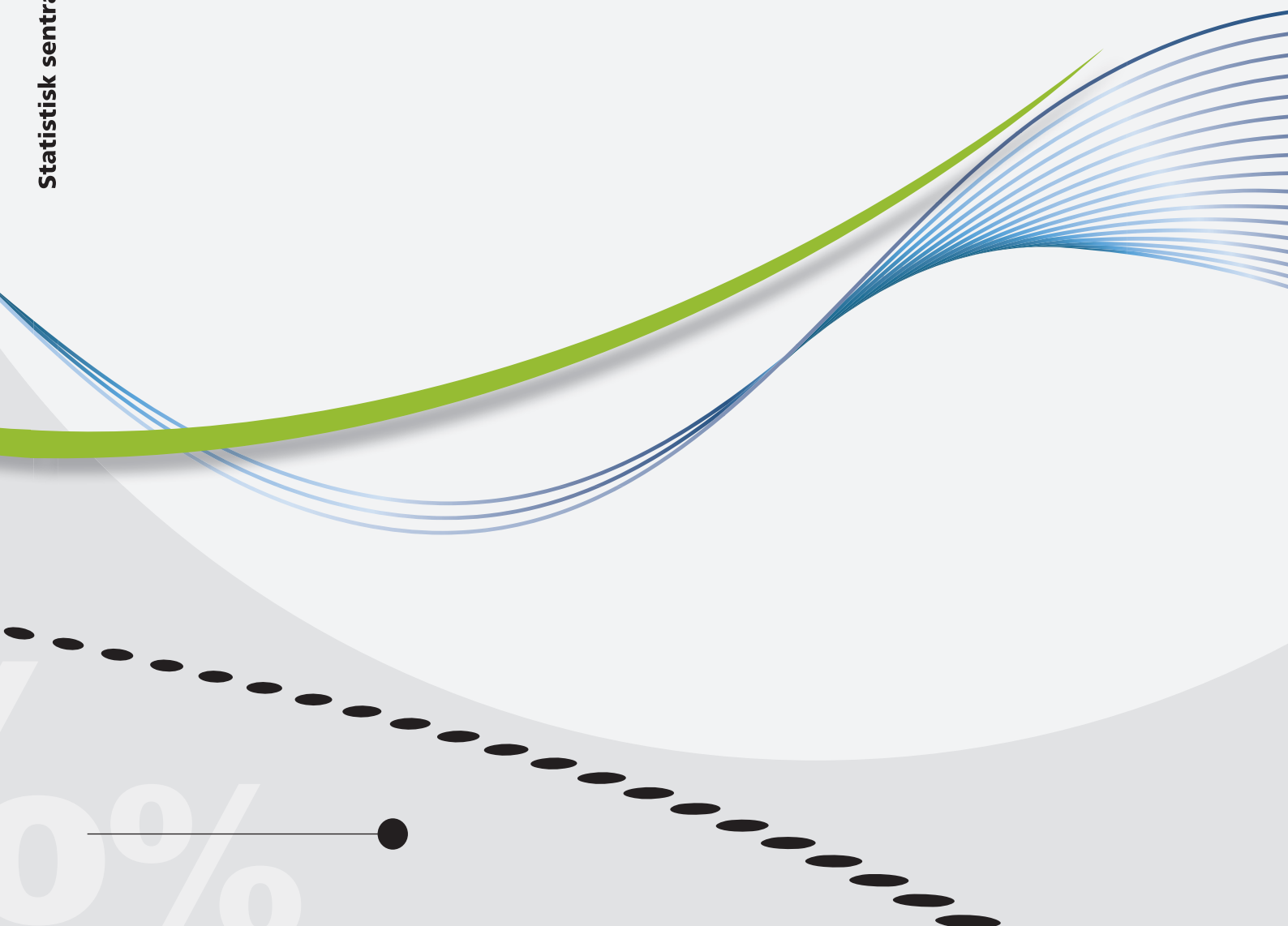




Ib Thomsen and Ole Villund

Nonresponse in the Norwegian Labour Force Survey (LFS): using administrative information to describe trends



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Preface

This document is the result of a study on nonresponse in the Norwegian Labour Force Survey (LFS). The study follows a broader project on how to deal with nonresponse, which investigates several different surveys. The LFS is distinct in its size and the relatively long time series, and therefore ideal for studying nonresponse trends in some detail. The motivation was how to better describe the effects of nonresponse, as the focus on increasing nonresponse rates tells us little about the effect on official statistics.

Statistics Norway, 14 August 2012

Hans Henrik Scheel

Abstract

Studying data from the Norwegian Labour Force Survey sample linked to administrative register data, we focus on trends in nonresponse and its effects. Analyzing response rates and nonresponse bias in several subgroups, we find relatively stable response patterns. Although the overall response rate is decreasing, it seems to exist some structural differences. Factors such as age, gender, citizenship and employment seem to determine a response pattern that changes little over a relatively long period, when we observe clearly increasing nonresponse over the same period. Using register-based employment status available for the total sample, we have estimated the nonresponse bias for employment. Defining the *response structure* as the ratio of response rates among employed/not-employed, we compare this indicator with nonresponse rate and nonresponse bias.

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1. Introduction and summary

The purpose of this document is to present a straightforward description of the nonresponse development over the period 1996–2011 in the Norwegian Labour Force Survey (LFS). The sample is linked to administrative registers in order to compare response rates in various subgroups.

In chapter 3, response rates are presented for a number of subgroups, such as age groups, gender, citizenship and employment.

In chapter 4, we concentrate on one variable, namely employment status in the register. However the target variable is employment status according to the ILO definition, based on the survey response. We know that the correlation between the two variables is very high (Thomsen and Zhang 2001), and therefore the findings concerning register status are relevant for the target variable as well.

In this study we concentrate on trends in yearly average nonresponse rates. However, as illustrated in additional figures (Annex), the difference in nonresponse rate between quarters can be relatively large. We plan to study this phenomenon later.

We discuss two quality indicators and compare their development over time: nonresponse rate and nonresponse bias. The main findings are:

There are clear differences in response rates between subgroups, and more interesting, the pattern remains relatively constant over time. This is an important finding because, it indicates that the representativeness of the sample of respondents changes little over time compared to a steady increase in nonresponse rates.

In spite of the clear increase in nonresponse rate, we find that the bias (of registered employment) is more or less constant during the studied period. This is observed across several subgroups such as age, gender and nationality. This shows that nonresponse rate alone is a poor indicator of the quality.

In chapter 5 we define *response structure* as a ratio of response rates. A simple relationship between the bias of a binomial variable and the response structure is presented. From this relationship we see that the bias is a function of the response structure and not of the nonresponse rate.

2. Data sources

2.1. Survey sample

The Norwegian Labour Force Survey (LFS) is a continuous, rotating panel, sample survey. The sample size is 24.000. The sample frame is registered families of residents between 15 and 74 years old. The sample design is a one-stage cluster sampling where every family member is included in the sample. Each person is interviewed once every quarter for eight consecutive quarters. Oversampling of some sparsely populated regions, result in a slight variation of selection probability.

The reference period is one week, and the interview is supposed to be performed within ten days after the reference week. Sample units are allocated to every week in each year, in order to cover all seasonal variation.

The interviewers are organized in a central unit and several local interviewers, but the mode of data collecting is exclusively computer-assisted telephone interviews and uses the same questionnaire.

The variable of interest here is employment, defined in the sample as having worked at least one hour during the reference week. This definition is in line with recommendations from the ILO (International Labour Organization).

Our goal was to study as long as possible time series. The Norwegian LFS started in 1972, but available data collected before 1996 do not contain relevant information about nonresponse at the micro level. For the present study, we have selected data starting with 1st Quarter 1996 up to and including 4th Quarter 2011. The resulting study data consists of over 1.5 million records for 230.000 people; including over 1.35 million interviews from nearly 220.000 people.

2.2. Administrative registers

Register data used in this study are collected by governmental agencies for administrative purposes.

The main source is the Norwegian Labour and Welfare Service's employee register. It is mandatory for employers to report employee jobs to the register, with few exceptions. Most data are sent to the register directly from the employers own IT-systems. Thus, the register data are independent of the survey responses, and quite comprehensive and accurate as well. In addition, the register data are somewhat revised at Statistics Norway, for instance merging records that pertain to the same job, and adjusting status by checking against other registers.

Another important source of administrative data is the Central Population Register, run by the Tax Agency. Demographic attributes, such as age, gender, citizenship and place of residence, are collected only from register data.

The survey sample data is linked to the register data at the micro level, using the personal identification and approximate reference time. It can be described as linking at the person level and not at job level.

We remark that due to differences in definitions, data collecting routines and time lag, there is some divergence at micro- and macro level between survey employment and register-based employment. For a discussion about these matters, see for instance Villund (2010).

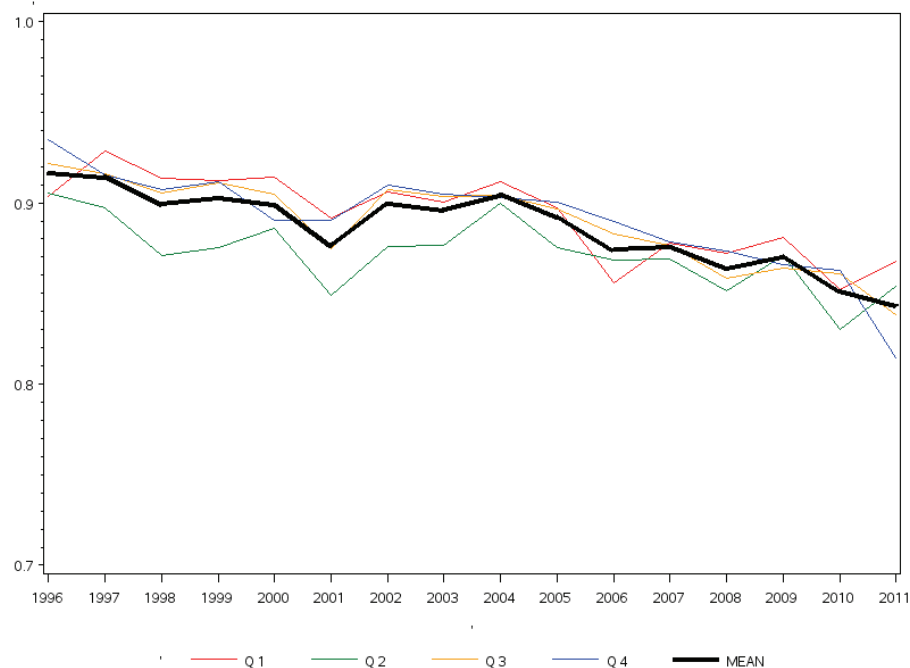
3. Response rate

We define nonresponse rate as $r_t = \frac{\sum_{i=1}^{n_t} R_{i,t}}{n_t}$ where $R_{i,t}$ is a binary variable for the response status for individual i at time t in sample of size n_t .

Figure 3–1 shows response rates over time, for each quarter and the yearly mean.

Response rates show a declining trend over the years (1996–2011). In addition to this trend, there is a variation between the years due to random and nonrandom factors (for instance interview staff reorganizations, countermeasures aimed at increasing response, etc.).

A “seasonal” pattern is observed in the period 1996–2005, when the response rate is significantly lower in the second quarter. We believe this can be explained by the allocation of ad-hoc modules, which result in more burdensome interviews. From 1996 to 2005 these extra questions were allocated to the 2nd quarter, now they are distributed over the whole year.

Figure 3–1. Response rate by quarter. LFS 1996–2011

The next figures illustrate variation in response rates between demographic groups. In this study, we had a few variables available such as citizenship, age and gender. The response rate is generally higher for people over 40 years old, for women, and for nationals. People under 40 years old have lower response rate, with less gender difference than total. Nonnationals have even lower response rate, and greater difference between men and women. This pattern seems rather constant over the whole period.

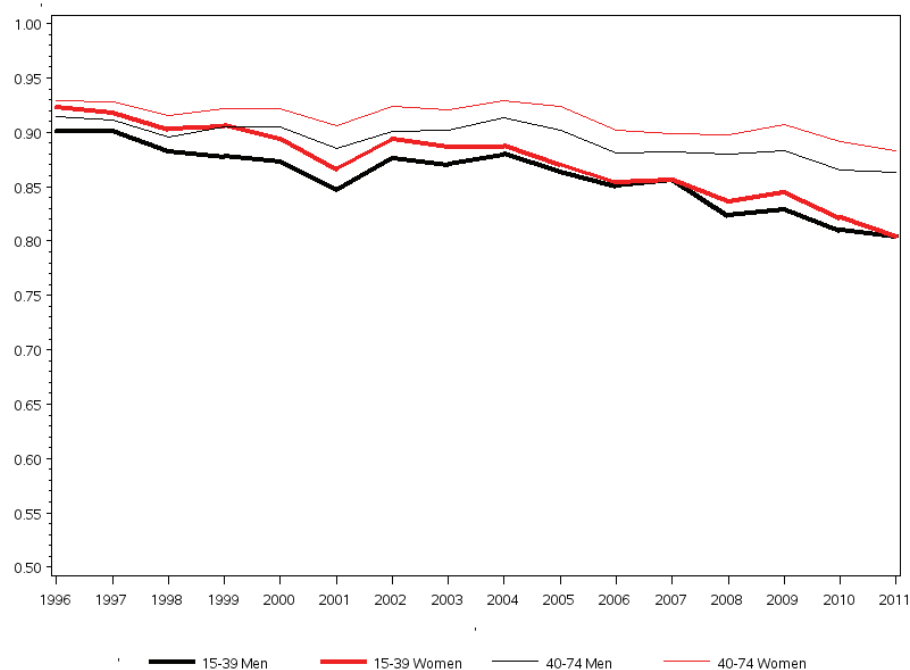
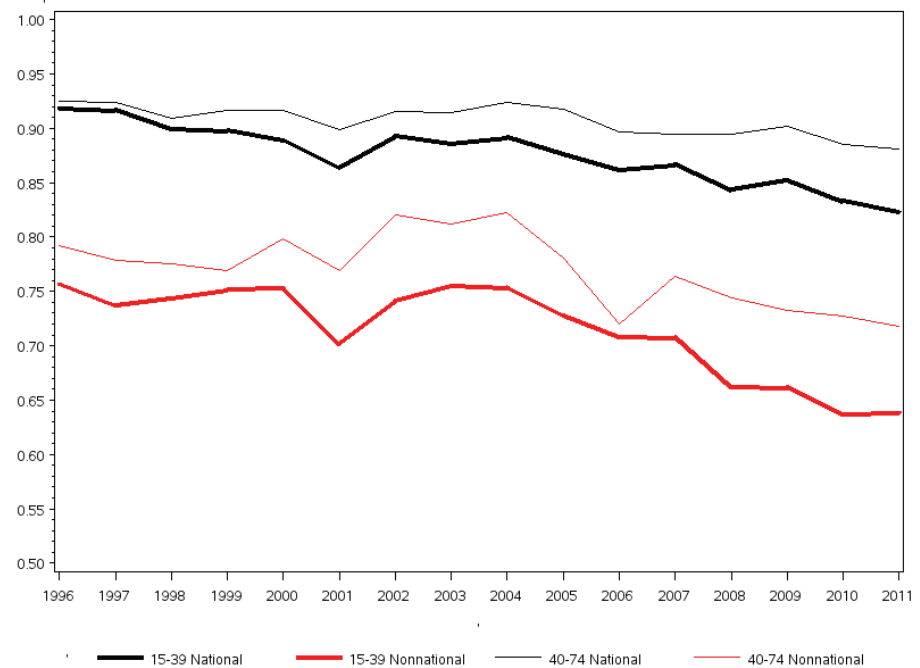
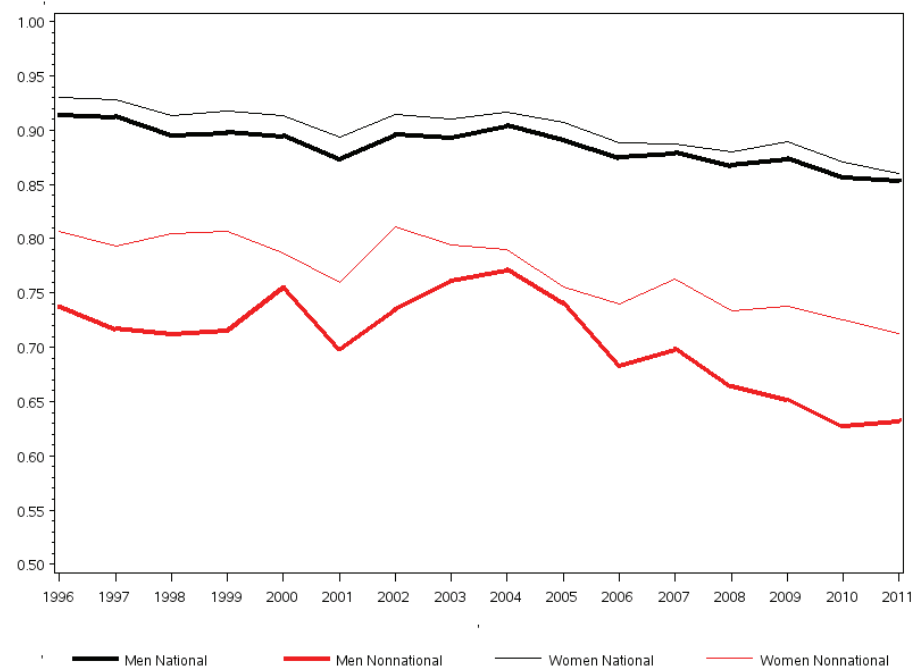
Figure 3–2. Response rate, by age and gender. LFS 1996–2011

Figure 3–3. Response rate, by citizenship and age. LFS 1996–2011**Figure 3–4 Response rate, by citizenship and gender. LFS 1996–2011**

We now turn to variation in response rate between employed and not-employed people. The next three figures illustrate variation in response rates between employed and not-employed people by age, gender and citizenship. We observe a clear difference in response rate between employed and not-employed, across the demographic groups.

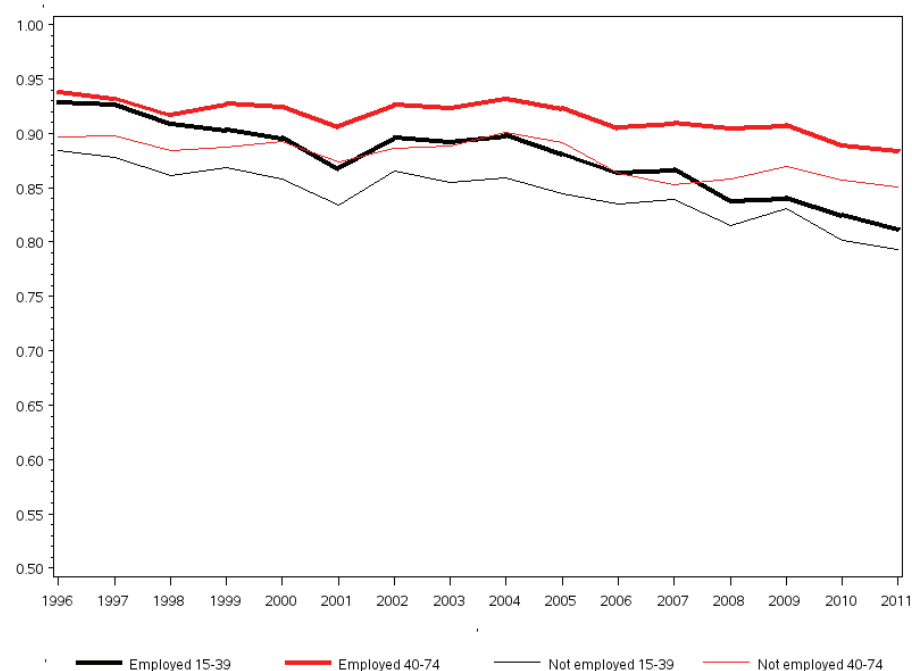
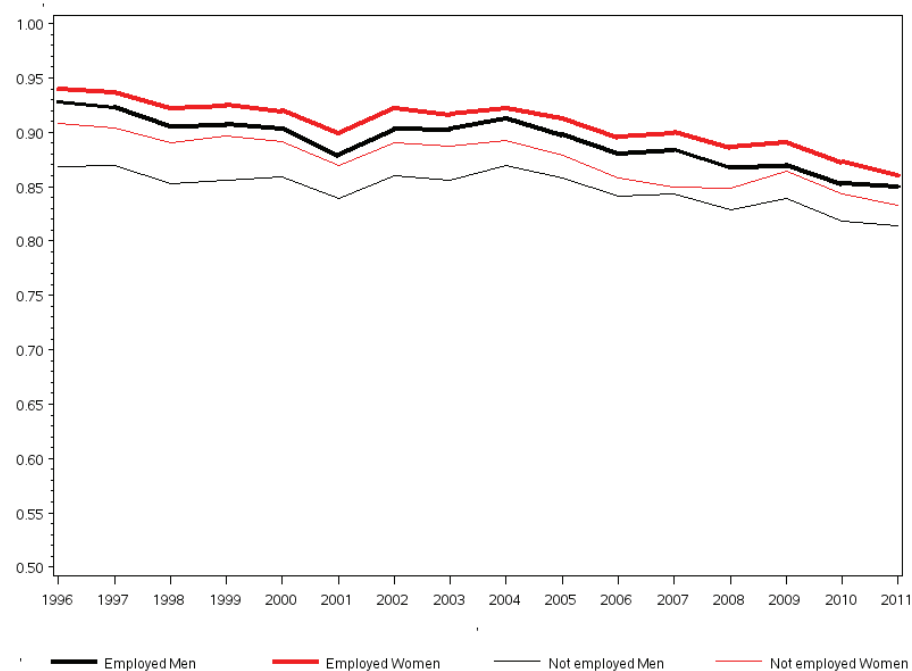
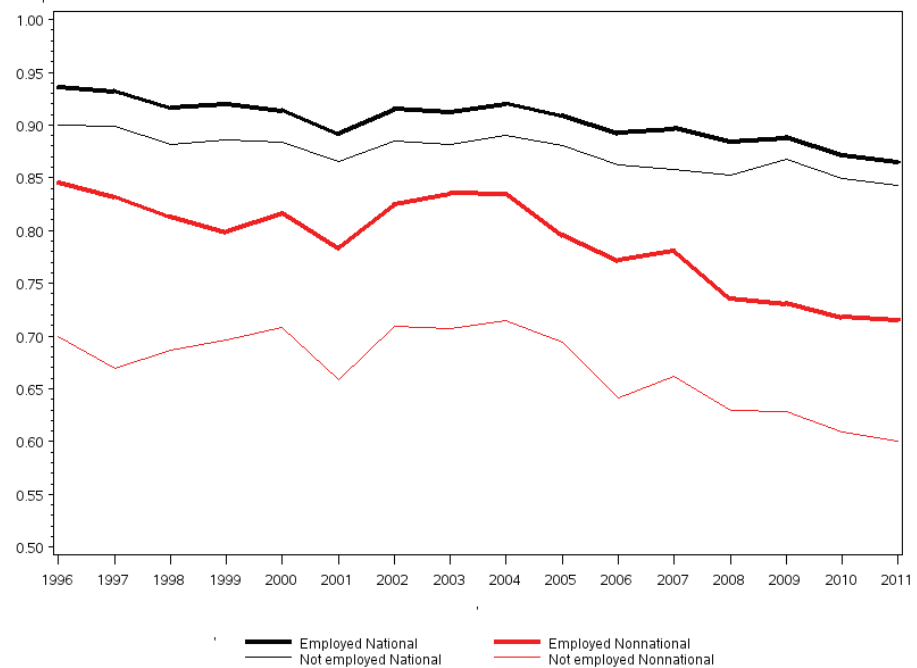
Figure 3–5. Response rate, by employment and age. LFS 1996–2011**Figure 3–6. Response rate, by employment and gender. LFS 1996–2011**

Figure 3–7. Response rate, by employment and citizenship. LFS 1996–2011

4. Nonresponse Bias

We define nonresponse bias as

$$\hat{p} - p = \frac{\sum_{i=1}^{n_t} (X_{i,t} R_{i,t})}{\sum_{i=1}^{n_t} R_{i,t}} - \frac{\sum_{i=1}^{n_t} X_{i,t}}{n_t}$$

where $X_{i,t}$ is a binary variable for the register employment status for individual i in sample n at time t , and R as defined in the response rate formula, \hat{p} the employment rate in the response sample, and p the employment rate in the total sample.

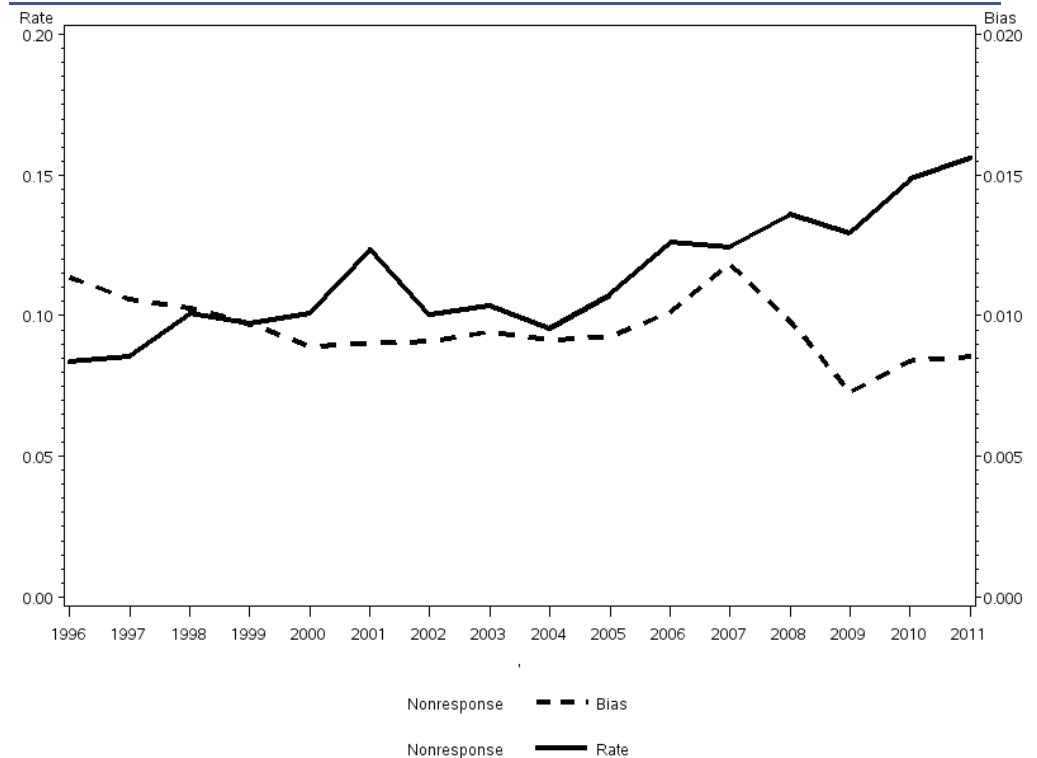
The previous section demonstrated the variation in response rate by employment. From earlier, we know that register-based employment status is correlated with survey-based employment status and survey response status. Therefore, register-based employment is a key variable for analyzing nonresponse bias. We define nonresponse bias as employment rate in the response sample minus employment rate in the total sample. Thus, a positive figure means that the response sample over-represents employment.

In order to observe the relationship between the bias and the rate over time, we compare the trends for nonresponse rate and nonresponse bias over the period 1996–2011. Figure 4–1 shows the results for this period. While the nonresponse rate shows a growing trend, the nonresponse bias shows no clear trend. Taking averages over 4-year periods, we actually find smaller bias in the period 2008–2011 than in the previous three periods, .85 percentage point compared to .9–1.0.

From this, we draw two preliminary conclusions:

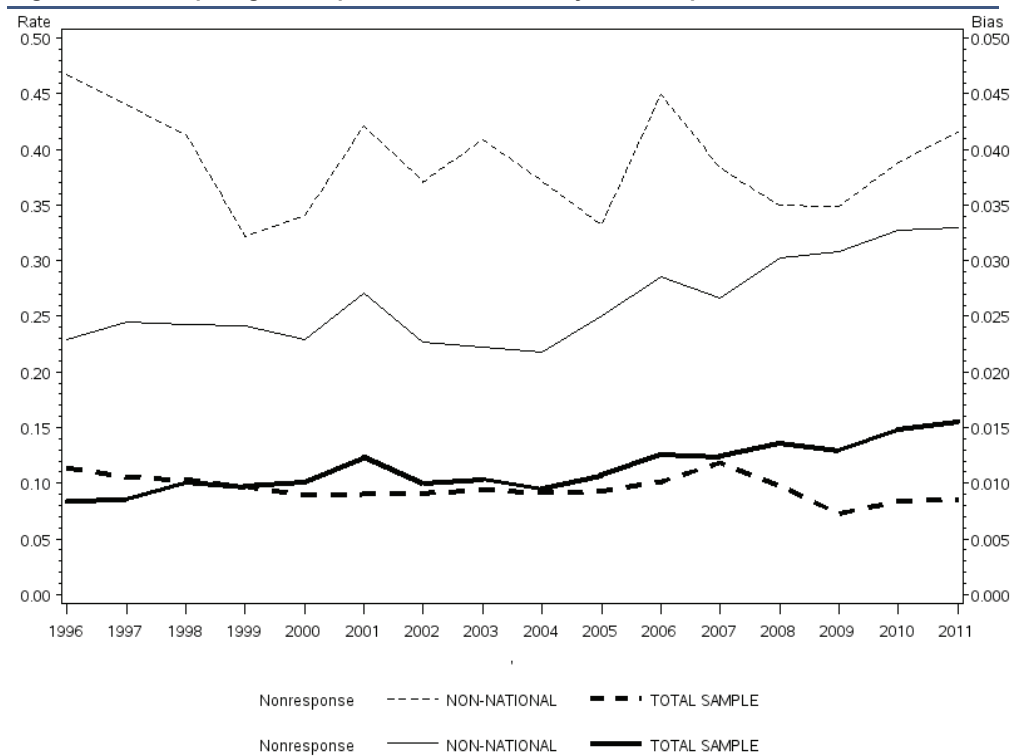
- Nonresponse bias does not show any clear trend during this period, but possibly a slow decline.
- The nonresponse rate is increasing and shows no obvious relationship with the bias. Thus it seems to be of little use in assessing the impact of nonresponse.

Figure 4–1. Nonresponse rate and -bias. LFS 1996–2011



Non-nationals and non-response

Since earlier findings (e.g. Villund 2008) have shown low response rates for immigrants, we wish to look closer at this group. Although still a relatively small group, the immigrant population has grown from 5 percent to 13 percent from 1996 to 2011. In comparison, the proportion of nonnationals in the sample has grown from around 3.5 percent to nearly 8 percent. Figure 4–2 Compares the nonresponse for nationals and nonnationals (thin lines). We observe a higher nonresponse rate and bias for nonnationals seems to be rather constant over time.

Figure 4–2. Comparing nonresponse rate and –bias, by citizenship. LFS 1996–2011

5. A simple relationship between response rate and nonresponse bias, for binominal variables

Let X_i and R_i denote the binominal variable and response status as defined in the previous chapter.

Furthermore, we define the following probabilities:

$$r_1 = P(R_i = 1 | X_i = 1)$$

$$r_0 = P(R_i = 1 | X_i = 0)$$

$$p = P(X_i = 1)$$

$$\hat{p} = P(X_i = 1 | R_i = 1)$$

Consider now the estimated **odds** of being employed:

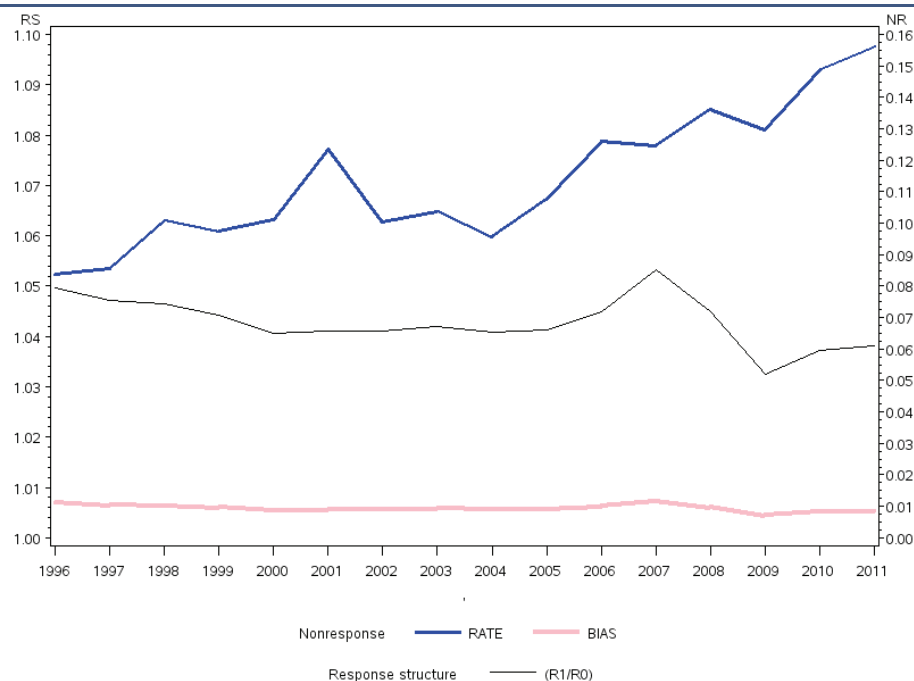
$$\frac{\hat{p}}{(1-\hat{p})} = \frac{\sum_{i=1}^n X_i R_i}{\sum_{i=1}^n (1-X_i) R_i}$$

Taking the expected value we find the following approximation:

$$E\left(\frac{\hat{p}}{(1-\hat{p})}\right) \approx \frac{E\left(\sum_{i=1}^n X_i R_i\right)}{E\left(\sum_{i=1}^n (1-X_i) R_i\right)} = \frac{\sum_{i=1}^n E(E(X_i R_i) | X_i)}{\sum_{i=1}^n E(E((1-X_i) R_i) | X_i)} = \left(\frac{p}{1-p}\right) \frac{r_1}{r_0}$$

From this we see that the bias of the observed odds, and therefore of the observed proportion, is a function of the ratio $\frac{r_1}{r_0}$ but not of the response rate. In other words, response rates can vary considerably without affecting the nonresponse bias, if this ratio remains constant. Figure 5–1 illustrates that this in fact is the case in the data we have studied. We plan to compare several sample surveys regarding this.

Figure 5–1. Comparing nonresponse rate, bias and response structure. LFS 1996–2011



Tables

Table 1. Response rates. LFS yearly average 1996-2011

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total	91,7	91,5	89,9	90,3	89,9	87,7	90,0	89,6	90,4	89,2	87,4	87,5	86,4	87,0	85,1	84,4
Gender																
Men	90,8	90,6	88,9	89,2	89,0	86,7	89,0	88,8	89,9	88,5	86,7	87,1	85,6	86,0	84,1	83,8
Women	92,6	92,3	91,0	91,4	90,9	88,8	91,0	90,5	91,0	90,0	88,1	88,0	87,2	88,1	86,2	85,0
Age																
15-24 år	92,3	90,7	89,7	90,5	89,7	87,7	90,4	89,0	90,1	89,4	88,1	88,1	86,7	88,6	86,2	86,0
25-39 år	90,6	91,1	89,1	88,6	87,6	84,6	87,6	87,3	87,5	85,2	83,6	84,1	80,8	80,7	78,7	77,0
40-54 år	92,0	91,6	90,0	90,9	90,6	88,3	90,2	89,8	91,2	89,8	87,7	88,2	87,3	87,5	84,7	84,3
55-66 år	91,9	91,3	89,7	90,5	90,9	89,5	91,5	91,6	92,2	91,8	89,8	89,7	89,9	90,4	89,7	89,0
67-74 år	93,0	94,2	93,8	94,3	95,1	94,2	94,8	95,2	95,6	95,9	92,7	90,4	92,3	94,2	94,0	93,6
Residence																
Other residences	92,6	92,4	91,1	91,3	91,1	89,3	91,2	90,6	91,4	90,3	88,7	88,8	87,6	88,3	86,3	85,7
Large Municipalities	92,0	91,8	88,6	90,5	90,1	87,2	90,9	90,0	90,8	89,7	86,8	88,1	87,0	87,1	85,1	84,8
Oslo (CAPITAL)	84,9	84,2	83,5	82,6	81,2	76,4	79,5	81,9	83,3	81,2	79,1	78,3	76,9	78,1	77,2	75,2
Employment																
Not employed	89,1	88,8	87,3	87,8	87,7	85,6	87,6	87,3	88,1	86,9	85,0	84,7	83,9	85,2	83,2	82,4
Employed	93,3	93,0	91,3	91,6	91,1	88,9	91,2	90,9	91,7	90,5	88,8	89,2	87,7	88,0	86,2	85,5

Table 2. Nonresponse bias. LFS yearly average 1996 - 2011

	P1-P															
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Gender																
Men	-0,49	-0,47	-0,57	-0,61	-0,53	-0,59	-0,57	-0,49	-0,32	-0,41	-0,39	-0,28	-0,47	-0,61	-0,60	-0,37
Women	0,49	0,47	0,57	0,61	0,53	0,59	0,57	0,49	0,32	0,41	0,39	0,28	0,47	0,61	0,60	0,37
Age																
'15-24	0,10	-0,14	-0,03	0,04	-0,04	-0,01	0,06	-0,10	-0,06	0,04	0,13	0,10	0,06	0,29	0,22	0,32
'25-39	-0,37	-0,14	-0,32	-0,62	-0,80	-1,09	-0,81	-0,80	-0,97	-1,29	-1,21	-1,05	-1,72	-1,90	-2,00	-2,30
'40-54	0,10	0,05	0,03	0,19	0,21	0,20	0,07	0,05	0,23	0,19	0,11	0,23	0,32	0,14	-0,16	-0,04
'55-66	0,04	-0,03	-0,03	0,04	0,16	0,34	0,30	0,41	0,38	0,54	0,53	0,47	0,81	0,79	1,07	1,09
'67-74	0,13	0,26	0,36	0,36	0,47	0,57	0,38	0,44	0,42	0,53	0,44	0,25	0,54	0,68	0,88	0,93
Residence																
Other residences ..	0,73	0,76	0,96	0,82	0,94	1,38	1,04	0,83	0,76	0,86	1,11	1,03	1,06	1,10	1,02	1,11
Large municipalities	0,06	0,06	-0,23	0,04	0,03	-0,08	0,15	0,06	0,06	0,09	-0,10	0,10	0,11	0,01	0,00	0,09
Oslo (capital)	-0,79	-0,82	-0,73	-0,86	-0,97	-1,29	-1,19	-0,89	-0,82	-0,95	-1,01	-1,14	-1,17	-1,11	-1,03	-1,21
Employment																
Not employed	-1,10	-1,04	-1,01	-0,93	-0,86	-0,85	-0,91	-0,94	-0,91	-0,93	-1,01	-1,18	-0,98	-0,73	-0,84	-0,86
Employed	1,10	1,04	1,01	0,93	0,86	0,85	0,91	0,94	0,91	0,93	1,01	1,18	0,98	0,73	0,84	0,86

Table 3. Response rate, by age and gender. LFS yearly average 1996 - 2011

	Total			Men			Women		
	Total	Other age groups	25-35 years olds	Total	Other age groups	25-35 years olds	Total	Other age groups	25-35 years olds
1996	91,6	92,0	90,2	90,7	91,3	88,6	92,5	92,8	91,8
1997	91,4	91,6	90,8	90,5	90,9	89,5	92,3	92,3	92,1
1998	89,9	90,3	88,6	88,9	89,5	86,9	90,9	91,1	90,3
1999	90,2	90,9	88,0	89,1	90,0	86,1	91,4	91,8	89,9
2000	89,8	90,6	87,2	88,9	89,9	85,7	90,8	91,4	88,8
2001	87,6	88,8	83,6	86,6	87,9	82,3	88,6	89,7	85,0
2002	89,9	90,8	87,1	88,9	89,9	85,8	91,0	91,7	88,4
2003	89,6	90,5	86,4	88,7	89,6	85,6	90,5	91,3	87,4
2004	90,4	91,4	86,7	89,8	90,8	86,2	91,0	92,0	87,2
2005	89,2	90,5	84,1	88,4	89,8	83,0	89,9	91,1	85,2
2006	87,4	88,5	82,4	86,7	87,8	81,9	88,0	89,3	82,9
2007	87,5	88,5	83,1	87,0	88,0	82,7	88,0	89,0	83,4
2008	86,3	88,0	79,1	85,5	87,2	78,1	87,2	88,7	80,1
2009	87,0	88,7	79,0	85,9	87,7	77,9	88,1	89,8	80,2
2010	85,1	86,9	76,8	84,1	86,0	75,7	86,1	87,9	78,1
2011	84,3	86,4	75,4	83,7	85,7	75,2	85,0	87,1	75,7

Table 4. Response rate, by citizenship and gender. LFS yearly average 1996 - 2011

	Total			Men			Women		
	Total	Nonnational	National	Total	Nonnational	National	Total	Nonnational	National
1996	91,6	76,3	92,2	90,7	72,8	91,4	92,5	80,1	93,0
1997	91,4	75,4	92,0	90,5	72,0	91,2	92,3	79,0	92,8
1998	89,9	75,8	90,4	88,9	71,7	89,5	90,9	80,2	91,3
1999	90,2	75,2	90,8	89,1	70,8	89,8	91,4	80,3	91,7
2000	89,8	76,5	90,3	88,9	75,0	89,4	90,8	78,1	91,3
2001	87,6	71,9	88,2	86,6	69,1	87,3	88,6	74,7	89,2
2002	89,9	77,2	90,4	88,9	73,5	89,6	91,0	81,0	91,4
2003	89,6	77,7	90,1	88,7	76,1	89,3	90,5	79,4	91,0
2004	90,4	78,0	90,9	89,8	77,1	90,4	91,0	78,9	91,5
2005	89,2	74,8	89,9	88,4	74,0	89,1	89,9	75,5	90,7
2006	87,4	71,3	88,1	86,7	68,2	87,5	88,0	73,9	88,8
2007	87,5	73,1	88,2	87,0	69,8	87,9	88,0	76,3	88,6
2008	86,3	69,6	87,3	85,5	66,4	86,7	87,2	73,3	87,9
2009	87,0	69,1	88,1	85,9	65,1	87,3	88,1	73,7	88,9
2010	85,1	67,2	86,3	84,1	62,7	85,6	86,1	72,4	87,0
2011	84,3	67,0	85,7	83,7	63,2	85,4	85,0	71,2	86,0

Table 5. Response rate, by citizenship and residence LFS yearly average 1996 - 2011

	Total			Nonnational			National		
	Total	Other residences	Oslo	Total	Other residences	Oslo	Total	Other residences	Oslo
1996	91,6	92,5	84,4	76,3	82,5	64,8	92,2	92,7	87,0
1997	91,4	92,3	84,0	75,4	81,9	62,4	92,0	92,5	86,7
1998	89,9	90,6	83,3	75,8	81,3	65,0	90,4	90,9	85,7
1999	90,2	91,1	82,2	75,2	80,6	63,6	90,8	91,4	84,5
2000	89,8	90,9	80,8	76,5	82,2	63,7	90,3	91,1	82,9
2001	87,6	88,9	75,8	71,9	78,3	55,9	88,2	89,3	78,3
2002	89,9	91,1	79,4	77,2	81,3	62,6	90,4	91,5	81,0
2003	89,6	90,5	81,9	77,7	81,7	64,0	90,1	90,8	83,6
2004	90,4	91,2	83,2	78,0	81,4	67,1	90,9	91,6	85,0
2005	89,2	90,1	81,1	74,8	79,3	60,3	89,9	90,6	83,5
2006	87,4	88,3	79,0	71,3	74,7	60,3	88,1	88,9	81,2
2007	87,5	88,6	78,2	73,1	76,2	61,3	88,2	89,2	80,0
2008	86,3	87,5	76,9	69,6	73,0	56,2	87,3	88,2	79,2
2009	87,0	88,1	78,0	69,1	71,3	61,0	88,1	89,0	80,3
2010	85,1	86,1	77,2	67,2	69,9	58,0	86,3	87,0	80,0
2011	84,3	85,5	75,1	67,0	69,4	57,3	85,7	86,6	77,8

Table 6. Response rate, by age and residence LFS yearly average 1996 - 2011

	Total			Other residences			Oslo		
	Total	Other age groups	25-35 years olds	Total	Other age groups	25-35 years olds	Total	Other age groups	25-35 years olds
1996	91,6	92,0	90,2	92,5	92,8	91,2	84,4	84,8	83,7
1997	91,4	91,6	90,8	92,3	92,4	91,8	84,0	83,8	84,4
1998	89,9	90,3	88,6	90,6	90,9	89,6	83,3	84,1	81,6
1999	90,2	90,9	88,0	91,1	91,7	89,1	82,2	83,1	80,2
2000	89,8	90,6	87,2	90,9	91,5	88,5	80,8	81,7	78,8
2001	87,6	88,8	83,6	88,9	90,0	85,2	75,8	76,8	73,6
2002	89,9	90,8	87,1	91,1	91,8	88,6	79,4	80,2	77,8
2003	89,6	90,5	86,4	90,5	91,3	87,4	81,9	82,4	80,6
2004	90,4	91,4	86,7	91,2	92,1	87,6	83,2	84,1	81,3
2005	89,2	90,5	84,1	90,1	91,4	84,9	81,1	81,8	79,3
2006	87,4	88,5	82,4	88,3	89,5	83,4	79,0	79,8	76,9
2007	87,5	88,5	83,1	88,6	89,5	84,5	78,2	79,2	75,9
2008	86,3	88,0	79,1	87,5	89,0	80,1	76,9	78,1	73,9
2009	87,0	88,7	79,0	88,1	89,6	80,3	78,0	80,2	72,7
2010	85,1	86,9	76,8	86,1	87,7	78,0	77,2	79,4	71,4
2011	84,3	86,4	75,4	85,5	87,4	76,5	75,1	77,1	70,2

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Villund, O.: “Immigrant participation in the Norwegian Labour Force Survey” *Statistics Norway Documents* 2008/7

Appendix A

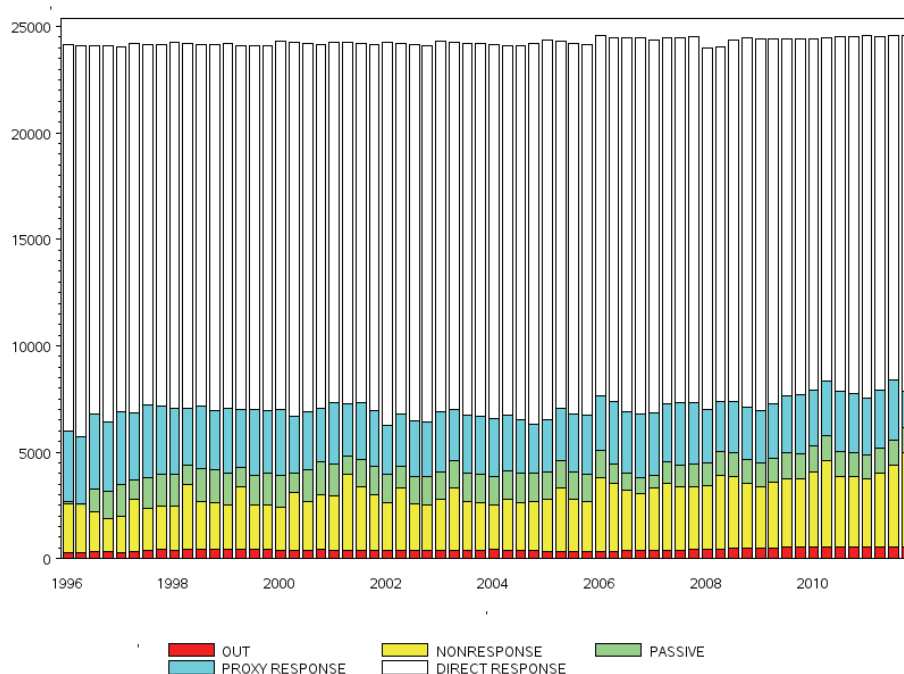
This annex contains some technical information and more detailed results made during the study. This material is included for reference and background information for future studies.

Documentation of the sample data

Figure 1 compares the sample size of direct- and proxy response, as well as nonresponse and ineligible units.

“Proxy response” means that a spouse or parent is interviewed on behalf of the study unit. “Direct” means self-response, i.e. the study units answer themselves. “Passive” units are old-age pensioners and institutionalized people that are intentionally not interviewed, thus not classified as nonresponse. The small group “Out” consists of people who are dead or emigrated between sampling and interview week.

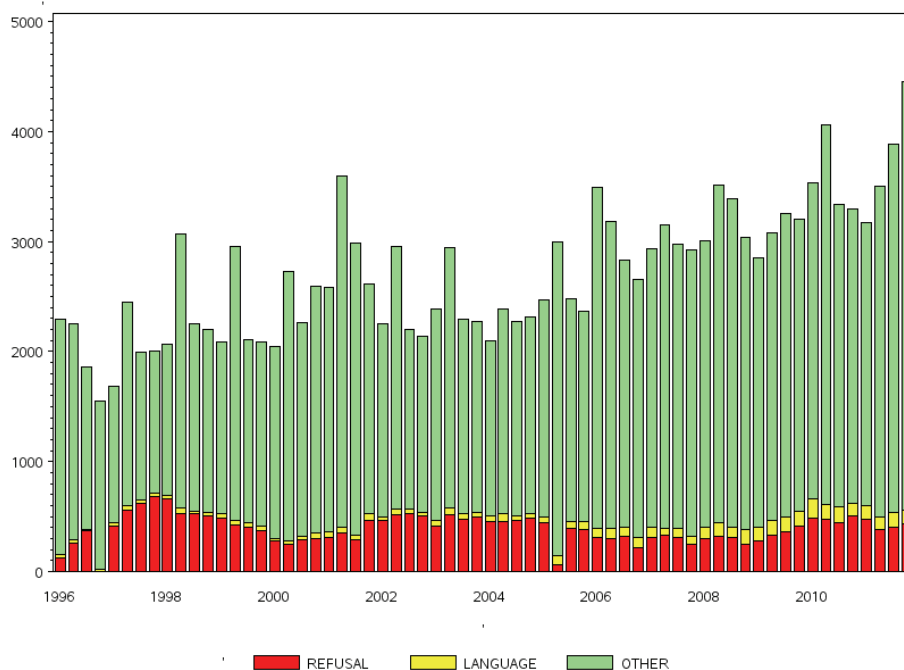
Figure 1. Composition of total sample. LFS 1996–2011



The purpose of this study was not to analyze the reasons or underlying causes of nonresponse. However, during fieldwork, the nonrespondents are classified according to reason for nonresponse. This classification is of course mainly based on the interviewers' perception of the situation, since we can't ask the potential respondent about the “real reason”. Some groups are relatively specific, such as ‘language problems’ and ‘refusals’, these groups are often relatively small. Many of the major groups tell us little about the actual causes, such as ‘non-contact’ and unspecified reasons.

Figure 2 shows the composition of the nonresponse, with respect to selected types. The main group “Other” consists mainly of non-contact and other plausible reasons for not being interviewed. Outright refusal constitutes a relatively small part of nonresponse, and without a clear trend.

Explicitly identified language problems are growing somewhat in later years, in line with an increasing immigrant population. We suspect that the proportions of both refusals and language problems are underestimated. For instance when people do not answer the telephone, it is hard to know the real reason.

Figure 2. Composition of nonresponse. LFS 1996–2011

Quarterly results

The figures presented previous chapters are yearly average results, with the intention of looking for structures and trends. In fact, results from the quarterly data show much more variation. The following figures illustrate this.

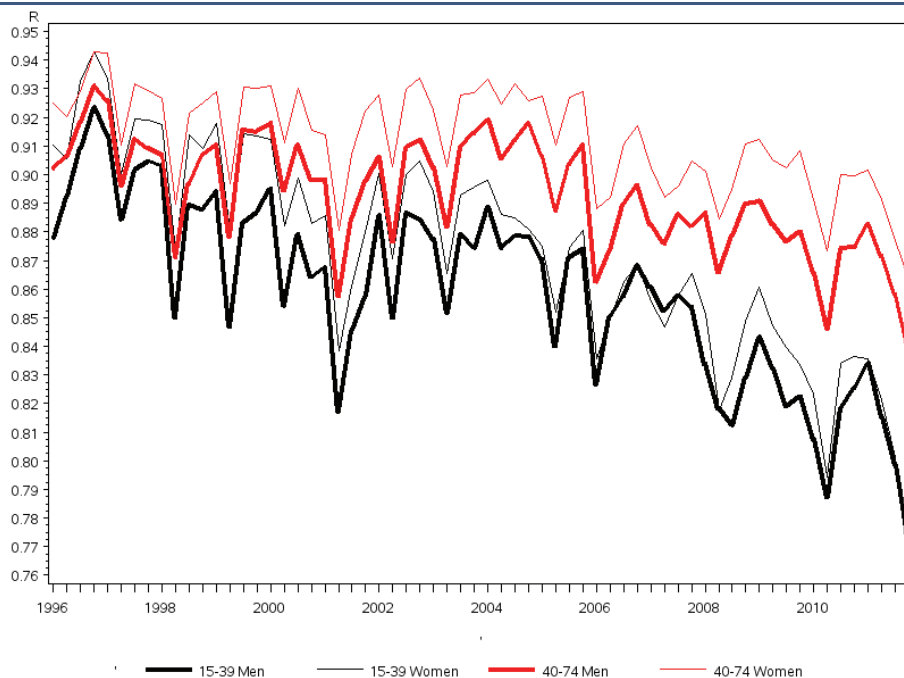
Figure 3. Response rate, by age and gender. LFS 1996–2011

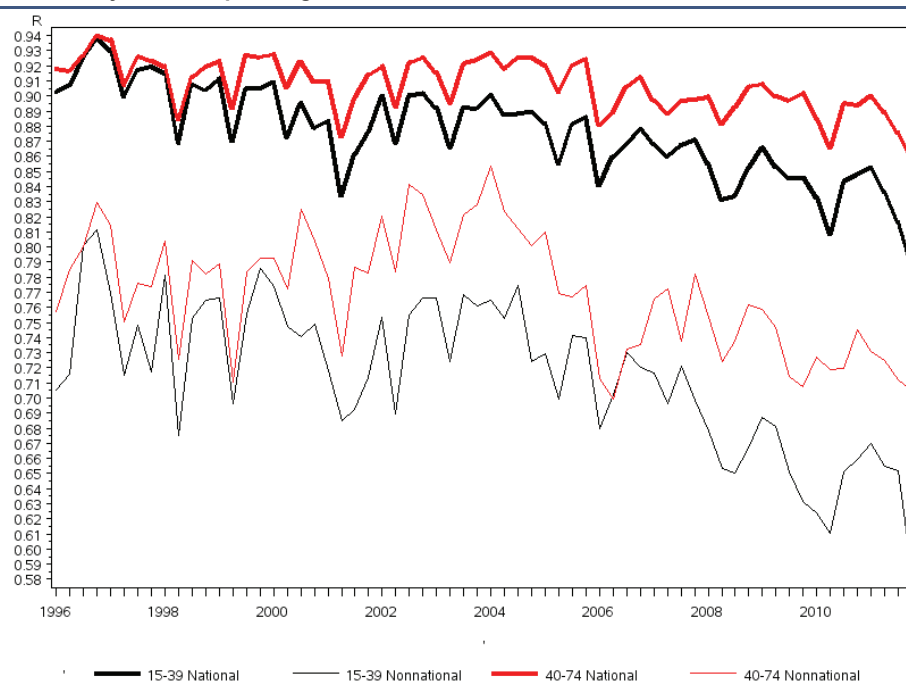
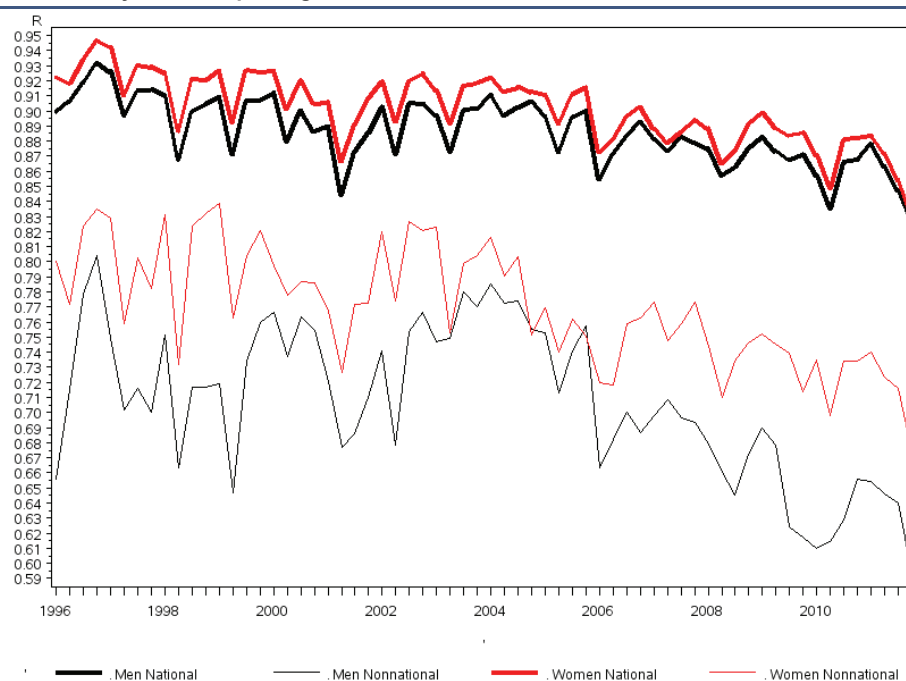
Figure 4. Response rate, by citizenship and age. LFS 1996–2011**Figure 5. Response rate, by citizenship and gender. LFS 1996–2011**

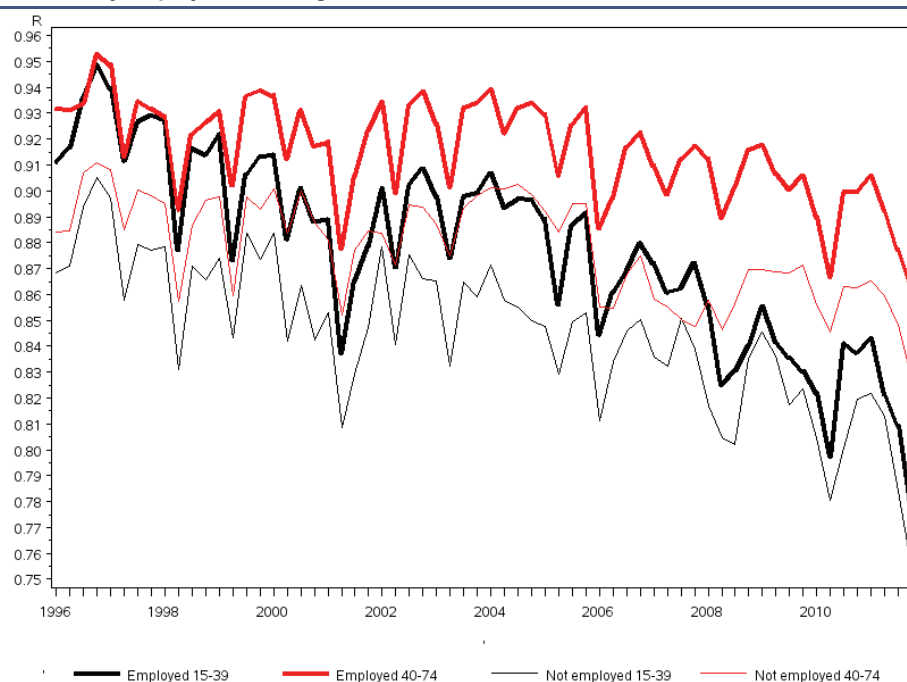
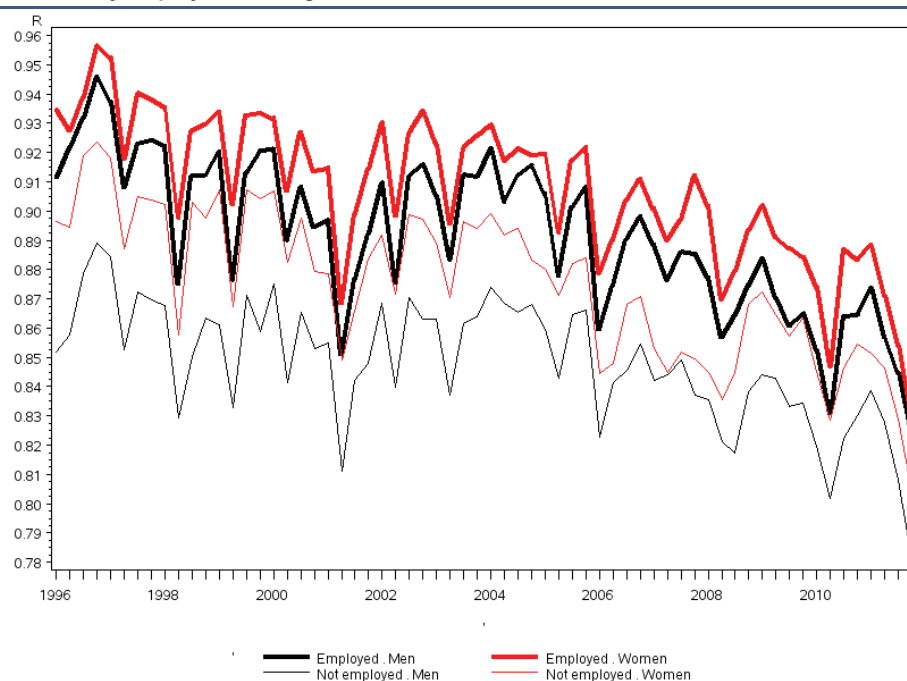
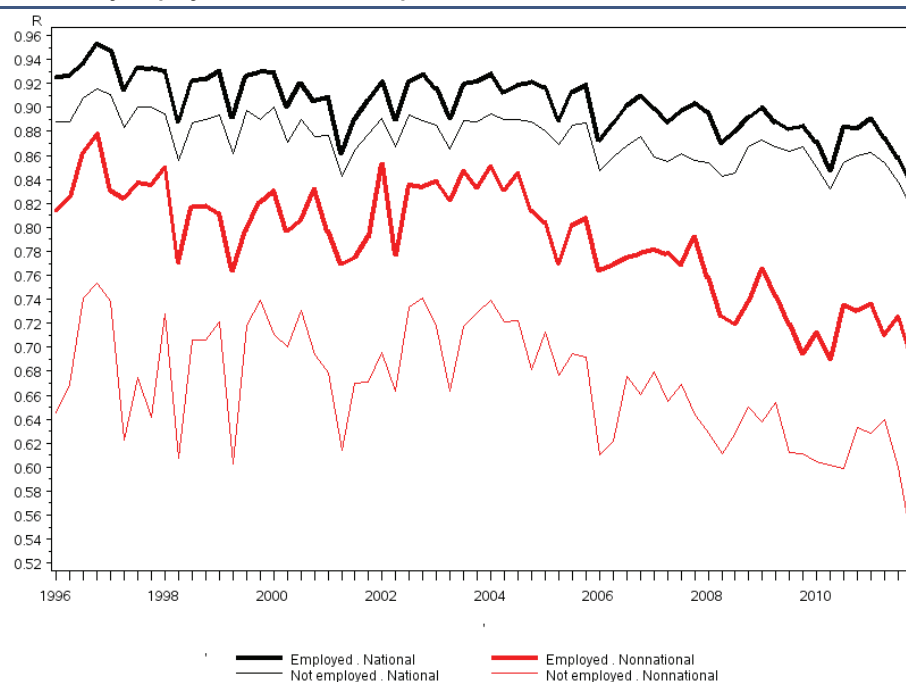
Figure 6. Response rate, by employment and age. LFS 1996–2011**Figure 7. Response rate, by employment and gender. LFS 1996–2011**

Figure 8. Response rate, by employment and citizenship. LFS 1996–2011

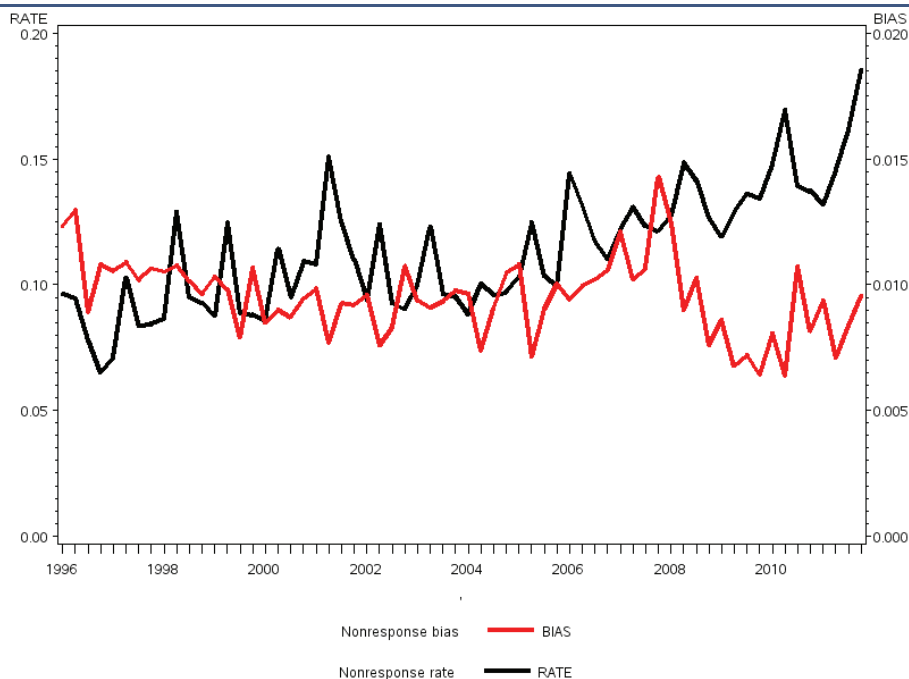
Place of residence

The two next figures illustrate difference in response rate by place of residence. We have not found a clear association between response rate and urbanization in general, but there are differences between the capital and other places of residence. These differences cut across demographic variables.

Figure 9. Response rate, by place of residence and age. LFS 1996–2011

Figure 10. Response rate, by place of residence and citizenship. LFS 1996–2011

Figure 11 compares nonresponse rate and nonresponse bias trends over the years 1996–2011. While the nonresponse rate shows a growing trend, the nonresponse bias shows a small but possibly decreasing trend, but with relatively large fluctuations over time.

Figure 11. Nonresponse rate vs nonresponse bias. LFS 1996–2011

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