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

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Abstract

The Federal Statistical Office of Germany (FSO), together with the Statistical Offices of the Länder (regions), is currently preparing a major reform of the German system of household surveys. The reform aims to establish a coherent and sustainable system of official household surveys that provides high quality results and is able to cope the with increasing methodological requirements and changing user needs as well as budget restrictions and expectations to lower the 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 subsamples. 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 outlines the planned architecture of the new system of household surveys and discusses 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 as the issues that already occurred during the conception stage. We 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.

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1 Background – household surveys facing increasing demands

In the context of many developments at the European level the requirements for the Labour Force Survey (LFS) and the other household surveys of official statistics is constantly increasing, both regarding the quantity of information as regarding data quality. Indicators from household surveys are increasingly used as indicators for policy monitoring in particular at EU level, but also at national level. The indicators in the context of the Europe 2020 strategy for a smart, sustainable and inclusive growth, the indicator scoreboard of the Macroeconomic Imbalance Procedure (MIP) and the Alert Mechanism Report (AMR) underpinning macroeconomic adjustments in the EU are cases in point for the increasing use of household survey data. At the same time, the recommendations of the Eurostat Task Force on the Quality of the LFS in its final report pointed out several areas in which further improvements of the LFS are necessary (Eurostat 2009). Finally, the director generals of the statistical offices in the European Statistical System (ESS), in the „Wiesbaden Memorandum" further emphasised not only the increasing information demand in the field of social statistics, but for instance the need to react more flexibly to changing demands in order to keep the data provided relevant (DGINS 2011).

Examples for the increasing demand in case of the LFS in Germany include the introduction of an intra-annual rotation scheme together with an equal distribution of the sample across all calendar weeks.[2] Considering the need to maintain a detailed level of regional and subject matter related breakdowns in line with user needs, alone this requirement goes along with additional efforts – budgetary, organisational as well as methodological. At the same time, the requirements for other European household surveys, e.g. the Statistics on Income and Living Conditions (SILC), are increasing, too.

Also regarding the contents, the requirements of users are constantly evolving. The changing labour markets require new kinds of information for example regarding the status in employment, working time arrangements, as well as the growing field of quality of employment (Körner 2013a). New variables from domains other than labour market statistics are put forward for an inclusion in the LFS, including migration, disability and health, education and training as well as IT use. Less directly related to the LFS, new information demand relates to an improved measurement of quality of life in response to the recommendations of the Commission on the Measurement of Economic Performance and Social Progress (Stiglitz-Sen-Fitoussi-Commission). Moreover, not only the scope of information requested increased. There is also a need to react more flexibly to changing demands when new policy issues arise. Furthermore, users more and more request coherent data, even if stemming from different surveys.

In order to cope with this growing demand and at the same time respecting the existing budgetary restrictions, the Federal Statistical Office, together with the State Statistical Offices of the German Federal States ("Länder"), in early 2012 launched a large-scale project for the advancement of the German system of household statistics ("Weiterentwicklung des Systems der Haushaltsstatistiken" – WSH). The project aims at dealing with all household surveys administered by the statistical offices in Germany[3] as an integrated and coherent system in order to reduce both the additional budgetary effort as well as the response burden and to maximise the informational value added. The changes envisaged in the project are not without consequences for the LFS, including improvements, but also new restrictions.

[2] In contrast to the most other member states, the German LFS does not yet use an intra-annual rotation scheme.

[3] The Household Budget Surveys were not included in the first development stage of the basic model outlined in chapter 2 due to their specific requirements. Still, the basic model aims at being sufficiently flexible to integrate these surveys at a later stage.

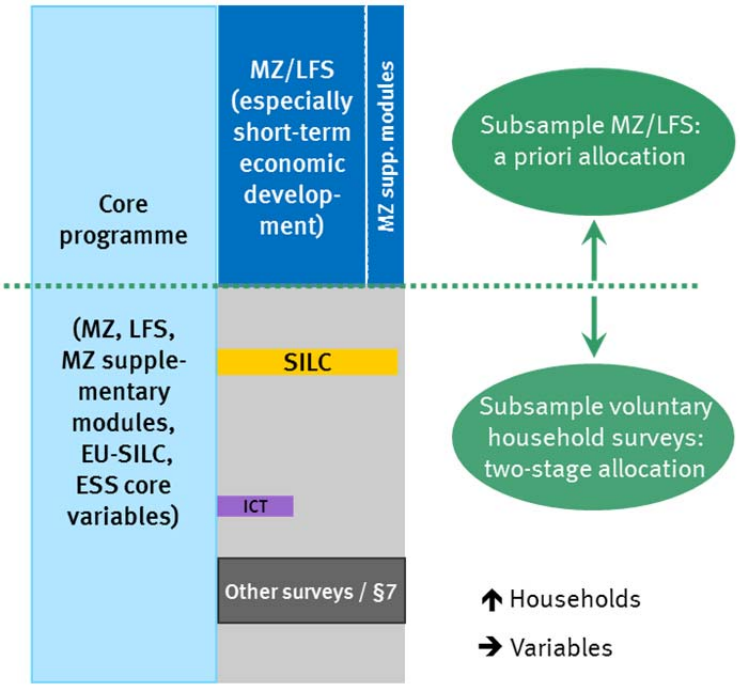
This paper first introduces the basic model developed in the project, including the sample, the data collection strategy and the potential for analysis and publications (chapter 2). In a second step, we focus on the specific aspects regarding the LFS, for instance regarding the harmonisation with the other surveys in the system, the modularisation of variables and the use of dependent interviewing (chapter 3). Chapter 4 reflects the challenges we faced in the course of the project and outlines some current discussions in reaction to these challenges.

2 The basic model of the future system of household statistics in Germany

The German LFS is currently integrated in the Microcensus (MZ), a survey covering one percent of the German population and carried out with legal obligation to respond. While the Microcensus includes various additional national variables (e.g. in the fields of health, education, migration, commuting, but also housing), the sampling design as well as the data collection processes are almost identical, the main difference being a differential data processing applied to the identical raw data (for a detailed account of the methodological set-up of the current LFS and Microcensus, see Körner et al. 2013: 37-90). Apart from the LFS and the Microcensus, the other household surveys in Germany, also referred to as "voluntary household surveys" (due to the lacking legal obligation to respond), despite some interdependences[4] are carried out as separate surveys, e.g. SILC, the statistics on the use of information and communication technology in private households (ICT), or the time use survey (TUS).

The guiding idea of the future system of household surveys is to conceive the different household surveys as one survey, with a common sample, a common set of harmonised core variable, a common system of survey administration, common data collection instruments and procedures and common tools for data processing, tabulation and analysis.[5]

Figure 1: Basic model of the future system of household surveys



The size of the boxes is proportional to the number of households (vertical) and the number of variables (horizontal)

[4] All voluntary household surveys use aggregated Microcensus results as calibration marginals or for the planning of the stratification of the sample. In addition, some household surveys use an access panel as a sampling frame that was recruited among former Microcensus respondents.

[5] The following section is based on Hochgürtel (2013), which contains further details.

As shown in figure 1, the basic model consists of a common random sample, which is subdivided in two subsamples, one for the purpose of the LFS as well as supplementary national Microcensus modules (subsample "MZ/LFS") and another one for the voluntary household surveys (from which the respondents for SILC, ICT and other surveys are drawn).

The design of the *common random sample*, the light blue box in figure 1, is very similar to the sample currently used for the Microcensus and the LFS: It comprises one percent of the German population, which corresponds to about 380,000 households. The sampling design is a stratified area sample. The sampling districts consist of entire buildings or parts of buildings (with an average of 9 dwellings) and are drawn from the most recent population census. The sampling districts as well as the stratification variables (region and size of building) are equally obtained from the population census. All households residing in the sampling districts selected for the sample are being interviewed.

The common random sample is a rotating panel, in which the households participate for two (subsample MZ/LFS) respectively four (subsample voluntary household surveys) successive years for four successive interviews. The sample is subdivided in 52 subsamples of equal size, each allocated to one calendar week. All households selected for the common random sample are being interviewed annually regarding a programme of core variables, plus additional questions specific to the subsamples. The programme of core variables comprises the ESS core social variables (Eurostat 2007), as well as those variables currently included in the Microcensus or the LFS for which a large sample size is required for detailed regional or subject matter-specific breakdowns. This already includes a number of variables included in SILC or ICT. The sampling design, data collection procedure and the operationalization of the variables in the questionnaire is identical for all households (no matter whether allocated to the subsample MZ/LFS or to the subsample voluntary household surveys). Response to all variables included in the programme of core variables would be required by law.

The *subsample MZ/LFS* (dark blue box in figure 1), according to the current plans, comprises 0.4% of the population, which corresponds to 160,000 households (but might be subject to changes depending on the revised LFS precision requirements).[6] The subsample also takes into account the future LFS requirement of a quarterly rotation scheme, which was endorsed by the European Statistical System Committee (ESSC) in February 2014: Households will be interviewed for two successive quarters, then pause for two successive quarters, before being again interviewed for two successive quarters (2-(2)-2). This rotation scheme enables the production of longitudinal indicators both from one quarter to another and from one quarter to the same quarter of the previous year via a sample overlap of 50% in each case.

The sampling units of the subsample MZ/LFS are allocated a priori, i.e. at the same time when the sample is being drawn. This is important in order to be able to collect all variables in one consistent interview integrating the programme of core variables, the specific LFS variables and some multiannual Microcensus supplementary modules ("Mikrozensus Zusatzprogramme"). The sample size of the subsample MZ/LFS is limited to the minimum requirements laid down in EU regulation no. 577/1998 (or the future revised legal act). While the precision remains largely the same for the quarterly estimates, it is clearly reduced for the annual variables, at least for those that are not included in the programme of core variables. Within the subsample MZ/LFS, a further subsample might be drawn for the structural variable and the ad-hoc-modules, according to the requirements set by European legislation.

[6] Due to the quarterly rotation scheme, this corresponds to a gross quarterly sample size of about 71,000 households.

The *subsample voluntary household surveys* (grey box in figure 1) constitutes the sampling frame for drawing the samples for the households surveys for which the respondents' participation is not required by law, i.e. SILC, ICT, TUS and other surveys. Before being selected for one of the voluntary surveys, the households in this subsample participate in a survey interview comprising the programme of core variables. The information obtained in this initial interview can be used for the stratification of the samples of the voluntary household surveys. Disposing of rich stratification variables is a key advantage for these surveys that require disproportional sample allocation. The samples for the voluntary household surveys can either be drawn for the subsequent year, or (in case of computer-assisted interviewing) "live" directly following the data collection for the programme of core variables.

Depending on the type and size of the survey under consideration, the data collection for the voluntary household surveys can either be done directly following the data collection for the programme of core variables (thus combining questions with mandatory and voluntary response) or as a separate interview. The information from the mandatory interview of the programme of core variables will be available for both respondents and nonrespondents in the voluntary surveys. This is an important element to achieve an effective weighting of the voluntary surveys in order to minimise nonresponse bias, for which the availability of a broad range of auxiliary variables is a clear advantage (assuming that they correlate with the readiness to participate in a voluntary survey).

It is important to note that the basic model is more than a common sampling frame. Beyond that, it understands each of the individual surveys as part of one common survey. This means that the a common system of survey administration will be created using not only a joint IT infrastructure, but also joint data collection instruments, a joint pool of field and telephone interviewers as well as joint data processing system. This joint system should at the same time support different modes of data collection, including computer-assisted personal interviewing (CAPI), computer-assisted telephone interviewing (CATI), computer-assisted web interviewing and self-administered paper-and-pencil data collection (PAP). Each survey could choose its appropriate multimode data collection approach from this "menu". The integrated system is connected to synergies, but also increased complexity of implementation.

For the LFS, we currently plan to use CAPI for the first interview and to rely on CATI for the follow-up interviews. A further objective is to replace the current share of 20% PAP cases by the use of CAWI to the maximum extent possible. Given the complexity of the survey, the use of self-administered paper-and-pencil questionnaires in the LFS goes along with severe shortcomings as the routing of the household questionnaire is hardly intelligible for an average respondent.

The basic module also conceives the individual surveys included as one survey during analysis and publication: The availability of abroad set of harmonised core variables facilitates the use of new techniques of analysis that can both be used to compensate for reduced sample sizes (e.g. in the case of LFS specific variables and Microcensus supplementary modules) and to facilitate additional types of results. Examples for additional results include more detailed regional breakdown through the use of small area estimation and the combination of information from different surveys through record linkage techniques. The actual implementation of such publications however requires substantial methodological development effort and feasibility tests. A further important issue in this respect is to what extent the users are ready to accept the use of synthetic data, e.g. for the calculation of indicators with policy relevance.

3 Integrating the LFS into a survey framework: chosen aspects

3.1 Chances and restrictions for the LFS

The integration of the LFS (and the other household surveys) in a system of household surveys like the basic model creates new opportunities, but also poses some restrictions. It also has important implications regarding the specification of the survey concepts as well as the IT tools in order to keep such complex system manageable.

One of the main advantages of the basic model for the LFS is that it allows the introduction of a quarterly rotation scheme. This new element, essential both to satisfy user needs and to comply with the future EU legal basis, will greatly enhance the potential of the LFS for analysis. Through the common core sample, the basic model ensures that, at least for the core variables, detailed regional and subject-matter related breakdowns remain possible for the annual results. For the core variables, the sampling size will even be slightly increased if combining the common core sample interviews with the follow-up interviews of the subsample MZ/LFS. This may also lead to an increase of the precision of the monthly estimates (Körner 2013b), although only for those variables included in the programme of core variables (that nevertheless include the variables of interest for monthly reporting).

The price to be paid for these new opportunities is a reduction of the sample size available for the variables that are part of the LFS, yet not included in the programme of core variables. In Germany, these variables, including the structural LFS variables, are currently equally available for a sample of 380,000 households per year. This creates a vast potential for detailed analyses that might be somewhat reduced in the future.[7] Extensive consultations with the State Statistical Offices and key users however suggest that this loss in precision, if restricted to the variables concerned, might be acceptable given the new potential for analysis resulting from the introduction of the quarterly sample rotation.

Together with the introduction of the quarterly sample rotation, the sampling design will abandon the concept of the sliding reference week and used fixed reference weeks instead. This will lead to a more even distribution of the sampling units over the 52 calendar weeks, which will probably reduce the volatility of monthly as well as quarterly results. It will also contribute to a slight reduction of nonresponse in the ad hoc modules currently caused by the yearly change of questionnaires (e.g. different ad hoc modules) due to the concept of the sliding reference week.

The design changes require a revision of the organisation and time schedule of the data collection operations in order to keep the time lag between the reference week and the survey interview as short as possible. This is crucial to avoid an increase of unit nonresponse as well as memory bias.

In order to cope with these requirements (but also to managed the increased annual number of interviews), the entire data collection approach will be revised, with an increased use of computer-assisted telephone interviewing for instance for the LFS follow-up interviews. A further important pillar is the introduction of a self-administered web questionnaire (CAWI), to replace the current self-administered paper-and-pencil questionnaire.

The reduction of the share of CAPI observations might be seen as a risk for data quality, at least if one assumes that the data quality obtained in face-to-face communication is superior to telephone conversation. However, recent analyses consistently did not find significant

[7] According to first estimations, e.g. the reliability threshold for weighted results (corresponding to a relative standard error of 15 %) will rise from 5,000 to 10,600 households, if only the subsample MZ/LFS is used for analysis (Hochgürtel 2013: 460).

differences in measurement by the mode of data collection for key LFS variables (Körner/Liersch 2014; Schouten/van der Laan 2014). Still the results of experimental mode effect studies suggest that certain types of question (in particular those with numerous response categories) needed to be designed with great care for the implementation in CATI surveys.

Working with one common random sample, together with an integrated IT infrastructure also enhances the use of subsampling, which is also one of the preferred Eurostat approaches to increase the number of variables (allocated to different subsamples) without increasing response burden. Subsampling has a long tradition in the German Microcensus so that it will not change the world with the basic model. However, if used extensively, it clearly poses additional challenges for data process and analysis, as each subsample will require the development of a specific weight. The different weight will lead to diverging results (even if forcing consistency for selected marginal distributions) thus creating new challenges of coherence. The integration of the survey infrastructure also requires a new approach towards the specification harmonisation of the concepts, which will be discussed in the following sections.

3.2 Modularization of survey

The integration of the former standalone surveys into a complex system of household surveys requires new ways to design data collection instruments efficiently. Therefore data collection in the basic model will be standardised within the basic model, and not designed specifically for each survey. The concept includes one common interviewer staff, in the case of field interviews and in the case of CATI interviews, a common infrastructure together with integrated IT systems for the survey administration as well as several survey programs in a multiple-mode design (CAPI, CATI, CAWI, and PAP). In the case of the LFS it additionally includes intra-annual versions of the questionnaires and the possibility of dependent interviewing to absorb some response burden. This multiplicity of survey instruments seems impossible to handle in the traditional way of creating a questionnaire (including wording, routing and plausibility checks) for every survey and every mode separately. Furthermore, the maintenance and IT implementation processes need to be kept in mind.

Hence, inspired by the ongoing discussions on European level about modularizing surveys (s. LAMAS 2012/2013) and in order to meet the challenges outlined above, we plan to transform standalone surveys and their content into a flexible system of survey content. To achieve this goal we aim to modularize both the survey and the questionnaire itself. Our objective is to create a flexible instrument, which remains customizable to future needs.

Key features of this envisioned survey content system is a software framework that is a carrier for the survey programs of the basic model, e.g. the LFS. Survey programs themselves are divided into content modules (equivalent to what is referred as a module in the current ESS level review of the LFS). However, content modules are not necessarily specific to one survey. A content module covering common core variables, e.g. education or employment, should be used in a harmonized way in all other survey modules. Content modules can be divided into sub modules to allow for specialization keeping in mind that the division of modules should not increase the complexity of the survey too much. Finally, every content module has its own routing and plausibility checks that are independent from those in other content modules.[8]

Obviously, the LFS would be a survey program and the questionnaire of the LFS would need to be modularized into content modules. Further plans include the attribution of characteristics to the

[8] This is not always possible and rather a goal to be achieved by programming. Additionally, routing and plausibility check information that are needed but asked outside the module must be “transported” by the framework.

content modules, like e.g. periodicity or permission of dependent interviewing. These attributes should be used to facilitate the compilation of a questionnaire that fits wave and on site situation.

The initial point of the modularization idea is the increasing need to build quarterly and annual/biennial sub-modules. In combination with the core questionnaire the LFS consists of items that need to be asked quarterly or annually/biennially. To reduce burden for the respondent it is obvious to only ask the annual items once per year. However, in the existing survey structure this would mean a lot of additional routing and the maintenance of the questionnaire would be an even more complex task than it already is. Therefore we cluster items together by periodicity and attribute them with an on/off switch that activates itself from the information provided from the respondent. This means that if a module is assigned a yearly frequency, it will deactivate itself if the second interview of the year is indicated. The continuation of this basic idea leads to the modularized survey framework outlined here, which is to keep maintenance, survey development and respondent burden within the bounds of possibility.

3.3 Harmonization of survey content

The idea of modularizing the survey introduced above focuses' on synergy effects by having only to take care of a given number of modules that can be used across surveys. As a precondition, the modules and variables to be used in different surveys need to be harmonized. Having a modularized survey structure implies that modules could be taken care of by specialized content teams together with some sort of general survey module team. However, the greatest risk that modularizing the survey poses is redundancy and incoherence of the questionnaire. Respondents will react negatively if they are asked about the same thing twice or if certain topics pop up repeatedly at different time points of the survey. Whilst many of these issues can be taken care of by thoughtful survey design, a harmonization of concepts on European level is a precondition to tap the full potential of modularization. A good example is the need of a harmonized definition of household. Running the core program together with the LFS- and SILC subsample in one system should not unnecessarily be complicated by differing household concepts.

3.4 The use of dependent interviewing

The introduction of a dependent interviewing instrument is planned for the time the intra-annual rotation pattern gets mandatory, mainly to lower response burden. So far, the Federal Statistical Office has developed a dependent interviewing questionnaire for all parts of the core/LFS program that seemed suitable for it. The construction of this instrument tried to focus on the main problem of dependent interviewing, namely underreporting of changes. The wording of the questions as well as training and supervision of the interviewers need to make sure that respondents do not shortcut the interview by simply stating that no changes have taken place. To find the right balance between the poles of decreasing respondent burden and providing unbiased results, we plan to conduct a pretest as well as a subsequent field test alike. However, even without firsthand experience the use of dependent interviewing seems to have methodological implications that could be worth to be addressed commonly at European level, e.g. model dependent interviewing questionnaires that NSIs can choose to use for their survey.

4 Challenges and next steps

The time schedule of the project aims to introduce the new system in 2017. Milestones include a test of survey response for EU-SILC in 2014, the development and test of a new IT-infrastructure, questionnaire pretesting as well as a field experiment within the ongoing Microcensus/LFS-survey in 2016. The objectives of the field experiment are to test the organisational, IT-specific and methodological aspects of the new design as close as possible under field conditions. In the course of a project as extensive as the outlined integration of household statistics it is also quite expectable that challenges and obstacles occur at several points of the process.

First of all, the challenges include management and organizational issues. The widespread cross-sectional organization of the project within the Federal Statistical Office demands the inclusion of different subject-specific, methodological, organizational, legal and technical points of view. In addition, the decentralized structure of official statistics in Germany comes along with complex decision-making processes. As a result more than ten working groups and boards – not yet including stakeholders outside official statistics - are involved in the process.

So far all methodological and IT challenges seem feasible. The major obstacles finally come down to costs and legal issues:

One key dimension not yet solved is the conflict between methodological reasoned interviewer requirements, employment laws and financing of field interviewers. The new system implicates increasing requirements to interviewers such as narrower time corridors to conduct the interviews (for instance: the introduction of a fixed reference week and an intra-annual rotation), additional knowledge of the survey programs and the concepts used in a range of modules and sub-modules and the ability to recruit households for voluntary household surveys.

Also some of the methodological aspects prove to be difficult when it comes to their legal embedding. The use of dependent interviewing especially in combination with proxy interviewing as well as a more extensive collection of paradata during the survey process is still under examination because of privacy concerns.

The biggest and probably most predictable obstacle is the financing of the new system. Despite the fact that a number of surveys will be integrated and cost reducing synergy effects are expected to be a consequence, in comparison with the status quo it is unlikely that the new system will lead to reduced cost, mainly because of the additional interviews due to the intra-annual rotation pattern. Besides the undisputed improvements, decision makers beyond official statistics make demands for cheaper or at least cost neutral solutions. As a reaction the Federal Statistical Office together with the State Statistical Offices are currently investigating alternative solutions for some design aspects alongside the dimensions sampling frame (area sample vs. use of population register), data collection mode (further reduction of CAPI) and processing (central vs. decentral, use of one or more CATI-studios) to reduce costs of the basic model. Nevertheless, the integrated system approach is not up for discussion for the time being. However, without an adopted legal basis on European level especially for the intra-annual rotation in the LFS, further progress in the project remains endangered.

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