

Annex B

Study on the payment attitudes of consumers in the euro area (SPACE 2022) – research methodology

B1 Scope and objectives

The Study on 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;¹ this is the second wave of the survey, conducted in the autumn of 2021 and the spring of 2022. The Study on the use of cash by households (SUCH) carried out by the ECB in 2016 also investigated the payment habits of consumers.² However, SUCH is only partially comparable to the SPACE surveys.³

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

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;

Online payments, covering any payments made online except regular bill payments such as electricity bills or rent. The term refers to the moment of payment, meaning that any orders made online but paid at the POS (e.g. when picking up food from a restaurant or paying a courier at the door) are classified as POS payments;

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

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

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

³ 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.

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 30 days. In SPACE 2022 respondents were further asked questions about their behaviour and attitudes towards cash and other payment instruments, financial products available to them, access to the internet and certain effects of the coronavirus (COVID-19) pandemic.

The fieldwork was carried out by the market research company Kantar Public in 17 of the 19 euro area countries (i.e. with the exception of Germany and the Netherlands).⁴ The SPACE survey methodologies described in this document refer to data collection in these 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 methodology of the German and Dutch surveys are described briefly in Box 1. However, both the questionnaire and the methodologies for SPACE 2022 were designed to improve comparability with the other 17 euro area countries.

B.2 Methodology and conduct

B.2.1 Sample design

The sample sizes of individual countries were determined so as to reach certain numbers of POS transactions; 2,000 for small countries, 4,000 for medium-sized ones and 8,000 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 2019.

In addition to country targets, the sample design included quotas for gender, age group and the day transactions are 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 fieldwork periods, with the aim of achieving a representative sample with regard to these variables.⁵

⁴ The 17 euro area countries where the SPACE survey was conducted were Belgium, Estonia, Ireland, Greece, Spain, France, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Malta, Austria, Portugal, Slovenia, Slovakia and Finland

⁵ 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 NUTS2 level in Belgium, Austria, Greece, Spain, France, Italy, Portugal and Finland, and at the NUT3 level in Estonia, Ireland, Cyprus, Latvia, Lithuania, Luxembourg, Malta, Slovenia and Slovakia. For the education level, the International Standard Classification of Education (ISCED) was used.

SPACE 2022 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,⁶ i.e. Kantar Public online panels; the exception was Malta, where due to the absence of online panels, online respondents too were recruited through a push-to-web design using an RDD sample.

The survey was carried out in two rounds. The first round of interviews were conducted between 2 October and 7 December 2021, and the second round between 17 March and 9 June 2022.⁷ 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 40%, and the share of the second round to 60%.

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

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

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

Table 1

Breakdown of sample by country, round and month (euro area 17)

Country	Round 1			Round 2				Total sample size
	October	November	December	March	April	May	June	
Belgium	376	835	0	592	978	194	0	2,975
Estonia	233	376	0	281	560	56	0	1,506
Ireland	303	421	9	330	793	81	0	1,937
Greece	151	581	1	341	356	413	26	1,869
Spain	642	1,171	4	1,023	1,399	253	0	4,492
France	815	1,635	77	876	2,125	537	13	6,078
Italy	618	1,150	30	842	1,604	239	0	4,483
Cyprus	0	402	0	241	373	0	0	1,016
Latvia	131	256	0	242	313	46	0	988
Lithuania	227	372	0	308	572	19	0	1,498
Luxembourg	128	282	0	150	386	60	0	1,006
Malta	226	163	6	266	238	95	0	994
Austria	332	661	9	438	704	343	0	2,487
Portugal	282	486	0	417	636	167	0	1,988
Slovenia	149	231	2	187	343	78	0	990
Slovakia	288	600	2	452	845	235	13	2,435
Finland	120	1,002	77	664	839	301	21	3,024
Total	5,021	10,624	217	7,650	13,064	3,117	73	39,766

A total of 40,269 respondents aged 18 or more participated in the survey and after data cleaning 39,766 interviews remained in the dataset. These respondents reported 68,023 POS and P2P transactions, 7,371 online purchases and 43,659 bill payments (excluding Germany and the Netherlands).

B.2.2 Data collection

The same questionnaire was used in all countries and translated from English into the national languages of each country by Kantar Public, 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 for a date up to two days after they were recruited. Efforts were made to improve the outline of

recruitment 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 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 2022 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 17 euro area countries.⁸

Table 2
Breakdown of sample by country and mode (euro area 17)

Country	CATI	CAWI	Total
Belgium	1,496	1,479	2,975
Estonia	749	757	1,506
Ireland	1,026	911	1,937
Greece	1,010	859	1,869
Spain	2,247	2,243	4,492
France	2,996	3,081	6,078
Italy	2,249	2,234	4,483
Cyprus	509	507	1,016
Latvia	504	484	988
Lithuania	749	749	1,498
Luxembourg	498	508	1,006
Malta	501	493	994
Austria	1,249	1,238	2,487
Portugal	1,015	973	1,988
Slovenia	507	483	990
Slovakia	1,251	1,184	2,435
Finland	1,529	1,495	3,024
Total	20,085	19,678	39,766

In addition, the SPACE data include the samples from the German and Dutch national surveys. For Germany the data include 5,870 respondents, of which 4,197 filled in the payment diary. For the Netherlands the data include 5,458 respondents for the main questionnaire and 5,283 respondents for the payment diary.

⁸ Two interviews in Spain and one in France were done using a mobile application made available for respondents recruited through the online mode who opted for it. The totals for France and Spain include these.

B.2.3 Diary data

The payment diary was split into six modules. The first five of these consisted of questions on the amount of cash available to respondents and various types of payments they made. The pooled data on POS, P2P and online payments from the one-day payment diaries represent the payment behaviour of the population of euro area respondents. 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 during the diary day. The report on the survey results focuses on the breakdown of payments by payment instrument and recognising different patterns of payment behaviour by different demographic groups. The survey data also make it possible to estimate annual usage by multiplying the individual weighted diary data by the number of days in the year.

Information on recurring payments was collected for a reference period covering the last 30 days. The module started with a screening question, in which respondents were asked whether they had made any of the following types of recurring payments: rent or mortgage, utility bills, insurance, telephone or internet bills, taxes and public charges, subscriptions, public transport tickets or loans. Because of large differences between the way data were collected on bill payments in SPACE 2019 and recurring payments in SPACE 2022, comparison between the two data sets is not possible.⁹

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 and only for up to five different types of recurring payment. When calculating the shares of payment instruments used for each type of payment, the following adjustments were made:

The value and number of weekly payments were multiplied by four to get the monthly amount and number;

Information on payments that were made less frequently than on a monthly basis were taken as representative of the entire year, so no adjustments were made to these;

Information on payments that were filtered out (the sixth, seventh and eighth payments of each respondent) were assumed to have identical properties to those for which details were collected. Since payments are filtered out randomly, this is a feasible assumption.

Because the module only collected details on 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. More detailed data collection would enable a more comprehensive analysis on the entire consumption basket of respondents, but the aim of the SPACE survey is to collect information on the use of various payment instruments rather than replicate the

⁹ SPACE 2019 reported any bill payments made in the last seven days. SPACE 2022 collected recurring payments made in the last 30 days, split into eight categories.

Household Budget Survey (HBS) in collecting the full consumption basket of households. When comparing the SPACE information on total consumption it is also worth noticing that while HBS collects information on household expenditure, all SPACE data were collected at the individual level.

Box 1

Box - Payment surveys in Germany and the Netherlands

Germany

The German study was conducted as a CATI survey. Over the period from 8 September to 5 December 2021, the market research institute forsa, commissioned by the Bundesbank, conducted a total of 5,870 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 birthday 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 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 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 throughout 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.¹⁰ Since the end of 2013, data has 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, accompanied by several questions concerning their payment behaviour and preferences. Data are gathered on a monthly basis, with up to 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. This is why results from the survey can be extrapolated to form a general view on payment-related topics in the Netherlands. Given the high internet usage in the Netherlands, most of the interviews were conducted using CAWI. A small share was conducted using CATI.

To ensure that data from this study could be properly used for SPACE 2019, 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 2021.¹¹ The

¹⁰ For more information on the survey, see Jonker, N. et al. (2018), "[From cash to cards: how debit card payments overtook cash in the Netherlands](#)", DNB Occasional Studies, Vol. 16, No 1, De Nederlandsche Bank, Amsterdam.

¹¹ For the full study, see De Nederlandsche Bank and the Dutch Payments Association (2022), "[Point-of-sale payments in 2021](#)", Amsterdam.

accompanying questionnaire was conducted in the first quarter of 2022. Background variables of all respondents were captured in both quarters. Results of respondents aged 12-18 were filtered out to match the population of interest for SPACE 2019. Answers from a total of 10,811 respondents were shared with the ECB to ensure smooth integration into the analysis.

B.2.4 Differences to the SPACE 2019 report

The report on SPACE 2022 contains several comparisons to data from SPACE 2019. To ensure comparability, some modifications have been made to the SPACE 2019 data to adjust for inflation and changes to one of the main definitions and categories. Several new questions and answer options were included in the 2022 questionnaire, which are explained below. In addition, the definitions of POS, P2P and online payments were modified slightly between the two survey waves.

B.2.4.1 Inflation adjustment

Any analyses of time series data should use values in real terms. While the SPACE report mainly focuses on the breakdown of payments by instrument and demographic characteristics, some references may be made to the values of transactions. The common practice for such indicators is to show the data from earlier reference periods in current values using a price adjustment factor.

The variables concerned

Inflation adjustments have been made to all variables collected in euro amounts and as point values. Adjustments are not feasible for values collected in ranges. Constructing inflation-adjusted ranges of income, for example, would lead to overlapping categories for the 2019 data when compared to 2022 data.

The variables that have been adjusted are: the amount of cash at the beginning of the day; cash added during the day; the amount of cash put aside; POS, P2P and online payments.

Inflation adjustment is most relevant when comparing average payments or payments by value range. It has no impact on the country-level figures on the breakdown of payments, and very limited impact on the euro area-level figures on the breakdown of the value of payments.

The adjustment factor used

In comparisons between SPACE 2019 and SPACE 2022, the 2019 data are expressed in 2022 prices. The adjustments were made separately for each country,

using only one adjustment factor per country for the entire survey wave. The adjustment was based on the consumer price index from the median interview months, i.e. September 2019 and March 2022. These are the months during which 50% of the interviews of the corresponding survey wave were completed.

Each observation for the above variables in the 2019 data was multiplied by CPI_{2019}/CPI_{2022} , where CPI_{2019} (CPI_{2022}) is the harmonised consumer price index for September 2019 (March 2022). The adjustment factors applied are shown below.

Table 3
The adjustment factors by country

Country	HICP 09/2019	HICP 03/2022	Adjustment factor
BE	107.70	120.28	0.895
DE	106.20	116.10	0.915
EE	111.70	127.31	0.877
IE	102.00	109.30	0.933
GR	103.30	108.43	0.953
ES	104.28	115.51	0.903
FR	105.28	112.26	0.938
IT	103.70	111.30	0.932
CY	101.65	106.13	0.958
LV	108.91	122.24	0.891
LT	110.02	129.93	0.847
LU	106.50	117.22	0.909
MT	108.44	108.46	1.000
NL	106.16	120.70	0.880
AT	107.42	118.00	0.910
PT	104.76	109.49	0.957
SI	105.64	111.30	0.949
SK	106.97	120.43	0.888
FI	103.83	111.54	0.931

Impact on cross-sectional results

The price level adjustment has changed some of the cross-sectional indicators from 2019, due to different price index multipliers being used for different countries. The revisions concern indicators at the euro area level only; all country-level indicators remain the same. The impact of inflation adjustment on the main indicators from 2019 (breakdown of POS and online payments by payment instrument) is minor, amounting to not more than 0.1% points.

B.2.4.2 Definitions of POS, P2P and online payments

Definition of POS and P2P payments

Person-to-person payments include private payments between individuals which are not connected to the purchase of goods and services, e.g. 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”. In SPACE 2019, P2P payments also included some payments usually made in person, specifically the category “Services inside or around the home (e.g. cleaning, babysitting, home repairs)”. To distinguish between payments for purchases of goods and services and other payments, this category is classified as POS in SPACE 2022 and the 2019 data has been adjusted accordingly.

In the SPACE 2022 report, POS payments include the following answer categories for QA6a_x: Supermarket; Shops for day-to-day items (e.g. bakery, drugstore, pharmacy, kiosk); Street vendor or at a market (e.g. newspaper stand, florist); 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); 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 new passport/ ID/ licence plate); Other physical location (e.g. payment at the bank counter or banking terminal).

Definition of online payments

For SPACE 2022 the wording of the question on remote/online payments and the answer categories for the instrument used were changed compared to the 2019 survey. In 2019, telephone and mail order payments were classified as remote/online payments and explicitly mentioned in the question. In 2022 the question was limited to non-recurring online payments only and the answer options “Cash” and “Bank cheque” were excluded. The question wording in 2022 was: “Please report any online payments you personally made on [diary day]. Please exclude any regular recurring payments such as rent, telephone or utility bills or subscriptions (streaming services, newspapers, etc)”.

To make the 2019 data comparable with SPACE 2022, all responses for online payments using cash or bank cheques have been re-classified as POS payments. In the 2019 data cash and bank cheque payments accounted for 5% of online payments by number and for 4% by value. After adjustment, the number of POS payments in the 2019 data increased by 0.5% and their value by 1%.

B.2.4.3 Most significant changes to the 2022 questionnaire

In the analyses on cash withdrawals, a new answer option was included to try to distinguish cashback (cash withdrawn in a shop when making a purchase for goods or services) from cash-in-shop (cash withdrawn in a shop when NOT purchasing goods or services), as these are different concepts. This information has brought additional insights into what the general public know about these different methods to access cash, and how they use them.

For payment instruments at the POS, the following changes were introduced: the options “Debit card” and “Credit card” were merged into “Card (e.g. debit card, credit card or prepaid card)”. An option “Loyalty points, vouchers and gift cards (e.g. Amazon or iTunes gift card)” was added and the option “Direct debit” was removed.

Recurring bill payments are often paid by consumers on a monthly basis. To get a more comprehensive picture of recurring payments made in euro area countries, the questions were modified to obtain a full month of information, not just the last seven-day reference period used in SPACE 2019.

In SPACE 2019, the answers to the question on the importance of having the option to use cash for payments were ranked from 1-10; in the SPACE 2022 questionnaire the answers were amended to a four-step scale from “Very important” to “Not important at all”.

B.2.4.4 New questions added to the SPACE 2022 questionnaire

To obtain further information on the development of new payment technologies and how these are accessed, accepted and perceived by euro area citizens, new questions were added on the use of crypto assets and access to instant payments.

A detailed set of questions related to the most important advantages of cash and card payment methods were also included in the SPACE 2022 questionnaire. This allows a better understanding of the attributes users value in each of these types of payment. The information will also enable better insight into respondents’ attitudes to payment choices.

B.2.5 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 was violated and

provided a basis for further data cleaning and identification of outliers. For each respondent, 54 variables (flags) were computed to indicate whether the rule in each logical check was violated or not. A total of 504 interviews were subsequently removed from the dataset, which represents 1.2% of the total number of interviews; most of these came from CAWI fieldwork.

Along with 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 the data points missing due 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 2019.

B.2.6 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.

The weighting process involved three steps. First, the net sample of offline respondents was weighted using known population benchmarks for gender within age bands, educational attainment, employment, household size, region and internet access. The probability-based telephone sample was the primary source for weighting, as it best represents the target population.¹²

Second, the online sample was matched to the weighted probabilistic sample of respondents with internet access using a selection of balancing variables. These included the sociodemographic information used in the first step, as well as a selection of non-demographic topic-specific questions where significant differences between the (weighted) offline and online samples were observed. Third, the online and offline responders were combined before weighting the combined dataset to the same population benchmarks.

This weighting procedure reduced the differences observed in key outcomes of the online and telephone samples (the incidence, number and amount of cash and non-cash payments), but did not eradicate them completely. Many of the remaining differences between the samples are likely to be attributable to modal differences relating to the presence of an interviewer (virtual versus oral experience). It is likely that some differences still relate to unobserved differences in the sample profiles.

¹² This applies to the 16 countries (excluding Malta) where two separate sample designs (CAWI and CATI) were used.

References

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