (∑ 36.1%)
ATM users only (∑ 52.4%)
No use of ATMs or counters (1.4%)
Total values may vary because of rounding.

In terms of socio-demographic characteristics, there is very little to distinguish those who only use ATMs and mixed users from the rest of the survey sample. The distribution of age and income in these groups is very similar to the distribution across all respondents. It is interesting that there is also very little difference between the two user groups themselves.

Conversely, those who only use bank counters have a completely different profile. The socio-demographic disparity is illustrated by age in the Figure below (see Figure 7). While mixed users and those who only use ATMs are, on average, approximately 47 years old, those who use counters exclusively average almost 20 years older. This user type also has a lower income and lower level of education than both other groups and can be found in greater num-

[14] For the remaining 1.4% who withdraw cash at neither counters nor ATMs, it can be assumed that others close to them are responsible for withdrawing cash on their behalf.

bers in the ethnic German population of the western federal states (see the detailed socio-demographic results in section 4.1).

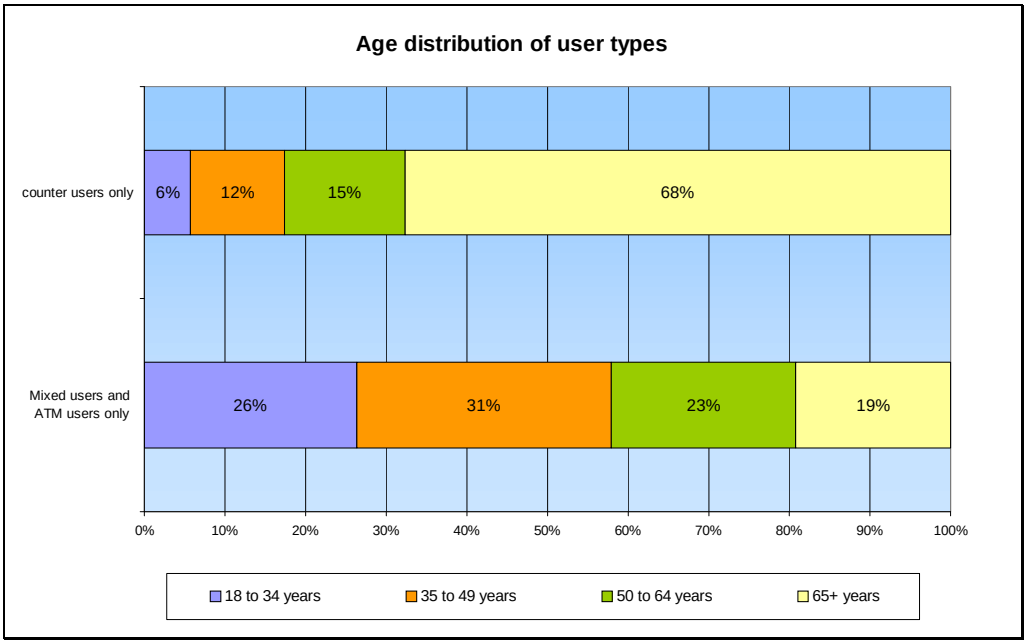


Figure 7: Age distribution of user types

The striking similarities between mixed users and those who only use ATMs is particularly interesting in this context. In the questionnaire, mixed users were asked to provide information on why they withdraw cash from bank counters as well as ATMs. This question assumes that this user group visits the ATM for "normal" withdrawals and only uses bank counters when there is a special reason, eg holiday, car purchase.

No special reason

In practice, however, almost half of mixed users have no particular reason for switching between bank counters and ATMs. They have no recognisable preference when withdrawing cash for everyday transactions. This also explains why there are hardly any differences between this group and those who only use ATMs. 49% of mixed users have no distinguishing socio-demographic characteristics. The only perceptible difference is that respondents from the eastern federal states are much less prone to give the answer "no particular reason".

Large purchases

27% of mixed users said that they go to the bank counter to withdraw cash for large purchases (eg car, furniture). In many cases, this is unavoidable as the amounts needed exceed the limits available from ATMs. Since wealthier people can generally afford more, it is hardly surprising that this answer was given more frequently as income increased. In close connection, persons with higher levels of education were found to visit the bank counter more often because of large purchases. More men than women also gave this answer.

Holiday

Similar behavioural patterns are observed for the withdrawal reason “holiday”. Here, too, respondents visit the bank counter because they require more substantial amounts. Those with a higher level of education and income visit the counter to finance holidays more often than other respondents. Men do so more often than women. Holiday was given as a reason less often by young men up to the age of 34 than by other age groups, presumably because younger people can more readily make do with amounts within ATM limits. By contrast, those with a migration background visit counters to withdraw cash for holidays more often than ethnic Germans. The fact that they intend to take cash with them to the respective country of origin may play a role here.

Other reasons

16% of respondents still go to the bank counter to obtain cash for household services. 11% say they need cash from the counter for gifts of money. Here, it is conceivable that large amounts, specific denominations or new banknotes are needed, which cannot be guaranteed from ATMs. 6% of mixed users said they go to the bank counter for transactions relating to savings. The other possible answers were given by no more than 3% of respondents and are therefore not included in further analysis at this juncture (see Figure 8).

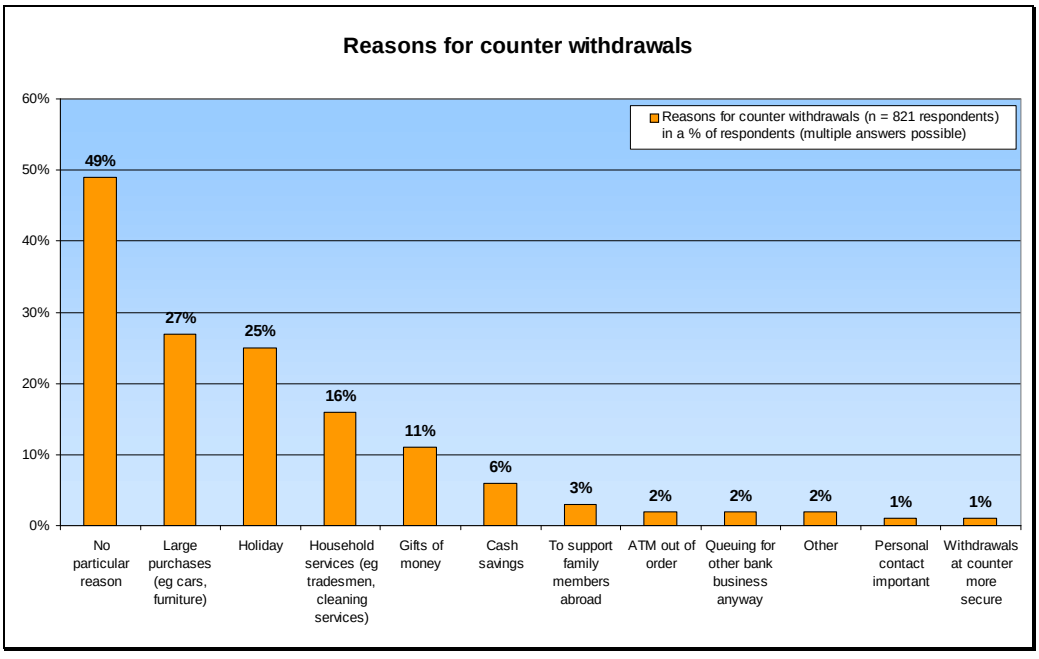


Figure 8: Reasons for counter withdrawals

3.2 Categorising respondents by means of a cluster analysis

Identifying various user types has already provided an initial overview of the different groups within the population. Those who would rather withdraw cash from the counter exhibit different characteristics to those who prefer to get cash from ATMs. However, there seems to be very little difference between mixed users and those who only use ATMs.

In order to gain a clearer picture in this respect, the data were evaluated in a two-step cluster analysis.[15] For the purpose of graphic representation, only two dimensions are shown – withdrawal frequency from ATMs and counters (see Figure 9). As with the analysis of user types, there was a marked separation between traditional counter users and those who only use ATMs/mixed users. The latter group, however, is divided into three different clusters in this analysis. The four groups can be characterised as follows.

"Traditionalists"
This cluster includes mixed users and all those who only use bank counters. While "traditionalists" are not identical to exclusive counter users, the latter group does account for a significant part of the cluster. The average withdrawal amount at the counter is almost EUR 320 and the average amount withdrawn from ATMs EUR 196. Respondents are, on average, 55 years old – the highest average value of all the clusters – and are mostly from the western federal states. In terms of payment habits, the group behaves traditionally: almost one-third pay exclusively in cash and nearly 20% do not even own a girocard. Credit card ownership is also below average. Thus, this is an older cluster which tends to use cash as its primary method of payment and prefers to obtain it from the counter.

"Normal mixed users"
This cluster comprises people who withdraw cash from ATMs either weekly or monthly. Without exception, all respondents in this group said that they withdraw cash from the counter "less than monthly". These are therefore mixed users who visit ATMs to withdraw cash for daily purchases and go to the counter sporadically for special occasions. This is confirmed by the average withdrawal amount of EUR 460 at the counter, which is much higher than that of "traditionalists". While the latter group withdraws cash at the counter to cover their everyday needs, this cluster tends to go to the bank counter only if they require more substantial amounts. They exhibit no extreme socio-demographic characteristics: in terms of age, income and background, this cluster is representative of the population as a whole.

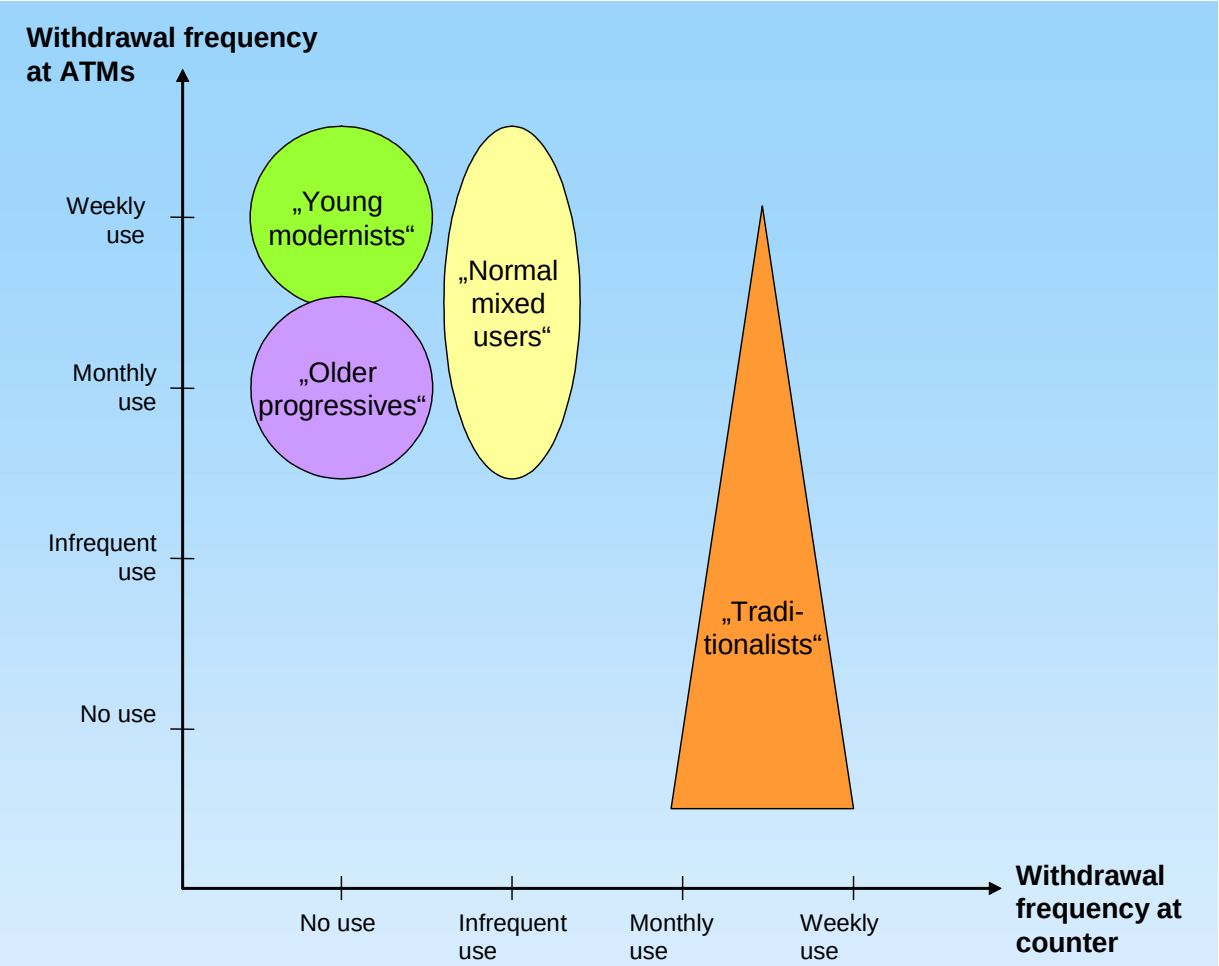
"Older progressives"
People in this group withdraw cash exclusively at ATMs. They do not visit bank counters. The average withdrawal is EUR 307 – the highest value of all the clusters and very similar to the average amount withdrawn from counters by "traditionalists". This cluster is slightly younger than the "traditionalists" (51-years-old on average) and slightly better off financially. Accounting for more than 25% of the group, this cluster has the highest number of respondents from the eastern federal states. On the whole, the behaviour of this group can be interpreted as follows. The withdrawal patterns observed very frequently in the past, ie withdrawing cash to cover needs just once or twice a month, are the same; however, the place of withdrawal has

[15] This multivariate method of analysis aims to identify different groups within which respondents exhibit the same behavioural patterns. This method is also known as an explorative process which identifies structures. The data are analysed with regard to the variables which determine withdrawal behaviour, ie frequency and amount of withdrawals at ATMs and counters. The resulting four-cluster solution is rated as "good" by the statistics program.

changed. Instead of visiting the counter, as they did in the past, this group has completely adapted to technical progress and now withdraws cash from ATMs. They are therefore known as “older progressives”. In terms of payment behaviour, this cluster has the same propensity to use cash as a payment method as “traditionalists” (approximately 62% of purchases), the difference being that they use their girocard more often.

“Younger modernists”

Respondents in this cluster, too, never visit the bank counter; they withdraw cash from ATMs once a week or more. At EUR 130, the average amount withdrawn is the lowest by far, as is the average age of the group. Thus, younger people clearly tend to withdraw smaller amounts more frequently, which undoubtedly reflects available income, their account management model (free giro accounts for young people) and payment behaviour – this cluster has the lowest propensity to use cash as a method of payment and the highest propensity to use girocards. This group uses girocards, in part, well above average, eg at petrol stations, for everyday retail purchases and for leisure activities, while cash transactions are comparatively rare. It can be assumed that the low cash sums withdrawn are used to cover small payments and/or intended for transactions at places where there is no alternative but to pay in cash (eg bakery, kiosk, many pubs/cafés).



Further information on the:

	„Traditionalists“	„Normal mixed users“	„Older progressives“	„Young modernists“
Ø Withdrawal amount at ATMs	€ 196	€ 209	€ 307	€ 130
Ø Withdrawal amount at counters	€ 319	€ 461	Not used	Not used
Ø Age	55 years	47 years	51 years	41 years

Figure 9: Results of cluster analysis

3.3 Cluster solutions within the context of past and future developments

Today's cluster structure, as presented in the previous sections, would have been inconceivable just a few decades ago. Until the 1970s, it was only possible to withdraw cash at the bank counter. All bank customers were therefore exclusive counter users. ATM networks were not

introduced to Germany until the 1980s.[16] This enabled the diversification of withdrawal behaviour with respect to place of withdrawal.

Two situations are therefore known: exclusive use of counters up to around 30-40 years ago and the current cluster structure. The developments leading from one to the other cannot be described with any degree of certainty owing to a lack of empirical surveys and studies. Nonetheless, it is in our interests to develop an understanding of events now in order to better assess future developments, which are also uncertain. Repeating this study will make it easier to chart changes in future behaviour. However, since this is the only study of its kind available at present and the starting point of the development is known, the following delineation of developments should be seen as a collection of hypotheses, the rebuttal or non-rebuttal of which will be the subject of further research (see Figure 10).

Presented below are the three possible reasons for the developments to date.[17]

- Period effects (effects relating to the historical period or effects of the succession of events which affect all people equally)
- Cohort effects (effects of belonging to a cohort)
- Age effects (effects of the passing of life phases)

Period effects

Period effects may be manifested in particular historical events or long-term trends. They are external influences which affect all individuals, eg technological advancement in society. Since the 1980s, credit institutions in Germany have steered their customers in the direction of withdrawing cash from newly installed ATMs. The option of counter withdrawals has been gradually reduced. This effect had an impact on all age groups, but reactions have varied. While younger people have embraced the new technical opportunities offered by the introduction of ATMs, older people have remained loyal to bank counters. Without the period effect of the introduction of ATMs, the situation would not have developed into the cluster structure described above. This variable should certainly be seen as given.

Cohort effects

Cohorts are generally deemed to be those born around the same time; the term “generation” is often used as a synonym. A cohort effect exists when a certain age group, eg today’s 70-year-olds, behave differently to those who will be seventy in twenty years’ time (ie people born in 1960). This is because – particularly in childhood and adolescence – cohorts are affected by various events and environmental influences during the course of their lifetime which play a similar role for fellow cohorts.[18]

[16] See Lischka, K, *Als Geldautomaten noch Öffnungszeiten hatten* (When ATMs still had opening hours), Spiegel-Online, 2007.
[17] As regards effects, see Schnell, R/ Hill, P/ Esser, E, *Methoden der empirischen Sozialforschung* (Methods of empirical social research), Munich, 2005, p 245 and Wessner, K, *Strategische Marktforschung mittels kohortenanalytischen Designs* (Strategic market research using cohort-analytical designs), Wiesbaden, 1989, pp 63-65.
[18] See Sensch, J, *Statistische Modelle in der Historischen Sozialforschung I: Allgemeine Grundlagen – Deskriptivstatistik – Auswahlbibliographie* (Statistical models in historical social research I: general principles – descriptive statistics – selected bibliography), Cologne, 1995, p 32 ff.

Most "traditionalists" were born into a world in which technological developments were generally less dominant, and ATMs, specifically, were not yet in use. Assuming a cohort effect, these respondents have clearly retained past withdrawal behaviour and continue to use counters as their main source of cash because of cohort characteristics. The normal processes of ageing and dying mean that this group is now just one cluster among four. Subsequent cohorts have grown up in a world coloured increasingly by technology, and therefore demonstrate different withdrawal behaviour.

If a period effect proves to be a long-term trend rather than a singular event, period and cohort effects often go hand in hand. In the case of this study, banks are shifting their long-term strategy towards more self-service (period effect); at the same time, young people are growing up with new technological opportunities (computers, mobile phones and also ATMs) and becoming a more technology-friendly generation (cohort effect). The two effects should be seen as separate, however, as customers may not necessarily accept the external influence of more ATMs. Not only older people may shy away from this influence due to their characteristics, younger adults could also theoretically become involved in anti-technology movements.

In this context, it will be interesting to see if today's younger generation retain their withdrawal behaviour in later years, thus supporting the cohort theory, or whether they start going to the bank counter as they get older, which would support the age theory.

Age effects

Age effects occur when people in certain life phases, eg 40 to 70-year-olds, always behave the same way, regardless of cohort. This can be explained to some extent by the "internal" changes associated with old age, eg deteriorating vision. As a result, older people may prefer to have their cash paid out to them at the bank counter rather than visit an ATM. Age effects also arise because of the specific lifestyles associated with certain ages. As pensioners no longer work, they have more time to go to the counter during banks' limited opening hours without time pressure. If the age effect holds true, today's professionals, who favour ATM withdrawals, will go to the bank counter more frequently when they retire.[19]

Developments from the 1970s to the present day are therefore based on several possible influences which are difficult to separate in a single study and may occur concurrently:

[19] With regard to the microeconomic analysis of payment behaviour at the point of sale – which is based on the same data as this analysis – the Bundesbank assumes an age effect variable. In terms of payment behaviour, this effect is measured to a lesser extent by age and to a far greater extent by the different characteristics of younger and older people, eg income or employment status. Thus, if today's younger generation adopts the characteristics of today's older generation in the future, the share of cash payments made at the point of sale should not change significantly, all other things being equal. Further research is required to determine whether this holds true for withdrawal behaviour. See Deutsche Bundesbank, The use of cash and other payment instruments, Frankfurt, June 2010, p 33 ff and Kalckreuth, U v/Schmidt, T/Stix, H, Choosing and Using Payment Instruments, Deutsche Bundesbank Discussion Paper, Series 1, 36/2009, 2009.

- The withdrawal behaviour of older people could be attributable to a cohort effect (early shaping by a world largely free of technology) or an age effect (they do not wish to use ATMs because of physical limitations).
- The behaviour of younger bank customers could also be due to a cohort effect (the younger generation have grown up in a more technology-oriented environment) or, generally, to a period effect (gradual introduction of ATMs).

Overall, this work proposes the hypothesis that the observed cluster structure is caused by both period and cohort effects. An age effect, such that younger professionals who currently withdraw cash from ATMs will turn to counter withdrawals in later life, is considered unlikely. It is rather more likely that this group will continue to withdraw cash from ATMs in their old age and reject any new possibilities for withdrawing cash because of their cohort characteristics.

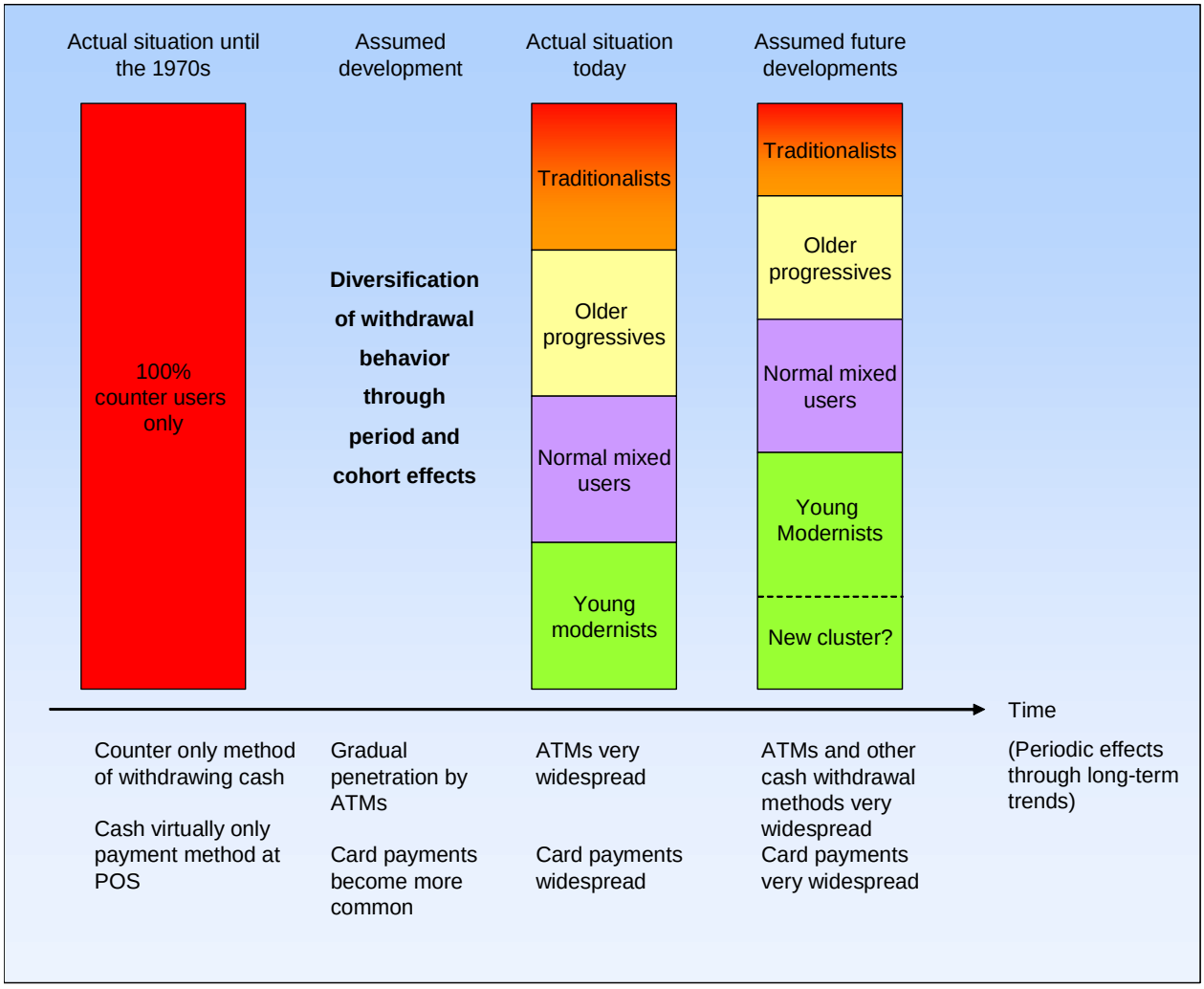


Figure 10: Development of withdrawal behaviour

At the moment, all four clusters are roughly the same size, each representing more or less one-quarter of respondents. Based on the assumed period and cohort effects, the hypothesis for future studies is that the number of “young modernists” will increase while the number of “traditionalists” will decrease. However, the mix of new cohorts and advancing period effects

(cash withdrawals at petrol stations, cash-back procedure, new cashless payment instruments) could also lead to the formation of a brand new cluster or the disappearance of existing clusters. The planned repeats of this study will show whether these hypotheses withstand the test of time.

4 Detailed characterisation of withdrawal behaviour

In the previous section, the withdrawal behaviour of different population groups was outlined and linked to past and future behaviour. The aim of this section is to analyse current withdrawal behaviour based on various variables. Readers will be given the opportunity to see the behaviour of the population from a variety of possible perspectives. External influences and socio-demographic variables are just two of the major groups of factors which may potentially determine individuals' behaviour.

4.1 Socio-demographic analysis

The Bundesbank's 2009 study of payment behaviour gave rise to the following hypotheses regarding socio-demographics.[20]

- **Age**: Older people mostly pay in cash and are under-represented when it comes to using girocards and credit cards at the point of sale (POS). Consequently, they withdraw larger amounts overall and make greater use of counters.
- **Income**: As income rises, the share of cash payments falls steadily. This group could therefore be seen as having low withdrawal requirements.
- **Gender**: Gender is expected to affect withdrawal habits as women have a greater propensity to pay in cash than men and own significantly fewer credit cards.
- **Regional background**: The share of cash payments in eastern federal states is far lower than that in western federal states. Thus, eastern Germans must require less cash, and the frequency and/or amounts of withdrawals should be lower.
- **Ethnic background**: Those with migration backgrounds do not behave uniformly: the payment behaviour of migrants is very similar to that of ethnic Germans, with the difference that the former group tend to carry more cash.
- **Education**: The propensity to pay in cash declines sharply as level of education increases. Those with fewer school qualifications may therefore withdraw cash more often and/or in greater amounts than others.

4.1.1 Age

In a first step, differences in withdrawal behaviour are examined by age group. The cluster analysis has already shown that different age groups have different withdrawal habits. This aspect is investigated in greater detail below. Figure 11 shows how often people of different ages withdraw cash from ATMs and the average amounts they withdraw.

[20] See Deutsche Bundesbank, Payment behaviour in Germany, 2009, p 52 ff.

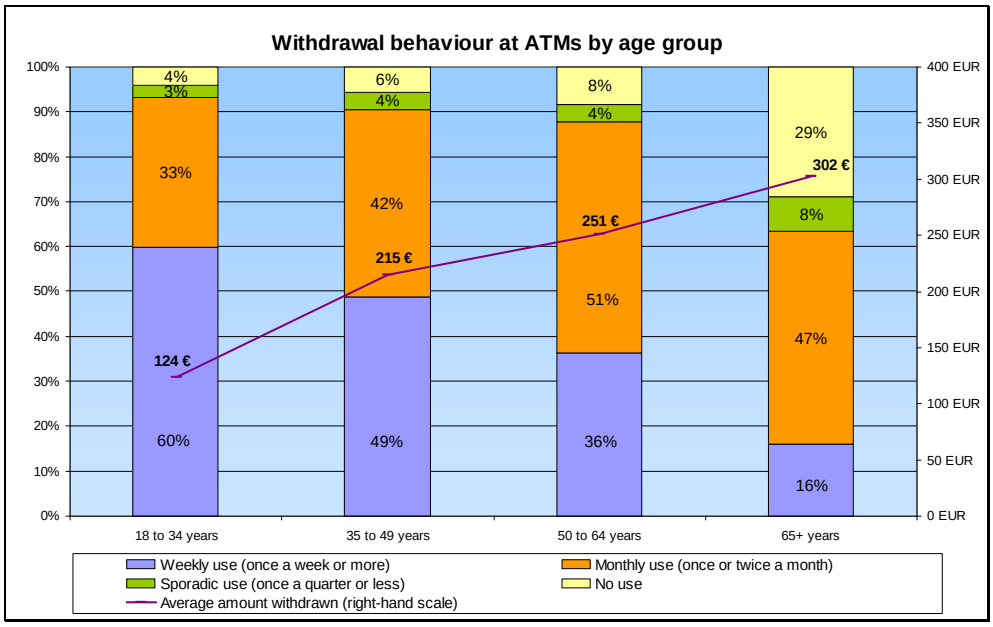


Figure 11: Withdrawal behaviour at ATMs by age group

The youngest population group uses ATMs most often: 60% of 18 to 34-year-olds visit the ATM once a week or more. Only 7% of this age group use ATMs rarely or never. As age increases, the frequency of withdrawals shifts increasingly towards monthly withdrawals. This trend is especially pronounced in the over-65s age group where the share of weekly users falls rapidly to 16% and non-users account for the largest share by far. The average withdrawal amount per age group is in line with the relevant withdrawal frequencies – as frequency of withdrawal decreases, the amounts withdrawn increase.

The figures for withdrawal behaviour at bank counters clearly show that over-65s are the most frequent users of counters. Counter transactions play a considerably less important role for all younger age groups. The trend of older respondents visiting bank counters more often is mirrored in the results of the cluster analysis.

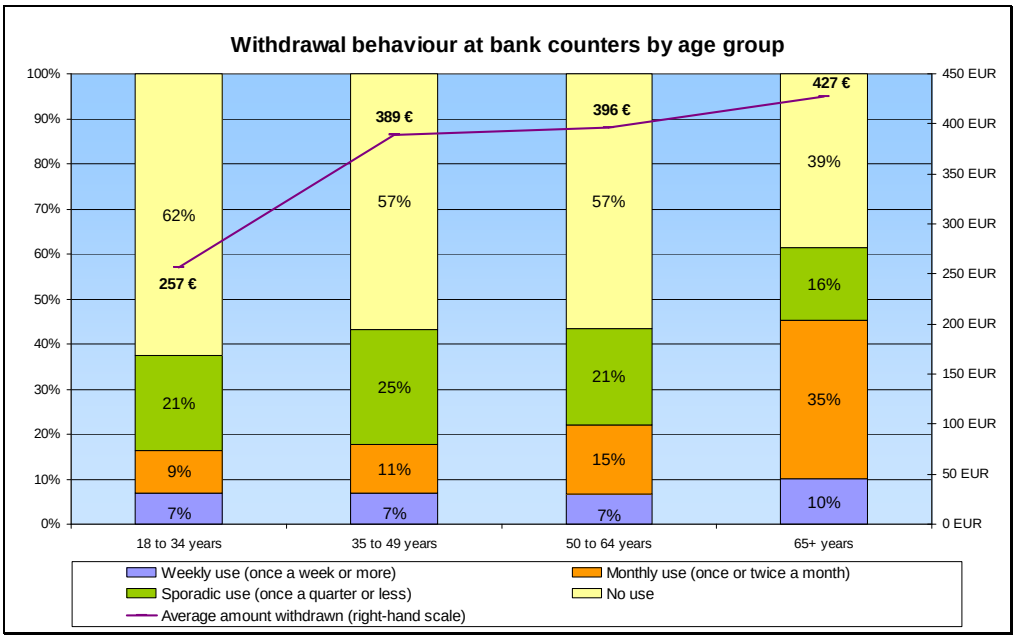


Figure 12: Withdrawal behaviour at bank counters by age group

The amounts withdrawn at counters are significantly higher than those withdrawn at ATMs and follow the same pattern: as age increases, so does the average amount withdrawn, although the withdrawal frequency is once again highest by a considerable margin in the oldest age category. The amount of cash remaining in people's wallets before the next withdrawal also increases with age. Retired respondents evidently want to replenish their cash stocks to a relatively high level in plenty of time. This age group places a high value on not running out of cash unintentionally due to bad planning as there are above-average numbers of cash-only payers in this age group.

4.1.2 Income

As net household income rises, both the frequency and amounts withdrawn from ATMs increase (see Figure 13). This outcome is particularly interesting because the population groups with the highest income have the lowest propensity to pay in cash in shops and, in many instances, use cashless instruments.[21] In the lowest income category, exactly the opposite is true.

Where does this withdrawal behaviour come from? One might suspect that, because wealthier people pay more by card, the amounts they withdraw should be lower. However, upon closer inspection, it is unsurprising that this group, in fact, accounts for the highest cash withdrawals as wealthier people tend to spend more than those on lower incomes. According to the payments diary, 30% of all expenditure was attributable to persons with net household incomes of EUR 3,000 or more, although they represented only 23.5% of respondents. In the low income segment, the opposite was true: 27% of respondents accounted for 21.5% of total expendi-

[21] See Deutsche Bundesbank, Payment behaviour in Germany, 2009, p 56 ff.

ture. Overall, in spite of their low cash payment rate, high-income households have to withdraw relatively large amounts to cover their expenditure.

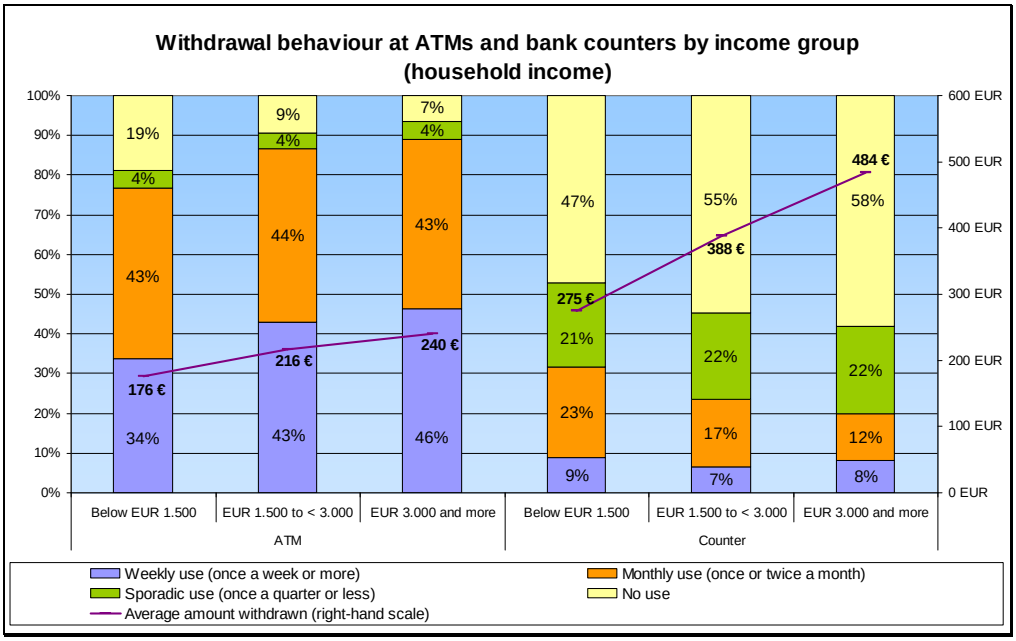


Figure 13: Withdrawal behaviour at ATMs and bank counters by income group

In terms of frequency of withdrawals from bank counters, behaviour is reversed. Respondents with the highest incomes use the counter least, while more than half of those in the lowest income group visit the counter to withdraw money. Individuals who earn up to EUR 1,500 account for almost one-third of those who use counters on a weekly or monthly basis. Those in the highest income category account for only 20%.

The age component also influences respondents' behaviour. Thus, over-65s are represented in disproportionately high numbers in the lowest income category and are significantly underrepresented in the highest. Income and age are therefore not statistically independent. This finding also helps to explain why those who earn up to EUR 1,500 have the lowest ATM and highest counter usage rate.

The amounts withdrawn at the counter increase in line with income, even if the frequency of utilisation declines. It seems that people with high incomes tend to use the counter as an irregular source of cash for special purposes which require the withdrawal of higher amounts, eg holidays.

Overall, ATM use increases as income rises, while the frequency of counter use falls. In both cases, the amount withdrawn increases in line with net household income. The hypothesis that the frequency and amount of withdrawals decreases as income increases is therefore not confirmed.

Box: Correlation between cash withdrawals and consumption (consumption rate)

The higher the nominal available income of households, the lower the proportion of income used for consumption purposes (consumption rate of private households). This is explained by the fact that savings grow disproportionately as income rises because – as is the case with lower incomes – almost all income is no longer used to cover everyday expenses. It is not unusual for low-earning households to have a consumption rate of over 100% as they have to take out (consumer) loans or draw on their savings. As the income of households rises, their consumption rate falls rapidly to below 60% in some cases.

The data underlying this study confirm this correlation with regard to POS consumption. This reflects consumer expenditure at the point of sale (POS), ie rent payments or insurance contributions are not included. It comprises only consumer expenditure paid for in cash (POS consumption in the narrower sense or cash consumption). With regard to the calculation method, for the purposes of simplification, it is assumed that cash withdrawals at ATMs or counters are used for consumption purposes only as the questionnaire asked for the frequency of regular withdrawals and average amounts withdrawn. This does allow indirect conclusions to be made about POS consumption in the wider sense, however, ie cash or cashless consumer expenditure.

What are the individual steps of the calculation? First, the annual cash withdrawals of one person are calculated by multiplying the withdrawal frequency by the average withdrawal amount – separately for ATMs and counter withdrawals. Adding both amounts together gives the annual withdrawal amount. Expressing these annual withdrawal amounts in relation to the annual net income of households gives the POS consumption rate in the narrower sense, in other words, the share of households' available income which is consumed in cash by that particular respondent. The share of cash used for everyday transactions is also known for each income category. Dividing annual withdrawal amounts by the share of cash gives POS consumption in the wider sense, ie the cash and cashless consumer expenditure of the respondent. Setting this expenditure in relation to the annual net income of households then gives the POS consumption rate in the wider sense.

Sample calculation:
Respondent X goes to the ATM twice a month where he withdraws EUR 700. He also visits the counter twice a year where he withdraws an average of EUR 2,000. The annual net income of his household is EUR 50,000.

Annual withdrawal amount, ATM:	24 x 700 =	EUR 16,800
Annual withdrawal amount, counter:	2 x 2.000 =	EUR 4,000
Total withdrawal amount (= cash consumption):		EUR 20,800
Divided by annual net income:		EUR 50,000
POS consumption rate in narrower sense / cash consumption rate:		**41.6%**

Extended calculation:

Total withdrawal amount (cash consumption)	EUR 20,800
Divided by cash share of	0.475 for this income group
= Total consumer expenditure (cash/cashless)	EUR 43,789
Divided by net annual income:	EUR 50,000
POS consumption rate in the wider sense (cash and cashless):	**87.6%**

Below are the overall results for each income category:

Monthly household net income	POS consumption rate in narrower sense cash consumption rate	POS consumption rate in the wider sense (cash and cashless)
Below EUR 1,500	**42%**	**59%**
EUR 1,500 to below EUR 3,000	**29%**	**50%**
EUR 3,000 and above	**21%**	**41%**

The fact that the share of consumer expenditure in relation to net income sinks as income increases is confirmed. If this calculation were extended to include narrower income categories, the result would be a spread ranging from 79% for household net incomes of below EUR 500 to 24% for households earning EUR 7,000 or more per month (in terms of the POS consumption rate in the wider sense). However, such a tight analysis suggests a degree of precision that cannot be assumed as given.

Instead, the results are lower limits since personal withdrawals from ATMs or counters are expressed in relation to the income of the entire household. Thus, if other members of the household also withdraw cash, the POS consumption rate rises. The alternative method of expressing the personal withdrawals in relation to the personal income of respondents was considered, but this could lead to implausible or mathematically impossible results, as many people have no income of their own and use the joint account they have with their partner for withdrawals. Dividing the withdrawals of the entire household by household income gives the best results. However, the questionnaire intentionally did not ask about the withdrawal habits of households as respondents cannot be expected to provide accurate information about the behaviour of all adult family members. The results of the analysis should therefore be seen as confirmation of the theory that the POS consumption rate falls as income increases and should also be seen as the lower limit thereof.

4.1.3 Gender

An examination of withdrawal behaviour by gender-specific criteria shows that the habits of both groups of respondents are similar. Men visit both ATMs and counters slightly more often, and at both places, there are more male weekly users and fewer male monthly users than there are women. The percentage differences are relatively low, however. The only remarkable difference is in the amounts withdrawn at counters: while women withdraw an average of EUR 316, men withdraw an average of EUR 444. By contrast, the corresponding values for ATM withdrawals are identical, at EUR 215.

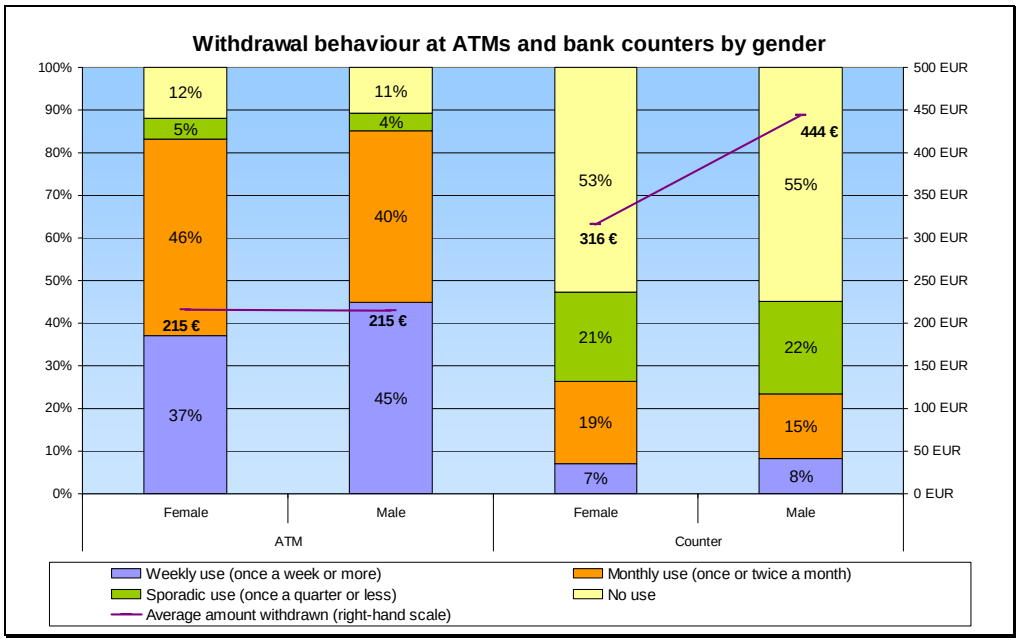


Figure 14: Withdrawal behaviour at ATMs and bank counters by gender

The differences between respondents are more pronounced if age is added as an additional variable. Especially in the over-65s group, women withdraw cash at the counter much more frequently than men in all surveyed frequency categories. Conversely, there are more male ATM users over the age of 65 than there are women. Older men, it would seem, have better adapted to technology-based self-service cash withdrawals than their female counterparts.

4.1.4 Regional background

Respondents from the eastern federal states visit bank counters much less frequently and ATMs less frequently than those from the western federal states. That said, they withdraw larger amounts at both places, which seems plausible for a low withdrawal frequency (see Figure 15). It is conceivable that this process is influenced by external circumstances. For example, this behaviour could stem from the fact that there is a lower concentration of ATMs and bank counters in eastern Germany. After all, the concentration of credit institutions per square kilometre in western Germany is almost five times higher than in the east.[22] The results of the questionnaire also confirm that respondents from the eastern federal states need more time to get to the nearest place of withdrawal than those from the western federal states.

Another factor which suggests that the withdrawal behaviour of eastern Germans is motivated to a greater extent by external circumstances is the insecurity they admit to feeling when carrying cash. While western Germans feel unsafe carrying an average of more than EUR 677 on their person, the equivalent value is EUR 200 lower in the eastern federal states. Moreover, the share of retail cash payments in eastern federal states is much lower than in the west. It can therefore be assumed that eastern Germans do not withdraw more cash because they

[22] Source: Bundesbank calculations from the Deutsche Bundesbank's bank office statistics and statistics from the Federal Statistical Office, see http://www.bundesbank.de and http://www.statistik-portal.de.

prefer to pay in cash or carry large amounts of cash on their person, but because there are fewer withdrawal opportunities in the eastern federal states.

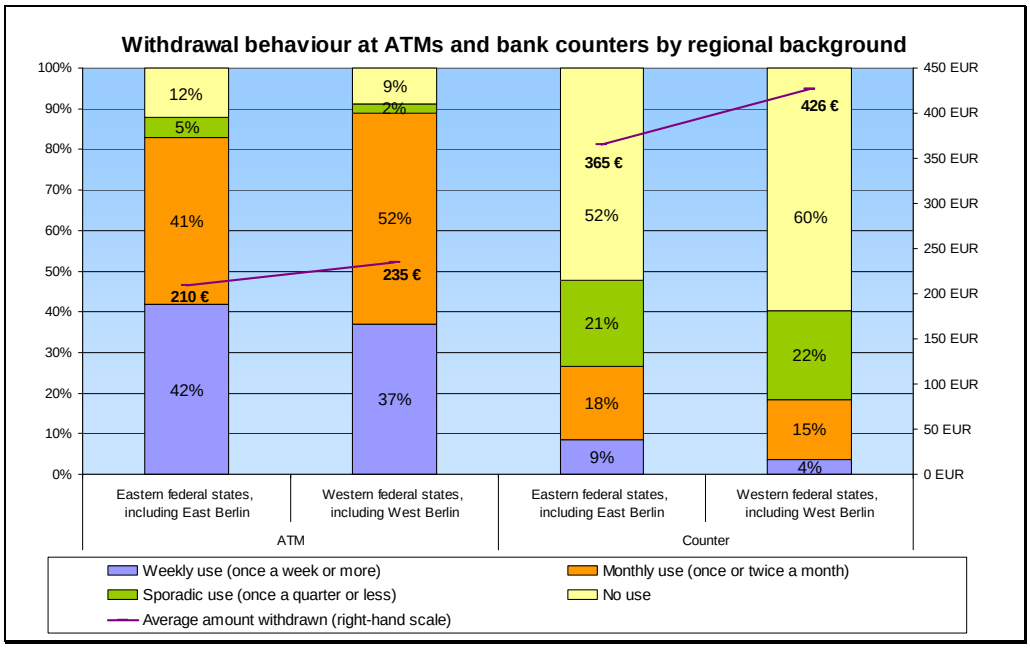


Figure 15: Withdrawal behaviour at ATMs and bank counters by regional background

4.1.5 Education

The frequency with which ATMs are used increases as the level of education increases and sinks somewhat in the case of academics. In terms of amounts, those without school-leaving certificates withdraw the lowest amounts by far, while university graduates withdraw the most cash. This upward trend is interrupted in the case of those with intermediate qualifications: people with school-leaving certificates withdraw more cash on average than those with university entrance qualifications. This can be explained partially by utilisation frequency – the higher the frequency, the lower the amounts withdrawn. Furthermore, the group consisting of those with school-leaving certificates / elementary school leavers includes many older people who withdraw higher amounts less often (see section 4.1.1). There is not only a strong correlation between age and level of education, however. Income and education are also closely linked – the higher the level of education, the higher the income. This explains the large amounts withdrawn by university graduates and the very low amounts withdrawn by those without qualifications.

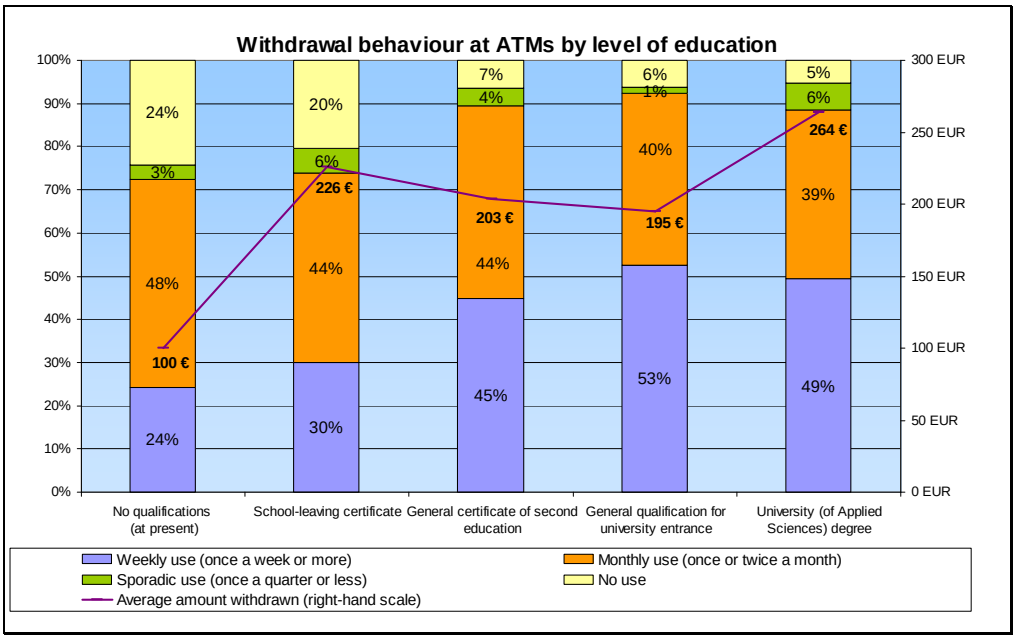


Figure 16: Withdrawal behaviour at ATMs by level of education

Utilisation frequencies at counters largely mirror those at ATMs. They are higher for those with lower levels of education, dip and then increase again slightly for respondents with university degrees. The average amounts withdrawn from the counter go up as the level of education rises and are at their most substantial by far for the two highest levels of education. This progression not only reflects utilisation frequency; as with ATM utilisation, income is also an influencing factor which increases in line with the level of education achieved. Based on the insecurity reported with regard to the amount of cash carried by respondents, it can be assumed that those with a high level of education and high income are accustomed to carrying higher cash stocks. Academics feel unsafe carrying more than EUR 826 in their pockets, while the equivalent value for respondents with no school qualifications is EUR 262.

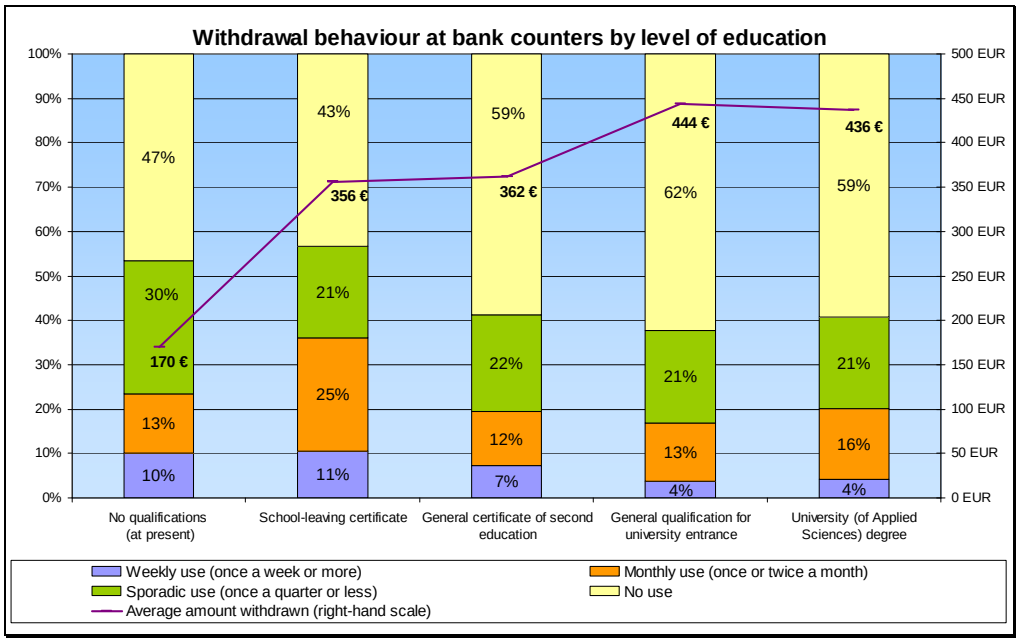


Figure 17: Withdrawal behaviour at bank counters by level of education

4.2 External circumstances

In addition to socio-demographic influences, external circumstances can also have an effect on withdrawal behaviour. The following hypotheses are investigated in this connection.

- **Bank affiliation**: Customers of an institution or group of institutions with a dense ATM and branch network withdraw smaller amounts more frequently, while customers of direct banks or groups of institutions with fewer ATMs or branches tend to withdraw larger amounts sporadically.
- **Fee structure of giro account**: Withdrawal behaviour is influenced by fees. Higher fees lead to less frequent and larger withdrawals from ATMs or counters.
- **Distance to the nearest cash source**: The frequency of withdrawals increases and the amount withdrawn declines as the distance to the nearest source of cash diminishes.
- **Insecurity**: Those who feel unsafe with large amounts of cash in their wallets withdraw smaller amounts more regularly.
- **Amount remaining before next withdrawal**: the amount of cash remaining before the next withdrawal is not expected to have an impact on the frequency and volume of withdrawals.

4.2.1 Bank affiliation

Two basic trends are observed with regard to withdrawals from bank counters (see Figure 18).[23] Customers of savings banks (*Sparkassen*), Landesbanks, People's banks and Raif-

[23] In order to analyse withdrawal behaviour, credit institutions were essentially subdivided into affiliated groups or independently formed affiliations. Only Postbank was analysed separately as this institution is unique owing to the fact that branches of the post office are used for bank transactions. In the overview, Postbank comes under the

feisen banks (*Volks- und Raiffeisenbanken*) and Postbank withdraw cash from the bank counter more often than respondents affiliated to other institutions or groups of institutions – 25% of their account holders go to the counter once a month or more to withdraw cash and, in doing so, withdraw smaller amounts on average. The high utilisation frequency of savings banks/Landesbanks and People's banks and Raiffeisen banks is particularly interesting in this regard, as their customers can only use their local bank to withdraw cash from the counter free of charge (there is no integrated usage network in place).[24] It seems, therefore, that those who favour counter withdrawals ensure there are sufficient branches of an institution in their area before they even open an account. In the case of Postbank, the high share of regular counter users – 34% of Postbank customers withdraw cash from the counter at least once a month – can be explained by another factor. In addition to separate Postbank branches, bank services are also offered in branches of the post office. Since very few of these have self-service terminals, customers are forced to withdraw cash from the counter.[25] A breakdown of the ATM and counter networks of the respective groups of banks can be found in Table 4.

Table 4: Overview of the number of branches and ATMs of credit institutions/groups of institutions[26]

	Branches	ATMs
Savings banks	15,812	Approx. 25,700
People's banks and Raiffeisen banks	Approx. 14,000	Approx. 18,200
Cash Group banks	UniCredit-HypoVereinsbank: 629 Postbank: 850 own branches and a number of post offices Deutsche Bank: 961 Dresdner Bank: 910 Commerzbank: 820	More than 7,000 Cash Group ATMs
Cashpool banks	Sparda-Banken: more than 400 Citibank (now: Targobank): 335 SEB-Bank: 174 Santander: 97	Approx. 2,500 Cashpool ATMs
Online banks	ING-Diba: no own branches, but cash transactions possible in branches of Reisebank	Approx. 1,300 own ATMs
	Comdirect: no own branches, but cash transactions possible in branches of Commerzbank	More than 7,000 Cash Group ATMs

It is also striking that customers of registered direct banks, such as ING-Diba or Comdirect, withdraw cash from the counter. These credit institutions allow their customers to access other banks' branches through cooperation agreements (ING-Diba – Degussa Bank and Comdirect – Commerzbank). Use of affiliated networks, eg the Cash Group, is still not possible, however.

Cash Group banks. It is not possible to assign customers of Comdirect bank to the Cash Group owing to the structure dataset.

[24] See various price lists of savings banks and People's banks and Raiffeisen banks. Telephone conversations with the relevant institutions were also used.

[25] See Postbank and Post websites.

[26] The data are based on the relevant websites of individual credit institutions. A detailed list of addresses can be found in the "List of references". As far as possible, the data refer to the year 2008, as the empirical survey underlying this study was also conducted in 2008.

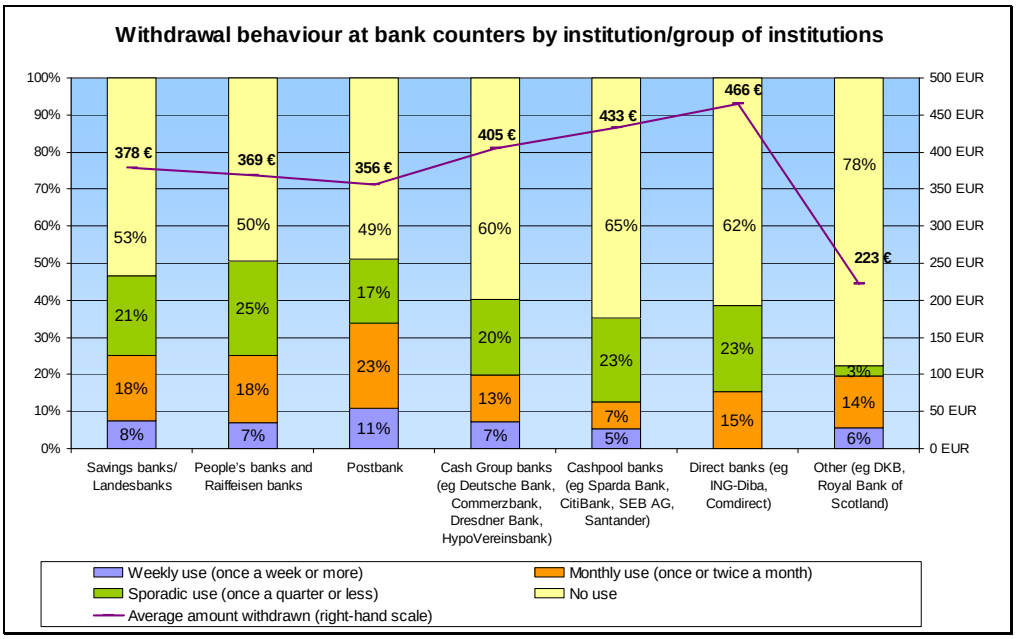


Figure 18: Withdrawal behaviour at bank counters by institution/group of institutions

Figure 19 shows the ATM utilisation frequency by bank or group of institutions. There is no remarkable difference between the amounts withdrawn at the different groups of institutions – the weekly withdrawal frequency fluctuates between 35% and 46% for the banks or groups of institutions. One exception is the average amount withdrawn by customers of direct banks. At EUR 354, these respondents lie well above the range of EUR 200 to EUR 240 withdrawn by customers of other groups of institutions.

Credit institutions' efforts to provide customers with the best possible access to ATMs through integrated networks seem to be proving successful in practice. Furthermore, banks with comparatively small ATM networks, such as ING-Diba, are giving their account holders girocards with a credit card function which allows them to withdraw cash from other institutions' ATMs at no or little charge. This practice has faced opposition, particularly from savings banks and People's banks and Raiffeisen banks, which have consequently blocked these users from using their ATMs.[27]

[27] See Gericke, U, *Visa-Karten-Streit weitet sich aus* (Visa card argument escalates), Börsen-Zeitung, 12 December 2009, p 3.

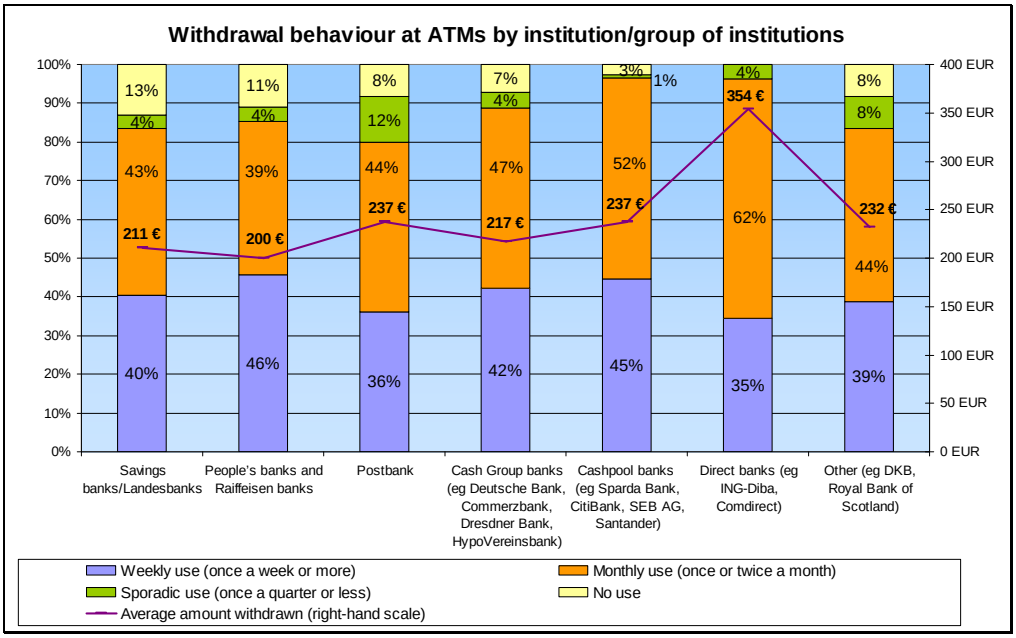


Figure 19: Withdrawal behaviour at ATMs by institution/group of institutions

Overall, the hypothesis that customers of banks with a dense ATM or branch network withdraw smaller amounts of cash more regularly can only be confirmed to a limited extent. With regard to ATM withdrawals, the frequency and amount of withdrawals differ only marginally, with a few small exceptions. This suggests ATM use has reached saturation point, with the effect that an increase in the number of ATMs would not give rise to a corresponding increase in withdrawals at this location. The high proportion of counter withdrawals by customers of savings banks, Landesbanks, People's banks and Raiffeisen banks and Postbank suggests that opting for these credit institutions or groups or institutions is a deliberate choice, which can be seen as an expression of individual preference. This may reflect the particular socio-demographic characteristics of the clientele of the above banks. The following box examines the customer structures of individual credit institutions or groups of institutions.

Box: Socio-demographic characteristics of customers of credit institutions

As indicated in the section above, one question in the cash study focussed on the giro account usually used by the person interviewed (see Figure 20). The results need not necessarily match the market shares of institutions or groups of institutions in the German banking sector as many individuals have a second or third bank account which we did not ask about. Most people have principal accounts at savings banks or Landesbanks. Together, the four most commonly named groups of credit institutions account for roughly 90% of all respondents, ie savings banks/Landesbanks, People's banks and Raiffeisen banks, Postbank and big banks.

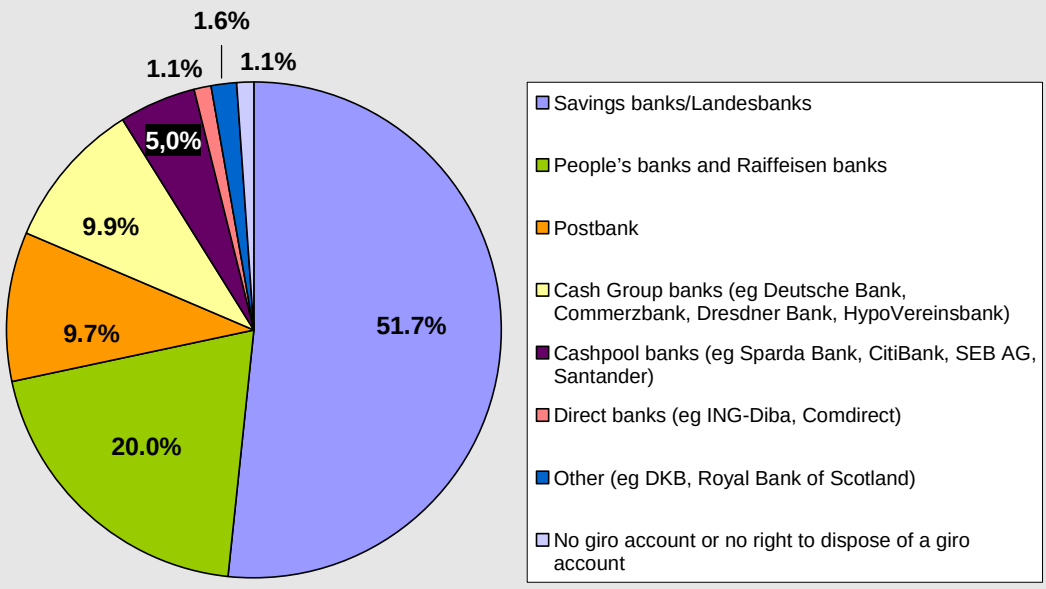


Figure 20: Distribution of giro accounts to institutions/groups of institutions

The aim of this box is to investigate the differences in the socio-demographic customer makeup of the respective credit institutions. We expect our analysis to confirm that, in addition to bank affiliation, the composition of banks' customer structure has an effect on direct withdrawal behaviour. The following variables were examined: age, monthly household income, size of place of residence, school qualifications, current occupation, fee structure and credit card ownership.

Overall, the differentiation is greatest between direct bank customers and customers of other credit institutions. A typical direct bank customer is over 35, lives in a household with a monthly income of over EUR 3,000, generally has a higher level of education, is in full-time employment, owns a credit card and has a free account. There is also a disproportionately high number of direct bank customers in the eastern federal states.

By contrast, the characteristics of account holders at savings banks and People's banks and Raiffeisen banks are more evenly spread across the criteria (income, school qualifications). Besides the above-average numbers of very young and older people among the ranks of savings bank customers, the age structure of both groups of institutions corresponds to that of the survey sample. While, in the case of savings banks, no observations can be made with regard to their distribution by size of place, there are more People's bank and Raiffeisen bank customers in rural areas, and, conversely, fewer People's bank and Raiffeisen bank customers in big cities with a population of more than 500,000. A disproportionately high number of savings banks can also be found in the western federal states, while People's banks and Raiffeisen banks in the eastern federal states have fewer customers in terms of overall population than those in western Germany. The question on current employment status revealed no abnor-

malities in the case of customers of savings and People's and Raiffeisen banks. Only with regard to credit card ownership and fee structure can we see that a very small number of customers of both institutions own credit cards and that larger numbers of customers have chosen, or had to choose, fee-based accounts.

Account holders of other credit institutions likewise rarely own credit cards and usually pay no fees for account utilisation. Other specific characteristics are observed only with regard to individual banks. Big banks, such as Deutsche Bank and Commerzbank, have a very strong presence in large cities with more than 500,000 inhabitants. Moreover, Cashpool banks and other credit institutions have a slightly younger customer structure than the population average.

The data analysis does not confirm any strong segmentation of customer structure in Germany's three-pillar banking system. Differences in withdrawal behaviour can be explained, in part, by customer structure. For example, a higher proportion of older customers (eg savings bank customers) suggests increased counter utilisation, whereas younger customers (eg Cashpool bank customers) tend to withdraw money from ATMs, see Section 4.1.1. Overall, however, it seems that respondents behave relatively pragmatically and choose a bank in their vicinity which is easy to reach.

4.2.2 Distance to nearest source of cash

The question relating to the distance to the nearest source of cash refers to the accessibility of the place of withdrawal (bank counter or ATM) usually used on the way to work or from the flat. The majority of respondents said that they only had to travel a short distance to the nearest, most commonly used place of withdrawal. Around 76% of respondents are no more than ten minutes from the next source of cash and approximately 19% can reach the nearest ATM or counter in under 20 minutes. Only roughly 5% of those who took part in the questionnaire require longer to reach their next, most frequently used place of withdrawal.

Figure 21 shows usage frequency and the amounts withdrawn for the three distance categories. In the case of ATMs, there is very little difference in the frequency of withdrawals, and the amounts withdrawn only increase slightly as distance increases. The withdrawal frequency and amounts withdrawn at bank counters do not provide any clear information about how these factors relate to the distance to the nearest place of withdrawal usually used. Contrary to the expectation that smaller amounts are withdrawn more frequently in the case of short distances to the relevant places of withdrawal, the amounts withdrawn are highest, and the withdrawal frequency lowest, in the lowest distance category. Statistical distortions are possible in this case, as the counter user group has a low basic population and a unique set of socio-demographic characteristics. In section 4.1.1 with regard to the relationship between age and withdrawal behaviour, we saw that younger population groups use bank counters less to withdraw cash than older people. The amounts withdrawn also increase with age.

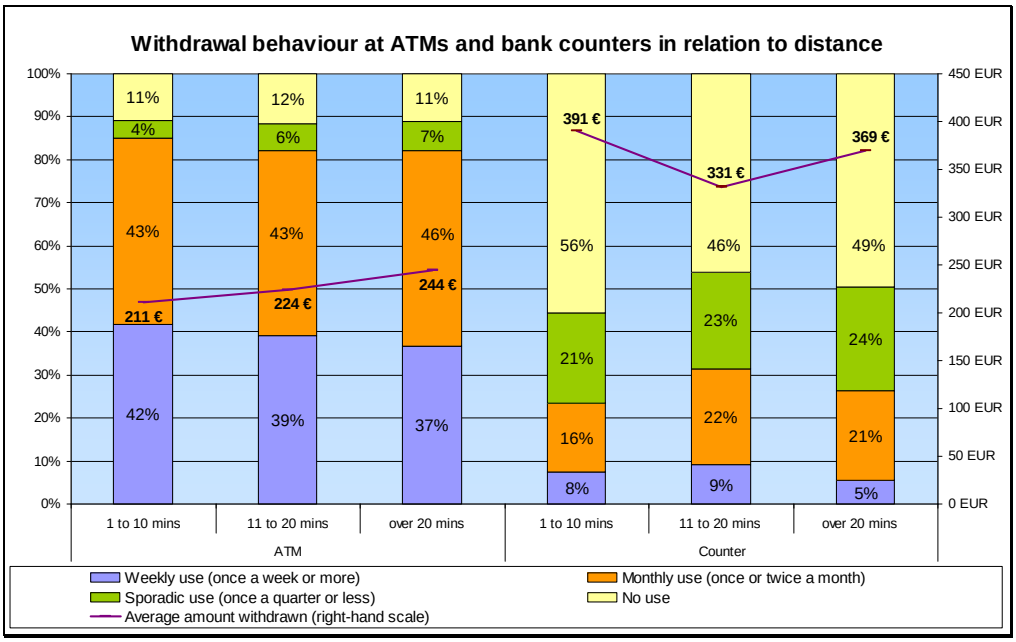


Figure 21: Withdrawal behaviour at ATMs and bank counters in relation to distance

Almost 95% of respondents can reach the nearest, most frequently used place of withdrawal within 20 minutes. The good availability of bank counters and ATMs in Germany is confirmed in a Europe-wide comparison (see Table 5). Alongside comparatively small countries with high concentrations of counters and ATMs, such as Malta or Luxembourg, Germany and Italy occupy leading positions in terms of ATM and bank counter concentrations in larger euro-area countries.

Table 5: Distance to nearest place of withdrawal in the euro area[28]

Country	Area in km²	Counters	ATMs	km² / counters	km² / ATMs
Belgium	30,528	5,678	15,471	5.4	2.0
Germany	357,093	41,601	57,256	8.6	6.2
Ireland	69,797	2,206	3,404	31.6	20.5
Greece	131,957	4,447	7,768	29.7	17.0
Spain	505,987	46,088	61,714	11.0	8.2
France	632,834	39,121	53,326	16.2	11.9
Italy	301,336	47,264	54,732	6.4	5.5
Cyprus	9,250	1,259	611	7.3	15.1
Luxembourg	2,586	487	460	5.3	5.6
Malta	316	143	166	2.2	1.9
Netherlands	41,543	3,671	8,654	11.3	4.8
Austria	83,844	5,049	7,646	16.6	11.0
Portugal	92,118	7,124	16,885	12.9	5.5
Slovenia	20,273	702	1,731	28.9	11.7
Slovakia	49,034	2,860	2,250	17.1	21.8
Finland	338,436	1,681	3,211	201.3	105.4

Thus, two factors contribute to the fact that withdrawal behaviour is not significantly influenced by distance to the nearest, most commonly used source of cash. First, customers choose their

[28] Bundesbank calculations: areas are taken from Eurostat, number of ATMs and counters is taken from the ECB's Statistical Data Warehouse. An analysis of area is sufficient as population density measured against the degree of urbanisation is practically identical for countries of the same size in the euro area. Overall, these are only average values which serve as a general indicator of the distance to the nearest place of withdrawal. Deviations are possible in individual countries as no data are available on the specific spatial distribution of counters and ATMs.

bank, and thus their primary source of cash, based on the best possible accessibility. This assumption is confirmed by the short distances respondents generally specified to the nearest place of withdrawal. Second, the infrastructure for withdrawing cash in Germany is good overall.

4.2.3 Fee structure

One of the questions in the cash study related to the fee structure of the giro account usually used by respondents. There were three possible answers to this question: free account, lump-sum basic fee or transaction-based fees. The term “transaction” includes cashless account dispositions (eg direct debits) and cash account dispositions (eg ATM withdrawals).

Overall, 29% of respondents said they had a free account, the majority of 46% had an account with a lump-sum fee, 23% had to pay for individual transactions and around 2% of respondents did not provide any response.

The following figure shows the withdrawal behaviour of respondents in relation to fee structure. Overall, those who pay no fees or a basic fee tend to withdraw smaller sums more frequently from ATMs than those who have to pay for each transaction separately. In the case of counter users, the opposite is true, with frequency of use increasing as the fees to be paid rise. Again, the particular characteristics of counter users play a role here. While there are disproportionately high numbers of young people in the group which does not pay fees for giro accounts, the group which pays for individual transactions includes a very high percentage of older population groups whose usage behaviour has a considerable impact on the evaluation, see section 4.1.1.[29]

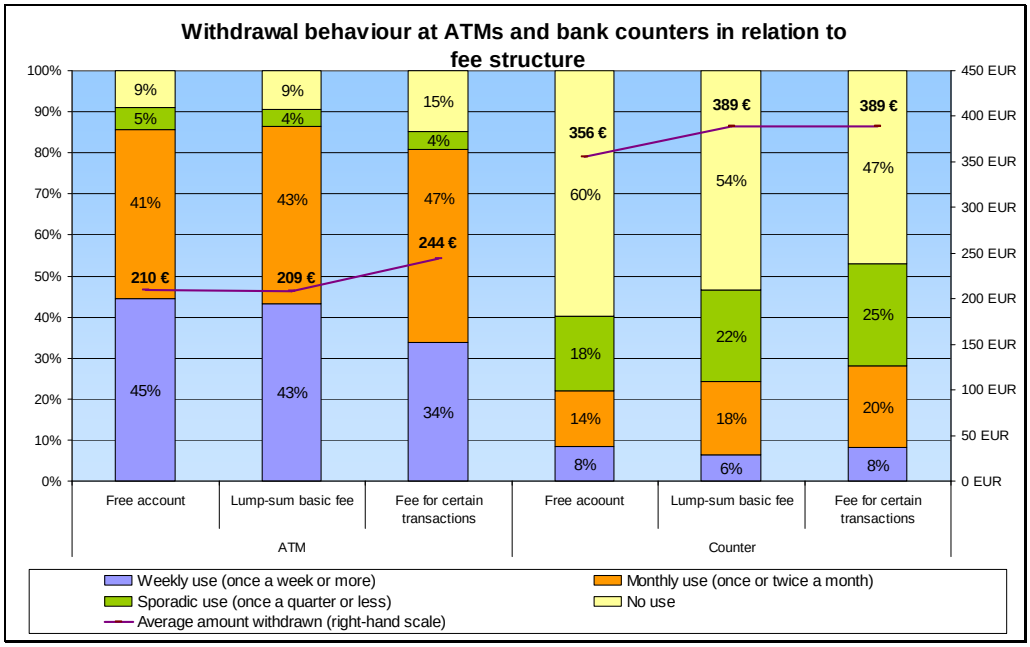


Figure 22: Withdrawal behaviour at ATMs and bank counters in relation to fee structure

[29] Young people withdraw more from ATMs and old people tend to use bank counters to withdraw money.

4.2.4 Insecurity when carrying large amounts of cash

A further question related to the feeling of insecurity and its influence on the amount of cash carried on one's person (see Figure 23).[30] The respondents were asked: when carrying cash, as of what amount do you feel unsafe? In addition to choosing between individual amounts, it was also possible to choose the general category – "Never feel unsafe, even when carrying large amounts of cash".

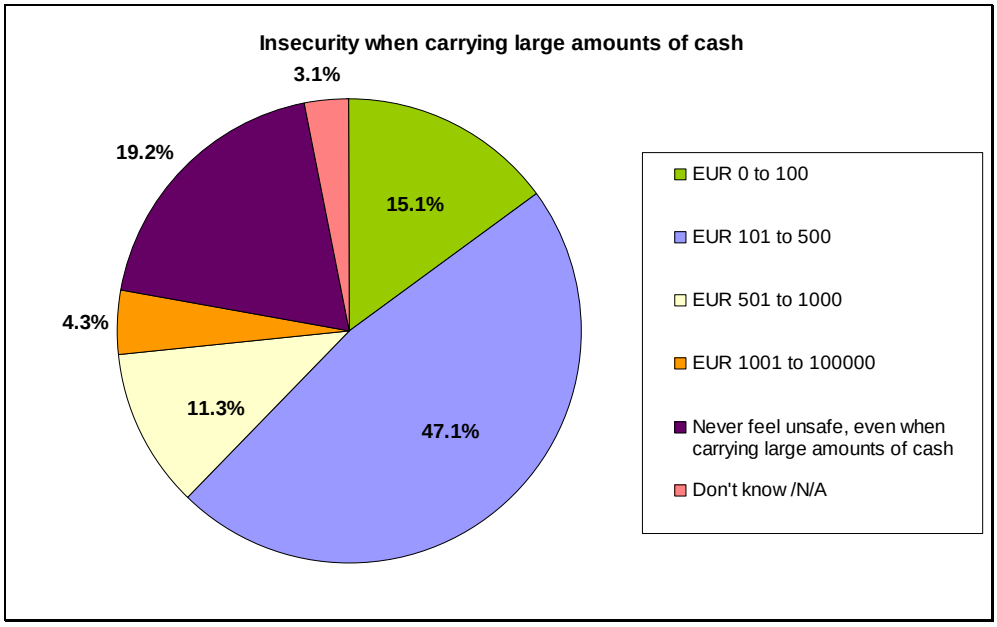


Figure 23: Insecurity when carrying large amounts of cash

If people feel unsafe when carrying large amounts of cash, they may be more likely to withdraw smaller amounts from the bank more often.[31] The withdrawal frequency at ATMs provides little information in this regard (see Figure 24). While there are only marginal differences between withdrawal frequencies in the various categories of insecurity, insecurity grows as the amount withdrawn increases, ie insecurity only increases as the amount of cash people carry increases. [32]

The effects of insecurity on withdrawal frequency from bank counters does not provide any clear-cut information on the impact on withdrawal behaviour as the differences between insecurity categories follow no general trend. In line with the trend observed for ATMs, the amount of cash withdrawn at counters increases as insecurity grows.

[30] This question aims to determine the influence of the external factor "risk of theft". The question, "When carrying money on your person, from what amount do you feel unsafe?" was deemed preferable to the direct question, "How do you assess the risk of being robbed on the street?".
[31] A more in-depth analysis of the relationship between insecurity and payment and withdrawal behaviour can be found in Kosse, A, The safety of cash and debit cards: A study on the perception and behaviour of Dutch consumers, DNB Working Paper No 245, 2010.
[32] As mentioned in the previous analytical section, socio-demographic factors also play a role in the analysis of withdrawal behaviour in relation to insecurity – older population groups (65+) use ATMs less to withdraw cash and represent 28% of the category of respondents who feel unsafe when carrying as little as EUR 100.

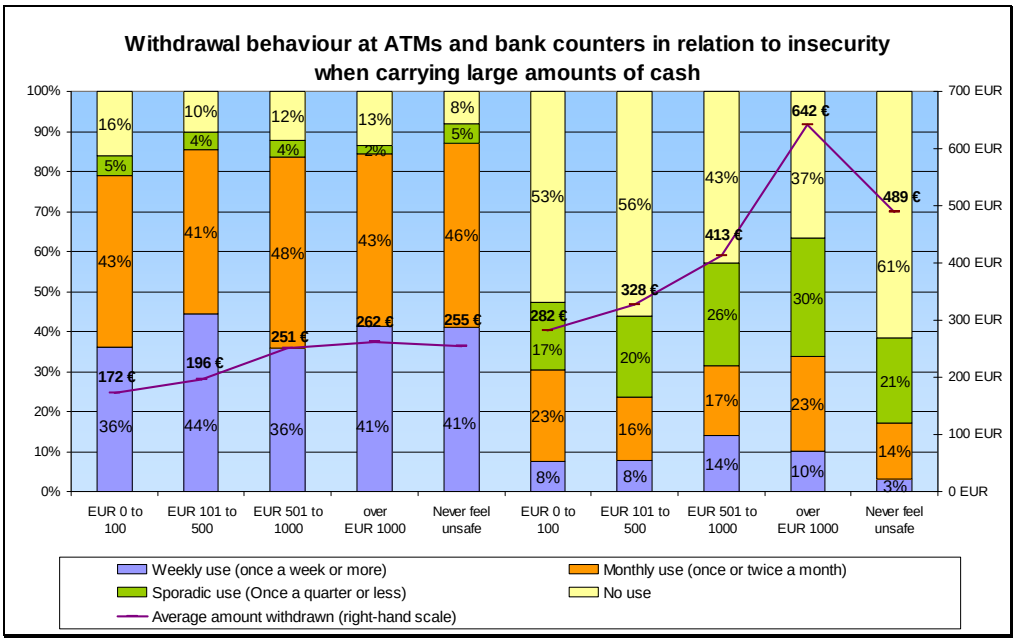


Figure 24: Withdrawal behaviour at ATMs and bank counters in relation to insecurity when carrying large amounts of cash

Overall, insecurity with regard to carrying large amounts of cash has no major impact on withdrawal frequency from ATMs and bank counters, while insecurity grows as the amounts withdrawn at both places rise.[33]

4.2.5 Amounts remaining in people's wallets

Around a third of respondents said they have between EUR 0 and EUR 10 in their wallets before their next withdrawal, the majority of 51% has between EUR 11 and EUR 50 and only 12% of respondents have more than EUR 50 in their wallets before they withdraw more cash.

The amount of cash remaining does not appear to influence withdrawal frequency. The frequency with which ATMs are used declines as the amount remaining before the next withdrawal increases, whereas withdrawal frequency at bank counters increases as cash stocks in people's wallets grow. The amounts withdrawn at both places of withdrawal go up as the amount of cash remaining rises (see Figure 25). This inconsistent result is caused by a number of factors. Insecurity influences the amount of cash remaining, ie if a person feels uncomfortable with large amounts of cash in his/her wallet, he/she retains a lower cash stock.[34] Besides, the amount of cash remaining is also influenced by socio-demographic factors.[35]

[33] It is also interesting that there are major differences between men and women when it comes to insecurity. While the majority of women feel unsafe as of amounts of EUR 500, men are disproportionately represented in the categories "more than EUR 500" and "never feel unsafe".

[34] Almost 70% of those respondents who feel unsafe with up to EUR 500 in their wallets have up to EUR 50 remaining before their next withdrawal. Only 45% of respondents with higher cash stocks in their wallets feel unsafe carrying around up to EUR 500.

[35] Young population groups are disproportionately represented in the category which holds a cash stock of less than EUR 10. They mostly withdraw cash from ATMs and, in doing so, withdraw smaller amounts. By contrast, older people tend to have larger amounts of cash remaining in their wallets.

Above all, people with higher incomes and credit card owners tend to have larger amounts of cash remaining in their wallets, ie because they have higher incomes and can spend larger amounts of cash, which has to be obtained beforehand.

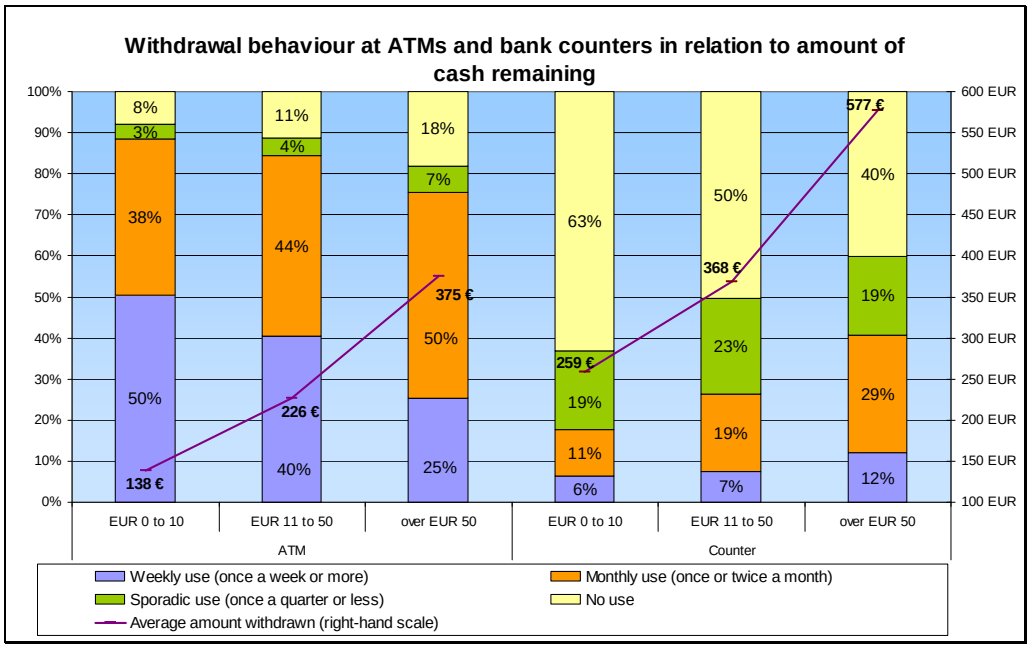


Figure 25: Withdrawal behaviour at ATMs and bank counters in relation to amount of cash remaining

On the whole, the amount of cash remaining seems to have little influence on withdrawal behaviour. Instead, it reflects a person's individual liquidity preference. If a person spends his/her money within a week and the amount held in reserve of, for example, EUR 10 is reached more quickly than in the case of someone who spends his/her money in a month, the person in question must visit the ATM or bank counter more often due to spending behaviour rather than the amount of cash remaining in his/her wallet.

4.3 Summary of withdrawal characteristics

The frequency and amount of withdrawals from bank counters and ATMs is influenced only to a limited extent by external factors. Only bank affiliation and fee structure seem to have an effect on withdrawal behaviour.

- People who hold their principal giro account at a credit institution which has a dense branch network withdraw smaller amounts from bank counters, but do so more frequently.
- Conversely, people with free bank accounts or those who pay a basic fee withdraw smaller amounts more often from ATMs. Interestingly, those who pay for each transaction visit the bank counter more frequently and withdraw comparatively large amounts.

The analysis of socio-demographics revealed that socio-demographic factors have a stronger influence on withdrawal behaviour.

- Age, in particular, has a considerable influence. Over-65s have a high propensity to use bank counters. By contrast, this group rarely or never withdraws cash from ATMs.
- Respondents with high incomes tend to withdraw the highest amounts because, although they have a low propensity to pay in cash, they spend larger amounts of cash overall. This group withdraws cash from ATMs more often than average and is represented disproportionately in the non-counter-user group.
- Furthermore, people with higher levels of education tend to withdraw cash from ATMs more, whereas those with foundation-level qualifications withdraw cash more often from counters.

All in all, the withdrawal behaviour of the population seems to be determined less by external factors and more by personal characteristics. Particularly striking is the major difference between withdrawal behaviour at bank counters and ATMs.

5 Conclusions and outlook

Socio-demographic variables have a major impact on withdrawal behaviour

Age plays a major role in this connection, exerting a significant influence on the frequency and amount of withdrawals as well as the chosen place of withdrawal. Income and level of education are also key factors: the higher the value of both variables, the higher the frequency and amount of withdrawals. Regional background also plays a role, while gender differences are minimal.

Age versus cohort effect

Since age is the key socio-demographic influence, it is important for future analyses to establish whether this is attributable to a cohort effect. In the unlikely event of an age effect, (ie when withdrawal behaviour depends on a certain age), there would presumably be no change in future behaviour. However, in the event of a cohort effect, changes in withdrawal habits would certainly be observed. These may potentially include shifts between identified clusters or the creation of new and disappearance of old clusters.

The withdrawal behaviour of the population depends only to a limited extent on external factors

Although bank affiliation and thus bank office density affects the frequency and amount of counter withdrawals, it has no discernible effect on ATM withdrawals. The fee structure of the giro account usually used also has a certain influence on withdrawal behaviour. By contrast, the amount of cash remaining before the next withdrawal, perceived insecurity when carrying large amounts of cash and distance to the nearest source of cash play only minor roles.

General market trends in payment behaviour also affect withdrawal behaviour

The amount of cash used to pay for retail purchases has been slowly but surely declining for a number of years, while the popularity of card payments is on the increase. Innovative new payment instruments, such as payment by mobile phone or finger print, also exist. At present, these have only niche status, but they could become more important in future.[36] These general trends in payment behaviour may also affect withdrawal behaviour. In the long run, the frequency of withdrawal transactions or the amount withdrawn is expected to decrease if fewer goods and services are purchased using cash.

Alternative places of withdrawal to become more important in the future

While ATMs and branches of credit institutions were the only places to withdraw cash in the past, an increasing number of alternatives are now becoming more established. Since 2008, it has been possible, under certain circumstances, to withdraw cash when paying for shopping in certain food discount stores (eg Penny and Rewe). Other companies also offer the opportu-

[36] See Deutsche Bundesbank, Payment behaviour in Germany, 2009. With regard to the potential of mobile banking using mobile phones, see Hampel, M, *Wenn das Handy zum Bankschalter wird* (When the mobile phone become the bank counter), Börsen-Zeitung, 30 September 2010, p 5.

nity to withdraw cash in cooperation with banks. For example, customers of Postbank or the Cash Group can withdraw cash free of charge from Shell petrol stations. In addition to creating greater flexibility when it comes to withdrawing cash, such partnerships also facilitate the disposal of sales revenues for the retail companies involved. As part of the Recycling Framework,[37] installing combined deposit and withdrawal ATMs (CRMs – cash recycling machines) in large shopping centres is quite conceivable. Most shopping centres already have ATMs, but these can only be used for withdrawals.

Banks influence withdrawal behaviour through their supply policy

For years, banks have been trying to automate staff-intensive cash processes in the name of process optimisation. This has mainly involved reducing counter transactions in favour of ATM transactions. As well as cash provision, ATMs can perform additional functions. They could be used to effect bank-internal services, such as transfers, or to offer bank-external services, such as ticket services for events (cross-selling). Another factor which may lead to the reduction of branch networks in the traditional sense is the consolidation potential of the German banking sector, as shown recently by the merger of Commerzbank and Dresdner Bank.

The current debate regarding fees for using other banks' ATMs shows that cash withdrawals are still a central function of banks. Banks with a dense ATM network want to protect themselves against increased use of their infrastructure, eg by direct bank customers. A sustainable solution is currently in the pipelines. Thus, it can be assumed that there will be no lasting detrimental effect on withdrawal behaviour.[38]

Overall conclusions and outlook

At present, the **ATM** is the **most important place** for withdrawing cash. **Bank counters** are used mostly by **older people**; younger people often only use counters to withdraw cash for a specific purpose. The younger the respondent, the more likely he/she is not to use counters at all anymore. Instead, he/she withdraws smaller amounts more frequently from ATMs. This **trend away from bank counters towards** regular withdrawals of smaller amounts from **ATMs or other sources** will probably continue provided the following developments persist.

- The number of credit institutions, bank branches and/or bank counters continues to decrease
- The number of ATMs continues to increase
- The attractiveness of ATMs is boosted by offering addition services
- Alternative sources of cash (supermarkets and petrol stations) are used increasingly
- The share of retail cash payments continues to decline
- The older, counter-using generation becomes more of a minority and subsequent generations retain their normal withdrawal habits at ATMs.

[37] Since 2007, private cash handlers have been able to independently process and put back into circulation banknotes in Germany in accordance with the individual agreements entered into by the banking industry and the Bundesbank.

[38] See Drost, F M/ Osman, Y: *Teuer, aber transparent* (Expensive but clear), Handelsblatt, 26 August 2010, p 30.

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Data source for Table 12 (all accessed on 12 October 2010)

- Savings bank source: http://www.dsgv.de/_download_gallery/Publikationen/DSGV_Flyer2008.pdf
- People's banks and Raiffeisen banks source: http://www.vr-networld.de/c151/default.html
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