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Nonresponse in Time: A Time Series Analysis of the Finnish Labour Force Survey

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The relation between the response mechanism in the Finnish Labour Force Survey (LFS) and the indicators for both social and political changes as well as organisational aspects are examined in this study using time series models. I show that besides the changes in the social climate, organisational decisions can have substantial effects on survey participation. The findings are discussed and the implications are shown to be organisation specific.

Key words: Survey nonresponse; autoregressive model; time series.

1. Introduction

The nonresponse rates of most major surveys were at reasonably low levels for a long time in Finland. However, the situation quickly turned worse in the mid-1990s. The response rates declined to a level where there is much greater possibility of bias in estimates than before. A good perspective on the situation can be found in the Labour Force Survey (LFS) time series, where monthly data extends to 19 years. By analysing the past development we try to learn and to avoid unwanted future consequences.

This article examines the nonresponse rate increase in the Finnish LFS taking into account both the changes in the climate in society and survey practices in one organisation. The focus will be on identifying especially those effects that the survey organisation can influence. However, some extensive institutional changes may have an effect at two levels. Finland's decision to join the European Union in 1995 can definitely be judged as involving such a change. The LFS had to be modified according to common European legislation. Correspondingly, the survey organisation had to adjust its own functions to the new conditions. But still there are many other actions and decisions which may have an influence on the survey outcome.

Time series models are not very typical in survey response and nonresponse analysis despite the fact that movements in time series are carefully followed in practical survey work. Some good examples of similar experiments can, however, be found in the literature. One of the earlier trials was completed by Steeh (1981), who analysed the University of Michigan surveys from the 1950s through 1979. The next examples are from

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the 1990s, and many of them were presented at the continuing workshop on Household Survey Nonresponse. For instance, Kantorowitz (1997) explained nonresponse time series from a panel survey. Harris-Kojetin and Tucker (1999) investigated the effect of political and economic events on the response rates of the U.S. Current Population Survey. They used various continuous variables such as inflation rate, unemployment rate, people's opinions about political climate (Presidential Approval), and the Index of Consumer Sentiment. All but the rate of inflation was found statistically significant. De Leeuw and de Heer (2002) presented a paper on the international comparison of nonresponse trends. They employed cross-classified data on responses, noncontacts and refusals and used time as the independent (explanatory) variable, and analysed the residuals further. The main results were that there is a clear negative trend in response rates across all organisations, but the countries have their specific response rate levels and speed of decline across time. Trends for noncontacts are the same for all countries but differ for refusals.

The approach in this study has much in common with those of Harris-Kojetin and Tucker (1999) and de Leeuw and de Heer (2002). Contrary to the influence of changes in the political or social environment, the effects of work practice and organisational decisions are mostly organisation specific. Thus the idea about how various actions influence nonresponse can be reproduced and tested in other environments while the level of their effect will probably differ from one country to another. The results obtained by de Leeuw and de Heer are indicating the common trend but a different level component may be interpreted to support the present approach, too.

2. Description of the Finnish Labour Force Survey

The Finnish Labour Force Survey was established in 1959 as a monthly mail survey. The original survey design was replaced by a new one in 1983, when a monthly interview survey was introduced. By and large, the basic survey design has been maintained since the early 1980s, though of course minor changes have taken place. They will be described in the subsequent paragraphs (see Djerf 1997).

The target population consists of people between 15 and 74 years of age across the whole country. The sampling design is a rotating panel design of elements, i.e., individuals, and the number of waves is five. The panel structure can be described as an incomplete six-wave structure where one wave is missing: each selected individual is interviewed five times in the course of 15 months. Normally, the lag between the interviews is three months except once when it is six months. Thus the structure looks as follows: 1-2-1-2-1-5-1-2-1 (i.e., 3 or 6 months lags between the interviews). The sample size is 12,000 individuals each month, distributed about equally across the five study waves.

From 1983 through 1999 the LFS data were collected normally in the third week of each month since the reference week of the labour force participation was the week around the 15th of each month. Since year 2000 the survey has been transformed into a continuing one with four or five reference weeks in each month. Sample elements are randomly allocated to the reference weeks in each wave.

Over the years, the LFS has served as a platform for numerous other surveys where other survey questions have been added to the LFS. Although these added questions clearly increased the respondent burden by adding interview time, their influence on

nonresponse rates was very limited. The general strategy was (and still is) not to disturb the LFS. In the field the respondents were asked separately whether they were willing to participate in an add-on survey or not. On certain rare occasions, however, the respondent burden has increased so much that we could detect an unusual increase in nonresponse.

Nonresponse rates for the first survey wave[2] have varied from five per cent in the early years to the current 15 per cent. The noncontact rate has always been the dominant part of the nonresponse because the fieldwork period is relatively short. In yearly figures the noncontact rate accounts for about two thirds, and the refusal rate for about one third. The third category, other, is merely a technical add-on and stays below 0.5 per cent (see Appendix). Figure 1 shows the three-month moving average of the nonresponse rate series.

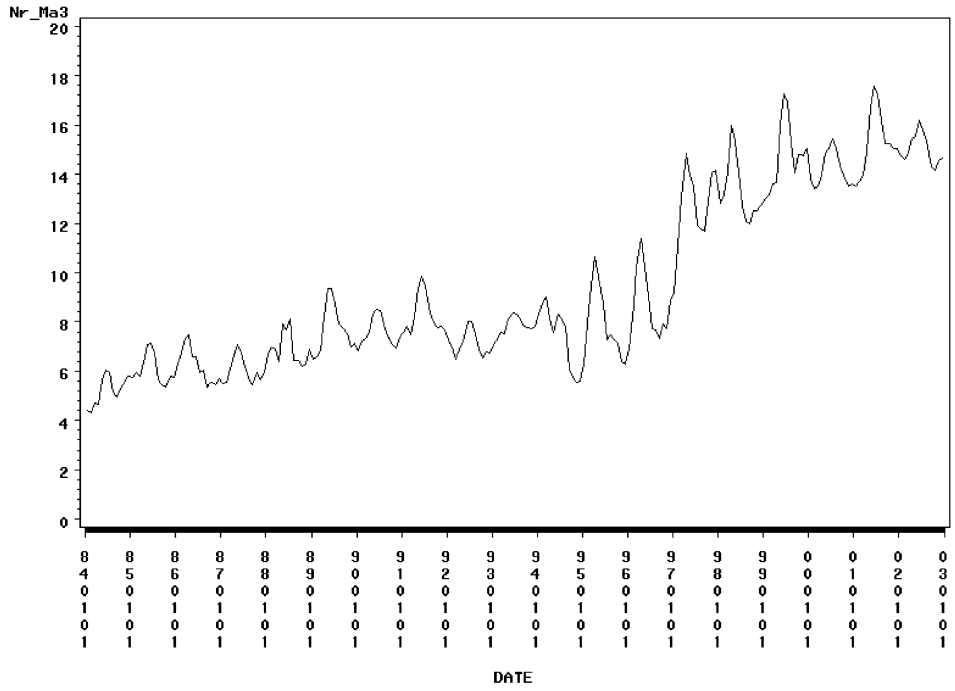

Fig. 1. Nonresponse rate of the Finnish Labour Force Survey Wave 1, 1984–2002. A three-month moving average

3. The Effects of Institutional Change

3.1. The period of the national LFS

We can divide the time span from 1983 into two main parts based on the changes that occurred in the survey. The first was the time of the national LFS, which covers the

[2] Wave 1 nonresponse rates are completely comparable across time since they do not contain any attrition related with the later panel waves.

years from 1983 through 1994. The national survey included a relatively short paper questionnaire: the average interview time in the first wave was about 12 minutes, and considerably less in the subsequent waves. The main interview mode was a telephone interview because telephone penetration was already more than 90 per cent in the early 1980s.

The nonresponse rate increased fairly slowly from five to seven per cent, on average, with a few extreme months when it was over 10 per cent. The refusal rate was about two per cent. Thus most of the nonresponse cases can be attributed to contact problems. During the period of the national LFS an attempt was made to reissue the noncontact cases either through a small centralised telephone interview facility or through mail questionnaires. This was feasible because the data processing time was long enough to allow the converted respondents to be included in the data set.

The unadjusted time series has some peaks, usually in the summer when it is more difficult to contact people. Some additional peaks outside the summer months can be detected too. One of those was an interesting special case. In February 1988 a study was published on the voting activity in the Finnish parliamentary elections of 1987. The study was conducted with a special permit to match the voting register against several other registers of the Finnish population. Despite the fact that it was not associated with any other survey, it had an effect on response rates. Finnish journalists were very anxious to find out whether privacy issues had been neglected in the study, and several articles appeared in the newspapers telling about the threat to privacy. However, after publication it was found that the study did not involve any such threat and the discussion about "big brother watching you" ceased rapidly. And soon public reactions were also calmed, pulling the nonresponse rates back to the normal level. A follow-up to the voting study is described below (see Martikainen and Wass 2002).

3.2. The harmonised European Union LFS

The second phase of the time span started with the alignment of the national LFS to the harmonised European Community LFS. Finland joined the European Union in 1995, which called for changes in statistics production as well. The European Commission (EC) declared unemployment as one of the key indicators of the economic and social structure in the EU. That decision obviously stressed the need for a harmonised labour force survey. Some countries like Finland had their national surveys that followed more or less exactly the recommendations of the International Labour Office (ILO). However, because of large differences between the member countries the Commission decided that a proper way to harmonise the surveys across countries was to introduce specific legislation on the issue. Thus a regulation on the European Community LFS was finally adopted in 1998. In most member countries, including Finland, the Community survey begun before the legal status was adopted.

During the starting phase of the Community LFS in 1995 survey harmonisation turned out to be a complex process for those countries, which were already conducting labour force surveys. The Commission stipulated that data had to be collected from all household members but the survey frequency was very low: the survey was carried out only for one quarter in a year. However, Statistics Finland felt it was very important to provide old

customers with comparable data for the labour market and decided to continue with the national monthly LFS for the other nine months. From a purely technical point of view enlarging the sample from one individual to the whole household is not difficult: sampling design is changed from element sampling to one-stage cluster sampling. Some partial nonresponse was, of course, found (i.e., one or more household members refused). However, the largest differences between the national and the EU LFS were found in the contents of the survey. Different questionnaires resulted in measurement problems and errors. The most apparent difficulties were encountered during the first contacts with the household instead of just one individual. The new household survey was much more burdensome than the old national survey, and nonresponse rates started to increase rapidly in the three spring months when data for the EU LFS were collected. However, for the rest of the year nothing changed and response rates stayed over 90 per cent in the national LFS.

The concepts of the Finnish national LFS were gradually integrated into those of the EU. The LFS regulation defined the LFS as a continuing survey, i.e., data should be collected for every week of the year instead of one quarter in the spring[3] months. However, some countries, including Finland, were partly exempted from the obligation to collect data from all household members and therefore Statistics Finland went back to interviewing only one member of each household starting from June 1998. Recently, the EU Commission renewed the demand regarding the issue and all household members were to be interviewed again as of 2003. Technically this problem was solved by collecting data from the entire household each month but only in the last wave of the LFS (roughly from one fifth of the total sample).

Altogether the integrated EU LFS imposed a greater burden on the households because the questionnaire became longer. The contents were developed and expanded gradually from 1998 to 2000. The last big change analysed in this article was that the collection was extended to cover all weeks of the year instead of one specified week of each month. Altogether we can call those changes the integration phase.

The overall nonresponse rates increased from the 1995 level of less than 10 per cent to the current 15 per cent. Most of the increase was due to the higher noncontact rate, although the refusal rate has increased, too. The nonresponse distributions across standard demographic variables have the same shape as described in Djerf (1996), with a marked shift in levels. Regarding demographic covariates the following can be said. The nonresponse rates for males are consistently higher than for females by two to three percentage points, according to age the distribution of nonresponse is a (flat) inverted U with the maximum around the age of 45 years, and in the geographical domain the highest rates are found in the largest towns, especially in the Greater Helsinki area. The most striking feature was found when the response behaviour was analysed with regard to whether the sampled persons were claiming unemployment benefits. Djerf (1997) showed that there is a clear dependence between the nonresponse rate and being an unemployed job seeker. The relation still exists: in 2002 the nonresponse rate for unemployed job seekers was more than 23 per cent while it was 14 per cent for the rest of the sample.

[3] Countries which are not able to collect data continuously can still only conduct the EU LFS in the spring months.

3.3. Changes in technology

Other explanations of why the nonresponse rates have increased can be sought from general types of changes in work practice.

The introduction of CAI techniques cleaned data sets, and the need for manual cleaning and editing decreased considerably. However, it may have given rise to the idea that other measures for reducing nonresponse were no longer needed. For example, before the introduction of CAI there were special nonresponse operations, i.e., reissuance and use of paper questionnaires. They appeared especially good for some noncontact cases, e.g., for those people who spend the whole summer in their secondary homes. Those operations were discontinued in 1997. The effect of the decision to give them up is tested empirically in the subsequent sections.

As in many other countries two competing measures of unemployment have been published for a long time. Besides the LFS unemployment figures the Ministry of Labour has published its results based on unemployed job seekers. The two sets of statistics tend to show a slightly different picture of unemployment. Discussions in the mid-1990s led to a joint decision by Statistics Finland and the Ministry of Labour on the timing and publication of the two results. The LFS had to speed up the data processing and publishing timetables, which made it impossible to extend the field operations to the earlier length. The shorter field time increased the number of noncontact cases.

4. The Effects of Political and Economic Changes in Society

4.1. Political changes

Joining the European Union in 1995 changed the political climate in Finland. The focus had to be changed from national to European policies in various areas of society. Specifically, many farmers were afraid that, despite subsidies, the free market would ruin their possibilities of continuing agricultural production. Farmers and other people in rural areas were quite strongly against the EU and some became frustrated after the referendum result, which barely was in favour of joining.

Political participation has decreased markedly from the 1980s to the present. It has been shown that a similar trend is present in many industrialised countries. However, the decreasing trend in voting activity in Finland is much stronger than in the other Nordic countries. For example, Martikainen and Wass (2002) give many possible reasons for the decline, examining the trend of voting turnout using the total population register data of the national elections of 1987 and 1999. It is obvious that the young, the least educated and those marginally attached to the labour market have lost interest in political participation.

Table 1 shows similar trends for voting activity in general and local elections. Although there is no scientific proof that the rapid decline since 1995 is due to joining the EU, such an effect cannot be ruled out. It is possible that people felt that their influence was reduced when part of the political power was transferred from the national parliament to the multinational and multi-body governance. One indicator is the turnout in the European Parliament elections: in 1996 it was 60.3 per cent, and in 1999 only 31.4 per cent.

Table 1. Voting turnout in national and municipal elections and LFS response rates 1984–2002

	National	Municipal	LFS response rate Wave 1 yearly average
1983	75.7	–	–
1984	–	74.0	94.8
1987	72.1	–	94.0
1988	–	70.5	93.1
1991	68.4	–	91.7
1992	–	70.9	92.9
1995	68.6	–	92.2
1996	–	61.3	91.4
1999	65.3	–	85.2
2000	–	55.9	85.8

The correlation between the yearly response rates and the voting turnout is over 0.90 for both types of elections. It would have been interesting to obtain a time series from the party preference surveys which have been conducted monthly since 1990. However, these surveys include questions on voting intentions only before the elections and does not give more information than the observed rates above.

4.2. Economic changes

There was a steady and fairly rapid growth in the Finnish economy during the 1980s. By the end of the decade the capital markets had been gradually freed, as in many other countries, and this is a combination with the good economic situation causing a large credit expansion. The liberalisation of capital markets in 1991 was a decisive blow: in the early 1990s the expansion bubble burst and at the same time the export markets started to decline very rapidly. That was partly due to the breakdown of the Eastern bloc countries that were big customers of many Finnish industries. The economic slowdown was very extensive indeed: it took three years before the economy was ready to recover. Since 1994 the economy has shown a steady growth but with a substantially higher level of unemployment than before. Thus the economic growth was by and large a result of increased productivity.

The seasonally adjusted GDP indicator and the unemployment rate are presented in Figure 2. The correlation of GDP with the monthly nonresponse rate is high (0.85). That phenomenon is probably linked to contact difficulties: the better the economy works, the harder people are to reach. We might expect unemployment to affect people's attitudes to society negatively and increase the nonresponse rate in a manner similar to the declining voting turnout described above. However, the correlation between the unemployment rate and nonresponse is positive but not very strongly so (0.24). This is in line with the Harris-Kojetin and Tucker (1999) findings from the U.S.A.

It would have been interesting to include consumers' economic perceptions as an indicator of the general attitude to economic phenomena, as in Harris-Kojetin and Tucker (1999). Despite the fact that the Finnish Consumer Survey was introduced in 1987, monthly data were not collected until 1995 (see Djerf and Takala 1999). Thus we could not use consumers' expectations.

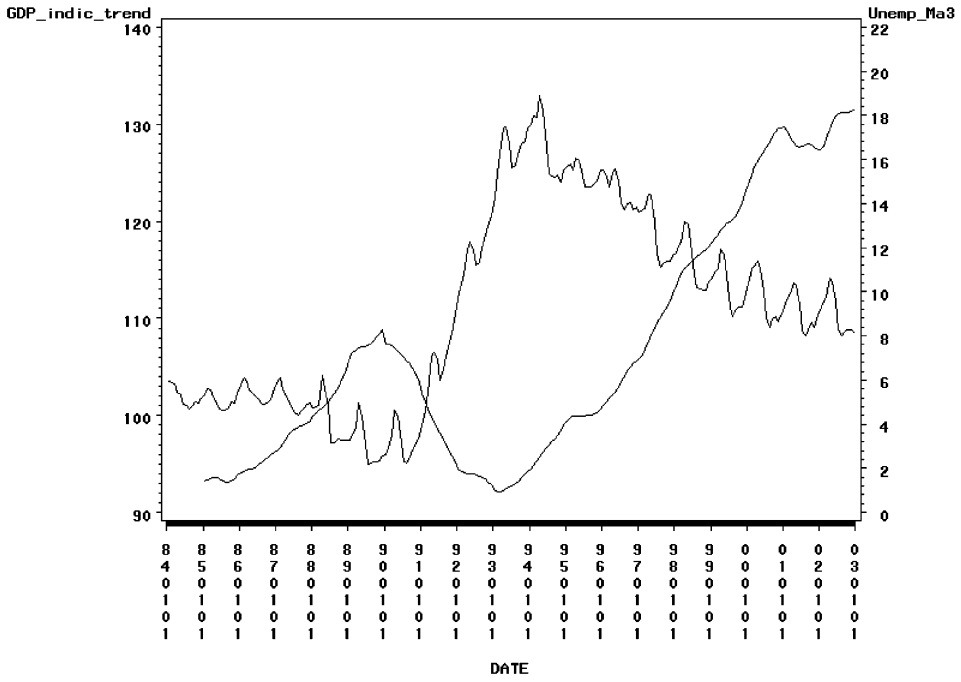

Fig. 2. Seasonally adjusted monthly GDP indicator and unemployment rate (a three-month moving average), 1984–2002. Note: the official seasonally adjusted unemployment rate series covered the years 1989 to 2002. Thus it was not used but instead a three-month moving average was calculated for the series beginning with 1984

5. A Time Series Model for Nonresponse

Next the Labour Force Survey nonresponse will be modelled using the indicators of change in political and economic climate as well as the organisational and technological changes as explanatory variables. Various ways to analyse their effects have been presented in the literature, especially in Groves and Couper (1998) and Harris-Kojetin and Tucker (1999). The overall nonresponse rate is the main study variable, but it is also divided into three major categories: noncontacts, refusals, and other reasons. Noncontact and refusal cases were investigated separately, while the third category was neglected because of its small magnitude.

5.1. Data

Data from the first LFS wave were chosen for this study because it is the only wave free of attrition and other measurement problems common to panel designs. Data are reasonably comparable in most respects since the basic sampling design, sample size and response categories have remained the same. Furthermore the basic methodology of collecting data via the permanent interviewer network was not changed over the years. Data were available from January 1984 until December 2002. All but one observation was used in the modelling. There was a civil servants' strike in April 1986 and data were not collected at all that month. However, the model applied was capable of imputing the missing values for the missing month. There are a total of 228 observations.

A time series model was applied to the nonresponse series to explain possible changes in the trends. The nonresponse rate and its components were regarded as continuous independent variables, although in reality they are bounded between 0 and 100 per cent. The reason for the choice was simply the existence of problems when it comes to applying logistic models in the time series context. Despite the bounds the real range of all study variables was reasonably far from zero and the time series behaved well, so that the approach appeared to be justified.

One might prefer the moving average type of model when the explanatory variables are mostly binary and the time span of a sudden jump can be regarded as short. However, the seasonal pattern of nonresponse is probably the most important factor to justify the use of autoregression correction in error terms.

We chose time measured in months for a continuous covariate to find out whether there is a clear linear trend in the series. The DATE data is an internal SAS variable beginning from 1 January 1960. The value for each month was attached to the 15th day.

Two indicators of economic activity were included. The first one is the trend component of the GDP indicator described above. It certainly is a measure of the overall economic situation. The other indicator, unemployment rate, is of more direct importance to all citizens. Unfortunately we were not able to include a reliable indicator for the real respondent burden. Not even the average interview time was included in the basic data until the start of using computer assisted interviewing.

Therefore four binary indicators were created to find out possible effects of various measurement issues:

variable	explanation
HH_INT	indicator for the months when data were collected from all household members (1 in March, April and May, 1995 to 1998; 0 otherwise)
CAI	indicator for CAPI data collection (1 from January 1997 on; 0 otherwise)
EU_LFS	indicator for the final harmonised EU-LFS questionnaire (1 from April 1999 on; 0 otherwise)
CONT	indicator for the continuing data collection, i.e., every week is a reference week (1 from January 2000 on; 0 otherwise)

Actually the CAI indicator contains three different effects. First, the questionnaire becomes considerably more comprehensive, which increases respondent burden. Second, it contains the effect of discontinuation of the noncontact reissuance by the centralised CATI facility or by means of a short mail questionnaire. Third, it contains the effect of shortened fieldwork time due to the more rapid publication policy.

The EU LFS resulted in some final changes to the questionnaire, basically enlarging it and thus imposing a greater burden on respondents. We also included monthly indicators for seasonal variation not explained by other covariates.

5.2. *Model for the nonresponse rate*

The estimated model with all covariates was:

Variable	Estimate	Standard Error	Approx t Value	Pr $> \|t\|$
DATE	0.000887	0.000250	3.55	0.0005
HH_INT	3.793	0.357	10.61	$<.0001$
CAI	3.554	0.375	9.47	$<.0001$
EU_LFS	1.636	0.462	3.54	0.0005
CONT	-0.134	0.471	-0.28	0.7762
GDP_INDIC	-0.0198	0.0240	-0.82	0.4104
UNEMP	-0.145	0.058	-2.48	0.0140
MAY	1.282	0.288	4.45	$<.0001$
JUN	1.736	0.251	6.93	$<.0001$
JUL	1.151	0.249	4.63	$<.0001$

$R^2 = 0.979$, $DW = 1.965$

The final model included neither the GDP indicator nor the indicator for continuing data collection.

Variable	Estimate	Standard Error	Approx t Value	Pr $> \|t\|$
DATE	0.000671	0.0000261	25.66	$<.0001$
HH_INT	3.829	0.349	10.97	$<.0001$
CAI	3.701	0.356	10.39	$<.0001$
EU_LFS	1.677	0.409	4.10	$<.0001$
UNEMP	-0.0933	0.029	-3.21	0.0015
MAY	1.080	0.245	4.41	$<.0001$
JUN	1.796	0.238	7.55	$<.0001$
JUL	1.182	0.234	5.04	$<.0001$

$R^2 = 0.976$, $DW = 1.964$

Note: Both models contain autoregressive terms with eight lags (Lags 1 and 8 significant). The effect of autoregressive parameters was eliminated from the results above.

The final model reveals that there is a slow continuous increase in the time trend of the nonresponse rate, slightly less than 0.25 percentage points a year. The trend begins from about six per cent at the beginning of 1984 and would have ended up at 10.6 per cent at the end of 2002 if the effects of all other covariates had been excluded. The time trend is affected by many factors. Some of these are not incorporated in the model – for example, the social and political climate as well as the tendency to protect one's privacy may have had effects.

The change to interviewing all household members increased the nonresponse rate by 3.8 percentage points. Furthermore, the changes in the fieldwork (CAI) and finally the

introduction of a more demanding and burdensome questionnaire (EU_LFS) increased the trend by 3.7 and 1.7 percentage points, respectively. Indicators for May, June, and July were significant, which confirms that people are less willing to participate in the summer because of their leisure activities.

Contrary to the observed effect in the general elections (Martikainen and Wass 2002), we have now a positive relationship between unemployment and survey participation. A similar relationship was found by Harris-Kojetin and Tucker (1999, p. 178) in their analysis of the refusal rates of the U.S. Current Population Survey. Thus it is possible that certain negative economic phenomena can increase survey participation.

Our model predicts that the baseline nonresponse rate of the LFS is above 15 per cent at the end of 2002 and may increase further.

The real nonresponse rate fell outside the 95 per cent confidence limits provided by the model in seven observations. One case has already been discussed: publication of the voting behaviour study in 1988. Of the six remaining cases at least three are due to exceptionally good weather conditions in the summer.

The residual series suggested the presence of heteroscedasticity since both the Portmanteau and Lagrange multiplier tests gave support for two-term GARCH[4] models. However, in the final model none of the GARCH terms appeared significant and thus we assume that the estimated model is free of heteroscedasticity.

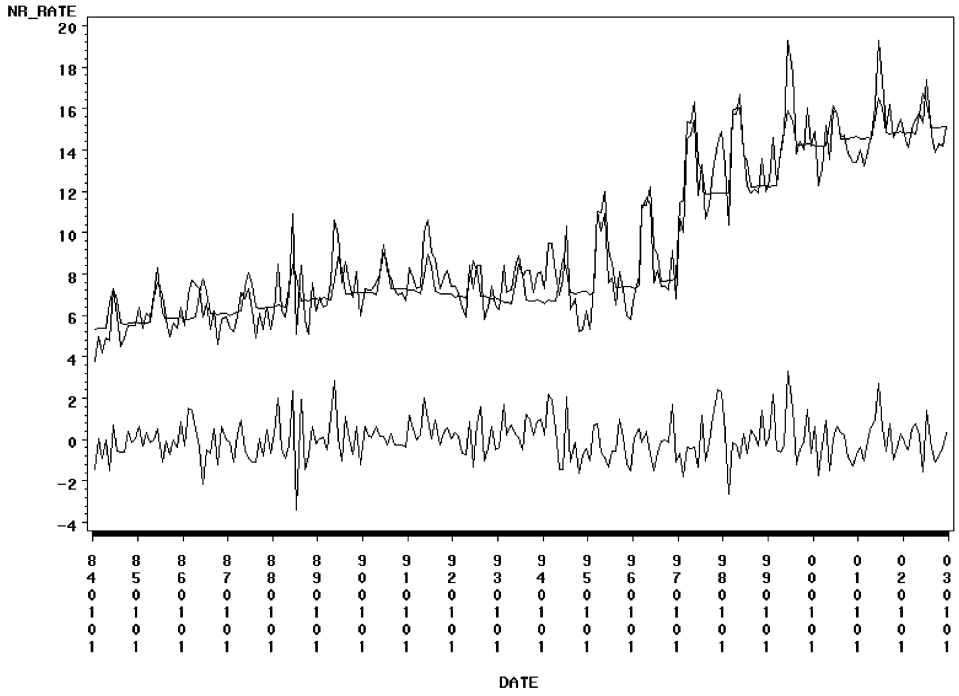

Fig. 3. The LFS nonresponse rate, its estimated trend and the error term

[4] The generalised autoregressive conditional heteroscedasticity (GARCH) model is an appropriate alternative for modelling time series with heteroscedastic errors.

5.3. Separate models for noncontacts and refusals

The analysis was also extended to refusals and noncontacts separately. Conceptually there is a causal relationship: only contacted individuals or households can refuse. We could expect that the basic relationship between noncontacts and refusals could yield a negative correlation. However, that can be detected only in basic cross-sectional observations while in time series the correlation turns positive. Furthermore, in a situation where the interviewing capacity is in full use it is highly probable that both the noncontact and refusal rates will tend to increase at the same time.

Therefore we can expect that the models and especially their error terms will be related if the regressions are run separately without appropriate adjustment in covariance structures. The autoregressive models were estimated together using the seemingly unrelated nonlinear regression method which takes care of the covariances between the error terms (Zellner 1962). SAS Proc Model was applied with the %AR-option and the SUR estimation method.

The idea was to explore possible similarities in the two main sources of nonresponse. We could expect that the variable related to respondent burden might be most important for refusals (especially the household interview indicator), whereas it is obvious that the problems associated with higher nonresponse rates during the summer are related to contact problems. The introduction of CAI techniques with a reduced fieldwork time presumably concerns noncontacts only.

The final models look as follows:

	Noncontact				Refusal			
	Parameter	Appr. S.E.	t	p	Parameter	Appr. S.E.	t	p
Constant	−5.784	1.457	−3.97	$<.0001$	–	–	–	–
GDP_INDIC	0.101	0.015	6.89	$<.0001$	–	–	–	–
DATE	–	–	–	–	0.00021	0.000008	25.81	$<.0001$
HH_INT	1.198	0.266	4.50	$<.0001$	2.190	0.204	10.74	$<.0001$
CAI	1.690	0.377	4.48	$<.0001$	1.503	0.218	6.88	$<.0001$
EU_LFS	–	–	–	–	0.668	0.245	2.73	0.0069
MAY	0.852	0.191	4.47	$<.0001$	–	–	–	–
JUN	2.248	0.190	11.82	$<.0001$	−0.430	0.131	−3.27	0.0013
JUL	1.837	0.189	9.72	$<.0001$	−0.695	0.140	−4.98	$<.0001$
AUG	0.619	0.185	3.34	0.0010	−0.331	0.126	−2.64	0.0089
NOV	–	–	–	–	0.251	0.126	1.99	0.0475
DEC	–	–	–	–	−0.494	0.126	−3.91	0.0001

$R^2 = 0.880$, DW $= 2.023$ $R^2 = 0.883$, $DW = 2.061$

The models differ from each other. Noncontact rates are explained by the GDP indicator (which can be interpreted that people are harder to contact when they work more), respondent burden indicators, and seasonal indicators. The CAI indicator accounts for a shorter fieldwork period and the ending of special nonresponse measures, i.e., it reflects reduced capacity for contacting.

Inclusion of all household members in the interview should actually improve contacting. But on the contrary, here we got a positive sign for the noncontact cases which may relate to respondent burden. According to the rules, it was mandatory to inform the households that all the members would be interviewed. Household interviews are more

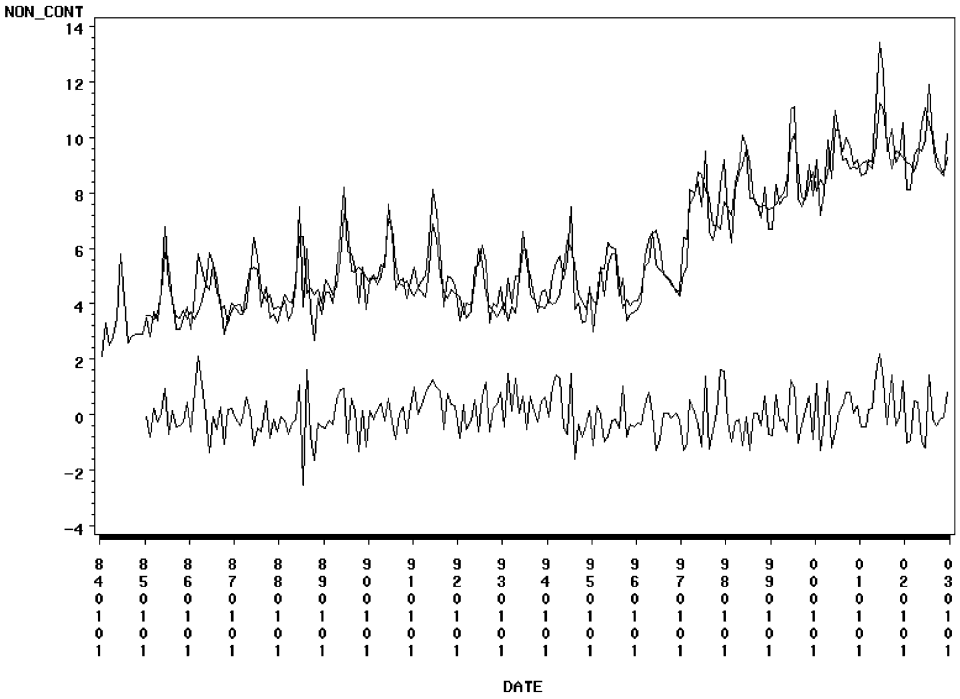

Fig. 4. Noncontact rate, model prediction, and the error term

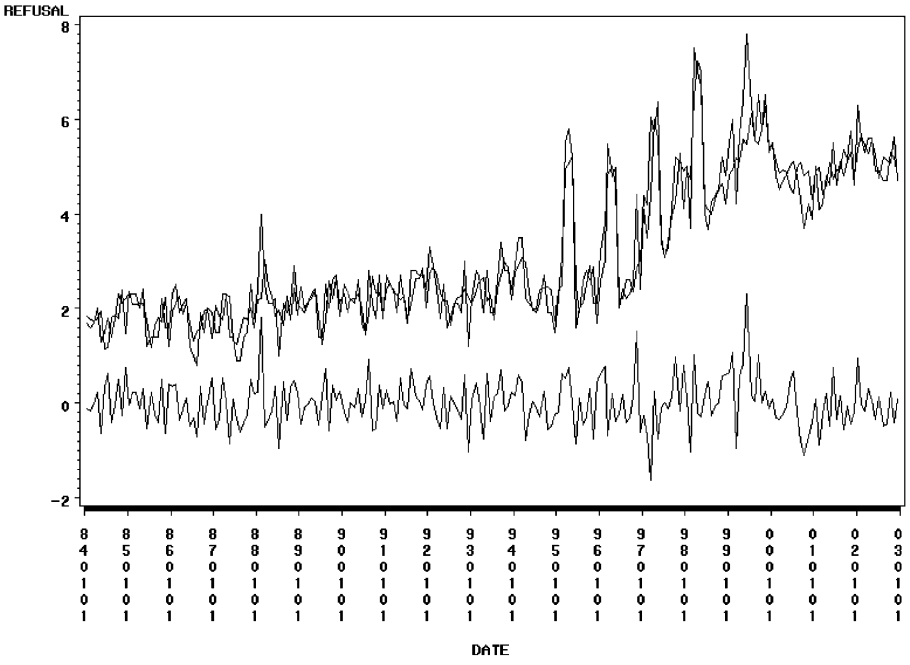

Fig. 5. Refusal rate, model prediction and the error term

burdensome, and it is probably harder to make appointments or conduct telephone interviews with all the eligible family members rather than with a single person. It is also possible that some refusals have been misclassified as contact problems.

Beginning from May people spend more time on their leisure activities. Many Finnish families have a summer place and people tend to stay there several weeks. Thus in the summertime it is much more difficult to contact households than at other times of the year.

In the case of refusals a linear time trend was present and its rival, the GDP indicator, did not seem to be significant. Neither was the unemployment rate. Covariates related to the respondent burden appeared important, especially interviewing all household members (2 percentage points) and introduction of the long EU questionnaire (partly contained both in the CAI and EU_LFS variables). Furthermore, there is a trade-off between contacting and refusing during the summer months: contact problems result in a negative effect for refusals.

The autocorrelation structures were different in the two equations. In the noncontact equation the estimates were obtained using lags one and five, while the model for refusals needed lags one, five, and eight. There were no signs of heteroscedasticity in the error terms of either equations.

6. Conclusions

Findings based on the nonresponse time series from the Finnish LFS show that both the general social and political climate and the survey organisation have an effect on response rates. They are discussed separately below.

6.1. General atmosphere in society

The biggest economic slowdown in post-war Finland certainly plays a key role when people's activities are investigated. It began in 1990 and continued for more than three years. Despite a long period of economic growth after the turning point there are still many social problems left due to the crisis: our unemployment rate, for instance, did not decline after the recovery as much as anticipated, probably because of increased work efficiency. These social problems may have some underlying effect on response behaviour in general.

There is also strong continuing migration from the countryside to urban areas. While we do not know whether the migrants change their behaviour after moving (i.e., adopt a more reluctant attitude), we know that they are more difficult to contact and thus generally cause some increased nonresponse.

There are other factors as well. Privacy issues are more important now than they were before. But some factors may be related to politics. Generally, there are inactivating trends in society, especially regarding political participation, which shows a steady decline since the late 1980s. The younger generation, the less educated and the unemployed were found to have the lowest voting turnout. But one should not forget attitudinal factors, especially in relation to the European Union. The voting rate in the last European Parliament elections in the spring of 1999 was a record low in Finland, only 31 per cent. The comparable rate in the parliamentary elections, 1999, was 68 per cent. The most negative attitudes are found among the old generation in the countryside while younger and urban people are much more positive towards the EU. So far it has not been ascertained whether there is a dependency between the nonresponse rates and the voting behaviour. General attitudes may have an effect on both of them.

6.2. Survey organisation and practice

Survey practice has immediate effects on the nonresponse rates. We found that increased respondent burden both in the contents and in the scope of the survey, and more limited time in the field operations, increased nonresponse rates by several percentage points. The higher nonresponse rates reflect data collection with shorter fieldwork period (and more pressure) and less effort at achieving better co-operation. If such changes could be anticipated and addressed in advance the results might improve.

According to our results, it seems that the "baseline" nonresponse rate of the Labour Force Survey is currently close to 15 per cent. If we optimistically think the work practice can be improved in those respects, we could conclude that the baseline nonresponse rate for a short telephone interview with individuals on an interesting and important topic could still be around 10 per cent.

6.3. The future

It is difficult to predict whether the response rate will stay the same or decrease further. The general atmosphere must be taken as given by a survey organisation. The best way to influence nonresponse is to rely on the organisation's activities: good reputation, independence and neutrality vis-à-vis political power are probably the most favourable factors when it comes to public acceptance. Thus the survey organisation is responsible for finding the right measures for keeping the response level as high as possible. Our results indicate that there are ways to do this; better design, better work practices, less burden, and a reasonable workload in the field can be used as remedies for keeping the response level acceptable.

Appendix

Finnish LFS wave 1-nonresponse rates yearly by main categories, 1984–2002.

Year	Non-contact	Refusal	Other	Total nonresponse
1984	3.2	1.8	0.2	5.2
1985	3.9	1.9	0.3	6.1
1986	4.2	1.8	0.2	6.2
1987	4.2	1.6	0.2	6.0
1988	4.3	2.3	0.3	6.9
1989	5.2	2.1	0.4	7.7
1990	5.2	2.2	0.2	7.6
1991	5.5	2.4	0.4	8.3
1992	4.4	2.2	0.5	7.1
1993	4.7	2.5	0.6	7.8
1994	4.8	2.3	0.3	7.4
1995	4.5	3.1	0.2	7.8
1996	5.1	3.3	0.2	8.6
1997	7.5	4.4	1.0	12.9
1998	7.8	5.1	0.4	13.3
1999	8.4	6.0	0.4	14.8
2000	9.2	4.6	0.4	14.2
2001	10.1	4.8	0.5	15.4
2002	9.4	5.2	0.4	15.0

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