WORKSHOP ON LABOUR FORCE SURVEY METHODOLOGY

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ABSTRACT

Istat

A EMBEDDING THE LFS IN AN INTEGRATED MODULAR SOCIAL SURVEY DESIGN - I

A1 The LFS review in the context of the Eurostat programme for modernising social surveys

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Since 2009, Eurostat has been working on the modernisation of social statistics. This modernisation programme includes several main components relating to social surveys, modernisation of population statistics, core social variables, administrative-based data and statistical frames.

Micro-data from eight social surveys (Labour Force Survey (LFS), Statistics on Income and Living Conditions (SILC), Information and Communication Technology (ICT) survey, Adult Education Survey (AES), European Health Interview Survey (EHIS), European Health and Social Integration Survey (EHSIS), Household Budget Survey (HBS), Time Use Survey (TUS)) are currently being collected by Eurostat. These surveys were developed independently to answer specific policy needs. In the context of the modernisation of social statistics, Eurostat has been working on the streamlining and integration of these surveys. The approach is to move towards the adoption of a modular architecture of social surveys with the aim to increase efficiency and responsiveness to users' needs. A proposal for a Framework Regulation for an Integrated System of Social Surveys (European Parliament and Council regulation) is being developed. The Framework Regulation will refer to data sources and introduce principles that countries might find useful for their statistical production. It will not include detailed variables to be collected or methodological issues, which will be dealt through Commission delegated or implementing acts ("technical packages").

LFS and SILC have embarked on revision processes since some years. Both projects are part of the modernisation of social statistics. The deliverables of both review projects must be streamlined into the modernisation of social statistics, together with improvements from other social surveys, and the timing must be co-ordinated.

The LFS review includes a number of initiatives on the timeliness of data transmissions, on the content of the survey (modularisation of the LFS, review of the list of variables on labour market and education, possible inclusion of further core variables (household income, health), harmonisation of the measurement of employment and unemployment and better measurement of working time), on the review of the system of ad-hoc modules and on methodological issues (introduction of the infra-annual sample rotation pattern as compulsory feature of the LFS, methodology for harmonised measurement of flows in development, improvement of precision requirements).

This paper will describe the Eurostat plans for modernisation of social surveys in general (including ideas about the new legal framework and timing for the exercise) and the link between the modernisation strategy and the LFS review.

A2 From LF Survey to a system of LF Statistics

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Currently, the LFS is a stand-alone survey in a rapidly changing society. The increase of electronic devices, applications and use of internet generates many possibilities for new methods of data collection both within the context of an LFS as outside. This could have implications for the role and design of the LFS.

Currently, the design of the LFS is not very modern in many countries. Data is often collected with traditional face-to-face or telephone data collection modes. To apply state-of-art technology, web data collection should be available. Furthermore, in many countries the LFS is stand-alone rigid survey with the same contents in all waves. To make the survey flexible a modular differentiated wave approach design should be adopted. This would allow to adapt the survey to changing requirements in the future.

The urgency to modernise the LFS is not only driven by new technologies. The on-going digital revolution results in a lot of available data of which survey data is only a small part of. This lead to increasing pressure to be very efficient and flexible. Another consequence of the enormous data growth is that the way how to produce statistics will change. The challenge is how to move from statistics based on the Labour Force Survey only to a system of labour market statistics based on several sources. This complicated task is best addressed through some kind of international collaboration to unite resources and expertise.

B EMBEDDING THE LFS IN AN INTEGRATED MODULAR SOCIAL SURVEY DESIGN – II

B1 Towards an integrated system of household surveys – Implications for the LFS

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The Federal Statistical Office Germany (FSO) together with the Statistical Offices of the Länder (states) is currently preparing a major reform of its system of household surveys. The reform aims to establish a coherent and sustainable system of official household surveys that copes with increasing methodological requirements and changing user needs as well as budget restrictions and expectations to lower response burden.

The basic idea of the new system is to conceive the household surveys, for instance SILC and the LFS, as one survey, using a common sampling frame, a common fieldwork organisation and a common IT infrastructure, including the software used for data collection. A sample of one percent of the German population will respond to a questionnaire with core questions that are common to all household surveys. Specific modules of the individual surveys are integrated as sub-samples. The objectives of the integration are to improve coherence, to facilitate compliance with new EU requirements, and tap the potential synergies of the integration.

The contribution will outline the planned architecture of the new system of household surveys and discuss the implications for the LFS. This includes an introduction into key features of the survey design, the data collection and the data processing as well the issues that already occurred during the conception stage. We will discuss the implications for the production of monthly and quarterly data and longitudinal indicators and also put an emphasis on the planned approach of modularizing the survey questionnaire including the partitioning into quarterly, annual and biennial modules.

B2 Distribution of sample in surveys of Central Statistical Bureau of Latvia

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Starting from 2002 the CSB of Latvia carries out the LFS as a continuous survey. We want to have a sampling design with following features:

- Probabilistic sampling design
- Rotation of units according to the specific rotation pattern
- Uniform distribution of sampled units over space
- Uniform distribution of sampled units over time
- Easy management of sampled units in a sample

The two stage sampling design is used for the survey. Census counting areas (2000) are selected as primary sampling units (PSU) with stratified systematic sampling with probabilities proportional to PSU size. If an enumeration area consists of both – urban and rural population, it is subdivided in two PSU. Dwellings are selected as secondary sampling units with simple

random sampling in each selected PSU. Households and individuals eligible to the LFS are selected in each sampled dwelling.

The target population consists of persons aged 15 to 74 and registered as permanent resident of Latvia. Population is subdivided in 4 strata – (1) Riga, the capital city; (2) six other largest cities; (3) all other urban population; (4) rural population. Sampling is made using similar procedure in all 4 strata.

Within each stratum PSU are ordering in such a way that neighbouring PSU in the list of PSU are geographically close to each other. Within each stratum sampling of PSU is made by systematic probabilities proportional to size (the number of households) with a random starting point. Within a stratum sample of each week consists of 16 PSU, but strata (1)of 8 PSU. Each PSU is included in the sample for 8 consecutive quarters, and then it is out of the sample for a long time.

We have found a way how to compute PSU for LFS and other continuous surveys according to the rotation pattern. Sampling units can be computed for long period (5 years for example). It allows timely planning of the work for interviewers.

The reduction of the total travel costs is one of important aspects what are taken into account when planning a survey. In this case there are possibilities to coordinate different continuous household samples in PSU. Currently there is a coordination of LFS, Household Budget Survey (HBS) and Survey of Domestic Travellers (SDT). The PSU samples of HBS and SDT are sub-samples of LFS PSU sample. One interviewer can manage to do all three surveys in a PSU with low travel times. The coordination allows keeping the total costs of three surveys low.

We have found a way to compute sampling units for LFS and other continuous surveys according to the rotation pattern. We have found that two stage sampling design is more effective comparing to single stage sampling design using rotation pattern for 3 continuous surveys – efficiency measured by cost and precision.

C SAMPLE DESIGNS

C1 How uniform allocation among reference weeks is ensured in the French LFS?

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In order to ensure a uniform distribution of the sample among reference weeks over time as over space, the French LFS sample is the following :

The LFS sample is made up of dwellings. The people interviewed in the survey are those living in ordinary housings. Respondents are interviewed at their main residence, i.e. the residence at which they usually live. Until the beginning of the 2010s, the survey sample has been drawn from the data available from the census. Since 2009Q1, a new sample of dwellings drawn from a tax register has been introduced progressively (first of all to increase the size of the sample by 50% ; then to replace progressively the former sample). Now, since 2011 Q4, the whole sample comes from the tax register. The new sample is - as the former - balanced on NUTS 2 and reference weeks. The sampling method consists in a selection of clusters (groups of six sub-groups made up of an average of 20 close main residences) with a stratified and balanced method. The stratification is by NUTS2. The balanced sampling uses the variables: type of dwellings, type of geographical area (urban, rural), level of income of the household, age of the reference person of the household, owner/tenant. Each quarter, about 67 500 dwellings are sampled. Each cluster area is surveyed for six quarters consecutively. Each quarter, the sample contains six sub-samples: 1/6 of the sample is surveyed for the first time, 1/6 is surveyed for the second time, 1/6 is surveyed for the sixth (and last) time. The new sample is also balanced on waves (and it is a specificity of this new sample) in order to avoid the rotational bias.

In order to ensure a uniform distribution of the sample among reference weeks, the data collection is the following :

The pollster has a detailed map of the survey area and an area file in paper form. These documents enable the pollster to spot any changes that may have taken place in the housing stock (housing mergers/break-ups, change of occupancy, construction, demolition, name of the occupant of the dwelling etc.) to be interviewed. During the reference week, the pollster's first job involves listing all these changes, in order to send the letter informing households that they are going to be interviewed shortly in the framework of the Labour Force Survey. Data-gathering for a given reference week begins on the Monday following the reference week and ends two weeks and two days later. Pollsters therefore have two weeks and two days to interview all homes associated with this reference week. They are instructed to carry out as many interviews as possible at the start of the data-gathering period partly because respondents can provide more accurate responses if they are interviewed on recent events and partly because this way the pollster has more chance of successfully contacting the maximum number of people. The goals of the pollster are the following : 60% of the collection at the end of the first week, 80% at the end of the second week and 100% two days later.

Some pollster work in little dense areas. In order to permit a collection within 2 weeks and 2 days, for some areas (clusters) the reference weeks are spaced out of at least 3 weeks.

The correction for non-response rate does not incorporate information about the reference weeks.

Until now, It seems not to be useful. We were able to verify it during additional analyses led during a social movement of some pollster (first quarter 2012). The weighting procedure and our balanced sample over weeks allow monthly estimates (but extremely volatile !).

C2 Deployment in space and time with relation to monthly processing in the Czech Republic

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An important goal of the sampling scheme and frame is to distribute the sample uniformly among reference weeks to ensure an effective distribution of the sample over time as well as over space. In our contribution, we have focused on two particular issues. The monthly processing creates the new challenge how to ensure the stability and representativeness of monthly sample. The second issue is the influence of the size of municipality on the quality of Labour Force Survey data, especially of monthly data. The unequal distribution of census areas according to size of municipality can result in distortion of final results. Moreover, the distribution of census areas is not random, but it often depends on the financial demands of Regional Offices. For example, in the Czech Republic, it is not preferable to survey the outlying regions in the winter.

C3 The Italian LFS sampling design: recent and future developments

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The Italian LFS sampling design is a two stage sampling design (municipalities are PSUs, households are FSUs) with stratification of PSUs and random selection of FSUs from administrative population frame. A mixed mode CAPI-CATI is used.

Leaving unchanged this general feature, the sampling design has been recently revised. The new sample has been introduced in 2012Q3; due to the rotation scheme only in 2013Q4 all the four rotation groups have been selected according to the new sampling design.

Several reasons led to the decision to introduce this revision: a) the sample that was in force till 2012 was designed in 2001-2002, considering the target variables (employed and unemployed people) estimated at that time by the quarterly LFS (still not continuous) and the frame information for stratification was referred to 2002; b) it was necessary to update the sample to several changes occurred in the boundaries of the administrative units such as municipalities and provinces; c) it was considered proper to further improve the monthly representativeness of the sample, considering the high relevance of monthly LFS estimates; d) budget constraints made it necessary to reduce the sample size.

To conduct this work a task force has been set up in Istat, involving both colleagues from the methodological unit (experts on sampling issues) and colleagues from the LFS units (dedicated to the management of the fieldwork and to the estimation process).

The new sample has been designed taking into account both methodological and operational constraints: i) the unemployment figures considered as target variables for the evaluation of

precision requirements are referred to the pre-crisis period (2004-2007); ii) the information on non responses has been considered when distributing the sample units among the territorial units; iii) the monthly distribution of the sample guarantees that each month (even if composed by 4 or 5 weeks) is representative of the whole national territory; iv) the new selected PSUs have to overlap as more as possible with the previous PSUs in order to minimize the impact on the fieldwork (and on the final estimates); v) a random rotation of a certain number of PSUs has to be applied every year to maintain the sample updated over time (and to guarantee the substitution of municipalities in which all – or almost all – the household already participated to the LFS).

In this paper this revision process of the Italian LFS sampling design is described.

Moreover some issues for future development are discussed. In particular the conduction of several CAPI sample surveys on households together with the new Population Rolling Census, make it necessary to develop a coordinated approach to develop harmonized sampling design and to optimize the distribution of the sample over space and time, taking into account the management of the fieldwork.

C4 LFS Sample Design, Allocation, Weighting

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As TURKSTAT we are applying LFS since 1992 and in 2013 we decided to conduct Continuous LFS. For this reason some changes had to be done about methodology (sample size calculation, sample allocation at NUTS3 level, sample distribution equally among reference weeks (52 weeks) weighting etc.). I want to summarize what have been done while passing to Continuous LFS in terms of the topics those will be discussed on 9th workshop basically;

Rotational Patterns ; As known, EU countries apply different rotational patterns according to their aims. As TURKSTAT we used rotational pattern having 8 subsamples, %50 overlap between consequent waves and %50 overlap between the same wave of consequent years. 2 – 2 – 2 System is used (in for 2 quarters – out for 2 quarters – in for 2 quarters). With this rotational pattern we aim to get consistent estimations between waves and minimize the seasonal effects on related estimations.

Ensuring uniform allocation among reference weeks ; Uniform allocation among reference weeks is an important issue that can affect the results. Sample sizes are calculated to produce estimations at NUTS2 (26 regions) level and distributed at NUTS3 (81 provinces) level, clusters each of having 10 selected households are divided among 8 subsamples. At last step, all selected clusters are distributed equally among reference weeks. After we constructed a scheme for allocation of clusters, we had almost equal distribution at NUTS2 x NUTS3 x SUBSAMPLE x REFERENCE WEEK x URBAN x RURAL detail. While using rotational patterns, 1 subsample is entering to design and 1 is leaving every quarter. By using scheme, this change(entered and removed subsamples) does not affect the uniform allocation among reference weeks.

Optimal allocation for (NUTS3) regions; Basic sample size calculations (optimum mixture of square root, proportional and compromise allocation methods) started at NUTS1 level and continued at NUTS2 and NUTS3 level. We tried to guarantee a sufficient number of samples at NUTS3 level because we also produce estimations at NUTS3 level yearly by using Small Area

Estimation techniques (EBLUP). Sample sizes changed while passing from one step to another (NUTS1 to NUTS2, NUTS2 to NUTS3). Document (Doc.: Eurostat/F2/LAMAS/38/10) published in 2010 after working group on “Labour Market Statistics” has taken as reference while checking the sufficiency of sample sizes at both NUTS2 and NATIONAL level. Design effects, non-response rates and household sizes at NUTS2 level are used to check if sample sizes satisfy 1st requirement (article 3(1)) or not. After necessary changes have done, we checked if the total sample size satisfies 2nd requirement (article 3(2)) mentioned in document. Finally we worked on these sample sizes at NUTS2 level, made some slight changes due to rounding and reached the final sample sizes in terms of households.

Efficient sampling schemes to meet precision requirements; Two – stage stratified systematic cluster sampling method is used. As TURKSTAT we produce estimations at National x Urban Rural level monthly from a cumulated data (ex// January+February+March data sets are used to produce estimations for February) and producing estimations at NUTS2 level yearly. While passing to Continous LFS we changed the number of selected households from each cluster to meet the precision requirements.

Weighting methods;

1st step : Calculation of basic weights

2nd step : Non response adjustment

3rd step : Integrative calibration & trimming

By using integrative calibration technique provides the same weights for each individual living in the same address.

Address Frame; Address Based Register System is used since 2008. We update address frame twice (on February and August) a year.

During year 2013 we conducted “LFS” and “Continuous LFS” together. Since it is really difficult to conduct 2 surveys together we decided to select a subsample for Continuous LFS with which we can produce estimations for some basic characteristics. The subsample was 1/3 of actual sample size calculated for Continuous LFS. At the end of the year we aimed to compare the results, see the changes in quarterly estimations at National level and tried to define the reasons(sample design, weighting, field application, reference week criteria, questionnaire form etc.) of change. It was a useful experience to analyse the changes between LFS and Continuous LFS results. Starting from 2014, we are just conducting Continuous LFS.

D MULTIPLE MODE DESIGNS

D1 Development and Implementation of a Mixed-Mode Multipurpose Survey Tool for Official Statistics

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Collecting data fast, with high quality and a minimum burden for respondents in a cost-effective setting; - these seem to be the demands for modern surveys in official statistics. One possibility to apply to these demands is changing survey designs to mixed-mode designs, integrating innovative modes like CAWI. Another possible solution might lie in modularizing, as to conduct efficient multipurpose surveys. But in order to do so the organizational and technical system of data collection within one institution needs to be adopted accordingly.

Statistics Austria has therefore started to develop a new IT-System for surveying the general population with the goal to facilitate the following:

1. Enable cost-efficient Case-Managment: Centralize all Question-, Case- and Field-Management in one system.
2. Enable Multipurpose Surveys: Make use of the concept of Modularity and organize survey-questions by topic in Modules and Submodules.
3. Enable Mixed-Mode Designs: Make use of “classic” and “new” ways of data collection (CATI, PAPI, CAPI, CAWI) and supply the possibility of combining modes in a concurrent, sequential or longitudinal mixed-mode design.

This new data-collection system is currently being implemented and will be continuously further developed. It will be firstly used for the Household Budget Survey 2014/15, followed by the LFS planned for 2016.

This contribution will give an overview of the organizational and technical aspects of the new data-collection system. It will focus on the adaptions (one may call them innovations) that were and will be made for organizing questions, managing the fieldphase and using a multimode questionnaire. For each of these adaptions we will discuss the expected benefits and implementation & future challenges.

D2 Using multiple Mode designs

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In recent years the expectations on NSI’s providing electronic questionnaires (CAWI) on the side of other data collection modes have increased. In 2012, Statistics Finland launched a project on designing and testing of web questionnaires, LFS being one of the surveys tested. The goal of the project was to design a user-friendly questionnaire, conduct a pilot survey and test for any arising mode-effects due to the differences in the data collection mode (CATI vs. CAWI). As the LFS indicators are closely monitored in the media, any unexpected mode effects would have harmful consequences on the credibility of the results. The aim was also to gain experience on data collection process to be used in further development of LFS mixed mode design.

In this paper we share our experiences on conducting LFS as CAWI based on qualitative cognitive interviewing and quantitative analysis of pilot survey data. We focus on the analysis of mode effects on working hours and employment status. While designing the questionnaire we were faced with several different options on formulating the CATI questions on the CAWI questionnaire. The results from our cognitive interviews showed that people tend to forget official holidays and other absences from work when answering to the question on actual working hours. However, this problem may be of less gravity in CATI where the interviewer can remind the respondent on occurrence of official holidays. Furthermore, we found that in CAWI people tended to invest more effort on recalling the working hours when the hours where asked separately for each day in a grid form.

In the pilot survey we used experimental design ("split-plot") to test whether the two different CAWI-layouts for the working hour questions produce different kinds of results. Two different types of implementing DK-option was also tested. After comparing the different CAWI question-layouts to each other, we evaluate which of the two layouts produce more comparable data with CATI results (ie. less mode-effects). The results are analysed using standard statistical methods such as chi-square and t-test. In addition, we provide insights on the qualitative feedback received from the CAWI respondents. Finally, we conclude the paper by sharing our experiences on mixed mode LFS and give some recommendations for designing questionnaires for mixed-mode design.

D3 Redesign of the Dutch LFS, from CAPI to CAWI/CAPI/CATI

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Statistics Netherlands has taken a big step towards full acceptance of web data collection as a data collection mode with the implementation of it into the Labour Force Survey (LFS). This paper will describe the transition process and the decisions that had to be taken in order to realise budget cuts while continuing all the necessary output. The use of web questionnaires in particular has reduced the required capacity for face-to-face interviewing, traditionally the most expensive collection mode. But the introduction of multiple, and especially web, data collection modes raised several issues that have taken some time to resolve. Several measures had to be taken to cope with the mixed mode design. Because of the complexity of the Labour Force Survey design and questionnaire, the design changed in two different steps. In 2010 telephone interviewing was added to the first wave. In addition, some of the yearly required variables were moved from the first to the subsequent waves. In 2012 the first wave changed into a full mixed mode design, including web data collection.

E EFFECTIVE DATA COLLECTION DESIGNS AND SUBSAMPLING

E1 Effective data collection designs

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Regulation 577/98 stipulates minimum requirements for the EU Labour Force Survey, e.g. as regards quarterly periodicity and continuous survey, existence of structural variables and ad-hoc modules. National LFS sample designs across European countries fulfil the EU minimum requirements but nevertheless show a lot of diversity. This paper will summarise the present situation as regards national infra-annual rotation patterns, sub-sampling for structural variables and sub-sampling for ad-hoc modules.

There are some lessons to be learnt from this situation:

- Some countries but not all collect annual variables in a sub-sample with the so-called wave approach. The present implementation of the wave approach in some countries is too different from others, e.g. some countries apply it only to one variable. More harmonisation is necessary, at least in the data transmitted to Eurostat.
- The present implementation of the ad-hoc modules is too heterogeneous. Many countries do not collect data during the whole year, but in one quarter only. Whereas ad-hoc module variables typically do not have seasonal pattern, results may show seasonality when ad-hoc module data are crossed with core LFS variables for analyses purposes. The overlap between ad-hoc modules and some structural variables like household variables is inexistent or too small in some countries. Some countries missed groups which should have been included in the ad-hoc modules, sometimes because of implementation problems like wrong routing in questionnaires.

Beyond existence of national differences, it makes sense to develop a survey architecture for mounting contents to be collected only from a sub-sample. This has its own merits: it is an efficient way of collecting data in a survey with a big sample like the LFS. This system can be used both for the annual variables and for the ad-hoc modules. The modular architecture of the future LFS will provide a flexible way to organise the survey contents.

This paper will explain a Eurostat proposal of minimum requirements for national sample designs in a future modular LFS. This would consist of arranging the quarterly, annual and multiannual variables (including ad-hoc modules variables and future biennial variables) into modules, and group the modules into blocks. There would be 1 or 2 blocks of annual and multiannual variables. These blocks could be collected from one or several sub-samples covering the 52 reference weeks and fulfilling certain conditions regarding which variables are collected together. This can be achieved by mounting the blocks in the survey waves, thus becoming an extension of the presently existing wave approach. This system will be compatible with multimode data collection systems. Countries with no incentive to adopt this system (e.g. small countries) could opt out, with some conditions.

This framework was already discussed in the LAMAS working group meetings in June and December 2013. This is work in progress. The goal is to agree the technical elements by the end of the year. Afterwards new EU legislation will be needed. Actual implementation in the LFS could be possible by the end of the decade

E2 Comparing Subsample Approaches

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The purpose of this paper is to discuss some practical and methodological issues regarding subsampling. The Norwegian Labour Force Survey has used three different subsampling approaches, and gained some practical and methodological results from that experience.

Practical considerations include IT management, interviewer workload and respondent burden. In a CATI-only setting, with flexible IT-systems and a capable interviewer staff, the wave approach seems like the best solution. With paper forms or more arbitrary IT-solutions, subsampling by a period in time may be more practical. A well-organized wave approach makes the interviewer workload more even. Perhaps it also improves measurement quality by balancing the experience with multiple questionnaires.

Any subsampling can introduce selection- or nonresponse effects. For instance, seasonal variation in response could affect the representativity of a period-based subsample. Generally, a wave approach evens out seasonal effects. However, time-approach could be better for some topics regarding specific groups. Another argument is that we observe lowest response rate in first wave, which might affect a wave-based subsample.

In modules that went from one approach to another, we saw no obvious break in the time series.

The Norwegian LFS estimation procedure, both for full-sample and subsample, uses post-stratification weighting. Auxiliary variables are register-based employment and demographic categories. The subsample weights seem to have little effect on overall figures; this applies to both structural variables and ad-hoc topics.

E3 Structural variables: Weighting the annual subsample

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The aim of this paper is to describe the Spanish experience in relation to the design of the annual Spanish LFS (EPA) sub-sample, that provides estimates for the structural variables.

The methodological solutions, which have been considered most appropriate for both, accurate estimations and consistency with LFS estimates, are described.

The structure of the presentation will be as follows:

- First a brief description of the LFS sample design, with emphasis on those aspects that have been taken into account when designing the annual subsample: Sample size, sample distribution, rotation pattern and estimation process.

- Then, a summary of the procedure to obtain the annual subsample is described. At this point the legislation in force (Commission Regulation (EC) No 377/2008) regarding sampling issues is reviewed, in especial those aspects that can be related to the design of the subsample.

- Finally, the calculation process of the subsample weights or expansion factors, which will be used in getting estimates, is presented in more detail.

Referred to the later section, the following points will be considered:

- Subsample size and distribution by NUTS 2 and NUTS 3.
- Initial weights before the calibration process
- Calibration method employed
- External sources. Description, time reference and availability
- Final weights and their statistical distribution

The paper ends up looking at the consistency between the estimates obtained with the annual subsample and the EPA year estimates The figures published in recent years from estimations of main variables in both surveys will be used as a reference to describe the achievements and limitations of the methodology used.

E4 Collecting the household data as a sub-sample – comparing the weighting model in the Danish household survey to the weighting model of the core-LFS

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The Danish LFS is characterized by having individual persons and not households as the primary unit. As a result of this, the household data are collected as a sub-sample to the core-LFS on individuals. The advantage is a smaller economic burden on Statistics Denmark since the sample-size is much smaller. Some challenges on the other hand are related with the different weighting models between the core-sample and the sub-sample. This is related to two things. Firstly smaller sample-size means a cruder weighting model. As a result of this much more information is added to the weighting model of the core-sample. Secondly the weighting model of the household survey is optimized to number of households in the population and the few variables solely connected to the household unit (de facto 'jobless household'), while the weighting model for the core-sample is optimized for individuals. This can result in differences in the estimates of central variables

F ESTIMATION AND CONSISTENCY ISSUES

F1 Estimation in the Swedish LFS – an example of combining survey data from independent samples

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In order to secure better statistics for both stocks and flows for small domains, in particular for groups outside or with a weak attachment to the labour market, the Swedish parliament in 2009 decided to increase the budget for the LFS. As a result, the total monthly sample size for the LFS increased by almost 40 %. Prior to the political decision, Statistics Sweden had conducted a project to illustrate what precision gains to expect under a limited number of different scenarios. In conclusion, the project did not simply suggest an increase in sample size for the sampling design already in use, nor did it suggest that the sampling design in use be replaced by a completely new sampling design. Instead, it suggested an approach that combines data from two different samples drawn from the same sampling frame.

From 2010, the LFS is based on two samples, one drawn according to the design, with the same sample size, used prior to the budget increase, the other drawn according to a sampling design tailored towards the outspoken goal behind the budgetary increase. Although both samples are drawn as stratified samples, they are based on very different stratifications. Moreover, whereas one sample is in effect self-weighting, the other is based on a stratification and sample size allocation aimed at resulting in a clear over-representation of respondents either unemployed or not in the labour force.

In retrospect, one may argue that the project that preceded the political decision should have spent more time on the issue of estimation. Once estimates were produced for 2010, the precision gains observed in practice turned out to be smaller, or even much smaller, than anticipated for many of the parameters of interest. The reason for this is quite simple – whereas the numerical results on expected gain in precision included in the report were derived using simplifying arguments that conform to near optimal parameter-specific weight systems, the estimator suggested, and actually used in practice, yields a single weight system to be used for all study variables. Against this background an overview of the estimation was initiated in 2011, aimed at finding a method for constructing a better single weight system than the one initially used.

In the paper we present the basic features of the new regression estimator that emerged as the main finding of the overview and which is now implemented in the LFS. In addition to being more efficient in general than the method used initially, the new estimator has the following desirable features:

- it is easy to justify theoretically,
- it conforms to a single weight system,

it is easy to implement given the available IT-infrastructure.

F2 Main issues of the weighting procedure in the French LFS

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The French LFS sample is made up of dwellings. Until the beginning of the 2010s , the survey sample has been drawn from the data available from the census. Since 2009Q1, a new sample of dwellings drawn from a tax register has been introduced progressively (first of all to increase the size of the sample by 50% ; then to replace progressively the former sample). Since 2011 Q4, the whole sample comes from the tax register. The sampling method consists in selecting clusters of dwellings with a stratified and balanced method (especially, the new sample is - as the former - balanced on NUTS 2 and reference weeks). About 67 500 dwellings are sampled every quarter. Each cluster is surveyed during six consecutive quarters. The sample is therefore divided into six sub-samples every quarter : 1/6 of the sample is surveyed for the first time, 1/6 is surveyed for the second time,…, 1/6 is surveyed for the sixth (and last) time. The new sample is also balanced on waves in order to avoid the rotational bias.

The new sample has been initially drawn from the 2006 housing-tax register for a period of 9 years (2009 - 2018), with sampling weights computed for dwellings in accordance with the sampling design. When the time of data collection arrives, several issues must be dealt with in order to produce final individual weights reconciling objectives of representativeness of respondents, minimal variance of main labour market indicators and minimal future revisions. In this context, the weighting procedure can be split up into different steps, especially to take into account the following issues :

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- Every year, clusters getting into the sample during the next four quarters are updated using the last yearly version of the housing-tax register. New dwellings in the scope of the LFS – missing in the initial sample drawn from the 2006 file – have to be randomly selected with positive inclusion probabilities, whereas the status of some other dwellings can have changed. How to modify the clusters without increasing too much the burden for pollsters and the spread of weights ?
- The sampling frame is now a statistical source distinct from the one (the census) giving the population margins on which weights have to be calibrated. More variables can then be used in the calibration procedure : on the one hand, those of the sampling frame to reduce the non-response bias (due to different kinds of non-response), on the other hand those of external sources to reduce the sampling variance.
- During the two weeks following the data collection related to one reference week, an additional survey of the non-respondents is carried out (NRS, Non-Respondent Survey). The aim of NRS is to characterize non-respondents in terms of their status on labour market. Because the questionnaire of NRS is very poor, compared to the one of the LFS, respondents to the NRS cannot be added to the file of the respondents to the LFS. Moreover, the results of the NRS for quarter T are only available when publishing the first

results of quarter T+1. Thus, the weighting procedure has to take up two challenges: first, integrating the results of the NRS in the procedure consisting in calibrating weights of the respondents to the LFS ; second, anticipating the NRS impact on one quarter when producing the first results for this quarter.

- Eventually, revisions regularly happen (quarterly with the latest results of the NRS, annually with the revisions of some margins, more punctually when some back calculations are carried out) and must be taken in consideration.

F3 Consistent weighting of the Dutch LFS; Monthly, Quarterly, Annual and longitudinal data

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This paper describes the challenges that are brought by pursuing both internal and external consistency when using the LFS for (un)employment statistics. Solutions for these challenges are presented, which enable Statistics Netherlands to publish consistent statistics on monthly, quarterly, annual and longitudinal data for the most important (un)employment estimates.

The Dutch Labour Force Survey (LFS) is based on a rotating panel design. Each month a sample of addresses is drawn and data are collected by means of computer assisted interviewing of the residing households. The sampled households are re-interviewed four times with quarterly intervals. The estimation procedure of this survey is based on the generalized regression (GREG) estimator, developed by Särndal e.a. (1992).

The rotating panel design of the Dutch LFS makes it possible to compose monthly, quarterly, annual and longitudinal statistics. However, there are also consistency problems with the use of a rotating panel design and subsampling for monthly, quarterly, annual and longitudinal LFS data. The problem addressed in this paper is the way to achieve consistency between different publications.

F4 The IT-LFS consistency framework

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The Italian LFS is one of the most important statistical sources about the Italian labour market. It provides monthly, quarterly and yearly figures of the main aggregates and, in a longitudinal perspective, flows estimates as well. Due to the needs of short term analysis monthly and quarterly figures are produced also as seasonally adjusted time series.

Methodological approach and estimation procedures in IT-LFS take into account the need of providing consistent estimates for the different indicators.

The adopted approach to achieve consistency on both micro data and final figures is based on calibration estimators while benchmarking on macro data is used for seasonal adjusted time series.

Since IT-LFS is designed as a quarterly survey, quarterly figures are the “main benchmark” to achieve a consistent framework.

In the calibration process specific constraints are defined to guarantee coherence between different type of estimates (e.g monthly vs quarterly or longitudinal vs quarterly).

For seasonal adjusted data a benchmarking procedure has been set up in order to take into account restrictions that can be of two types: contemporaneous constraints, assuming the form of linear combinations of the variables which should be fulfilled in every observed period, and temporal aggregation constraints, which require that the high frequency adjusted series (e.g. monthly) be in line with low frequency aggregates (e.g. quarterly).

Even if we do not apply wave approach yet, it could be necessary to introduce it considering the new modularization approach. In this context the IT-LFS consistency framework should be adapted in order to face this issue. A brief exercises has been conducted for evaluating the impact of wave approach in terms of biasness and accuracy of estimates on our rotational scheme.

G ESTIMATION EXPLOITING THE LONGITUDINAL DIMENSION OF THE LFS

G1 Longitudinal Weights for the Production of Transitions and Flow Estimates

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Information on flows from one quarter to another is only available for a subset of the LFS sample. The sample size depends on the survey design, more precisely the rotation scheme, and the reference quarters. In the Austrian LFS every quarter one fifth of the survey is exchanged, a household stays for five consecutive quarters in the sample.

Longitudinal analysis can be based on different subsamples. First, one removes all incomplete cases for the flow analysis, i.e. flows are based on the subsample of persons who are successfully surveyed in both quarters, q(t) and q(t+1). This reduction might lead to biased results and an underestimation of labour market dynamics. Second and more promising, all persons who are successfully surveyed in one quarter, first q(t) and second q(t+1) respectively, and do not regularly rotate in or out, are used. Potentially missing information of the second q(t+1) and first quarter q(t) respectively is imputed. For an imputation of unobserved labour statuses in one quarter, administrative data, e.g. from the Federation of Austrian Social Insurance Institutions, can be used. If the imputation works well, a potential bias can be reduced.

Whatever subsample is used for longitudinal analysis, the cross sectional weight cannot be used. In a simple case the subsample is weighted to fit the population in the first q(t) or second quarter q(t+1) or q(t+4). The objective is to attain full consistency between stocks and flows which is desirable but hard to achieve.

This contribution will focus on the adaption of the weighting routine to the longitudinal perspective taking into account the imputed part of the subsamples and taking care of consistency with quarterly stocks of the LFS.

G2 An example of longitudinal LFS weights

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To use the advantage of longitudinal LFS (with rotation scheme 3-[2]-2), we are looking for a possible approach to calculate longitudinal weights which are necessary for the production of gross flow estimates. As there are no auxiliary demographic data available for ‘longitudinal’ population, we decided to take as a starting point the demographic distribution in the first quarter of the longitudinal observation. An advantage of this approach is simpler calculation of longitudinal nonresponse weights, which are in our case the second component of longitudinal weights. The third component of longitudinal weights is calibration to main employment statuses of the starting quarter.

We are aware that this is only one of many possible calculations of longitudinal weights. Its disadvantage is that the demographic and employment estimates are not adjusted to the last quarter of the longitudinal analysis. They are not even adjusted to the other subgroups of target variables of the starting quarter, so it is not recommended to make a more detailed longitudinal

analysis. Another practical disadvantage is that these longitudinal estimates describe the situation of the past quarter.

In the case of Slovenia the longitudinal sample between two consecutive quarters in practice represents around half of the cross-sectional sample. For calculating longitudinal weights fewer subgroups were used than for calculating cross-sectional weights. With simplified calculation of variance (taking the longitudinal sample as the cross-sectional and considering employment status one quarter later as an additional variable) the majority of estimates of flows are less precise estimates (10% < cv < 30%).

We have repeated the same process as described above with the cohort which was interviewed in the same quarter of two consecutive years. In practice it represents only around a quarter of the cross-sectional sample. In this case all above mentioned problems are even more explicit.

There are large user needs for gross flow estimates, if possible by some age groups, to see the migration of population among different employment statuses. We see the need for some standardization of longitudinal weights calculation to produce comparable data.

G3 Regression composite estimation for the Finnish LFS from a practical perspective

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This paper examines the regression composite (RC) estimator in a complex rotating panel design from a practical perspective. Empirical results are based on real data from the Finnish Labour Force Survey (LFS). Currently, the Finnish LFS estimation system uses generalised regression (GREG) estimation and calibration techniques. Estimation for employment and unemployment are based on cross-sectional data. It is expected that estimation can be improved by using the rotating panel property, because employment and unemployment tend to be correlated over time. The RC estimator extends the standard GREG estimator by taking advantage of the temporal correlations.

We present a summary of some of the features and properties of the RC estimator from a practical perspective.

System implementation. The RC estimator can be implemented within the current LFS estimation system by adding control totals and auxiliary variables to the estimation program. It can be performed by using, with minor modification, standard software for GREG estimation, such as ETOS. It yields a single set of estimation weights. Leading to internal consistency of estimates (e.g. Employment + Unemployment = Labour Force).

Empirical results. We have compared the RC estimator to the GREG estimator in the Finnish LFS real data. Here we have used the ETOS program for point and variance estimation (Taylor linearization method). Sampling variance is a measure of the design's efficiency. For the variables that were included as composite control totals, there are substantial gains in efficiency for both estimates of level and of change. In particular, this holds for employment by Standard Industrial Classification. A reason for large efficiency improvement is the high correlation of employment over time. For unemployment estimates, the efficiency gains were modest. An explanation for this is that unemployment is only moderately correlated over time and the register data on unemployment (labour force status in Ministry of Labour's job-seeker register) are used as auxiliary information already at the GREG estimation stage. For variables that were

not controlled, there were little or no efficiency gains from RC estimation, unless the variable in question was highly correlated with a composite auxiliary variable. The results are well comparable with results reported from other countries.

The quality of the estimates. The RC estimator produced level and change estimates that were usually more efficient than the estimates produced by the current GREG estimator. When designing the sample, we try to reduce the sampling variance. From another viewpoint, a more efficient sample design, or one that results in a smaller sampling variance, helps to control the impacts of growing nonresponse compared to another less efficient design, while maintaining the quality of the estimates.