

Transition from single mode to mixed mode

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1. Summary

Statistics Norway has decided to change the data collection mode of the Labour Force Survey, specifically from telephone interviews to a combination of telephone and web. This paper discusses some of the issues that are relevant for this type of change in a running survey.

The following are set restrictions. First, will be no pilot study, parallel sample, or extra interviewer work. Second, the overall survey design stays much the same, such as the sample size, stratification, and rotating panel. Third, the questionnaire will remain constant across time and mode. The current form was designed with the expressed purpose to fit both the future web survey as well as the ongoing computer-assisted telephone interviews.

We identified two questions as the most important before the transition. First, should we make a clean break or introduce mixed mode gradually into the ongoing data collection process? Second, should people be free to choose mode each wave, or should we impose some kind of allocation or sequence of modes?

To answer the first question, the plan is to ease mixed mode into the statistical production process. Concretely, the new design will be introduced for one eighth of the sample each quarter for two years. As for the actual mix of modes, we have more or less decided that at least the first interview will be telephone only. The main reasons are to establish proper contact, motivate people, and give some personal guidance in order to ensure the quality of some key questions. For the rest, we present two alternatives that we would like to discuss further.

2. Background

Mixed-mode promises several advantages. If implemented the right way, it can maintain data quality while also reduce administration costs. One can increase sample size, improve coverage, and even achieve higher response-rates. To keep up with the demands of the next generation, every kind of information should be transmitted via the smartphone, even completing public surveys. As a consequence, most European LFS¹ have already introduced CAWI² as part of their data collection. However, the way countries combine web, telephone, and personal interviews varies considerably.

Statistics Norway seems to be among very few that still use single-mode in a mandatory LFS. This hesitation is due to financial, practical, and statistical considerations, especially possible problems during the transition period. Mixed-mode surveys are known to be susceptible to selection effects and mode-dependent measurement errors, collectively referred to as mode effects (Buelens & Brakel, 2011, p.3). Introducing CAWI to the CATI³-only survey may affect data quality and create breaks in the much-treasured time series of the Norwegian LFS. However, the various advantages and disadvantages depend on how it is implemented, i.e. how we organize the data collection.

¹ Labour Force Survey

² Computer Assisted Web Interview

³ Computer Assisted Telephone Interview

3. Discussion

A concurrent design offers a free choice of mode for each interview. This is likely the most cost-effective approach when introducing a self-administered mode to an interviewer assisted survey. It may also appeal to the respondents' sense of freedom, especially since it is a compulsory survey. However, there are several challenges with a concurrent design. Firstly, with a concurrent design non-response rates can increase, as the respondents may use the web-option to defer or avoid answering the survey. An obvious counter-measure is to follow up by telephone. Thus, another challenge with concurrent design is that CATI as follow-up can affect data quality. We aim to interview respondents as soon after the reference week as possible, so that respondents better recollect facts and details. Time lag between the reference week and the actual interview can result in measurement error due to reporting an answer to a question that require episodic memory (Olsen, 1998, s. 38).

A sequential design would be the obvious choice to counter these possible negative effects. Being able to choose which respondents are allocated to each mode will perhaps even increase contact-rates or give better coverage, as it would allocate interviewer resources to the respondents that are hard to reach and difficult to persuade, while using less resources to interview willing respondents. Some willing respondents may even prefer to answer self-administrated and in turn give better coverage.

One could argue that it is possible to allocate resources to the difficult respondents with a concurrent design as well, but the order in which modes are introduced is significant. Contact rates often depend on being able to reach respondents shortly after an invitation letter is received. Allocating hard to reach respondents to CATI initially can increase the chances of interviewing them, and the ability to decide mode for different groups would also decrease the chance of non-response. Characteristics such as level of education, age and national background would be demographics to consider when allocating mode. However, allocating mode based on demographics may also increase selection effects, as it amplifies the mode which the groups are prone to answer.

A sequential design may give the opportunity to reduce measurement errors. While it is quite clear that an interviewer presence can affect an answer and be a source of error, the presence of an interviewer also helps the respondents understand the questions. Literature suggests that this depends on the questions being subjective or objective. When the issue is essentially objective, interviewer presence can have a positive impact on the answering process (Schork et al. 2021 p.216). The LFS asks mainly about facts rather than opinions, such as working hours and shift work. For occupations such as fishers and offshore workers, self-administrated responses are more likely to misreport working hours and shift work. Trained interviewers can reduce these types of errors by guiding the respondents through the LFS questionnaire, explain definitions, and so forth.

Research done by Statistics Norway on non-response in the Norwegian LFS maintains that the first interview is crucial for minimising non-response (Lagerstrøm et al. 2015, s 4). As almost no one in the population sample refuse or defer to participate eight times. The non-response rate must be considered a result of respondents dropping off sporadically. Consequently, in the first wave, interviewers are crucial in motivating respondents to participate each upcoming quarter and in explaining why it is important to monitor their work situation over time.

When considering a sequential design, we must therefore not only consider who should be offered a self-administered option, but also when the option is introduced. The literature suggests that the risk of measurement errors associated with CAWI is lower for objective issues, i.e. questions about facts. When introducing CAWI to a running survey, one could either ignore measurement errors or calibrate for them. But this becomes problematic in a panel survey because misunderstandings manifests over time, making the errors hard to ignore (Shouten et al. 2013, p.1556).

In a concurrent design, respondents can manifest their misunderstandings over time by choosing the self-administrated option freely. In a sequential design the same thing can happen if respondents with high responsiveness gets the self-administered option during all eight interviews. Arguably, the presence of an interviewer in later waves will help ensure data quality. If the respondent has misinterpreted questions, the interviewer assisted interview in a later wave will at least partially correct the error.

Considering the pros and cons of different approach is crucial before changing a running survey, such as deciding on a concurrent or sequential design. However, it is also important that interviewer management adapts during the data collection period. In 2018 Statistics Norway conducted a pilot to see if collecting mixed mode was possible without effecting key variables and if a mixed-mode design could save administration-costs. Another goal was to inquire if the pilot could achieve the same response rate as the regular LFS. The pilot was successful in all three aspects, and even achieved a higher response rate. This was much due to working both adaptive and responsive with data collection (Gravem et al. 2019).

While adjusting adaptive refers to making changes to the data collection strategies between data collection periods, a responsive adjustment makes changes during the data collection period. The LFS makes for a unique opportunity to work both adaptive and responsive as respondents participate eight times over the course of two years. The quarterly field period is long enough to make changes and switch modes responsive, but it is also possible to offer a change of modes between waves based on response pattern. Respondents who for example defer when being allocated to CAWI, can be allocated to CATI the next quarter. Nonetheless, the pilot showed that an increasing number of respondents wanted to answer self-administered, and that web was the more popular option in subsequent waves (Gravem et al. 2019).

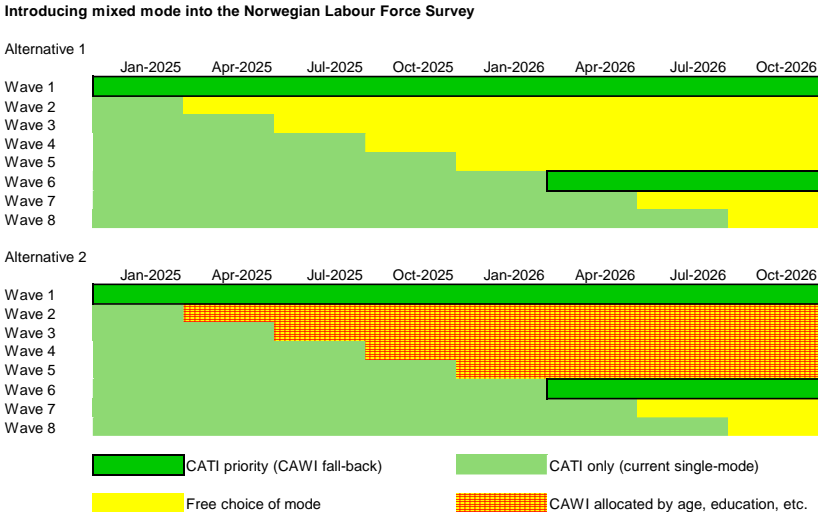
There are many ways to work with a mixed-mode design and many strategies to consider. However, what we seek to achieve with the organisation of mixed mode data collection must be at the centre of the decision. As the explicit goal of Statistics Norway is to maintain response rates, minimize measurement error and breaks in datasets while not increasing the administrative budget – a mix between the strategies discussed in this chapter seems to be the way to go. Nonetheless, to mix a sequential design with a concurrent and working both adaptive and responsive can get quite complicated and needs a modern case handling system to be successful. While Statistics Norway's case handling system for respondents (SIV) is outdated, Statistics Norway still has completed many mixed mode surveys, but perhaps not in the same scale as the LFS, which has 24.000 respondents each quarter. The 2018 pilot concluded that a mixed-mode LFS needed a better case handling system (Gravem et al., 2019). Luckily, Statistics Norway should have the new system running by January 2025, just in time for the LFS transition.

After discussing the results from the pilot and our experience from other mixed-mode surveys, we have more or less settled on a contact protocol. This will start from reference week one in January 2025. It will begin with the first wave and introduce mixed-mode for each subsequent waves, thus increasing the number of CAWI respondents gradually throughout 2025 and 2026. This will give us some possibility to adapt and potentially reduce negative impact, but also delay some of the promised cost cutting.

Considering the importance of an interviewer introducing the respondents to the LFS, both to decrease non-response and to make sure they understand the questions the right way, the first interview will be allocated to CATI. After completing the first interview by telephone, web will be offered to most respondents. Only persons with no completed education and an age-span that indicates that they will have a low response rate will be allocated to CATI. From the third wave, CAWI will be to respondents who have completed the questionnaire in the previous wave. Also, we are considering an obligatory CATI interview in the sixth wave, to correct possible measurement errors. Wave seven and eight the respondents will again choose freely, and we will make responsive and adaptive adjustments to maintain the response-rate.

The following (Figure 1) illustrates the two alternatives for introducing mixed mode. Both starts at the first quarter of 2025, while the new scheme is complete by the last quarter of 2026.

Figure 1: comparing alternative plans.



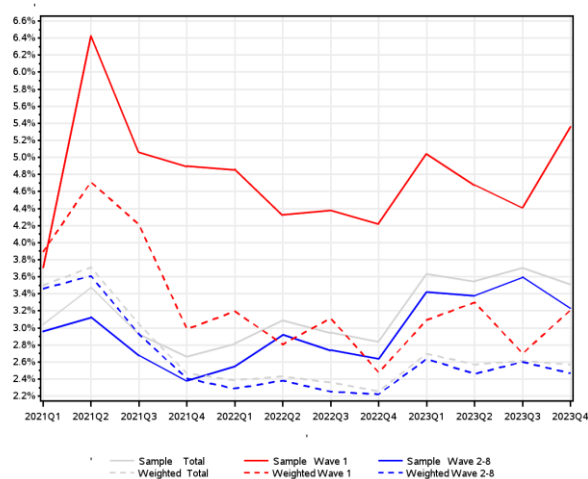
4. Survey design and characteristics

This section describes some key features of the Norwegian LFS, and some recent results that we consider relevant to the discussion. As mentioned, the interviews are all CATI, there has been no face-to-face interviews since 2006. Important properties of the survey remain the same, such as the sample size, stratification, and rotating panel. Also, the questionnaire was redesigned (2021) to fit a web survey as well. In all, we expect a minimum of changes other than the data collection mode itself. One possible change might be adjusting the estimation method, which will perhaps find some support from the following as well as future results.

Notably, the survey is designed as a rotation panel with eight consecutive quarterly waves, i.e. lasting a two-year period with no breaks (Jentoft 2022). According to theory and some earlier findings, a long-running panel survey can suffer from attrition. The panel is slowly eroded as respondents move, die, or stop responding for various other reasons. In a rotating sample, a proportion of people are replaced regularly. Thus, in order to study panel effects, results are analysed by each “wave”.

The Norwegian LFS typically shows little decrease in response rate by wave 3 to 8, while the second wave often has higher response rate than the first. More notable, results for labour market status indicate a response bias by wave. Typically, unemployed people have a lower response propensity in the LFS and are under-represented in most response subsamples. Recent results (2021-2023) show that there is a significantly higher proportion of unemployed people in the first wave of responses, than in subsequent waves. After adjustment⁴ there is a considerably smaller but persistent difference, as illustrated in figure 2.

Figure 2: Proportion of unemployed people, by interview number. LFS 2001-2023. Percent.
Unemployment by interview wave.



Hungnes et al. (2024 p.125) point out that wave-specific effects, or rotating group bias, are long known to affect these kind of surveys. Also, the bias may vary in an unpredictable way. From the perspective of estimation, these problems can be partly overcome by developing more refined methods. However, from the perspective of optimising the data collection process, it is of course better to prevent errors.

5. Conclusion

Both European and national results suggest that mixed-mode significantly effect response level and measurement accuracy. We argue that in order to increase response and reduce errors, the mix of modes should be guided and adapted in at least some waves. Mode chosen freely by the respondents certainly have practical advantages. Nevertheless, we suggest that the cons outweigh the pros. Independently, for practical reasons and with regards to user communication, we plan to make a gradual transition rather than an abrupt switch.

Anyway, though we are grateful for evidence from previous studies, we welcome even more further discussion with European colleagues.

⁴ The weighting method uses register data on employment status, age, sex, place of residence, immigration background, education level, family size, and marital status (Alper 2023).

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