

## Annex B

### Study on the payment attitudes of consumers in the euro area (SPACE 2024) – research methodology

#### B1 Scope and objectives

The Study on the payment attitudes of consumers in the euro area (SPACE) is a survey carried out by the ECB to investigate the payment behaviour of euro area citizens. The first SPACE survey was launched in 2019;<sup>1</sup> this is the third wave of the survey, conducted in the autumn of 2023 and the spring of 2024. The Study on the use of cash by households (SUCH) carried out by the ECB in 2016 also investigated the payment habits of consumers.<sup>2</sup> However, SUCH is only partially comparable to the SPACE surveys.<sup>3</sup>

The SPACE survey is based on a payment diary and an accompanying questionnaire (see the Survey Questionnaire in Annex A). The payment diary is split into the following modules:

- Cash holdings and withdrawals;
- Payments at the point of sale (POS), covering payments made to purchase goods or services, e.g. at supermarkets, shops for day-to-day items, restaurants, bars, petrol stations, venues for culture, sports or entertainment, as well as for services outside the home or inside or around the home;
- Payments to other persons (“person-to-person” or P2P), covering private payments between individuals which are not connected to the purchase of goods and services, e.g. charitable donations and payments such as pocket money or gifts, both in person and online;
- Online payments, covering any payments made online except regular bill payments, such as for electricity bills or rent. The term refers to the moment of payment, meaning that any orders made online but paid for at the POS (e.g. when picking up food from a restaurant or paying a courier at the door) are classified as POS payments;

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<sup>1</sup> European Central Bank (2020), “[Study on the payment attitudes of consumers in the euro area \(SPACE\)](#)”, Frankfurt am Main, December.

<sup>2</sup> Esselink, H. and Hernández, L. (2017), “[The use of cash by households in the euro area](#)”, *Occasional Paper Series*, No 201, ECB, Frankfurt am Main, November.

<sup>3</sup> The SUCH study aimed to shed light on consumers’ payment behaviour and improve the understanding of consumers’ payment choices at the POS. Unlike the SPACE studies, the SUCH survey was conducted mainly by web interview and the focus was on POS transactions rather than online payments.

- Recurring payments, covering payments consumers make regularly, such as for rent and utility bills.

The survey process consists of three parts: the recruitment interview, the recording period and the diary interview. Survey respondents were requested to report their POS, P2P and online transactions in a one-day diary. They were also asked to report any recurring payments made during the last month. In SPACE 2024, respondents were also asked questions about their payment behaviour and attitudes towards cash and other payment instruments, their behaviour as regards cash withdrawals, the perceived advantages of cash and cards, the financial products available to them, their access to the internet, etc.

The fieldwork was carried out by the market research company Ipsos Group S.A. in 18 of the 20 euro area countries (i.e. with the exception of Germany and the Netherlands).<sup>4</sup> The SPACE survey methodologies described in this document refer to data collection process in these 18 countries.

The Deutsche Bundesbank and De Nederlandsche Bank, together with the Dutch Payments Association, have carried out their own surveys on payment behaviour over a period of more than a decade. In order not to create a break in the time series, their data have been integrated where possible. The methodologies of the German and Dutch surveys are described briefly in Box 6. However, both the questionnaire and the methodologies for SPACE 2024 were designed to improve comparability with the other 18 euro area countries.

## B.2 Methodology and conduct

### B.2.1 Sample design

The sample sizes of individual countries were determined to reach a certain number of POS transactions: 2,000 for small countries, 5,000 for medium-sized countries and 10,000 for the largest. The number of consumers sampled was determined based on these targets and the average number of POS transactions reported by a sample unit in SPACE 2022.

In addition to country targets, the sample design included quotas for gender, age group and the day transactions were recorded in the payment diary, to ensure fair representation of the population and each day of the week. The breakdown of respondents by region of residence and education was monitored during the

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<sup>4</sup> The 18 euro area countries where the SPACE survey was conducted were Belgium, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Malta, Austria, Portugal, Slovenia, Slovakia and Finland.

fieldwork periods, with the aim of achieving a representative sample with regard to these variables.<sup>5</sup>

SPACE 2024 was a mixed-mode survey. Recruitment and interviews were conducted in two different modes: computer-assisted telephone interview (CATI) and computer-assisted web interview (CAWI). The sample for each country was split equally between the two.

The CATI sample was a probabilistic one, i.e. all citizens in the euro area had a non-zero probability of being selected. The sampling method was random digit dialling (RDD). The CAWI sample was drawn from a non-probabilistic frame,<sup>6</sup> i.e. Ipsos online panels.

The survey was carried out in two rounds. The first round of interviews was conducted between 26 September and 16 November 2023, and the second round between 9 April and 3 June 2024.<sup>7</sup> The rounds were spread across different months of the year to cover various periods and as far as possible avoid seasonal effects on people's payment behaviour.

The interviewing pace was as homogeneous as possible within and across countries and modes. For practical reasons, the sample share of the first survey round was set to 45%, and the share of the second round to 55%.

The number of interviews completed per wave, month and country is shown in Table 1 below.

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<sup>5</sup> The targets on educational attainment, gender, age and region were defined based on the latest Eurostat data. Characteristics monitored for quotas for the regions were at Nomenclature of Territorial Units for Statistics (NUTS) level 2 in Belgium, Austria, Greece, Spain, France, Italy, Portugal and Finland, and at the NUTS level 3 in Estonia, Ireland, Croatia, Cyprus, Latvia, Lithuania, Luxembourg, Malta, Slovenia and Slovakia. For the educational level, the International Standard Classification of Education (ISCED) was used.

<sup>6</sup> Non-probability sampling is a technique whereby the odds of any member of the public being selected for a sample cannot be calculated (e.g. owing to low response rates or unknown panel joiner probabilities).

<sup>7</sup> The Christmas holiday period during the first round was avoided because payment behaviours were expected to deviate drastically from the normal spending pattern over this period.

**Table 1**

Breakdown of sample by country, round and month (euro area 18)

Country	Round 1			Round 2			Total sample size
	September	October	November	April	May	June	
Belgium	57	938	187	717	663	0	2,562
Estonia	9	589	121	324	482	1	1,526
Ireland	18	700	206	556	563	0	2,043
Greece	12	690	290	479	599	0	2,070
Spain	89	1,502	331	1,112	1025	1	4,060
France	96	1,895	328	1,471	1285	0	5,075
Croatia	24	912	248	597	764	1	2,546
Italy	95	1,540	300	1,144	1009	0	4,088
Cyprus	29	403	47	280	277	0	1,036
Latvia	2	401	109	255	276	0	1,043
Lithuania	8	390	82	251	294	0	1,025
Luxembourg	18	422	68	304	257	0	1,069
Malta	5	386	110	197	365	0	1,063
Austria	57	889	220	750	615	0	2,531
Portugal	17	944	251	700	671	0	2,583
Slovenia	12	420	51	267	294	0	1,044
Slovakia	32	932	257	734	600	0	2,555
Finland	56	1,063	226	897	820	0	3,062
<b>Total</b>	<b>636</b>	<b>15,016</b>	<b>3,432</b>	<b>11,035</b>	<b>10,859</b>	<b>3</b>	<b>40,981</b>

A total of 41,074 respondents aged 18 or more participated in the survey and after data cleaning 40,981 interviews remained in the dataset. These respondents reported 74,880 POS payments, 2,776 P2P transactions and 27,453 online purchases (excluding Germany and the Netherlands).

## B.2.2 Data collection

### Questionnaire harmonisation and survey mode

The same questionnaire was used in all countries and translated from English into the national languages of each country by Ipsos, with the help of experts in the national central banks. Special attention was paid to ensuring that interviewees fully understood the questions and terms the way they were intended in their own language. For this reason, examples of payment methods, in particular, were adjusted to the national context.

In all countries, the survey process consisted of three parts: a recruitment interview, the recording period and the main (follow-up) interview. Data collection encompassed an average of three days per respondent. The main interview was

ideally conducted the day after the payment diary was recorded. When respondents were not available for the main interview the day after the recording period, interviewers could make an appointment to conduct the main interview on a date up to three days after the respondents were recruited. Efforts were made to improve the respondent recruitment outline for the online mode to encourage participation and limit measurement error.

The interviews were conducted both online (self-administered CAWI) and over the telephone (CATI), using a mix of mobile phones and fixed lines. The number of interviews was equally divided between CATI and CAWI in all countries, as shown in Table 2. For the SPACE 2024 survey, all respondents filled in the diary modules as well as the questionnaire, and the two interview modes were used in all waves. Table 2 shows the breakdown of the sample by mode and country in the cleaned dataset for the 18 euro area countries.

**Table 2**  
Breakdown of sample by country and mode (euro area 18)

Country	CATI	CAWI	Total
Belgium	1,182	1,380	2,562
Estonia	719	807	1,526
Ireland	924	1,119	2,043
Greece	992	1,078	2,070
Spain	1,922	2,138	4,060
France	2,319	2,756	5,075
Croatia	1,184	1,362	2,546
Italy	1,935	2,153	4,088
Cyprus	479	557	1,036
Latvia	512	531	1,043
Lithuania	480	545	1,025
Luxembourg	508	561	1,069
Malta	501	562	1,063
Austria	1,166	1,365	2,531
Portugal	1,212	1,371	2,583
Slovenia	483	561	1,044
Slovakia	1,221	1,334	2,555
Finland	1,345	1,717	3,062
<b>Total</b>	<b>19,084</b>	<b>21,897</b>	<b>40,981</b>

Note: CATI stands for computer-assisted telephone interview and CAWI for computer-assisted web interview.

In addition, the SPACE data include the samples from the German and Dutch national surveys. For Germany, the data include 5,598 respondents, of whom 4,036 filled in the payment diary. For the Netherlands, the data include 5,501 respondents for the main questionnaire and 3,732 respondents for the payment diary.

## Recruitment questionnaire

Respondents were requested to participate in the survey over the phone or by filling in an online questionnaire. In the recruitment questionnaire, the respondents provided their basic demographic information (age, gender, education, occupation, household size and region of residence). In addition, the respondents were asked to record their cash holdings, withdrawals and payments on the diary day.

## Diary data

After the diary day the respondents were contacted again by the survey company, through the same survey mode (telephone or online) as in the recruitment phase. The survey started with a mapping question asking the respondents to report (with a simple yes/no answer) whether they had withdrawn cash or made any of several types of payment on the diary day. This approach has been used since SPACE 2022 to maximise coverage of different types of payment and minimise reporting errors and recall bias.

The payment diary was split into four modules. The first consisted of questions on cash withdrawals, the second and third consisted of questions on various types of payments made during the diary period, at a POS or online (both of these including P2P payments). The pooled data on POS, P2P and online payments from the one-day payment diaries reflect the payment behaviour of the population of euro area respondents.

During the collection of diary data the respondents were also asked questions on their payment experiences over the past month with regard to the acceptance or non-acceptance of their preferred payment method; technical difficulties during any POS payments; and the authentication of online payments.

The last diary module collected information on recurring payments over a reference period covering the last 30 days. To keep the response burden manageable, the follow-up questions on the amount and frequency of recurring payments were collected only for the latest payments of each type and only for up to five different types of recurring payment. Because the recurring payments module only collected details of the last of each type of payment, it is not possible to obtain reliable total numbers or values for all recurring payments, but the survey data were analysed at the level of each type of recurring payment.

Survey participants were encouraged to report their transactions in an open and honest manner and respond to the survey even if they did not make any payments on the diary day. The report on the survey results focuses on the breakdown of payments by payment instrument and on recognising different patterns of payment behaviour by different demographic groups. With regard to the SPACE information on total consumption, it is also worth noting that all SPACE data were collected at the level of the individual, whereas other surveys on consumption, such as Eurostat's Household Budget Survey, usually collect information on household expenditure.

## Accompanying questionnaire

After reporting the diary data and the information on recurring payments the respondents were asked several questions on their payment attitudes. These collected information on, for example, their preferred payment method for paying in shops and for person-to-person payments, their ownership of payment cards, accounts and crypto-assets, their perceived access to cash and the importance of having the option to pay with cash. The full questionnaire is appended as Annex A of this report.

### Box 6

#### Payment surveys in Germany and the Netherlands

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##### Germany

The German study was conducted as a CATI survey. Over the period from 4 September to 30 November 2023, the market research company commissioned by the Deutsche Bundesbank, Forsa Gesellschaft für Sozialforschung und statistische Analyse mbH, conducted a total of 5,598 telephone interviews. Respondents were selected by applying a random sample approach using multivariate stratification based on the ADM sampling system for telephone surveys (dual-frame approach) and date of birth method. Different selection probabilities stemming from the dual-frame approach were offset through design weighting. The sample then underwent structural weighting, adjusting it to align with official statistics in terms of the age, gender, level of education and place of residence of the respondents. The random selection and subsequent weighting mean that the study is representative of the German-speaking population aged 18 and above in the Federal Republic of Germany.

Following the telephone interviews, respondents were asked to record their day-to-day payment transactions, including the location and means of payment, over a period of three days. Participants could either record their expenditure themselves in an online diary or, if this was not possible, convey the information by telephone. To ensure that all days of the week were covered as evenly as possible, respondents were randomly assigned three consecutive reporting days on which to record their transactions.

##### The Netherlands

In 2010 De Nederlandsche Bank and the Dutch Payments Association started a yearly payment diary survey to monitor cash payments at the POS in the Netherlands<sup>8</sup>. Since the end of 2013 data have been collected throughout the entire year: each day several respondents are asked to fill in a payment diary survey about their purchases during that day and answer several questions about their payment behaviour and preferences. The data are gathered on a monthly basis from around 2,000 respondents each month. The monthly group of respondents is a good representation of the Dutch population in terms of gender, age, ethnicity, education, region and income. Hence, results from the survey can be extrapolated to form a general overview of payment-related topics in the

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<sup>8</sup> For more information on the survey, see Jonker, N. et al. (2016), "From cash to cards: how debit card payments overtook cash in the Netherlands", *DNB Occasional Studies*, Vol. 16, No 1, De Nederlandsche Bank, Amsterdam.

Netherlands. Given the high level of internet usage in the Netherlands, most of the interviews were conducted using CAWI. A small share was conducted using CATI (2.5%).

To ensure that data from this study could be properly used for SPACE 2024, several changes and additions were made to the payment diary and accompanying questionnaire. Payments at the POS, online payments and recurring payments were captured during the fourth quarter of 2023.<sup>9</sup> The accompanying questionnaire was conducted in the first quarter of 2024. Background variables for all respondents were captured in both quarters. The results for respondents aged 12-18 were filtered out to match the population of interest for SPACE 2024. Answers from a total of 10,651 respondents were shared with the ECB to ensure smooth integration into the euro area analysis.

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### B.2.3 Definitions of P2P, POS and online payments

P2P payments include private payments between individuals which are not connected to the purchase of goods and services, i.e. the categories “Charity (e.g. donations, people in need)” and “Private payment to another person (e.g. family members, friends)” in variable QA6a\_x “Where or for what was the payment made”, as well as the categories “Charitable donations (e.g. church, Red Cross, crowdfunding platforms)” and “Private payment to another person (online payment)” in variable QB1\_x “What was your #th purchase on [DAY] that you paid online?”.

The online payment category “Private payment to another person” was added to the SPACE 2024 questionnaire and, to improve consistency, the category “Charitable donations” was reclassified under P2P rather than under online payments. The share of charitable donations was 1% of all online payments, so this has a negligible impact on comparability.

POS payments refer to payments that consumers pay for at physical locations, regardless of whether or not they ordered the goods online. For example, food ordered online from a restaurant but paid for either in the restaurant or to the courier delivering the food to the home are classified as POS payments.

POS payments include all the answer categories for QA6a\_x other than private payments and charitable donations, i.e.: Supermarket; Shops for day-to-day items (e.g. bakery, drugstore, pharmacy, kiosk); Street vendor or at a market (e.g. newspaper stand, florist, lottery, flea market, second hand purchases); Shop selling durable goods (e.g. clothing, toys, electronics, household appliances, furniture); At the petrol station; Restaurant, bar, café; Hotel or similar (e.g. B&B, vacation apartment); A venue for culture, sports or entertainment (e.g. museum, swimming pool, amusement park, cinema, theatre); Vending or ticketing machine (e.g. for coffee, snacks, cigarettes, parking fees, transportation tickets); Services outside the home (e.g. hairdresser, dry cleaning, car maintenance, doctor, taxi, transport ticket if not bought at a machine); Services inside or around the home (e.g. cleaning, babysitting, home repairs); Office of a public authority or post office (e.g. for getting a

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<sup>9</sup> For the full 2023 study, see De Nederlandsche Bank and the Dutch Payments Association (2024), “Point of sale payments in 2023”, Amsterdam.



new passport/ID/licence plate, taxes); Other physical location (e.g. payment at the bank counter or banking terminal); and Pick-up station (e.g. goods ordered online). The Pick-up station category was added to the SPACE 2024 questionnaire and additional examples were added to some other categories.

Online payments refer to payments that consumers pay remotely, i.e. not when purchasing a good or service at a physical location. These include all other categories for QB1\_x other than charitable donations and payments to private persons, i.e. Clothes, sportswear and/or accessories; Electronic goods or household appliances (e.g. laptop, washing machine); Meals and beverages deliveries from a restaurant; Groceries and daily supplies (e.g. supermarket delivery); Medicine, cosmetics and drugstore products; Media, games or entertainment (e.g. books, games, music, toys, movies, lottery, gambling); Travel and accommodation; Furniture and other household items (e.g. decoration for the house); Tickets for events and attractions (e.g. concerts, theme parks, cinema); Luxury goods (e.g. jewellery, art, high-fashion); Financial products (e.g. insurance, investment, crypto-assets); Household related services (e.g. repairs, home renovation, car services); and other online payments. Restaurant deliveries was introduced as a new category, whereas in previous SPACE survey waves it had been included as part of food and daily supplies.

#### B.2.4 Definition of instant payments

Instant payments are credit transfers whereby the funds transferred reach the beneficiary a few seconds after they are sent at any time, day or night, on any day of the year. To send an instant payment, the payer specifies in a payment order the account from which the money should be sent and the account to which it should be sent. Importantly, those accounts do not have to be held with the same institution, or even in the same country.

Payments within the same institution, so called “on us” payments, are not considered to be instant payments, irrespective of whether the institution is a local bank or a large multinational payment institution operating a closed-loop system. Card payments are also not classified as instant payments, even though they may be accepted by a beneficiary holding an account with a different payment service provider from that of the payer. In this latter case, the funds are not transferred to the beneficiary when the payment is authorised, but some time later.

#### B.2.5 Changes in consumer prices

The SPACE 2024 report focuses on structural information on consumers' payment behaviour at various points in time. With regard to structural information on, for example, payments by means of payment instruments, the data have not been adjusted for inflation. The reason for this is that cross-country differences in developments in the consumer price index (CPI) would distort the structural data from previous survey years. However, to compare average values of payments

between 2024 and other years using the data from previous SPACE studies, developments in the CPI between 2016 and 2024 should be taken into account.

### B.2.6 Most significant changes in the 2024 questionnaire

The following questions were removed from the SPACE 2024 questionnaire: cash withdrawal for a third time; amount of cash put aside from the wallet, purse or pockets; recurring payments made on behalf of whom; fees for instant payments; and three questions on the impact of COVID-19 on payment behaviour.

The following questions were added to the SPACE 2024 questionnaire: experiences with payment acceptance over the past month; experiences of technical difficulties with payments over the past month; authentication difficulties with online payments; preferred authentication method for online payments; journey to make a withdrawal; reactions to ATM fees; reasons for not using cashback/cash-in-shop; preferred payment method for P2P payments; online banking assistance; privacy concerns with regard to digital payments; and factors that would convince someone to try a new payment solution.

The categories for mobile phone and online payments were revised for SPACE 2024, given the rapidly developing payment solutions market. In the recurring payments module, rents and mortgages were introduced as separate items, transport tickets were removed and school, childcare and tuition bills were introduced as a new item. Crypto-asset ownership was introduced as a separate question, whereas in previous SPACE survey waves the question about crypto-asset ownership had been asked in the context of payment card and account ownership.

### B.2.7 Data validation

Fieldwork progress was monitored continuously in terms of quotas across all survey modes and in all countries. At the end of the fieldwork for each wave, responses were checked for completeness, consistency and plausibility on the basis of multiple criteria, including but not limited to sociodemographic information, outliers, contradictory and unusual answers, balance in the diary part, payment instrument ownership and consistency between respondent characteristics and the payments made. Based on a predefined set of rules, inconsistent results were marked with a flag. These indicated the individual case, marked the rule that had been violated and provided a basis for further data cleaning and identification of outliers. For each respondent, a number of flag variables were created to indicate whether or not the rule in each logical check had been violated. A total of 93 interviews were subsequently removed from the dataset, which represents 0.2% of the total number of interviews.

Alongside the detection of inconsistent answers, outlier detection was applied for some variables. The outlying payment values detected (as described in the previous sub-section) were then imputed, along with data points missing owing to non-

response. Imputation was done using the k-nearest neighbours (KNN) method. This imputes missing values by estimation (usually by computing a weighted average based on the values from the k-nearest neighbours, as measured by distance).

Finally, the overall aggregates calculated from the answers were compared with the results from SPACE 2022.

## B.2.8 Weighting

All results presented from the SPACE survey are based on weighted data. All survey data need to be weighted to minimise the observable bias of survey estimates and enable solid inferences to be made about the sample based on the demographic characteristics of each country.

SPACE is a mixed-mode survey including both telephone (CATI) and online (CAWI) samples. These features of the sampling design need to be considered in weighting the SPACE data. The weighting process for the data for the 18 euro area countries, excluding Germany and the Netherlands, involves the following steps.

In the first step, design weights were applied to the CATI sample to adjust for unequal selection probabilities arising from differences in phone ownership (mobile phone only, landline only, dual user). Each respondent's design weight was calculated as the inverse of their probability of selection in the dual-frame telephone recruitment.

After the calculation of CATI design weights both samples were calibrated to known population targets with regard to gender\*age, education, occupation, household size and region.

The calibrated CATI and CAWI samples were then compared in terms of various survey variables in order to select additional variables that could be used to recalibrate the CAWI sample to make it more comparable to the CATI sample, which is considered to be the primary data source for this survey. The variables that were retained were QQ9 (Keeps a cash reserve), QA1 (Amount of cash at the beginning of the day) and urbanity based on the municipality of the respondent).

In the following step, the CAWI sample was recalibrated by applying the additional calibration variables and the original socio-demographic variables in all countries except for Malta and Luxembourg where no significant difference was observed for the additional variables.

In the fifth step, the CATI and CAWI samples were blended in proportion to their resulting weighting efficiency. In this step, the calibrated weights were multiplied by their efficiencies and the resulting combined weight was then rescaled so that the average weight was equal to 1. This blending approach is based on the Kish proposal for blending samples, given that weighting efficiency generally reflects the differential sample designs and the differential non-coverage and non-response biases across samples.

In the final step, a weight variable was created that projects the individual weight to the population of each country. These weights make it possible to produce estimations for the entire euro area and to extrapolate sample total values to population total values.

## References

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