



EUROPEAN CENTRAL BANK

EUROSYSTEM

ECB Consumer Expectations Survey

Methodological information on the
survey

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1 Introduction

This document presents a brief overview of the general methodological features of the ECB Consumer Expectations Survey (CES). The CES is an online panel survey of consumers which is carried out on a monthly basis.

The microdata for the CES are collected through a survey of a panel of euro area consumers, which is currently conducted by IPSOS Public Affairs on behalf of the European Central Bank (ECB). The countries included since the beginning of the survey are Belgium, Germany, Spain, France, Italy and the Netherlands.

This overview complements the CES evaluation report, which is available on the [ECB's website](#).¹ It provides more information on the background to the survey, methodological aspects and data collection, as well as an assessment of the results of the pilot phase (January 2020 to June 2021).

¹ For further details please see “ECB Consumer Expectations Survey: an overview and first evaluation”, Occasional Papers, No 287, ECB, December 2021.

2 Target population, sampling and sample structure

2.1 Target population and sample size

The target population of the CES is the entire adult population, aged 18 and above, residing in the countries included in the CES sample. The sample aims to be representative by age, gender and region. While respondents can be aged 70 or above, the requirements for sample representativeness have initially been set to include only the 18-70 age range, given the difficulty of recruiting panel members aged 70+ for the sample. The recruitment process effectively screens out respondents who do not use the internet. The survey comprises two main samples: a probability sample, which in principal should be representative of the target population, and a non-probability sample drawing on existing online panels of survey respondents.

Initially, until June 2021, the target sample size of the survey was 10,000 monthly respondents. This original sample size consisted of 2,000 respondents from each of Germany, Spain, France and Italy, and comprised 1,500 respondents in the probability samples and 500 in the non-probability samples. For Belgium and the Netherlands, the sample was non-probabilistic in its entirety, with target sample sizes of 1,000 respondents for each country.

From July 2021 the sample size was gradually increased, the aim being to reach a target of 14,000 respondents by September 2021. This was achieved by increasing the sample size of the non-probability samples in Germany, Spain, France and Italy from 500 to 1,500 respondents. The overall sample size in these countries therefore increased from 2,000 to 3,000.

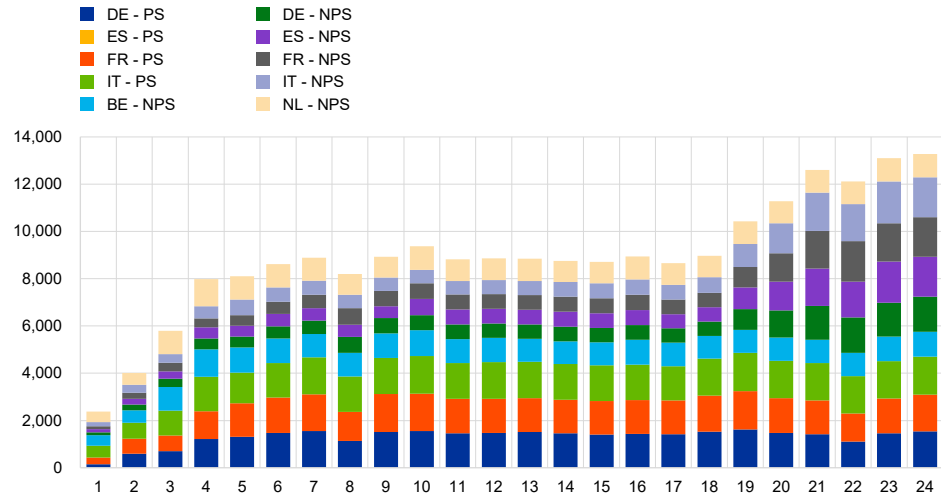
During 2022, Ireland, Greece, Austria, Portugal and Finland have been added to the non-probability sample on a pilot basis, with a target sample size of 1,000 respondents for each country.

Chart 1 shows the change of the unweighted sample size in the first two years of the survey, from wave 1 (January 2020) to wave 24 (December 2021). After the panel build-up phase, the target sample size of 10,000 was reached in June 2020. The new target sample size of 14,000 respondents was reached in September 2021, after the panel build-up phase which started in July 2021.

Chart 1

CES sample size by country and sampling type: waves 1 to 24 (January 2020 to December 2021)

(y-axis: sample size, x-axis: CES wave)



Notes: The sample size was gradually expanded from 10,000 to 14,000 over waves 19-21. PS stands for probability sample and NPS for non-probability sample.

2.2 Sample structure and sampling design

The sampling design is a combination of two methodologies: 1) random probability sampling, where all individuals belonging to the target population have a non-zero and known probability of being selected, and 2) non-probability sampling, where only a specific subset of individuals belonging to the target population has a non-zero probability of being selected. Using the two sampling methodologies allows us to control for sampling design effects, which are described in more detail in the CES evaluation report.

The recruitment process uses a dual-frame method that consists of a mix of fixed line and mobile telephone numbers. Both the fixed line and the mobile sampling frames make use of random digit dialling (RDD), a method that generates telephone numbers at random. The sampling procedure takes the overlap between mobile and fixed line ownership into account. In defining the share of the mobile sample, all potential respondents who can be reached on a mobile line are included (regardless of whether they can also be reached on a fixed line). The same logic applies for the fixed line sample.

In the fixed line sample, the alternating birthday rule is used to select the respondent: if a fixed number is dialled, the computer-assisted telephone interviewing (CATI) interviewer will ask to speak with the person who last had, or will next have, their birthday. For mobile numbers no birthday rule applies – the interview starts immediately with the person who answers the call.

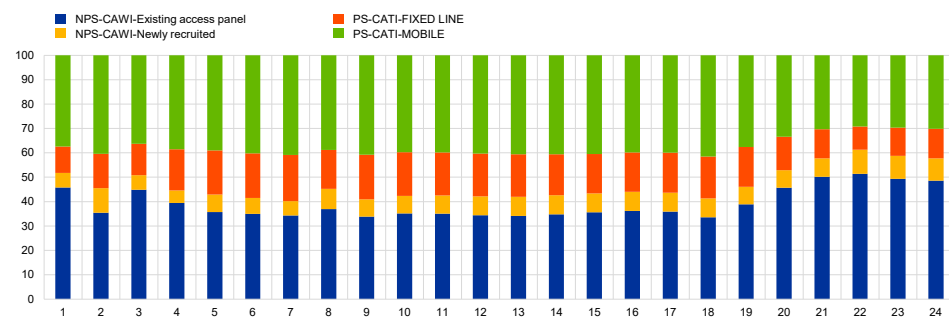
Non-probability sampling recruitment and data collection is entirely internet based. This type of sample is drawn mostly from existing online access panels, although it also includes freshly recruited respondents who have less experience in taking surveys. Quotas are applied in the non-probability component of the CES panel for age, gender and region.

Chart 2 shows the composition of the core monthly module² respondents in the first two years of the CES, for the four recruitment sources described above.

Chart 2

CES sample composition by recruitment source: monthly core modules, waves 1 to 24 (January 2020 to December 2021)

(y-axis: percentage of the total completed responses in the core module, x-axis: CES wave)



Notes: The sample was gradually expanded from 10,000 to 14,000 over waves 19-21 by increasing the non-probability sample sizes in the four largest countries from 500 to 1,500. All observations available until wave 24 are included, meaning that in the last wave the data include the build-up phase for the new countries. PS stands for probability sample and NPS stands for non-probability sample. CAWI stands for computer-assisted web interviewing and CATI stands for computer-assisted telephone interviewing.

For the probability samples, the recruitment response rates recorded in this first phase do not deviate significantly from those generally observed in RDD surveys in both Europe and the United States (Hansen and Pedersen, 2012³; Yeager et al., 2011⁴). For more information on survey participation and unit non-response, please see Section 2.1.2 of the CES evaluation report. The total number of CES recruits amounted to around 72,000 individuals as of December 2021. Around 54% of these (38,624) had completed the background interview and were considered eligible panellists for the regular monthly and quarterly modules.

The CES sample is a panel on which the same consumers respond to the survey over multiple rounds. The vast majority of panel members, irrespective of the sampling method used, normally complete their first monthly module in the same round as the background survey. Only a few panel members remain inactive for one or more rounds before their first complete participation. To help limit the impact of conditioning and sample selectivity effects on the quality of CES data over time, the CES is set up as a rotating panel so that panel members who exit the survey normally are replaced by new members. A panel rotation is currently being

² More details on the core monthly module can be found in Section 3 of this document.

³ Hansen, K., M. and Pedersen, R., T., "Efficiency of Different Recruitment Strategies for Web Panels", *International Journal of Public Opinion Research*, Vol. 24, Issue 2, Summer 2012, pp. 238-249.

⁴ Yeager, D., Krosnick J., Chang L., Javitz, H., Levindusky, M., Simpser, A. and Wang, R., "Comparing the Accuracy of RDD Telephone Surveys and Internet Surveys Conducted with Probability and Non-Probability Samples", *The Public Opinion Quarterly*, Vol. 75, No 4, Winter 2011, pp. 709-747.

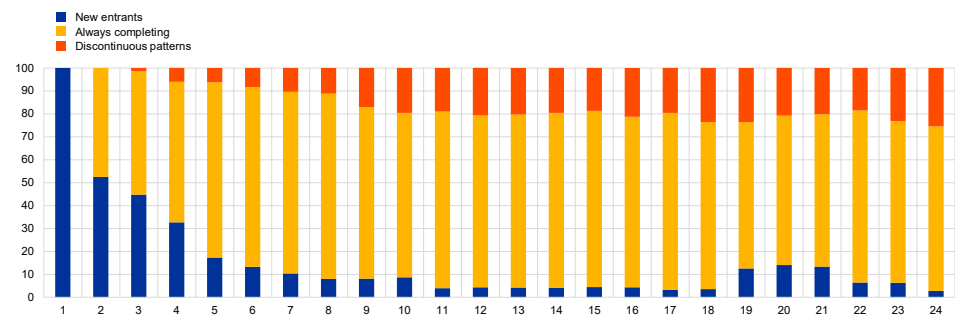
implemented in a gradual manner for respondents who have completed at least 24 waves of the survey.

The CES's panel retention has proven effective as most panel members always complete their monthly survey tasks (Chart 3). Activity rates are also high for panel members who exhibit discontinuous patterns, with most of them having missed only one or two rounds. All in all, after the initial sample building phase the share of new entrants in each wave was around 5-10%.

Chart 3

CES sample composition by respondent tenure: waves 1 to 24 (January 2020 to December 2021)

(percentages)



Notes: Patterns of responses are calculated based on complete core modules. All observations available until wave 24 are included.

The CES faces a number of challenges in ensuring the overall representativeness of the data. Although internet penetration is increasing rapidly in most EU countries, there are still differences in internet access and usage across countries, including by age group and educational level. As reported in the CES evaluation report, the CES's sample composition – in respect of its main socio-demographic characteristics – has been compared with appropriate external benchmarks, to assess sample representativeness. The results show that the CES compares well with euro area benchmarks relating to employment status, housing tenure and household size. However, they also show that the elderly population (particularly individuals aged 71 and over) is currently under-represented in the final survey results. The share of the less well educated is also under-represented, a feature which reflects the difficulty encountered in recruiting such participants online and also, potentially, the CES's focus on economic and financial topics. As the following paragraphs make clear, these limitations in the raw data could be partially addressed through a re-weighting of the survey results.

3 Questionnaires and survey structure

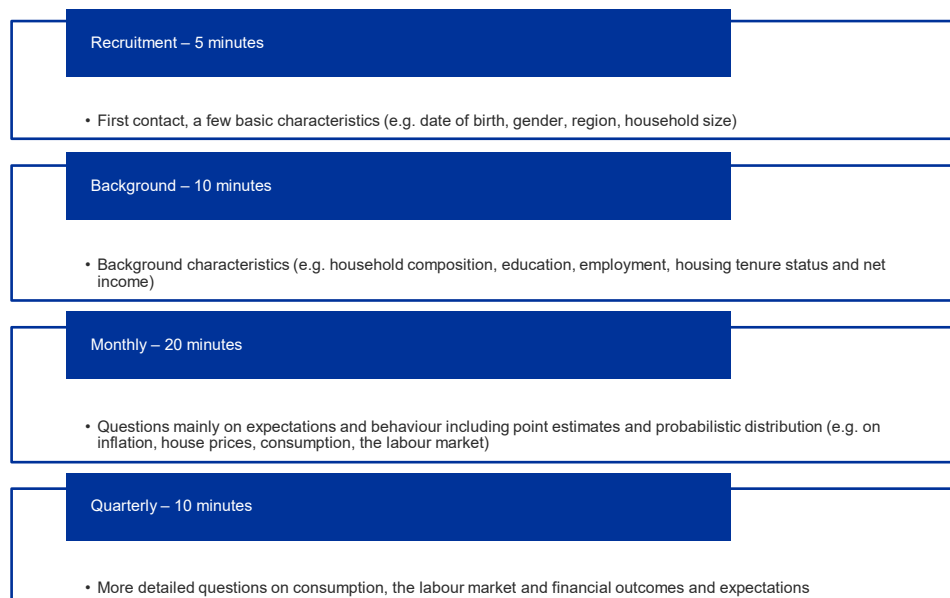
The CES follows a modular survey structure, drawing on international experience of similar surveys. The underlying approach is to use mixed frequencies, with some questions asked monthly and others at a quarterly or annual frequency. This approach is designed not to overburden respondents, while at the same time collecting information at meaningful intervals. After the survey members have been recruited the CES has three components:

(1) An annual *background interview* aims to collect information on incomes, financial/real asset holdings, debts and basic household demographics. Collecting this background information makes it possible to link the survey data with other data sources. Such information includes the household location so that, for example, data can be combined with NUTS⁵ information on local conditions, including regional GDP growth rates, car sales, consumption and local labour market conditions.

(2) A *monthly core survey* module includes perceptions and expectations as regards inflation, the labour market, spending, housing and credit decisions, as well as other time-sensitive information that can be collected on a monthly basis.

(3) A *quarterly module* collects information at a lower frequency. A brief overview of the CES modular survey structure is provided in Figure 1.

Figure 1
Overview of the CES questionnaire



⁵ The Nomenclature of Territorial Units for Statistics (NUTS) classification is a hierarchical system used to divide up the economic territory of the EU for the purpose of analysis by geographic region.

4 Data collection

The CES is designed to ask a common set of questions across countries and over time. The underlying approach is to use mixed frequencies and follow a modular survey structure. Some questions are asked monthly while others are asked at quarterly or annual frequencies.

For the probability sampling component, the CES starts with a *recruitment interview* which collects information on basic household demographics including age, gender and region. The interview is conducted offline by telephone, with the aim of recruiting respondents for the CES probability samples. The CES is otherwise entirely internet-based and all the other survey modules are conducted online.

Those who indicate that they are willing to join the panel and have supplied the necessary socio-demographic information are asked to provide a valid email address where they can receive further information on how to join the panel. All email addresses collected during the random sampling recruitment procedure receive an invitation email with a link that allows respondents to register on the What You Expect Panel. Invitation emails are also sent to convenience-sampled (non-probability sampling) units.

All invited respondents who successfully subscribe to the What You Expect Panel are requested to take part in a *background interview* which collects further demographic information, as well as education and income data from those recruited to the survey. Those who complete the background interview can then participate in the monthly and quarterly modules, which contain more time-sensitive information, as described in Section 3 of this document.

CES respondents can use a computer, a smartphone, a tablet or other device to complete the questionnaires. In the core module for wave 22 (October 2021), 58% of completed responses were provided using a computer and 34% using a smartphone.

The monthly CES data collection period typically opens on the first Thursday of the month and closes on the first Tuesday of the following month. For instance, the October 2021 data collection started on 7 October and was completed by 2 November. Around 70% of the responses are usually completed within the first ten days of the data collection period.

5 Weighting

To ensure that the CES panel is representative of the adult population of each survey country, weights are calculated for each panellist.

5.1 Design weights

The weighting step accounts for the differences in each respondent's probability of participating in the recruitment survey. The respondents from the non-probability sample have no known probability of selection and therefore no design weights; they are assigned a base weight of 1. For the panellists recruited through the probability telephone recruitment survey, a design weight is calculated, based on their chance of selection for the CES panel.

The probability of selection in the dual-frame telephone recruitment is calculated by setting the expected number of people available per telephone line to 1 for both fixed and mobile lines, resulting in the following formula:

$$\pi_i \approx \frac{n_F}{N_F} * F_i + \frac{n_M}{N_M} * M_i$$

n_F = sample size for fixed numbers; N_F = population size for fixed numbers;

n_M = sample size for mobile numbers; N_M = population size for mobile numbers.

The terms F_i and M_i are equal to 1 if the respondent has a fixed/mobile line respectively, regardless of the number of fixed/mobile lines they can be reached on.⁶

For a respondent who has participated in the recruitment survey and who has given initial consent to join the panel in the k th wave, the selection probability is calculated as the summation of k selection probabilities minus the product of the probabilities (the likelihood that they are selected in all waves).

$$\pi_i = (\pi_1 + \pi_2 + \dots + \pi_k) - (\pi_1 * \pi_2 * \dots * \pi_k)$$

The design weight is the inverse of the probability of selection ($1/\pi_i$) for each respondent in the probability sample. Starting in wave 11, design weights are raised to the power of 0.8 to smooth out variance inflation in the probability samples.

5.2 Adjustments for non-participation

The weights are adjusted for any non-response that occurs after initial consent has been obtained in the recruitment questionnaire. Enrolment weights are thus

⁶ The term n refers to all phone numbers used (i.e. dialled).

obtained, and each panel member has an enrolment weight, regardless of whether they complete the monthly questionnaire in a specific wave or not. A panel member's enrolment weight is calculated once, during the wave in which the background survey is completed, and remains constant across the waves of the CES panel. The weighting adjustment models the probability of becoming a panellist by completing the background survey, and uses the following information collected in the recruitment survey: age, gender, internet usage, household size and region.

The cumulative recruitment and background data files are used to model responses to the background survey by means of a logistic regression model. The models are run by country and sample type – probability and non-probability – using the same set of variables within each country. The weights are calculated at the end of each wave and remain constant for panellists who participated in the background survey in the previous wave. To avoid extreme weights being obtained, response propensity class adjustment is used rather than inverse propensity weighting. Accordingly, the data are divided into ten classes using quintiles of response propensities. The non-response weight of the i th case is calculated as the inverse of the median response propensity in its class j ($1/\hat{\pi}_j$).

The design weight (probability sample) and base weight (non-probability sample) multiplied by the non-response weight make up the final enrolment weight.

5.3 Calibrated weights

The enrolment weights are calibrated to adjust the sample marginal distributions to match external population benchmarks for the population aged 18 years or older. The population benchmarks are based on Eurostat population statistics. The benchmarks are updated once a year with the most recent data available. The calibration benchmarks refer to the benchmark population of T-2 in January each year.⁷

The calibration method used is raking (iterative proportional fitting). Calibration is carried out on a country-by-country basis, and separately for probability and non-probability samples. The same set of variables is used in each wave of the study. The enrolment weights are calibrated to benchmarks for:

- age (four sub-groups: 18-34, 35-54, 55-70, 71+);
- gender (male and female);
- region (grouped).

For wave 1 to wave 11, the age variable was based on panellists' age at the time of recruitment. In waves 12 and 13 the calibration model was based on age at the time of the survey wave (i.e. age in December 2020 for wave 12 and age in January 2021

⁷ For instance, waves 1-11 referred to 1 January 2018, waves 12-24 to January 2019 and wave 25 onwards to 1 January 2020. The exception was wave 12 for which the benchmark had already been updated with 2019 data.

for wave 13). From wave 14 onwards, the age variable in the calibration model was changed to (1) age in January 2021 for panellists recruited between January 2020 and January 2021 and (2) age at recruitment for panellists recruited after January 2021. Significant under-representation was observed for the elderly. To enable the analysis to be performed without the under-represented group i) the age variable in the calibration model has four categories, the last being 71+ and ii) the weights add up to the figures for the population aged 18-70 years old in each country.

5.4 Blended weights

The weights of the probability and non-probability samples are blended following DiSogra et al. (2011).⁸ Probability and non-probability samples are combined and the starting weights of the blended sample are calibrated to the population benchmarks (age, gender and region). In the blended calibration, the starting (input) weights for the non-probability sample are the enrolment weights and the starting weights for the probability sample are the calibrated weights. The starting weights are scaled to sample size before the blended calibration takes place in order to balance the unequal starting weights for the probability and non-probability samples.

The results for selected variables⁹ are compared across the calibrated probability sample and the calibrated blended sample, to see if any additional adjustment of the calibration model is necessary. If there are significant differences a minimum number of questions from the background survey can be included in the calibration. The data provider tests for differences in key survey outcomes using a set of variables from the monthly core module. Since wave 21, background survey variables have not been used in the calibration model.

Trimmed weights are also constructed because they are useful in the evaluation of the impact of outlier weights. In trimming, weights are trimmed to a specified bound and the trimmed-off amounts are redistributed to other sample units to reduce variation among the weights. Trimming is applied in both the calibration step and the blending step to obtain the final trimmed blended weights.

As the variability of the weights is high for the 71+ age group, trimmed weights may prove useful in sensitivity analyses.

⁸ DiSogra, C., Cobb, C., Chan E. and Dennis, J.M. "Calibrating non-probability internet samples with probability samples using early adopter characteristics", *Joint Statistical Meetings, Survey Research Methods*, August 2011, pp. 4501-4515.

⁹ There are variables from the background survey that all respondents are asked about and that cannot be skipped (and that have no missing values), as well as a set of key survey variables from the monthly module.

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For specific terminology please refer to the [ECB glossary](#) (available in English only).