A follow-up with basic questions of nonrespondents to the Dutch Labour Force Survey

Discussion paper 07011

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Explanation of symbols

.	= data not available
*	= provisional figure
x	= publication prohibited (confidential figure)
–	= nil or less than half of unit concerned
0 (0,0)	= less than half of unit concerned
–	= (between two figures) inclusive
blank	= not applicable
2005–2006	= 2005 to 2006 inclusive
2005/2006	= average of 2005 up to and including 2006
2005/'06	= crop year, financial year, school year etc. beginning in 2005 and ending in 2006
2003/'04–2005/'06	= crop year, financial year, etc. 2003/'04 to 2005/'06 inclusive

Due to rounding, some totals may not correspond with the sum of the separate figures.

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Summary: From July to December 2005 a large scale follow up of nonrespondents in the Dutch Labour Force Survey (LFS) was conducted at Statistics Netherlands. In the study a sample of nonrespondents in the LFS was approached once more with strongly condensed CATI, web and paper questionnaires containing only the key questions of the LFS; the basic-question approach.

We analysed the additional response obtained in the basic-question approach and compared the composition of this group to the LFS response. There were no large differences between the two groups. We had to conclude that the mixed mode design of the basic-question approach influenced the composition of the response.

When we restricted the analysis to households with a listed, land-line telephone we found that the basic question-respondents are different from the regular LFS respondents and similar to the remaining nonrespondents. When we only regarded the CATI group, the combined response of LFS and basic-question approach became more representative with respect to the auxiliary variables in the response models.

Keywords: mixed mode data collection, nonresponse reduction, nonresponse adjustment, R-indicator.

1. Introduction

Unit nonresponse is one of the sources of error in surveys. Part of the survey sample does not respond due to a variety of reasons, leading to missing data. In interviewer assisted surveys, the most important reason for nonresponse is a refusal of the selected household or person. In household surveys that Statistics Netherlands conducts, approximately one quarter of the households that are contacted refuses participation. The second most important reason is no contact. For about 5 to 10% of the sampled households no contact is established during the survey.

For decades it is known that nonrespondents are different from respondents and that nonresponse is a potential risk for the quality of statistics that are based on surveys. For extensive overviews of survey nonresponse and its consequences, see Groves et al. (2002) and Stoop (2005).

There are two ways to deal with nonresponse, adjustment and reduction. Nonresponse adjustment methods use auxiliary information from administrative data to predict the answers of nonrespondents. Methods are usually model-based. The missing-data-mechanism is modelled and the methods thus rely on assumptions about the behaviour of nonrespondents. See e.g. Bethlehem (2002) or Kalton and Flores-Cervantes (2003). Nonresponse reduction methods aim at diminishing nonresponse. One method of reducing nonresponse is the so-called call-back approach. After a household is processed as nonresponse, it is once more

approached in order to insist on participation in the survey. Call-backs were already suggested by Hansen and Hurwitz (1946). Recently, Bethlehem et al. (2006) and Laaksonen and Chambers (2006) discussed how to make statistical inference from surveys with call-backs.

The call-back approach is a rather expensive method to obtain information. Also, it will considerably lengthen the fieldwork period to sample and follow up nonrespondents. An alternative to the call-back approach is the basic-question approach (BQA). This method can be applied when due to time or budget constraints the call-back approach is no option. The basic-question approach assumes that many survey questionnaires are composed around a few basic questions. With the answers to these questions the most important conclusion of the survey can be formulated. This procedure was first proposed by Kersten and Bethlehem (1984), who observed that persons who refused to participate in a survey often could be persuaded to answer just a few basic questions. The main goal of the basic-question approach is to gain insight in possible differences between respondents and nonrespondents with respect to the most important variables of the survey; represented by the *basic questions*. If such differences are detected, the approach also provides information for adjusting estimates for other variables.

The basic-question approach is a method that could prove very useful in regular interviewing, to obtain at least some information about nonrespondents. But for this approach to be profitable, it should not be too expensive. Therefore, face-to-face interviewing is no option. The benefits of a short questionnaire, to be answered by one person only, do not cancel out the high costs involved by interviewers making house calls. Computer Assisted Telephone Interviewing (CATI) offers a good alternative. However, by CATI we cannot reach the entire population and we thus have undercoverage. This undercoverage of households with no listed, land-line telephone is selective and leads to biased statistics, see e.g. Cobben and Bethlehem (2005). Combining CATI with a paper and web questionnaire deals with the undercoverage issue. This mixing of data collection modes is a popular topic in survey research because it provides the opportunity to combine data collection modes to exploit the merits of one mode while compensating for the demerits of other modes. A lot of literature is devoted to this subject, for an overview see De Leeuw (2005).

One way to apply the basic-question approach is to let the interviewers attempt the basic questions straight after they have been confronted with a refusal for the main questionnaire. This may lead to higher nonresponse rates for the main questionnaire, as Van den Brakel and Renssen (1998) find. Therefore it is better (but also more expensive) to re-approach the refusers after a short while with different interviewers.

Considerable insight into the characteristics of nonrespondents can be obtained in situations where especially the name of the survey causes nonresponse. This may occur when people think the survey does not apply to them, e.g. if they do not intend to move (in a housing demand survey), they do not have a job (in a labour force survey), or they do not visit a doctor (in a health survey).

A similar method, PEDAKSI, is proposed by Lynn (2003). PEDAKSI stands for Pre-Emptive Doorstep Administration of Key Survey Items. The main difference between PEDAKSI and the basic-question approach is the length of the questionnaire. Kersten and Bethlehem (1984) propose to ask only 2 or 3 basic questions, whereas Lynn (2003) uses questionnaires that contain a larger number of questions.

Uncertainty about the impact of nonresponse, especially about the bias of population estimators, is a constant boost for research in methods for nonresponse reduction and adjustment. The lasting uncertainty about the influence of nonresponse was the motivation for various studies with intensive call-backs of nonrespondents. We refer to Elliott et al. (2000), Keeter et al. (2000), Lynn et al. (2002), Stoop (2001 and 2004) and Voogt (2004). The studies aim at a full response in a call-back of nonrespondents or at least a nonresponse that is Missing-Completely-at-Random. Stoop (2004) describes a study in the Netherlands in which about 70% of the former nonresponding households were converted to respondents.

From July to December 2005 a large scale follow-up of nonrespondents in the Dutch Labour Force Survey (LFS) was conducted at Statistics Netherlands. In the study a sample of nonrespondents in the LFS was approached once more with strongly condensed CATI, web and paper questionnaires. The sample consisted of LFS households that refused, were not processed or were not contacted in the LFS of the months July – October. This follow-up is part of a larger study that also includes an intensive follow-up of nonrespondents by a small set of selected interviewers (call-back approach) and a follow-up of respondents that refused to participate in the CATI waves of the LFS. For a description of the whole study see Bethlehem et al. (2005). In this paper we focus completely on the follow-up of nonrespondents with the basic-question approach. The other parts of the study will be discussed in different papers. Schouten (2007) presents the results from the call-back approach. He shows that the call-back respondents are different from the LFS respondents but that differences in employment status disappear within post stratification classes. Furthermore, the call-back response resembles the remaining nonresponse.

As Statistics Netherlands disposes of a large set of administrative data, we can also enrich the samples with a number of auxiliary variables.

The study will answer the following research questions:

- Do basic-question respondents have similar demographic, geographic and socio-economic characteristics as LFS respondents?
- Are LFS respondents and basic-question respondents different with respect to employment situation?
- If LFS respondents and basic-question respondents are different with respect to employment situation, can this difference be adjusted for by stratification using auxiliary information?
- Are basic-question respondents similar to basic-question nonrespondents?

- Are basic-question respondents similar to call-back respondents?
- Does the basic-question approach leads to a more representative pool of respondents?

The research questions relate to the concept of a continuum of resistance, see e.g. Groves and Couper (1998). In two dimensions, contactability and willingness to participate, households can be put on a scale from easy to difficult. It is conjectured that easy-to-convert nonrespondents are similar to respondents, while hard-to-convert nonrespondents may be different. Literature does not present a consistent view of differences between easy and difficult responders. Lynn et al. (2002) conclude that extended efforts change both the composition of the response as well as survey estimates. They base their findings on three surveys with a range of topics; the Family Resources Survey, the Health Survey and the Social Attitudes Survey. One of their main conclusions is that the impact of extended interviewer efforts is particularly large for the variables age and employment status. They claim, however, that these changes are largely due to the follow-up of difficult-to-contact households and to a lesser extent to the follow-up of reluctant refusals. Stoop (2005) concludes that persistent refusers are different from converted refusers and that a follow-up not necessarily leads to a better response.

First, we want to investigate whether a follow-up of nonrespondents with basic questions gives more of the same. In other words, are converted nonrespondents similar to respondents? Given the literature, it is interesting in general to identify differences between the LFS and basic-question respondents. In the light of the LFS is it important to investigate whether nonrespondents are more often unemployed or not a member of the labour force.

Second, we compare the composition of the LFS response to that of the combined response of LFS and the basic-question approach to investigate the representativity of the two response sets. We do so using so-called R-indicators; see Schouten and Cobben (2007).

In the analysis, we are confronted with a practical implication of the design of the experiment. In the basic-question approach, we randomly selected one person per household. In the regular LFS however, we interviewed every person in the household (up to a maximum of 8). We can deal with this design-difference in two ways: from the regular LFS also select one person like in the basic-qustion approach and compare this group to the basic-question group. Or, compare the composition of households instead of persons, i.e. when comparing the composition of the two groups we use aggregate variables on the household level. Except when the basic-questions themselves are compared, then personal records are used for the analysis but with characteristics that are aggregated to the household level. We chose the second option and use characteristics that are aggregated to the household level.

Section 2 starts with a description of the LFS and the basic-question approach. Next, section 3 contains the various analyses. The conclusions follow in section 4.

2. Design of the basic-question approach

2.1 The Dutch Labour Force Survey

The Dutch Labour Force Survey (LFS) is a monthly household survey. In 2005 the sample size was approximately 6500 addresses per month. The target population consists of all inhabitants of the Netherlands of 15 years and older, except for people living in institutions. The main objective of the LFS is a set of statistics about the employment status of persons and households. Most statistics concern the population of 15 – 64 years. However, the LFS also produces statistics about persons of 65 years and older.

The sampling frame of the LFS is the Dutch municipality administration (Gemeentelijke Basisadministratie or GBA). The survey is a two-stage sample, where geographical stratification is based on a regional classification; the so-called COROP-classification. In the first stage clusters are formed by municipalities. These clusters are selected with probabilities proportional to their size. From the clusters simple random samples without replacement are drawn consisting of addresses. The first-order inclusion probabilities differ only for age. Addresses with all inhabitants older than 64 years have a lower inclusion probability. Also in the allocation of addresses the sample is reduced for some interviewer districts due to workload or staffing of interviewers. For each address up to four households can be interviewed and within each household the maximum of interviewed persons is set to eight.

The selected households are interviewed face-to-face in CAPI (Computer Assisted Personal Interviewing). Proxy interviewing is allowed under certain circumstances. The LFS is a rotating panel. Each household is asked whether it is willing to participate in four CATI interviews with time lags of three months. Hence, the last interview is 12 months after the CAPI interview. In this paper, we concentrate on the CAPI interview and the nonresponse in this interview.

The CAPI response is weighted to known population totals using the generalised regression estimator, see e.g. Bethlehem (1988). The weighting model has the following form

$$(AgeGen_8 \times Region_{44}) + (Gender_2 \times Age_{21}) + (Age_5 \times Marstat_2) + (Gender_2 \times Age_5 \times Ethnicity_8)$$

where subscripts denote the number of strata. $AgeGen_8$ is a combination of age and gender in eight classes, $Region_{44}$ is the COROP-stratification, Age_{21} and Age_5 are stratifications of age, $Marstat_2$ is a dichotomy of marital status in married and unmarried, and $Ethnicity_8$ is a stratification in 8 categories based on ethnic background. '×' implies that the variables are crossed whereas '+' indicates an additive weighting adjustment. Boonstra et al. (2005) investigate an extension of the weighting model using administrative data of the Dutch Centres for Work and Income (Centra voor Werk en Inkomen or CWI). Persons looking for a job can subscribe to these centres. Boonstra et al. propose to add variables from this register

as they are closely related to the main topics of the LFS and serve as predictors for the employment status. For this reason we will also consider CWI related variables.

For further details we refer to Hilbink et al. (2000), Cuppen and Martinus (2001) and Boonstra et al. (2005).

2.2 The basic-question approach

In the basic-question approach we took samples out of the nonresponding households for the months July to October. The design had the following features:

- A strongly condensed questionnaire containing only key questions of the LFS which takes between 1 and 3 minutes to answer or fill in (see Appendix A);
- The questionnaire was to be answered by only one randomly selected person per household;
- Besides a sample of nonrespondents, also a fresh control sample was approached by condensed CATI, paper and web questionnaires to analyse possible mode effects of the basic-question approach;
- Eligible response types were refusal, no contact and unprocessed cases;
- The timing of the basic-question approach is one week after the household was processed as a nonresponse.

The questionnaire contained a small number of questions to determine the key variable of the Labour Force Survey – employment status. Statistics Netherlands uses a classification of the employment status in three categories, employed, unemployed and non labour force. The exact definitions are complex. Essentially someone is employed if he or she has a paid job for at least 12 hours a week and is unemployed if he or she is working less than 12 hours a week but is actively seeking and available for one or more jobs with a total of more than 12 hours a week. The remaining persons are not a member of the labour force. We will refer to them as non labour force. In the regular LFS, these questions are asked in the beginning of the questionnaire. The questions are thus not taken out of their context. We assume that there are no questionnaire effects and we can directly compare the answers in the basic-question approach to the answers in the regular LFS.

The design for the basic-question approach is mixed. Addresses for which a listed, land-line telephone number could be linked, were approached by CATI. The addresses for which such a link could not be established, were approached by a combination of a paper questionnaire and a web questionnaire. A pre-notification letter with a paper questionnaire was sent to the selected addresses, and in the letter the selected person in the household was presented the choice between a web questionnaire and a paper questionnaire.

The idea behind the basic-question approach is that respondents who refuse to participate can often be persuaded to answer a few questions. However, asking too much questions risks getting no information at all. We decided to only interview one person per household to reduce the response burden and thus stimulate participation.

As opposed to the regular LFS, where every eligible person in a household has to participate, we randomly selected one person to still obtain a random sample of respondents. We chose to use the method of the next birthday, i.e. the person that was the next to have its birthday was asked to participate. For a description and analysis of the next-birthday method in the basic-question approach, see Cobben and Schouten (2007). For approximately 16% of the households with more than one person, the selection procedure did not result in the randomly selected respondent. However, there is no strong evidence that this selection error is related to the employment status of the respondents.

We also approached a fresh control sample of a 1000 households with the basic-questionnaires. Ideally, the basic-questionnaires should also have been presented to a sample of LFS-respondents. That would enable us to directly compare the answers obtained by the nonrespondents to that of the respondents. However, the experiment was designed not to intervene with the regular LFS. Therefore, we chose to approach a fresh control sample instead of LFS respondents to analyse possible mode effects. Cobben (2007) analysed this control sample. She found that the design of the basic-question approach caused a break in the composition of the respondents with respect to telephone ownership. The response in the CATI group was much higher than in the paper/web group and due to this design-effect, the most influential variable on the response indicator is the listed telephone indicator. Therefore, she restricted the analysis to households that could be approached by CATI. In this group, there is no strong evidence that the employment status that is derived from the basic questions suffers from mode effects.

A label was assigned randomly to all sample units in the LFS beforehand. A label 2 implied that the household was a candidate for the basic-question approach, i.e. in case it would not respond it was selected for the approach with condensed questionnaires. A label 0 meant that no follow-up was undertaken irregardless of the response type of the household. The labelling was based on historic response rates in the participating interviewer districts. The labelling procedure was necessary because nonrespondents were selected before the end of the fieldwork period and because we wanted to run the selected households through an extensive, manual, telephone number linkage procedure. This procedure is not performed in the regular LFS, because the first round in the LFS is face-to-face. For the CATI waves, we ask respondents for their telephone numbers. Also, the procedure is rather expensive because it is done manually.

It was decided not to select households that did not respond due to problems with language or due to a mental or physical handicap or long term illness. In practice this is, however, a relatively small group. See Figure 2.2.1 for the groups involved.

Figure 2.2.1: The various groups in the LFS and basic-question approach

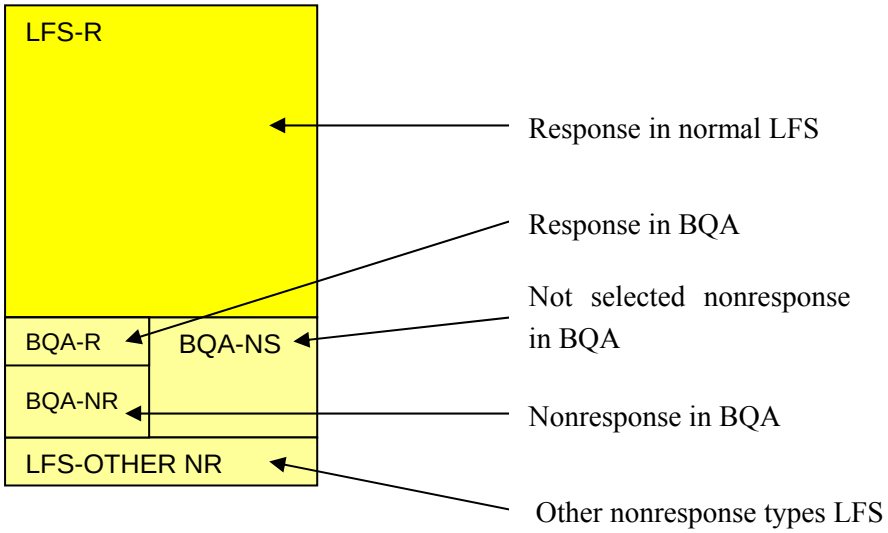
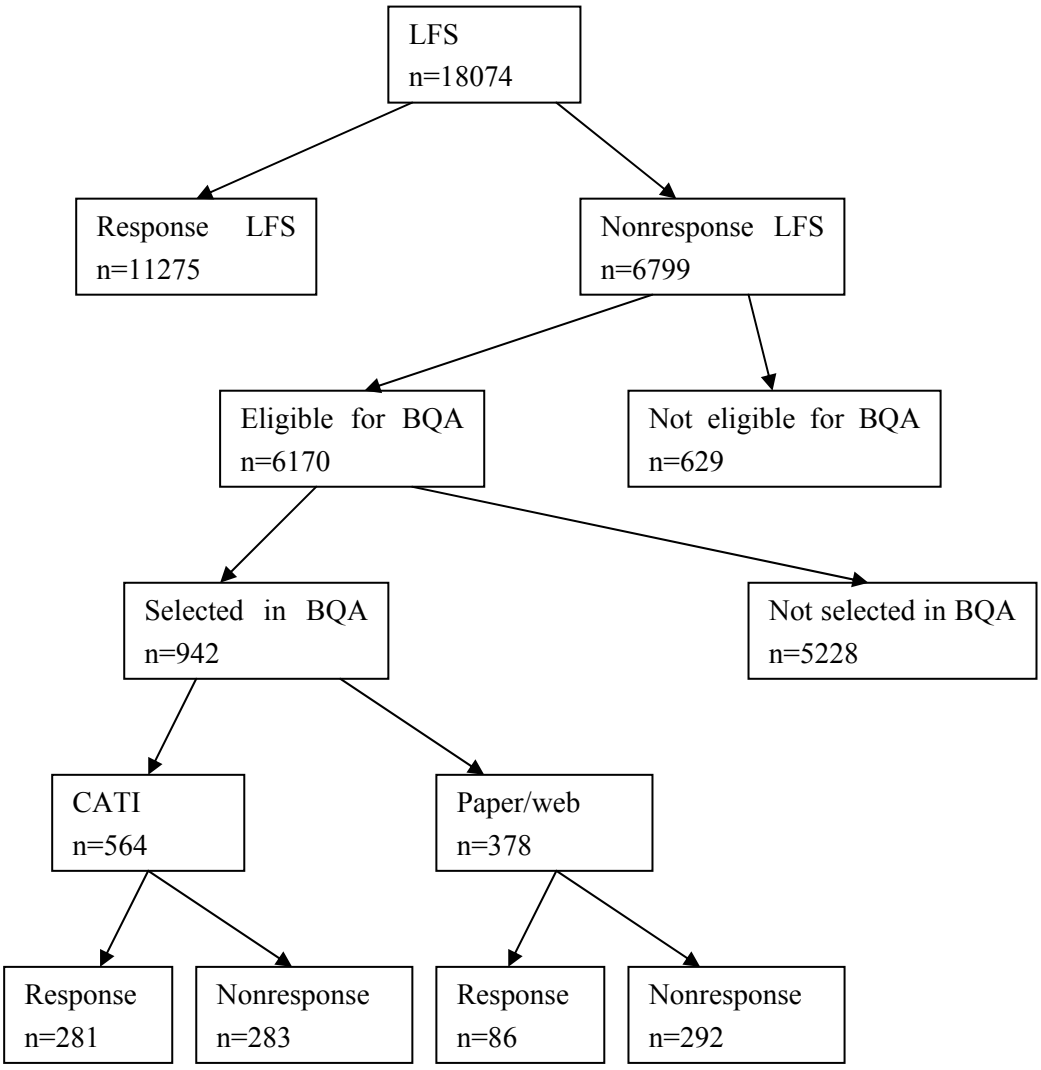


Figure 2.2.2 gives an overview of the number of households in the LFS. Approximately 62% (11275 out of 18074) of the households responded. Of the remaining 6799 households 6172 were eligible for the basic-question approach. From the LFS nonresponse of July – October 942 eligible households were selected, which is approximately 15% (942 out of 6127). Of the selected households 367 responded, a response rate of approximately 39% (367 out of 942).

Figure 2.2.2: Sizes of the various groups in the basic-question approach



When we distinguish between the two different data collection modes that were used in the basic-question approach, we see that the response rate in CATI (50%) is much higher than in the paper and web variant (23%). This result is not very surprising. Interviewer-assisted data collection modes in general obtain higher response rates due to the persuasive power of the interviewers. Besides that, we know from previous research (Schouten 2004) that persons without a listed telephone participate less in surveys. Furthermore, Griffin et al. (2001) found that offering multiple modes of response in a mailing led to a lower response rate. They suspect that offering a mode of response other than mail, in combination with a paper questionnaire, contributes to a break in the response process and thus results in a lower overall response rate.

In the analysis we assigned weights to all households selected for the BQA in order to let these households represent all of the eligible households. In section 3.1 we describe how these weights were chosen. For the moment we only remark that eligible households that were not selected receive a weight equal to zero, i.e. we

omitted them from the analyses. The selected eligible households thus represent the whole group of eligible households.

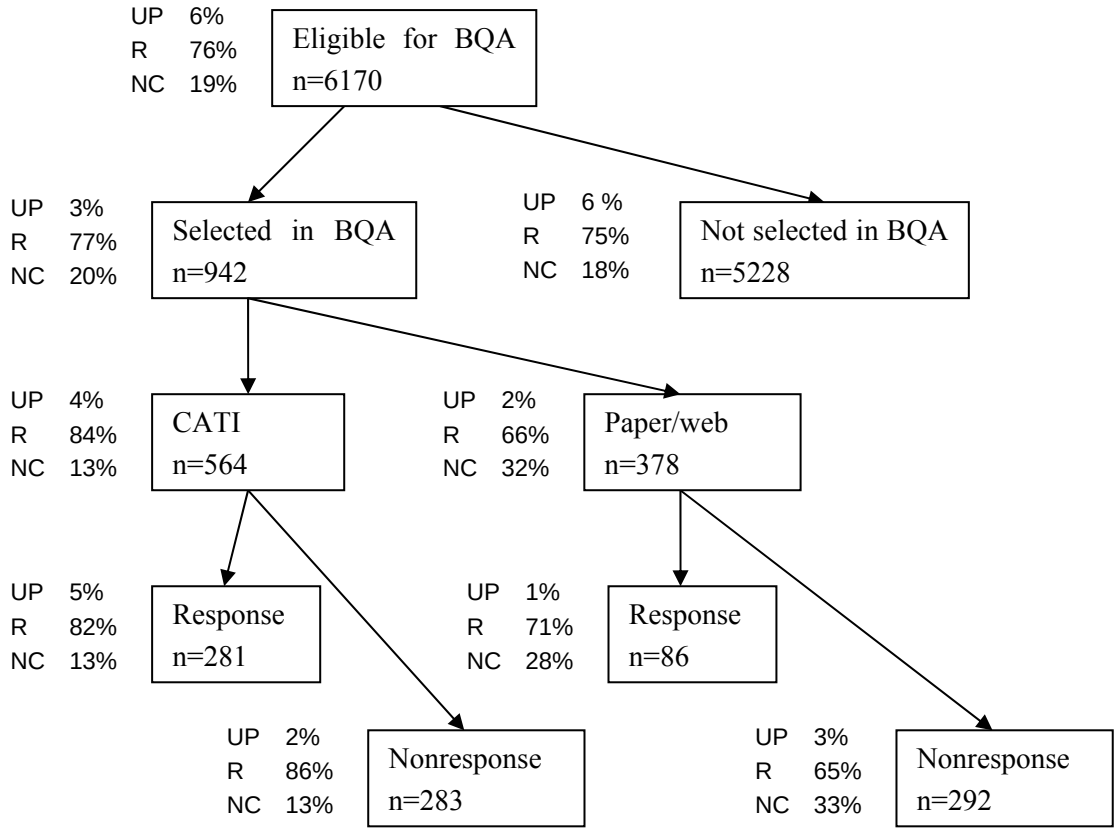
2.3 Different causes of nonresponse

In the experiment, we selected three types of nonresponse that were eligible for the basic-question approach. These are: households that were not processed, that refused or were not contacted in the regular LFS.

It is important to obtain insight into the characteristics of nonrespondents. The better we understand what causes a nonresponse, the better we are able to adjust for the effect of nonresponse on the estimation of population characteristics. Previous research on nonresponse shows that nonrespondents that are reluctant to cooperate (refusals) differ in composition from nonrespondents that are difficult to reach (non-contacts). See Bethlehem and Schouten (2004) and Stoop (2005). Nicoletti and Peracchi (2005) propose a sequential model for nonresponse. They regard refusal as a type of nonresponse that is conditional on contact. After all, one can only refuse once contact is made. Cobben et al. (2006) also distinguish different causes of nonresponse in a sequential model to adjust for nonresponse bias.

It is interesting to see how these different groups participated in the basic-question approach. In Figure 2.3.1 we show the composition of the various groups in the basic-question approach, based on the type of nonresponse in the regular LFS.

Figure 2.3.1 Classification of the groups in the basic-question approach according to the nonresponse types in the regular LFS. UP = unprocessed; R = refusals; NC = non contacts.



UP is an abbreviation of unprocessed households, R of refusal and NC of non-contact. The figures are calculated with respect to a reference group. For instance, 564 households are selected for CATI basic-questions. Of these 564 households, approximately 4% were unprocessed in the regular LFS, 84% refused and 13% were not contacted.

A smaller number of unprocessed households has been selected in the basic-question approach than was eligible for selection; 3% versus 6%. This is possibly caused by the labelling process, which is based on estimated response probabilities. Selected households with a listed telephone were approached by CATI. Households without a listed telephone were approached by the paper/web combination. In this group, the largest proportion consists of former non-contacted households. Because most former non-contacts ended up in this group, there were less former non-contacted households in the CATI group. Therefore, the percentage of refusals was higher in this group (84% versus 77%). This seems to contradict the literature, e.g. Schouten (2004) finds that persons with a listed telephone are more cooperative than persons without and yet we find here more refusals amongst the households with a listed telephone. However, one should bear in mind that in this experiment, only former nonresponding households are selected. Amongst these households, there will be less households with a listed telephone because they already participated in the regular LFS. This is confirmed by the figures, in the population approximately 67% of the households in the Netherlands has a listed telephone. In the experiment however, we found that only 60% (564/942) has a listed telephone.

Almost 50% of the households in CATI responded. There is little difference over the former nonresponse groups. For the non-contacts we found no difference. The unprocessed households more often responded, and the former refusers tended to respond less. In the paper/web combination, we saw the contrary. The former refusers responded more often whereas the unprocessed households more frequently did not respond. The former non-contacts less often responded.

In Table 2.3.1 we show the results, related to the former nonresponse types. For instance, of the former refusals that have a listed telephone, 49% participated. Of the former refusals without a telephone, 24% participated in the paper/web combination. The total refers to the total response in the former nonresponse group. Of the former refusals in total, 40% could be persuaded to participate in the basic-question approach.

Table 2.3.1 Response in the BQA according to former type of nonresponse

Former nonresponse group	*Response CATI*	*Response Paper/web*	*Total*
Unprocessed	75%	11%	55%
Refusal	49%	24%	40%
Non-contact	50%	20%	31%

Non-contacts had lower response rates than refusals in the paper/web basic-question approach and also in the basic-question approach as a whole. We tested for

independence between response and former type of nonresponse in the paper/web variant and in the group as a whole with a Chi square test. The nulhypothesis of independence is rejected at a 5% level (p=0.56 for paper/web and p=0.15 for the whole group). Although the differences are not significant at the 5% level, they still may affect the composition of the additional response. We know that non-contacts in general have features that are different from refusals.

3. Analysis

In the analysis we made five comparisons using a set of auxiliary variables that was retrieved from administrative data. Appendix B contains the list of the auxiliary variables and their abbreviations that we refer to throughout the paper. In the following we use LFS and BQA as abbreviations for labour force survey and basic-question approach, respectively. We compared

- the LFS response with the LFS sample (section 3.2)
- the LFS plus BQA response with the LFS sample (section 3.3)
- the LFS response with the BQA response (section 3.4)
- the BQA response with the BQA sample (section 3.5)
- the BQA response with the call-back response (section 3.6)

Based on the research by Cobben (2007), we also decided to analyse only the households that have a listed land-line telephone. This implies that we only consider the basic-question approach that was carried out by CATI. The results of this analysis can be found in section 3.7. Finally, in section 3.8 we look at the representativeness of the response for the different groups in the pilot.

We regard response as a decision of the household. The analyses that concern the composition of the different groups comprise characteristics that are aggregated to the household level. These are the analyses in section 3.2, 3.3, 3.5 and the first analysis in section 3.7. When we directly compared the response, in section 3.4, 3.6 and the second analysis in section 3.7, we analysed personal records but we still used aggregated characteristics of the household.

The analyses are described in sections 3.2 to 3.8. Due to the design of the basic-question approach, there were two selection mechanisms that we had to account for in the analysis. We explain this in section 3.1.

3.1 Selection weights

The nonrespondents that were re-approached with basic questions answer these questions in a different time period than do the regular LFS respondents. It is known that employment has seasonal and cyclical components. Hence, a delay in time may imply that we find a difference in employment rate that is to be attributed to the month of observation and not to nonresponse bias. Unless a time series model is

posed for employment, it is not possible to disentangle the effects of nonresponse and time. We will not do that but accept the time lag.

As mentioned before, there were two selection mechanisms that we had to account for in the analysis. The first comprised the selection of eligible households for the basic-question approach. This selection effect is easily accounted for by assigning weights to the selected, eligible households so that they represent all eligible households, see Table 3.1.1.

The second selection mechanism played a role when regarding the response to the basic-question approach. Here, the next birthday method was applied and only one person of the whole household responded. When we compared BQA respondents to LFS or call-back respondents we had to account for this selection probability (section 3.4, 3.6 and 3.7). In the other analyses, i.e. where the nonrespondents were also considered, no adjustment was needed because then the analysis was based on household characteristics only and did not depend on the number of respondents per household. In other words, we regarded response as a household decision. Obviously, in case of a refusal or a response it is always a single person that makes the decision, but in case of non-contact or a non-processed address the nonresponse is related to household characteristics. The selection weights are based on the number of persons in the household. We retrieved this information from the Dutch municipality administration. Respondents represent all persons in their household and the inclusion probability equals 1 / number of persons in the household.

Table 3.1.1: The selection of eligible households for the BQA, weights and sizes

Group	*Total size*	*Size selection*	*Weight*
Eligible BQA	6170	942	6,55
Not eligible BQA	629	0	1
LFS response	11275	0	1

3.2 A comparison of LFS response with LFS sample

The first analysis concerned the response in the regular LFS, see Figure 3.2.1. We used Stata for the analysis. This software package has a survey design feature that can account for different selection weights. We applied the selection weights displayed in Table 3.1.1. to the selected households in the basic-question approach so that they represent all eligible households for this approach.

Figure 3.2.1: A weighted comparison of LFS response with LFS sample

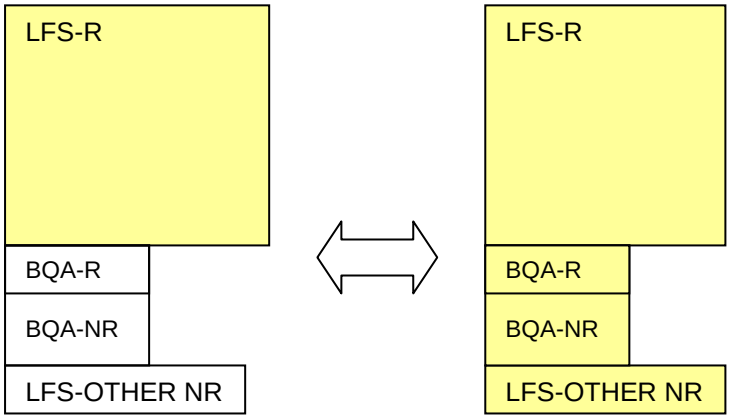


Table 3.2.1: Univariate tests of independence between LFS response and auxiliary variables. Test statistics are the adjusted Pearson's Chi square and the adjusted Wald statistic

Variable	*p-value*	
	Pearson's Chi square	*Wald statistic*
Urbanicity	< 0.0001	< 0.0001
Telephone	< 0.0001	< 0.0001
Region	< 0.0001	< 0.0001
Province	< 0.0001	< 0.0001
Gender	< 0.0001	< 0.0001
Ethnicity	< 0.0001	< 0.0001
House value	0.0014	0.0008
Household type	< 0.0001	< 0.0001
Job	0.0005	0.0009
Disability allowance	0.4874	0.4953
Social allowance	< 0.0001	< 0.0001
CWI subscription	0.0040	0.0064
Unemployment allowance	0.1738	0.1517
Self employed	0.3686	0.3541
Average age	0.0297	0.0347

First, we compared the composition of the auxiliary variables in the LFS response to the composition in the sample. Table 3.2.1 shows the *p*-values for two univariate tests for independence between LFS response and auxiliary variables. The test statistics are in line with each other and lead to similar conclusions.

Both Pearson's Chi Square and the adjusted Wald statistic test the (null-)hypothesis that the response and the auxiliary variables are independent. This null hypothesis is rejected if the corresponding p-value < α (significance level). For almost all variables independence is rejected at 5% or 1% levels. This means that there is a significant relation between these variables and the LFS response in the sample. The only exceptions are disability allowance, unemployment allowance and self employed.

Table 3.2.2: The adjusted Wald statistic for the auxiliary variables in the logistic regression model. The dependent variable is response (1) in the LFS vs. nonresponse (0). In parenthesis are the corresponding p-values

Model	*Telephone*	*SocAll*	*Gender*	*Urb*	*Region*	*Ethn*	*Typehh*
Wald statistic	28.49	13.24	4.59	4.12	4.04	3.21	2.44
p-value	(0.0000)	(0.0003)	(0.0102)	(0.0025)	(0.0070)	(0.0037)	(0.0168)

Next, we performed a weighted logistic regression with LFS response (1) and nonresponse (0) as a dependent variable and the available auxiliary variables as covariates. Table 3.2.2 describes the model fit to the LFS response. The model selection is based on the adjusted Wald statistic. We chose to select a model according to the methodology of general-to-specific modelling (Campos et al. 2005). First, all the available auxiliary variables are included in the model. Then, stepwise the least significant variables are left out of the model until all remaining variables are significant.

Table 3.2.3: The parameters in the logistic regression for LFS response with standard errors and p-values. One and two asterisks denote significance at 5% and 1% level, respectively. Each first category is used as a reference category

Category	*Parameter*	*Standard error*	*p-value*
Intercept	-0.173	0.153	0.256
Urbanicity			
very strong	0		
strong	0.205*	0.090	0.022
moderate	0.151	0.101	0.136
little	0.420**	0.113	<0.001
not	0.346**	0.124	0.005
Telephone			
no	0		
yes	0.371**	0.070	<0.001
Region			
North	0		
East	0.081	0.149	0.589
West	-0.059	0.131	0.651
South	0.260	0.145	0.073
Household type			
single	0		
not married	0.012	0.169	0.944
married	0.210	0.173	0.223
not married + children	0.109	0.205	0.597
married + children	0.366*	0.166	0.028
single parent	0.217	0.143	0.128
other	-0.459	0.295	0.119
>1 household	0.447*	0.207	0.031

Category		*Parameter*	*Standard error*	*p-value*
Ethnicity				
	native	0		
	Moroccan	-0.563*	0.223	0.012
	Turkish	-0.331	0.199	0.096
	Surinam/Antilles	0.064	0.194	0.740
	other non-western	-0.349**	0.124	0.005
	other western	-0.205	0.164	0.211
	mix	0.134	0.111	0.226
Gender				
	All male	0		
	All female	0.319**	0.105	0.002
	Mix	0.123	0.159	0.439
Social Allowance				
	no	0		
	yes	-0.407**	0.112	<0.001

The variable that gives the strongest explanation is the availability of a fixed land-line telephone. This result for the LFS is confirmed by other studies of CAPI surveys, e.g. Schouten (2004), Van den Brakel et al. (2004), Cobben and Bethlehem (2005), and can be explained to some extent by the fact that interviewers are allowed to make appointments with respondents by telephone after a third failure to make contact. Also, households for which no telephone number is available may have an unlisted telephone number. These households may be less willing to participate in a survey.

Table 3.2.3 gives the regression parameters of the final logistic regression model of Table 3.2.2. An intercept was included in the model. From the regression parameters we can conclude that the availability of a telephone increases response. Furthermore, the north of the Netherlands has a lower response rate than the southern part. Within regions, the more urbanised areas tend to have a lower response. Relative to native households, Moroccan, non-western groups other than Turkish households have a significantly lower response rate. When it comes to the type of household the married couples with children and addresses with more than one household do significantly better than households consisting of only one person. Also, households that consist of only women respond better than households with men only. Last, having a social allowance reduces the probability of a response.

3.3 A comparison of LFS plus BQA response with LFS sample

Next, we added the BQA response to the LFS response and repeated the analysis of section 3.2. Figure 3.3.1 shows the groups involved.

Figure 3.3.1: A weighted comparison of LFS & BQA response with LFS sample.

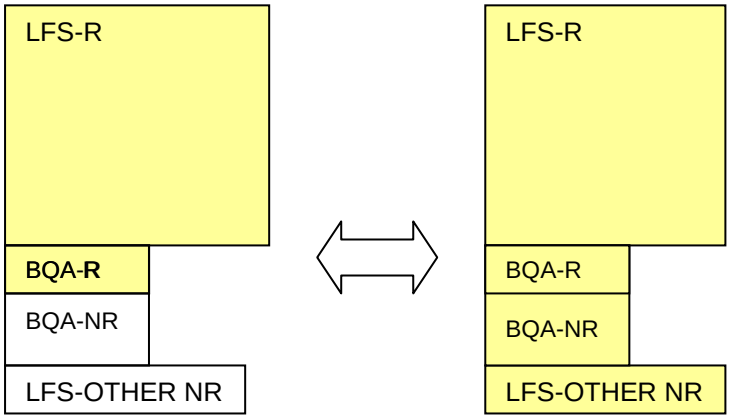


Table 3.3.1 contains the *p*-values of the univariate weighted tests for independence of response in LFS plus BQA and various auxiliary variables. In general the *p*-values are decreased when the BQA response is added. This would imply that the response has become more dependent from the auxiliary variables and thus less representative with respect to those variables. Independence is still rejected for most variables, except for average age, disability- and unemployment allowance and self employed. These are almost the same variables as in the LFS response alone; the only distinction being average age of the household. This would imply that the response became more representative with respect to age.

Table 3.3.1: Univariate tests of independence between LFS & BQA response and auxiliary variables. Test statistics are the adjusted Pearson's Chi square and the adjusted Wald statistic

Variable	*p-value*	
	Pearson's Chi square	*Wald statistic*
Urbanicity	< 0.0001	< 0.0001
Telephone	< 0.0001	< 0.0001
Region	0.0001	< 0.0001
Province	< 0.0001	< 0.0001
Gender	< 0.0001	< 0.0001
Ethnicity	< 0.0001	< 0.0001
House value	< 0.0001	< 0.0001
Household type	< 0.0001	< 0.0001
Job	< 0.0001	< 0.0001
Disability allowance	0.1995	0.2176
Social allowance	< 0.0001	< 0.0001
CWI subscription	0.0001	0.0005
Unemployment allowance	0.1600	0.1336
Self employed	0.6016	0.6091
Average age	0.1637	0.1518

Table 3.3.2: The adjusted Wald statistic for the auxiliary variables in the logistic regression model. The dependent variable is response (1) in the LFS or the BQA vs. nonresponse (0). In parenthesis are the corresponding p-values

Model	*Telephone*	*Gender*	*Job*	*Ethn*	*SocAll*	*Urb*	*Age*
Wald statistic	62.79	13.00	7.13	5.41	4.15	3.89	3.36
p-value	(0.0000)	(0.0000)	(0.0076)	(0.0000)	(0.0416)	(0.0037)	(0.0348)

The model fit of the logistic regression models for the LFS plus BQA response is given in Table 3.3.2. The final model is similar to the model for the LFS response except that type of household and region are not included. Instead of those variables, average age and having a paid job now entered the model. In the univariate analysis it seemed that there was no significant relation between age and response. However, when adjusting for the effects of other variables, age still added explanatory power to the response indicator. Table 3.3.3 gives the regression parameters.

Again the less urbanised areas of the Netherlands show a higher response. Having a fixed land-line telephone still implies a higher response rate. This is not surprising as the design of the basic-question approach consisted of a mix of CATI, paper and web questionnaires. As mentioned before, the response in the CATI group was much higher than in the paper/web group. Since we added the response in the BQA to the LFS response, the influence of telephone on response is now very significant and positive. Having a job has a positive effect on response. Relative to native households, Moroccan, Turkish, other non-Western and other Western households have a significantly lower response rate. The age group of 35 and younger has the highest response. Households that consist of only women or a mix of men and women do better than households with men only. Having a social allowance still has a negative impact on response.

We can conclude that the addition of the BQA response led to changes in the composition of the total response. We come back to the composition of the total response in section 3.8 when we consider the representativity of the response. The explanatory power of the response model is increased, which implies that the response has become less representative.

Table 3.3.3: The parameters in the logistic regression for LFS & BQA response with standard errors and p-values. One and two asterisks denote significance at 5% and 1% level, respectively. Each first category is used as a reference category

Category	*Parameter*	*Standard error*	*p-value*
Intercept	0.262	0.146	0.073
Urbanicity			
very strong	0		
strong	0.272*	0.107	0.011
moderate	0.107	0.117	0.361
little	0.432**	0.134	0.001
not	0.386**	0.142	0.007

Category	*Parameter*	*Standard error*	*p-value*
Telephone			
no	0		
yes	0.666**	0.084	<0.001
Ethnicity			
native	0		
Moroccan	-0.779**	0.229	0.001
Turkish	-0.601**	0.215	0.005
Surinam/Antilles	-0.150	0.220	0.495
other non-western	-0.449**	0.146	0.002
other western	-0.634**	0.180	<0.001
mix	0.041	0.135	0.761
Gender			
All male	0		
All female	0.512**	0.119	<0.001
Mix	0.488**	0.106	<0.001
Social Allowance			
no	0		
yes	-0.278*	0.136	0.042
Average age			
< 35	0		
35 – 54	-0.250*	0.098	0.011
55 +	-0.127	0.123	0.302
Job			
no	0		
yes	0.272**	0.102	0.008

3.4 A comparison of LFS response with BQA response

In the preceding two sections we compared the response to the sample. It turned out that the response has become slightly less representative of the sample when the BQA response is added. We continued the analysis by directly comparing the LFS response and BQA response to see whether we could find a confirmation of these conclusions. In this section, we discuss the results of that analysis. See Figure 3.4.1 for the groups involved.

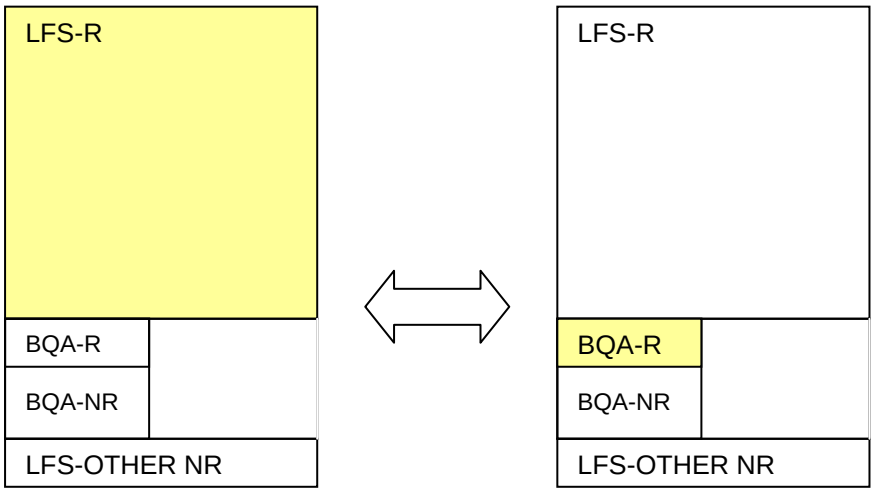
Because we considered the respondents, we had to compare persons instead of households. The answers to the survey questions were made by persons. In the BQA only one person per household was approached for participation. Therefore we could not compare aggregate variables for the employment situation. We had to assign weights to the respondents in the basic-question approach, so that they represented all persons in their household. See section 3.1.

In Table 3.4.1 again a summary is given of weighted univariate tests for independence of response group, LFS or BQA, and the various auxiliary variables.

From Table 3.4.1 we can see that independence for the target variable is not rejected. Between the two response groups there is no significant difference in employment status on the household level. In general, we see very high *p*-values. The null hypothesis of independence is rejected for the variables urbanicity, province,

household type and average age. With respect to these variables, the composition of the response in the LFS and the BQA seems to be different. For all job related variables independence is not rejected, which seems to indicate that indeed the two response groups do not differ with respect variables related to employment. The high *p*-values indicate that the additional response in the basic-question approach did not lead to a very different pool of respondents, but gave us 'more of the same'.

Figure 3.4.1: A weighted comparison of LFS response with BQA response



In Tables 3.4.2 and 3.4.3 the logistic regression model for LFS response versus BQA response is given. The model does not have a very strong explanatory power and contains only the variables age and region. With respect to these variables the two response groups are significantly different from each other. However, these results are only weakly significant. The only significant parameter is that for an average age between 35 and 54. This group has responded more in the LFS, compared to the age group of < 35.

Again the LFS variable employment status did not give a significant contribution to the model. This implies that there is no difference in employment status between the two groups.

The results of the logistic regression suggest that the response became slightly more representative with respect to age and region as the households that do worse in the LFS are overrepresented in the BQA response.

Table 3.4.1: Univariate tests of independence between LFS response with BQA response and auxiliary variables. Test statistics are the adjusted Pearson's Chi square and the adjusted Wald statistic

Variable	*p-value*	
	Pearson's Chi square	*Wald statistic*
Employment status	0.4179	0.2506
Urbanicity	0.0148	0.0112
Telephone	0.7968	0.7974
Region	0.0999	0.0829
Province	< 0.0001	< 0.0001
Gender	0.4861	0.5382
Ethnicity	0.6546	0.3445
House value	0.7869	0.8387
Household type	0.0475	0.0829
Job	0.6633	0.6582
Disability allowance	0.4696	0.4509
Social allowance	0.4555	0.4861
CWI subscription	0.4153	0.3978
Unemployment allowance	0.2576	0.2170
Self employed	0.1170	0.0759
Average age	0.0104	0.0149

Table 3.4.2: The adjusted Wald statistic for the auxiliary variables in the logistic regression model. The dependent variable is response in the LFS (1) or the BQA (0). In parenthesis are the corresponding p-values

Model	*Age*	*Region*
Wald statistic	3.87	3.58
p-value	(0.0208)	(0.0132)

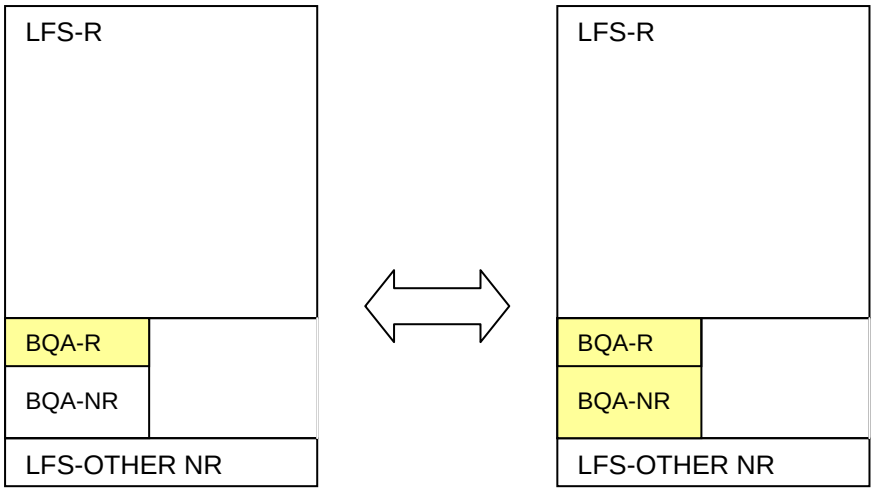
Table 3.4.3: The parameters in the logistic regression for LFS response (1) compared to BQA response (0) with standard errors and p-values. One and two asterisks denote significance at 5% and 1% level, respectively. Each first category is used as a reference category

Category	*Parameter*	*Standard error*	*p-value*
Intercept	1.258**	0.204	<0.001
Region			
North	0		
East	0.167	0.233	0.474
West	-0.090	0.197	0.650
South	0.367	0.226	0.105
Average age			
< 35	0		
35 – 54	0.360**	0.130	0.005
55 +	0.229	0.142	0.108

3.5 A comparison of BQA response with BQA sample

This analysis is within the BQA study itself. We compared the BQA response to the BQA sample, see Figure 3.5.1. For this analysis it was not necessary to use weights since all selected households in the BQA have the same weight.

Figure 3.5.1: The BQA response and BQA sample.



The *p*-values for the tests of independence of response and auxiliary variables are given in Table 3.5.1. The variables that show a significant association with response at the 1% level are telephone, gender, job and social allowance. At a 5% level independency is rejected also for the variables ethnicity and household type.

Table 3.5.1: Univariate tests of independence between BQA response and the BQA sample and auxiliary variables. Test statistics are the adjusted Pearson's Chi square and the adjusted Wald statistic

Variable	*p-value*	
	Pearson's Chi square	*Wald statistic*
Urbanicity	0.4177	0.4201
Telephone	<0.0001	<0.0001
Region	0.9627	0.9632
Province	0.5148	0.5400
Gender	0.0002	0.0001
Ethnicity	0.0404	0.0167
House value	0.1857	0.2152
Household type	0.0341	0.0316
Job	0.0012	0.0009
Disability allowance	0.3505	0.3434
Social allowance	0.0061	0.0037
CWI subscription	0.0773	0.0710
Unemployment allowance	0.4028	0.4118
Self employed	0.1183	0.1065
Average age	0.0563	0.0564

Next, we constructed a logistic regression model for the BQA response indicator. The model and regression parameters are given in Table 3.5.2 and 3.5.3, respectively. The model contains the variables telephone, age, job and gender.

In Table 3.5.3 we see that the households with an average age between 35 and 54 years have a significantly lower response rate in the BQA. Furthermore, households that consist only of women or a mixture of men and women have a higher response rate, as do households where at least one person had a job in January 2005. Having a listed, land-line telephone has a large influence on the response. This can be explained by the data collection design of the basic-question approach. See also section 3.1. Based on telephone ownership households were assigned to CATI or a paper/web questionnaire. The response in the CATI group was much higher, and this is reflected in the high parameter for telephone.

The composition of the BQA response is different with respect to the variables telephone, age, paid job and gender.

Table 3.5.2: *The adjusted Wald statistic for the auxiliary variables in the logistic regression model. The dependent variable is response (1) in the BQA vs. nonresponse (0). In parenthesis are the corresponding p-values*

Model	*Telephone*	*Age*	*Job*	*Gender*
Wald statistic	29.62	5.37	7.60	3.39
p-value	(0.0000)	(0.0048)	(0.0059)	(0.0341)

Table 3.5.3: The parameters in the logistic regression for BQA response with standard errors and p-values. One and two asterisks denote significance at 5% and 1% level, respectively. Each first category is used as a reference category

Category		*Parameter*	*Standard error*	*p-value*
Intercept		-1.254**	0.235	<0.001
Telephone				
	no	0		
	yes	0.810**	0.149	<0.001
Average age				
	< 35	0		
	35 – 54	-0.540**	0.168	0.001
	55 +	-0.243	0.212	0.253
Gender				
	All male	0		
	All female	0.427*	0.218	0.050
	Mix	0.472*	0.186	0.011
Job				
	no	0		
	yes	0.496**	0.180	0.006

The BQA respondents do not seem to be a good representation of the BQA sample. There are still four variables on which the BQA respondents significantly differ from the BQA nonrespondents. However, the design of the basic-question approach appears to play a large role in these differences.

3.6 A comparison of BQA response with the call-back response

So far, we focussed completely on the basic-question approach in the LFS follow-up study of nonrespondents. In the analysis presented in this section we also compared the basic-question respondents to the other additional response that was obtained by the call-back approach. More details about this approach can be found in Schouten (2007). He shows that the call-back respondents are different from the LFS respondents but that differences in employment status disappear within post stratification classes. Furthermore, the call-back response resembles the remaining nonresponse.

We compared the composition of the respondents in the basic-question approach to that of the respondents in the call-back approach. In Table 3.6.1, the results for the univariate analysis are shown. A significant difference between the two groups is found with respect to the variables telephone, province, gender, house value, household type and job.

Table 3.6.1: Univariate tests of independence between BQA & call-back response and auxiliary variables

Variable	*p-value*	
	Pearson's Chi square	*Wald statistic*
Employment situation	0.2657	0.2247
Urbanicity	0.2737	0.2569
Telephone	<0.0001	<0.0001
Region	0.1457	0.1597
Province	<0.0001	<0.0001
Gender	<0.0001	<0.0001
Ethnicity	0.1194	0.0812
House value	0.0296	0.0251
Household type	<0.0001	<0.0001
Job	0.0007	0.0004
Disability allowance	0.4507	0.4427
Social allowance	0.3784	0.3645
CWI subscription	0.6248	0.6216
Unemployment allowance	0.7867	0.7851
Self employed	0.3314	0.3133
Average age	0.6247	0.6120

For the multivariate analysis, we perform a weighted logistic regression. The model selection is based on the adjusted Wald statistic. The final model and corresponding statistics are shown in Table 3.6.2. The model parameters can be found in Table 3.6.3.

Table 3.6.2: The adjusted Wald statistic for the auxiliary variables in the logistic regression model. The dependent variable is response (1) in the BQA vs. response in the call-back approach (0). In parenthesis are the corresponding p-values

Model	*Telephone*
Wald statistic	17.27
p-value	(0.0000)

Table 3.6.3: The parameters in the logistic regression for BQA/call-back response with standard errors and p-values. One and two asterisks denote significance at 5% and 1% level, respectively. Each first category is used as a reference category

Category		*Parameter*	*Standard error*	*p-value*
Intercept		0.178	0.106	0.093
Telephone				
	no	0		
	yes	-0.590**	0.142	<0.001

The only variable for which a significant difference is found between the call-back respondents and the basic-question respondents, is the availability of a listed, land-line telephone.

We suspect that also here, we are actually looking at a design-effect of the basic-question approach. As Cobben (2007) already concluded, the design of the basic-question approach caused a break in the composition of the response with respect to telephone ownership. The mixed-mode design of the BQA is largely dependent on listed telephone ownership. Households with no listed number are sent a one time invitation to participate in a Web or paper questionnaire. No additional effort is put in obtaining participation from these households, i.e. no reminders by mail or telephone. Also, the CATI approach is assisted by an interviewer as opposed to the self-administered questionnaires in both the Web and the paper variant. Consequently, the response in the last group was considerably lower, 23% compared to 55% in the CATI-group. One of the main differences between these groups obviously is telephone ownership. It is not surprising that this variable turns out to be significant when explaining response behaviour. Based on these findings, and the research by Cobben (2007), we decided to perform an additional analysis where we restrict the sample to households that have a listed land-line telephone. We do so in the following section.

3.7 Analysis restricted to households with a listed land-line telephone

The results from the previous analyses indicated that there is a strong design-effect in the basic-question approach. In section 3.2 we compared the LFS response to the LFS sample. The variable telephone entered the multivariate logistic model as the strongest explanatory variable. This implies that already in the regular LFS persons with a listed land-line telephone respond more often. When in section 3.3 the total response in the LFS plus the BQA is compared to the sample, again telephone is the most significant variable. When comparing the BQA response to the BQA sample

(section 3.5), also telephone ownership is the strongest explanatory variable. Finally, in the comparison of the BQA response to the call-back response (section 3.6), the variable telephone is the only variable for which a distinction between the two groups can be made.

It is interesting to investigate whether a restriction to households with a listed telephone will change our conclusions. From the previous analysis we would expect so. We made two additional analyses. First, we compared listed telephone households amongst the BQA respondents to listed telephone households amongst the LFS respondents. This analysis corresponds to the analysis in section 3.4 and the results can be found in section 3.7.1. The second analysis comprised a comparison of the response in the BQA to the BQA sample. This analysis is a replication of the analysis in section 3.5, but now with a restriction to households with a listed land-line telephone. The results are discussed in section 3.7.2.

3.7.1 BQA response compared to LFS response for listed telephone households

Like in section 3.4, we compared persons in the BQA response to persons in the LFS response. The target variable of the LFS, employment status, was included in the analysis. The results from the analysis are displayed in Table 3.7.1 to Table 3.7.3.

In the analysis for all households we found a significant difference for age and region. When we restricted the analysis to households with a listed land-line telephone, we found a difference with respect to age and urbanicity. It seems LFS respondents are older than BQA respondents. Furthermore, LFS respondents more often live in less urbanized areas than BQA respondents. Hence, in the basic-question approach we find more younger households and more households that live in the cities. This is a promising result, as these groups usually have a lower response rate in regular household surveys.

Still the LFS variable employment status did not enter the model, i.e. within classes defined by the auxiliary variables we do not find differences in employment status between the LFS respondents and the BQA respondents. It seems that we do obtain a different group of respondents but there is no indication that they are very different with respect to employment.

Table 3.7.1: Univariate tests of independence between LFS response with BQA response and auxiliary variables restricted to listed telephones. Test statistics are the adjusted Pearson's Chi square and the adjusted Wald statistic

Variable	*p-value*	
	Pearson's Chi square	*Wald statistic*
Employment status	0.6140	0.6388
Urbanicity	0.0176	0.0198
Region	0.2466	0.2062
Province	< 0.0001	< 0.0001
Gender	0.6280	0.6760
Ethnicity	0.5232	< 0.0001
House value	0.2760	0.2937
Household type	0.0553	0.1414
Job	0.7188	0.7140
Disability allowance	0.9597	0.9599
Social allowance	0.1221	0.2174
CWI subscription	0.5276	0.5096
Unemployment allowance	0.2305	0.1718
Self employed	0.1051	0.0578
Average age	0.0057	0.0136

Table 3.7.2: The adjusted Wald statistic for the auxiliary variables in the logistic regression model. The dependent variable is response in the LFS (1) or the BQA (0). The analysis is restricted to listed telephones. In parenthesis are the corresponding p-values

Model	*Age*	*Urb*
Wald statistic	4.32	2.49
p-value	(0.0134)	(0.0410)

Table 3.7.3: The parameters in the logistic regression for LFS response (1) compared to BQA response (0) restricted to listed telephones with standard errors and p-values. One and two asterisks denote significance at 5% and 1% level, respectively. Each first category is used as a reference category

Category	*Parameter*	*Standard error*	*p-value*
Intercept	0.8974**	0.1893	<0.001
Urbanicity			
very strong	0		
strong	0.0820	0.2119	0.699
moderate	0.3767	0.2438	0.122
little	0.6266*	0.2510	0.013
not	0.4981*	0.2413	0.039
Average age			
< 35	0		
35 – 54	0.5021**	0.1848	0.007
55 +	0.4899*	0.1960	0.012

3.7.2 BQA response compared to BQA sample for listed telephone households

We also performed the analysis for the BQA respondents compared to the BQA sample, restricted to households with a listed, land-line telephone. The results for the univariate and the multivariate analysis are displayed in Table 3.7.4 to Table 3.7.6.

If the BQA respondents resemble the BQA nonrespondents, then this is an indication that the basic-question approach selects a representative subset of the nonrespondents in the LFS (for which a listed, land-line telephone number could be linked). In the analysis for all households (section 3.5) we found that the respondents in the BQA differed from the nonrespondents with respect to telephone, average age of the household, having a paid job and gender of the household. We thus found that the respondents were different with respect to a number of variables.

When we restrict the analysis to households with a listed land-line telephone we find that only two auxiliary variables give a significant explanation for response to the BQA, being average age of the household and self-employment of a household core member. It turns out that the response propensity decreases with an increasing age, and that self-employment also lowers the response rate.

Table 3.7.4: Univariate tests of independence between BQA response and BQA sample and auxiliary variables, restricted to listed telephones. Test statistics are the adjusted Pearson's Chi square and the adjusted Wald statistic

Variable	*p-value*	
	Pearson's Chi square	*Wald statistic*
Urbanicity	0.5752	0.5751
Region	0.7642	0.7647
Province	0.3312	0.3285
Gender	0.3125	0.3115
Ethnicity	0.9312	0.9329
House value	0.9447	0.9457
Household type	0.1380	0.1371
Job	0.0166	0.0160
Disability allowance	0.7540	0.7540
Social allowance	0.4205	0.4200
CWI subscription	0.9723	0.9723
Unemployment allowance	0.6030	0.6030
Self employed	0.0109	0.0104
Average age	<0.0001	<0.0001

Table 3.7.5: The adjusted Wald statistic for the auxiliary variables in the logistic regression model. The dependent variable is response (1) in the BQA vs. nonresponse (0). The analysis is restricted to listed telephones. In parenthesis are the corresponding p-values

Model	*Age*	*SelfEmpl*
Wald statistic	11.25	6.05
p-value	(<0.0001)	(0.0142)

Table 3.7.6: The parameters in the logistic regression for BQA response restricted to listed telephones with standard errors and p-values. One and two asterisks denote significance at 5% and 1% level, respectively. Each first category is used as a reference category

Category	*Parameter*	*Standard error*	*p-value*
Constant	1.0651**	0.2373	<0.001
Average age			
< 35	0		
35 – 54	-1.1030**	0.2652	<0.001
55 +	-1.2826**	0.2761	<0.001
Self employed			
no	0		
yes	-0.6654*	0.2705	0.014

From the analysis we can conclude that, when we restrict the analysis to the households with a listed, land-line telephone the results are somewhat more encouraging. The BQA respondents are more similar to the BQA nonrespondents, and less similar to the regular LFS respondents. In the analysis in the following section, we calculated the R-indicator for the different groups to see whether indeed the representativity of the response increased with a follow-up using the basic-question approach.

3.8 Response rates and representativeness

Response rates are sometimes regarded as the main quality indicator for surveys. However, the response rate is a poor indicator of the possible nonresponse bias. Recent discussions in survey research acknowledge this, see e.g. Stoop (2005), Biemer and Lyberg (2003) and Groves (2006).

Schouten and Cobben (2007) propose a number of R-indicators to measure the similarity between the response and the survey, i.e. the representativeness of the response. The response is representative of the sample with respect to a pre-defined set of auxiliary variables if there is no difference in the distribution of these variables in the response subset compared to the sample, for a chosen level significance.

The regular LFS had a response rate of 62,4%. In the basic-question approach, we obtained a response rate of 38,9%. The total (weighted) response rate now equals approximately 75,7%. We would like to know whether this additional response has made the total response subset more representative of the sample.

Let $i = 1, 2, \ldots, N$ denote the population of interest. A sample of size n is selected from this population. Every person i receives a label s_i that equals 1 in case the person was selected in the sample, and 0 otherwise. By r_i we denote the response indicator, i.e. $r_i = 1$ in case person i responded, and 0 otherwise. π_i denotes the first-order inclusion probability of person i. The concept of the R-indicator is based on

the response propensity $\rho_i = P(r_i = 1 \mid s_i = 1)$. If, in subclasses defined by auxiliary variables, the variation of the average response propensity is (close to) zero, the response subset is said to be representative with respect to the pre-defined auxiliary variables. Unfortunately we do not know the response propensities, so we have to estimate them. We use a logistic regression model. The estimated response propensities are denoted by $\hat{\rho}_i$. We apply the scaled standard deviation of the estimated response propensities as an indicator of representativeness

$$R(\hat{\rho}) = 1 - 2\sqrt{\frac{1}{N-1}\sum_{i=1}^{N}\frac{s_i}{\pi_i}(\hat{\rho}_i - \hat{\bar{\rho}})^2} \qquad (1)$$

We do not know the response propensities in the population, therefore we have to estimate the average response propensity $\bar{\rho}$. We use the Horvitz-Thompson estimator for this, i.e. $\hat{\bar{\rho}} = \frac{1}{N}\sum_{i=1}^{N}\frac{s_i}{\pi_i}\hat{\rho}_i$.

The value of $R(\hat{\rho})$ varies between 0 (no representativeness) and 1 (perfect representativeness). In case all the (estimated) response probabilities are equal, i.e. there is no significant relationship between the auxiliary variables and the response indicator, there is no variation in response probabilities and $R(\hat{\rho})$ = 1. The more the (estimated) response propensities vary, the lower the value of $R(\hat{\rho})$ will become. The minimum of 0 is attained in case $\hat{\bar{\rho}}$ = 0,5 and half of the (estimated) response probabilities equals 0 and the other half equals 1.

In section 3.2 and 3.3, we modelled the response indicator for the LFS response and the LFS plus BQA response. Based on these models, we estimated the response propensities $\hat{\rho}_i$. In section 3.7 we found that the response to the BQA is influenced by the design of the BQA. We restricted the analysis for households with a listed, land-line telephone only. For the LFS response and the LFS plus BQA response, we also model the response indicator restricted to these households. The results are displayed in Table 3.8.1. It is remarkable that in the model for the LFS plus BQA the indicator for a paid job enters the model, since this variable was not included in the model for the LFS alone. Also, the variable social allowance did not disappear from the model. These variables are closely related to employment status which is a discomforting result.

With these models, the response propensities can be estimated. These estimated values can then be used to calculate (1). In Table 3.8.2 the response rate and the R-indicator for the different groups are shown.

Table 3.8.1 Response models for LFS response and LFS plus BQA response, restricted to households with a listed, land-line telephone

Response	*Model*	*Urb*	*Typehh*	*SocAll*	*DisAll*	*Gender*	*Age*	*Job*
LFS	*Wald statistic*	3.35	2.48	4.50	15.74	-	-	-
	p-value	(0.0095)	(0.0152)	(0.0340)	(0.0001)			
LFS +BQA	*Wald statistic*	3.02	-	6.91	-	5.81	6.93	7.52
	p-value	(0.0167)		(0.0086)		(0.0030)	(0.0010)	(0.0061)

Table 3.8.2 Response rate and R-indicator for the LFS response and the LFS plus BQA response, given for all addresses and also restricted to households with a listed, land-line telephone

Response	*Group*	*Response rate*	*R-indicator*
LFS	All addresses	62%	0.79
LFS	Listed telephone numbers only	68%	0.85
LFS + BQA	All addresses	76%	0.77
LFS + BQA	Listed telephone numbers only	83%	0.87

From Table 3.8.2 we see that the response increased 14% for the whole population, from 62% to 76%. For the telephone households the response increased 15%, from 68% to 83%. The representativeness indicator shows that the composition of the response has improved when the follow-up is conducted for households with a telephone; it increases from 0.85 to 0.87. For the whole population the opposite occurs; the composition gets worse and drops from 0.79 to 0.77. Hence, for the population with a telephone the basic-question approach is beneficiary in general, for the whole population it is not. We have to ask ourselves though, whether this increase is significant. For now, we can merely regard it as an indication that the composition of the response for the telephone households became more representative of the sample with respect to the available auxiliary variables.

There is strong evidence that this is caused by the design of the basic-question approach; persons without a telephone were only very passively approached to participate in the basic-question approach and therefore the response in this group was considerably lower (23% compared to 50% in the CATI group).

4. Discussion and conclusions

In this paper, we analysed the additional response that has been obtained in a basic-question approach to the Dutch Labour Force Survey (LFS). A total of 942 eligible households was selected for a follow-up with strongly condensed questionnaires containing only the basic questions of the LFS. The design of the basic-question approach was mixed. Households with a listed, land-line telephone number were approached with CATI. The other households were approached by a rather passive combination of a Web and a paper questionnaire. This difference in design is

reflected in the response percentage: for CATI, 50% of the households participated in the survey. In the Web- and paper combination, only 23% of the households responded.

We were interested in the composition of the extra response. We wanted to know whether the basic-question respondents resembled the remaining nonrespondents or whether they were similar to the regular LFS respondents. Because we had the answers to the key survey questions, we could also compare the employment situation for the basic-question respondents and the LFS respondents.

Therefore, we performed several analyses. We compared the composition of the different groups with respect to a set of auxiliary variables, both univariately and multivariately. We also compared the employment situation for the basic-question respondents to that of the LFS respondents.

We found that the basic-question respondents closely resemble the LFS respondents. There is no difference in employment situation between the two groups. The only significant difference can be found with respect to region and age. The total combined response of the LFS and the basic-question approach appears to be slightly more representative with respect to age and region as the households that do worse in the LFS are overrepresented in the basic-question approach.

When comparing the basic-question response to the original LFS nonrespondents, we concluded that the composition of the basic-question response is different with respect to telephone ownership, age, having a paid job and gender. The basic-question respondents do not seem to be a good representation of the total nonresponse.

When we regarded the initial causes for nonresponse in the LFS, we found that non-contacts more often do not have a listed telephone than refusals. As households without a listed telephone number received the paper/web basic-question approach and response rates were low for this variant, this resulted in a somewhat lower response rate of non-contacts. This difference may in part explain the differences found between the whole population and the population restricted to listed telephone numbers.

These results are not very promising. In the basic-question approach we seem to get ‘more of the same’. Because of the large influence of telephone ownership, we suspect that the design of the basic-question approach influences the composition of the response. The same conclusion was reached by Cobben (2007). Therefore, we decided to analyse only the group in the basic-question approach that was approached by CATI, i.e. we restricted the analysis to households with a listed, land-line telephone.

For this restricted group, the basic-question respondents are different from the LFS respondents with respect to age and region. In the basic-question approach we found more younger households that live in the cities. This result is promising, as these groups usually have a lower response rate in regular household surveys. We also found that the basic-question respondents are more similar to the total

nonrespondents. Only the average age of the household and the self-employment of a member of the core of the household are related to the basic-question response. It turns out that the response propensity decreases with an increasing age, and that self-employment also lowers the response rate.

Next, we calculated R-indicators for the different groups to determine whether the representativeness increased with the additional response obtained with the basic-question approach. We distinguished between all addresses and households with a listed telephone only. The results of the R-indicator confirm the other analyses. They indicate that the composition of the response has improved when the basic-question approach is conducted for households with a listed telephone. It increases from 0.85 to 0.87. For the whole population the opposite occurs: the composition of the response becomes less representative and the R-indicator drops from 0.79 to 0.77.

The analyses indicate that the basic-question approach is beneficiary for the composition of the response when restricting to households with a listed telephone. The basic-question respondents are different in composition than the LFS respondents, and they resemble the remaining nonresponse. We suspect that the design of the basic-question approach causes the decrease in the R-indicator for the whole population.

In future research on the BQA the design of the basic-question approach should be adapted so that the influence of the design on the composition of the response diminishes. We find very strong design effects that are almost completely caused by the implementation of the basic-question approach. For example, the Web- and paper questionnaires can be surveyed more actively, by sending reminders or providing an incentive.

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Appendix A: The questionnaire of the basic-question approach

1. Do you currently have a paid job? (Also 1 hour a week or a short period count, as well as freelance work)

- Yes: Go to question 2

- No: Go to question 6

2. Are you employed or self-employed? (In case you have more than one employment, please answer the question for the employment with the maximum of working hours)

- Employed: Go to question 3

- Self-employed: Go to question 4

3. Do you currently have a permanent appointment?

- Yes

- Partially

- No

4. How many hours do you work on average?

.... hours per week

5. Do you currently want to work more hours than you do now, possibly in a new appointment?

- Yes: Go to question 10

- No: End of questionnaire

6. Do you currently want to have a paid job? (Also 1 hour a week or a short period count, as well as freelance work)

- Yes: Go to question 8

- No: Go to question 7

- I want to but cannot: Go to question 7

7. What is the main reason that you currently cannot accept a paid job?

- Care for family/household: End of questionnaire

- Education or study: End of questionnaire

- Retirement or age: End of questionnaire

- Illness, disability or bad health: End of questionnaire

- Other reason: End of questionnaire

8. At what notice can you start the new job?

- Within 2 weeks: Go to question 10

- Between 2 weeks and 3 months: Go to question 9

- Between 3 and 6 months: Go to question 9

- More than 6 months: Go to question 9

9. Do you need time to finish activities related to:

- Volunteer work

- Education or study

- Child care

- Illness

- Vacation

- Other reason

10. How many hours do you want to work?

.... hours per week

11. Did you undertake any activities over the last 4 weeks to find a job? (Reading adds in a paper already counts)

- Yes

- No

12. How many months have you been looking for a job?

.... months

Appendix B: Available auxiliary variables and their abbreviations

Individual auxiliary information is aggregated to the household level through the members of the core of the household, i.e. the head and the partner if present.

Age = Average age of household core ∈{15 – 34 years, 35 – 54 years, 55 years and older}

CWI = At least one member of household core has a subscription to the CWI database ∈ {yes, no}

DisAll = Household receives a disability allowance ∈ {yes, no}

Ethn = Ethnic background of household core ∈ {native, Moroccan, Turkish, Surinam/Dutch Antilles, other non-western, other western, mixed}

Gender = Aggregated gender of household core ∈ {male, female, mixed}

Typehh = Type of household ∈ {single, unmarried couple, married couple, unmarried couple with children, married couple with children, single parent, other, more than 1 household}

HsVal = Average house value at zip-code level in 1000 Euro ∈ {not available, 0 – 50, 50 – 75, 75 – 100, 100 – 125, 125 – 150, 150 – 200, 200 – 250, 250 – 300, 300 – 400, more than 400}

Job = At least one member of household core had a paid job at January 1, 2005 ∈ {yes, no}

Telephone = Fixed land-line telephone available ∈ {yes, no}

Prov = Provinces and four largest cities ∈ {Groningen, Friesland, Drenthe, Overijssel, Flevoland, Gelderland, Utrecht, Noor-Holland, Zuid-Holland, Zeeland, Noord-Brabant, Limburg, Amsterdam, Rotterdam, Den Haag, Utrecht stad)

Region = Region of the Netherlands ∈ {north, east, west, south}

SelfEmpl = At least one member of the household core is self-employed ∈ {yes, no}

SocAll = Household receives a social allowance ∈ {yes, no}

UeAll = Household receives a unemployment allowance ∈ {yes, no}

Urb = Degree of urbanisation ∈ {very strong, strong, moderate, little, not}