THE REMAINDER AS A TOOL TO INCREASE RESPONSE RATE: THE ITALIAN PERMANENT CENSUSES OF ECONOMIC UNIT

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Abstract. The continuous declining response rate in the surveys conducted by the National Institute of Statistics is countered, in the first instance, with the application of a reminder strategy. But is this really the winning strategy? What is behind the sometimes-frantic rush to send a reminder?
What is the institute doing to optimise this path?
What other elements can interact to support the improvement of the response rate?
The aim of the paper is precisely to answer these questions by comparing the experiences of the major business surveys, i.e. the Permanent Censuses of Economic Units.

1. Introduction

The declining response rates in surveys conducted by the Italian National Institute of Statistics (Istat) is faced initially through the implementation of a reminder strategy. However, is this really the most effective approach? What underlies the urgency - at times bordering on haste - to send reminders? What measures is the Institute undertaking to optimise this process?

Which additional factors may interact to support the enhancement of response rates?

This work is part of a broader analytical initiative led by the Data Collection Directorate, aimed to identify the most effective levers to increase participation in the Institute's surveys.

We are fully aware that broadening the criteria for sanctionability or building a more active and targeted system for engaging enterprises during the data collection period is not sufficient to stimulate their participation. Our intention is firstly to analyse and address the challenges within our Directorate and subsequently extend the resulting initiatives to other structures within the Institute.

The objective of this paper is to explore these matters by comparing the operational experiences of the principal surveys on businesses, namely Permanent Censuses of Economic Units. To this end, it is important to consider the international context, in particular the tools used to increase response rate in business surveys. Section 2 briefly presents the international context.

Section 3 describes the methodological and operational characteristics of the 2022 Permanent Census of Economic Units (CPUE2022). Section 4 outlines several innovative features introduced in the implementation of CPUE2022. Section 5 examines the role of reminders in the survey process. Section 6 explains the main results of the proposed statistical model, while Section 7 summarises the key conclusions.

2. The international context

The progressive decrease in surveys participation doesn't concern exclusively the Italian context but represents an international issue.

Scheme 1 – *Tools used in the main National Statistical Institutes (NSI) context to increase participation in business surveys[1].*

NSI	Obligation to respond (business surveys)	Reminders use/ suggestion	Enforcement (sanctions/actions)	Transparency Response rates
K ONS	Yes, required by law for all the surveys conducted under the Statistics of Trade Act 1947	Sequence of planned reminders; online platforms	Enforcement conducted by Enforcement Unit in case of non-response	High: publishes monthly response rates dataset for MBS (production & services) and historical for ABS
S Census Bureau	Depending on federal and state laws	Sequence of reminders; e-mail; responsive follow-up, calls	Administrative Enforcement	High in technical documents and scientific articles: outcomes of contact experiments/reminders and performance reports
Canada Statistics Canada	Yes, required by law for most surveys	E-mail, SMS, calls; channels reported in the Frequently asked questions page and in Information for survey participants page	Compliance with legal requirements	Medium: public information about contact procedures and burden; publication of rates

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[1] For further analysis refer to the following links:

https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/annualbusinesssurvey
https://www.ons.gov.uk/economy/economicoutputandproductivity/output/datasets/currentsurveyresponserates
https://www.statcan.gc.ca/en/survey/faq
https://unece.org/sites/default/files/2023-07/DC2023_S1_Australia_Dsouza_et_al_Paper.pdf
https://www.abs.gov.au/participate-survey/business-survey/quarterly-business-indicators-survey
https://www.abs.gov.au/participate-survey/business-reporting/quarterly-business-indicators-survey-abs-business-reporting
https://www.stats.govt.nz/help-with-surveys/
https://www.stats.govt.nz/help-with-surveys/business-survey-information/

Scheme 1 (cont.) −*Tools used in the main National Statistical Institutes (NSI) context to increase participation in business survey.*

NSI	Obligation to respond (business surveys)	Reminders use/ suggestion	Enforcement (sanctions/actions)	Transparency Response rates
Australia ABS	Yes	Sequence of reminders: SMS; reminders, calls	Obligation.	Medium/high: FAQ pages and notes about the reminders; UNECE documents report the survey's results
New Zealand Stats NZ	Yes, required by law for most surveys	E-mail/letters and follow-up depending on response rate; multi-channel support	Obligation with compliance procedures; support channels	Medium: "Help with surveys" pages and "Business survey information" reporting general rules
Norway SSB	Yes, required by law for most business surveys	Internet Portal Altinn; e-mail/letters	Enforcement fines in compliance with the Statistics Act. regulations)	Medium: public informative report on obligations, deadlines and enforcement
Italy Istat	Yes: required by law for all the surveys conducted under Articles 7 and 11 of the legislative decree n. 322/1989	Certified Electronic Mail (PEC)/e-mail, letters; calls (outbound 1510) and standardised reminders, web page for respondents	Sanction procedures required by law, in compliance with the General Censuses Plan and related Acts	High: internal guidelines and manuals on quality/compliance; public documents on the General Censuses Plan

Note: The Scheme, produced by the authors, summarizing the information derived from the NSI websites listed in note1.

The figure highlights a shared model grounded in mandatory participation, multi-channel reminder systems, and enforcement actions, with countries differing mainly in how transparent they are and how they manage respondent contact. The UK and Italy distinguish themselves through more structured data systems and broader dissemination practices, whereas the US and Canada place stronger emphasis on supporting respondents throughout the process.

3. Permanent Censuses of Economic Units.

Istat has launched a strategic project for the transition from a decennial census framework to a triennial cycle, with the objective of collecting, producing, and disseminating up-to-date information on the structural and behavioural characteristics of Italian enterprises (Bellini, Filiberti, 2024). This shift, initiated with the first edition of the Permanent Census of Economic Units (CPUE) in 2018

and continued with the 2022 edition, responds to the growing need for comprehensive, detailed, and timely data in an economic context marked by rapid and unforeseen changes. The project aligns with the objectives set out in the General Census Plan (PGC), the planning document adopted by Istat to regulate the organisation of the Permanent Census of Economic Units[2].

The new General Census Plan (PGC) introduces innovative elements based on a close complementarity between the core business registers (such as the ASIA Register), satellite registers, and direct sample surveys. This approach aims to significantly reduce both the time required and the burden on respondents. Specifically, the Permanent Census seeks to:

- provide a statistical information framework on the structure of the economic system with high territorial granularity;
- deepen the knowledge of specific aspects of the production system through targeted information sets;
- expand, update, and improve the quality of statistical business registers through the integration of administrative data;
- promote innovation in data collection methods and the exchange of statistical information.

The survey, conducted every three years on a probabilistic sample drawn from the ASIA Register, is structured into two survey modules: the "long form" questionnaire for enterprises with 10 or more employees, and the "short form" for enterprises with fewer than 10 employees. This design choice was adopted to accommodate the diversity of business realities and to reduce the statistical burden, particularly for those survey units that may not possess all the requested information due to their structure.

From a contextual standpoint, the design of the 2022 questionnaire was heavily influenced by the shock of the pandemic, the geopolitical conflict in Ukraine, and the resulting energy crisis. These circumstances led to the development of a qualitative questionnaire for enterprises that took into account emerging information needs and the potential obsolescence of certain questions.

4. Innovative Aspects Introduced in the Implementation of CPUE2022

Given the internal organisational changes that occurred within the Institute on the eve of the census, the project was guided by the principle of activating agile and flexible organisational processes to ensure more effective and efficient management of human resources—always with the overarching goal of producing clear, comprehensive, and high-quality information on the entire Italian business system.

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[2] In addition to the Census of Economic Units, the General Census Plan (PGC) also governs all other permanent censuses on population, non-profit institutions, and agriculture.

In CPUE 2022, the sampling design adopted was a one-stage stratified simple random sample. Stratification was based on economic activity, enterprise size in terms of number of employees, and geographic location at provincial level. The sample size consisted of 287,348 units, determined through a one-stage stratified simple random sampling design, with strata defined by combinations of structural variables used to identify the domains of interest: economic activity, average number of employees, and location of the enterprise (ISTAT, 2023).

The data collection phase was characterised by innovative solutions aimed to increase efficiency, reduce the duration of fieldwork, and minimise the burden on enterprises. These efforts were shaped by the redefined role of the territorial support network, which was significantly downsized in terms of dedicated personnel (from 150 to 15 coordinators compared to the previous edition). This led to a more agile and specialised structure, focused on resolving more complex thematic issues.

Passive (inbound) technical and non-specialist support—i.e., enterprises assistance requests — and active (outbound) support—i.e., follow-ups with non-responding enterprises — were both managed by the centralised Contact Centre.

The core of the organisational innovation lies in the structure of the official communication sent to enterprises to request their participation in the census: the information letter signed by the President of Istat[3] that is the element that formally and legally involves the respondent—whether a citizen, enterprise, or institution—in the statistical survey. It is the act that transfers responsibility and the burden of response to the respondent; therefore, it must be clear, comprehensive, and not induce concern, as the ultimate goal is to encourage participation in the survey.

This is the focal point of the entire process, particularly for surveys in which respondents are liable to sanctions. In this regard, significant simplifications were introduced in the communication language and structure—the various components of the message were clearly and comprehensively highlighted— in order to achieve the primary objective: encouraging respondent participation.

To this end, the sample was segmented into seven groups based on enterprise size (number of employees), registration on the Statistical Business Portal due to previous participation in Istat surveys, questionnaire type (long form/short form), and, indirectly, sanctionability (derived from employees number). Furthermore, through the sample segmentation it has been possible to target the follow-up actions to specific subsamples, allowing for more effective identification of categories with

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[3] Given the response obligation and the application of sanctions for non-respondents—which, of course, applies only to enterprises with more than 20 employees—the information letter constitutes the first legal act supporting the sanctioning framework in the event of non-compliance. Through this letter, the President of Istat formally establishes that the enterprise is part of the survey and, therefore, subject to potential sanctioning procedures should it fail to respond, specifically for enterprise with 20 or more employees.

lower response propensity and prioritising reminder efforts accordingly. Moreover, this process enabled the Institute to optimise the information letter sending.

The information letters initiating the data collection were delivered via Certified Electronic Mail (PEC) as the primary channel, followed by registered mail with return receipt for enterprises without PEC but with at least 10 employees, and ordinary mail for the remaining enterprises (those with fewer than 10 employees)[4].

The centralised Contact Centre supported enterprises through a dedicated toll-free number, a specific email inbox, and—for the first time—a dedicated certified email (PEC) address for those enterprises choosing to use a certified communication channel. The service was structured on two levels: the first level (Contact Centre operators) handled simple and standardised requests (e.g., system access, usability), supported by an extensive set of FAQs with predefined responses; the second level (Istat thematic experts) managed more complex or specific requests, particularly those related to the thematic content of the survey.

5.   The reminders

For the first time in a business census, Istat chose an adaptive strategy to recover total non-response, integrating standard mass reminders with targeted follow-up actions [5]. This strategy is based on the awareness that the success of statistical surveys—in terms of participation—depends on the behaviour of the statistical units involved, and that non-response, if not uniformly distributed across estimation domains, can introduce bias into the final estimates [6]. The objective is to minimise such distortion—which cannot be measured even retrospectively—by aiming to ensure that all units reach a comparable response propensity.

During CPUE2022, four key phases can be identified that highlight the importance of reminders and how they influenced the progress of data collection.

As shown in Figure 1, the launch of the survey is, naturally, marked by the delivery of the information letters to enterprises. These letters not only inform them

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[4] For enterprises with fewer than 10 employees that fall within the group of non-sanctionable units, it was not necessary to send the information letter via certified email (PEC) or registered mail with return receipt.

[5] The adaptive strategy is closely linked to the concept of Total Survey Error (TSE), whereby the quality of information is the result of multiple sources of error, including nonresponse. The adoption of adaptive strategies is viewed as a methodological response to mitigate non-sampling error and improve the representativeness of estimates (Ceccarelli *et al*. 2021). In essence, targeted actions are directed at non-respondents based on pre-observed characteristics that define specific behavioural profiles with respect to total nonresponse (Bellini *et al*.2019).

[6] The lack of representativeness of the collected sample within the planned domains is one of the most critical issues.

of their inclusion in CPUE2022 but also provide the necessary credentials and instructions for accessing the portal and filling out the questionnaire[7].

Figure 1 – *Trend in questionnaire completion as a function of the distribution of the information letter and reminders[8].*
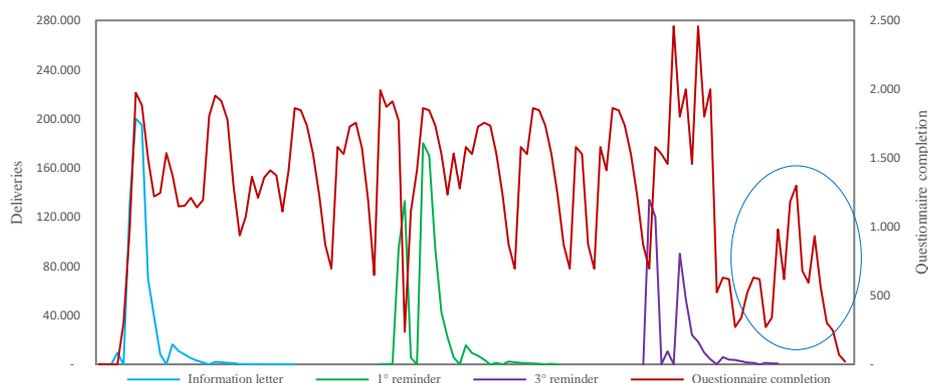
The questionnaire completion curve clearly shows—particularly in the final portion highlighted by the oval in the graph—the effect of the fourth reminder. Unlike the previous reminders, this one was not sent via mail (PEC and/or ordinary mail, depending on the segment), but was instead carried out through direct phone calls from the Contact Centre to a selected group of enterprises—specifically, the largest ones in terms of number of employees—that had not yet responded[9].

6. The model and the empirical outcomes

To complete the analysis of response propensities and to identify the factors influencing the behaviour of statistical units in deciding whether or not to participate in the survey, we employed a logistic regression model to highlight the variables that improve the response rate—commonly used as a crude indicator of data collection quality and effectiveness.

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[7] The CPUE2022 was conducted entirely using the CAWI (Computer-Assisted Web Interviewing) mode.

[8] To enhance the readability of the chart, the information related to the second reminder was intentionally omitted. However, such information has been included in the model presented below.

[9] The calculation was performed by considering, overall, the peak in questionnaire completion during the reminder sending period and the minimum, which coincides with the completion rate immediately prior to the launch of the reminders themselves.

The model considers, individually, the main variables—appropriately grouped—that defined the seven segments into which the sample was divided, along with the variable indicating whether a reminder was sent. Specifically, we included as dichotomous explanatory variables: territorial distribution, whether the enterprise is subject to penalties for non-response, the type of questionnaire, enterprise size in terms of number of employees, the three economic activity sectors, and indicator variables for the four reminders.

The selected model is specified without an intercept. Table 1 reports the corresponding test statistics, which demonstrate the good fit achieved with the data.

Table 1 – *Goodness of fit parameters.*

Global null hypothesis test: BETA=0			
Test	Chi-squared	DF	Pr > Chi-squared
Likelihood ratio test	349029,218	13	<.0001
Score	248923,492	13	<.0001
Wald	35428,732	13	<.0001

Table 2 reports the odds ratios for the categories of the dichotomized variables (one for each category of the original variable) relative to the reference categories, which were excluded from the model. The reference profile is defined as follows:
⇒   Sanction = No,
⇒   Questionnaire type = Short form,
⇒   Territorial area = Islands,
⇒   Enterprise size = Up to 9 employees,
⇒   Economic activity = Services,
⇒   Reminder = First.

For each category of every variable, the odds ratio was calculated with respect to its corresponding reference category. A particularly noteworthy result observed during the CPUE2002 survey is that enterprises receiving a telephone reminder had a response probability three times higher than those who received only the first reminder. The odds ratios for the second and third reminders, also relative to the first, indicate a response probability approximately one and a half times greater.

From an operational standpoint, these findings highlight the effectiveness of a targeted reminder strategy compared to a blanket reminder approach.

The odds ratios also reveal interesting patterns regarding enterprise size in terms of employees number. Specifically, the odds ratios increase with enterprise size, with the largest firms showing a response probability nearly six times higher than the smallest ones. This likely reflects differences in organisational capacity and familiarity with responding to Istat surveys.

A separate consideration is warranted for the variable indicating whether an enterprise is subject to sanctions. Usually, large enterprises that have previously participated in other Istat surveys are aware in advance of potential penalties for non-response

Table 2 – *Odds Ratio.*

Variabile	Comparison between categories	ODS RATIO
Sanction	Yes vs No	1.21
Questionnaire type	Long form vs Short form	0.63
	North West vs Islands	1.01
	Nord East vs Islands	1.12
Geographical area	Centre vs Islands	1.43
	South vs Islands	1.37
	10 to 49 / Up to 9	3.51
Enterprise size	50 to 249 / Up to 9	4.25
	250 and more / Up to 9	5.83
Economic activity	Industry vs Services	2.98
	Constructions vs Services	3.23
	Second vs First	1.49
Reminder	Third vs First	1.48
	Fourth vs First	3.08

The label "subject to sanction," in addition to verifying elements of objectivity, is often unknown to the enterprise, which may decide whether to respond without considering the risk of incurring penalties. In fact, the probability of response among enterprises that meet the criteria for sanctionability is approximately 1.2 times higher than that of enterprises not subject to sanctions in the event of non-response. These results suggest that the sanction serves to encourage enterprises to respond, but it plays only the role assigned to it by the National Statistical Plan: the sanction reinforces the obligation to respond that applies to every citizen, enterprise, or institution required to participate in statistical surveys included in the plan.

Table 3 shows the probability of responding to the questionnaire as a function of the characteristics of the enterprises participating in the census, always taking the baseline profile described in the previous paragraph as a reference.

There are important insights that emerge from the analysis of this table. Being merely subject to sanction, in addition to the baseline profile, increases the probability of response only marginally. Enterprises that received a phone call from the Contact Centre as a fourth reminder, in fact, show a response probability of 0.9084.

The second and third reminders play a crucial role, raising the probability of response to approximately $p = 0.75$.

Table 3 - *Response probability resulting from the combination of enterprise features.*

Parameter	$P(X/\beta i)^{10}$
Sanction → No Questionnaire type→ Short form Geographical area → Islands Employees number → Up to 9 Economic activity → Services Reminder → First	0.5000
Sanction → Yes	0.5485
Type of questionnaire → Long form	0.3665
Geographical area → North West	0.5592
Geographical area → North East	0.6151
Geographical area → Centre	0.6635
Geographical area → South	0.6331
Employees number → 10 to 49	0.7781
Employees number → 50 to 249	0.8095
Employees number → 250 and more	0.8892
Economic Activity → Industry	0.7484
Economic Activity → Constructions	0.7633
Reminder → Second	0.7466
Reminder → Third	0.7414
Reminder → Fourth	0.9084

Enterprises required to complete a long-form questionnaire are understandably not encouraged by the additional workload involved in completing the entire survey; the probability of response decreases significantly (p=0.3663). As already highlighted in the odds ratio analysis, a very long questionnaire can act as a deterrent, especially for enterprises that access the portal and, upon seeing the questionnaire's length, decide to abandon it rather than continue (Binci *et al,* 2025). However, in this case, the analysis cannot be conducted simply by including one parameter at a time, because - due to the survey design - a small enterprise will never be required to complete a long-form questionnaire. For enterprises with more than 250 employees, which are required to respond using the long-form questionnaire, the probability of response is p=0.82227. If these enterprises receive the fourth reminder by phone by the Contact Centre, reserved only for larger enterprises, the probability of response rises to p=0.9787, making response almost certain. Only those who have firmly

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[10] A response probability of 0.5 results from the combination of variables that define the baseline profile: Sanction = No; Questionnaire type = Short; Geographical area = Islands; Employees number = up to 9; Economic activity = Services; Reminder = First.

decided not to respond—regardless of any consequences, including the risk of a sanction—ultimately fail to do so.

7. Conclusion

As part of a series of studies conducted by Data Collection Directorate over the years, the approach presented in this work aims to identify key factors that can enhance the probability of survey response. Working with and analysing the outcomes of a large and demanding survey such as the Permanent Census of Economic Units provides us with the statistical power necessary to conduct consistent and robust analyses. This, in turn, allows us to apply the empirical findings to other business surveys as well.

With regard to the analysis, we observed that the effectiveness of reminders is also confirmed by the logistic model. However, it is the fourth reminder - addressed to a limited group of enterprises economically significant and still hesitant to participate, that proves to be particularly impactful.

The factors that emerged are clear and provide both the scale and direction of the actions needed to achieve higher participation rates. The issue must be addressed from multiple angles:

- **Communication.** Effective and timely communication is essential to inform, engage, and motivate enterprises to participate, for this reason it should be tailored to the target audience. The purpose and the importance of the survey should be clearly explained to reduce uncertainty or perceived burden.
- **Burden reduction**. This involves simplifying and shortening questionnaires through greater harmonisation between the definitions used in European Regulations and those adopted nationally for administrative purposes.
- **Use of administrative data.** Leveraging administrative data as a partial or even full substitute for specific questionnaire items - or, in some cases, for entire surveys - can significantly reduce response burden and improve efficiency.
- **Returning useful information to enterprises.** Providing enterprises with feedback and insights that are relevant to their specific economic sector can enhance engagement and reinforce the value of participation in statistical surveys. Let us not forget that enterprises operate for profit, not out of charity. Providing them with data derived from multiple sources - not only from the specific survey editions in which they are asked to participate - is a practical, low-cost, and effective way to directly convey the importance of their contribution to statistical information, which constitutes a public good for the entire country.

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