

Measuring the Employment Status in the Labour Force Survey and the German Census 2011

Insights from Recent Research at Destatis

Zur Erfassung der Erwerbstätigkeit in der Arbeitskräfteerhebung und im Zensus 2011

Erkenntnisse neuerer Forschung bei Destatis

Britta Gauckler und Thomas Körner

Abstract

Measuring the employment status according to the labour force concept of the International Labour Organization (ILO concept) is far from being straightforward. By defining employment as any economic activity of at least one hour per week, the ILO guidelines apply a strictly economic concept which risks to conflict with everyday life perception. Consequently, small and informal jobs are likely to be overlooked in household surveys.

The employment status according to the ILO concept is the conceptual backbone of the Labour Force Survey (LFS) and at the same time it is required as a compulsory variable for the European census round. Due to its particular importance, the German Federal Statistical Office (Destatis) carried out extensive research in order to improve the survey measurement in the LFS and at the same time to develop a suitable approach for the requirements of the household survey carried out under the census 2011. The paper will focus on the impact of the questionnaire design. It is based upon the results

Zusammenfassung

Die Erfassung des Erwerbsstatus gemäß dem international vereinbarten Labour-Force-Konzept (ILO Konzept) kann in Erhebungen nicht ohne Weiteres umgesetzt werden. Insbesondere das Ein-Stundenkriterium, nach dem jede ökonomische Aktivität ab einer Stunde pro Woche als Erwerbstätigkeit definiert wird, steht nicht immer im Einklang mit einem Alltagsverständnis von Erwerbsarbeit und kann daher bei Befragungen zu Schwierigkeiten führen. Infolgedessen sind kleinere oder informelle Tätigkeiten in Haushaltsbefragungen schwieriger zu erfassen. Der Erwerbsstatus gemäß dem ILO Konzept ist nicht nur das zentrale Merkmal der Arbeitskräfteerhebung, sondern auch ein Pflichtmerkmal der europaweiten Zensusrunde in 2011. Gemessen an der Bedeutung wurden beim Statistischen Bundesamt (Destatis) umfangreiche Untersuchungen durchgeführt, um die Erfassung der Erwerbstätigkeit in der Arbeitskräfteerhebung zu verbessern und um einen geeigneten Ansatz für die Haushaltestichprobe des Zensus 2011 zu entwickeln. Dieser Beitrag konzentriert

of a follow-up survey which was carried out in the Microcensus in 2008, a large-scale field test for the preparation of the census as well as a number of cognitive laboratory tests.

sich auf den Einfluss der Fragebogengestaltung. Er baut auf den Ergebnissen einer im Jahr 2008 durchgeführten Nachbefragung im Mikrozensus, den Ergebnissen eines Feldtests im Rahmen der Vorbereitung für den Zensus 2011 sowie verschiedenen kognitiven Tests im Pretestlabor auf.

1 Introduction^{1,2}

Statistical measurement can be described as a sequence of translation processes (Radermacher/Körner 2006). In the case of household surveys, the translation from the language of the survey researcher into the language of the respondent plays a key role. The translation problem stems from the fact that the respondents are usually not familiar with the underlying concepts of the researchers. Nevertheless, they have to provide information that fits the need of the researches. Getting this translation problem under control is a basic prerequisite for achieving accurate and valid results.

There are many reasons why statistical concepts will normally deviate from everyday life's perception. Research concepts need to be more systematic, more differentiated, and universally applicable than necessary for (or even viable in) everyday life. Furthermore, the concepts of statistical measurement will always depend upon the specific research problem whereas everyday life's concepts tend to focus on practical viability and therefore lack the methodological rigour that characterises analytical concepts. Also the discipline of the researcher has eminent implications: Sociologists usually focus on different aspects of a phenomenon than economists or lawyers do, for instance.

The specific conceptual details are not easily taken into account by the researcher's most valuable source of information – the respondent. It is the task of the questionnaire to translate what the researcher wants to know into a language that the respondent understands. As often demonstrated in questionnaire testing studies – and shown in the results presented in this paper – this process, or operationalisation, is cumbersome, imperfect, and usually involves pragmatic compromises.

1 An earlier version of this paper was presented at the European Conference on Quality in Official Statistics (Q2010), Helsinki, Finland, 3-6 May 2010. The views expressed in this paper are those of the authors and do not necessarily represent the views of their agency.

2 The authors thank the two anonymous referees for their constructive and helpful comments.

Measurement of the employment status is a particularly striking case in point. At first sight not being a particularly complex phenomenon, employment seems to be a familiar notion to almost everybody. Nevertheless, respondents regularly have deviating definitions from researchers – be it in economy, sociology or other areas. Measuring the number of employed persons therefore requires particular methodological attention in order to adequately portray what statisticians are supposed to measure.

This is especially important for European Union surveys, like the Labour Force Survey or Censuses; statistics will not be relevant for European Union policies, unless they are internationally comparable. The aim of international comparison has important implications: For international comparisons, concepts have to be as independent as possible regarding their specific institutional and cultural context. In the case of employment, for example, all connotations with national social or labour legislation have to be avoided. Normally this leads to an increased level of abstractness and accessibility for the respondents is further decreased. International concepts therefore often require special efforts in the operationalisation process.

At the same time and quite paradoxically, international concepts are often more directly relevant for specific policies. At the European level, the Excessive Deficit Procedure, but also the Open Method of Coordination (OMC) for social policies are frameworks in which statistical results are being used as target values for policy programmes. Employment figures are at the forefront of variables tailored for such purposes.³ In the Europe 2020 strategy, the employment rate has been defined as one out of only five target indicators for “smart, sustainable and inclusive growth”. These indicators are going to be strictly monitored under this programme, requiring a solid and reliable statistical basis.

Against this background, it becomes evident why the European Union Labour Force Survey and the decennial censuses mandated by EU legislation are subject to strict quality control and have led to intensive methodological research. Many of these activities focussed on the problem of how to design the survey questionnaire in order to achieve a maximum of accuracy in the number of employed persons. Currently survey researches have ample tools at their command to calibrate measuring instruments to fit their requirements (for a recent overview

3 In a recent communication, the European Council for Economic and Financial affairs underlines this point by stating that the council “considers it important that the statistical indicators and underlying data to be used for the enhanced economic policy coordination are firmly based on a sound statistical methodological framework, compiled in accordance with the principles laid out in the European Statistics Code of Practice” (Press communication issued on 17 November 2010; see http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ecofin/117762.pdf (23.11.2010).

from official statistics, see Brancato et al. 2006). Regarding employment, the main research problem has been how people, for whom the statistical definition and the everyday life's perception are in conflict, can nevertheless be accurately captured in the survey interview.

This paper summarises the main insights from recent research carried out at the Federal Statistical Office Germany (FSO). It first outlines the main features of the internationally agreed concept for the measurement of employment – the Labour Force Concept of the ILO (chapter 1). Chapter 2 presents the problems of implementing the Labour Force Concept in the German Labour Force Survey and summarises the results of a follow-up survey in chapter 3. The findings of this research revealed some important problems and resulted in a revised operationalisation of employment. This revised operationalisation are being used both in the questionnaire of the Labour Force Survey but also in the questionnaire of the household sample within the German Census in 2011. The operationalisation for the census and the specific aspects in the context of a population census are presented in chapter 4.

2 The Labour Force Concept of the ILO – a Challenge for Statistical Measurement

In the field of employment and unemployment, the definition of the labour force concept of the ILO (ILO concept) is the conceptual backbone of both the EU Labour Force Survey (LFS) and the 2011 Census of the European Statistical System (ESS). While unemployment and employment are by far the most important variables within the LFS, they are also prominent – albeit to a lesser degree – for the census.

The labour force concept exclusively and exhaustively divides the population of a given country into two broad classes: Those who are considered "economically active" (or in the labour force) and those who are considered "economically inactive" (or outside the labour force). Persons in the labour force are additionally subdivided in employed persons and unemployed persons. Figure 1 outlines the main criteria of the ILO concept. It should be noted that for certain groups of employed persons special rules apply, which are however not relevant in the context of this paper.

The labour force concept was first agreed as an international standard at the Sixth International Conference of Labour Statisticians (ICLS) in 1947 (see Rengers 2004). The last major changes have been endorsed by the 13th ICLS in 1982 and the 16th ICLS in 1998 (ILO 1982; 1998). The UNECE recommendations for the 2010

population censuses (UNECE 2006) are largely built around the ICLS resolutions and guidelines, which are almost literally reproduced in many parts. It should be noted that in order to measure the employment status in household surveys, the labour force concept needs to be further operationalised. In the case of the LFS, a series of regulations guarantees a large degree of conceptual harmonisation (namely EU Council Regulation no. 577/98 and the EU Commission regulations no. 1897/2000 as well as no. 1575/2000). For censuses, similar operationalisations are laid down in the recommendations of the United Nations Economic Commission for Europe (UNECE), but with slightly more flexibility regarding the practical implementation (EU Council Regulation no 763/2008; EU Commission Regulation 1201/2009).

The basis for the distinction between the economically active and inactive parts of the population is the notion of work: The economically active population comprises all persons who provide the supply of labour, as employed or as unemployed, for the production of goods and services. The background of this basic definition is the close connection of the labour force concept with the System of National Accounts (SNA): In order to be consistent with National Accounts, all people who provide the supply of labour for the production of goods and services have to be included, even if the input towards the production is as small as one hour per week.⁴

Figure 1 The Labour Force Concept of the ILO (as operationalised in the EU-LFS)

Employed	Unemployed	
<ul style="list-style-type: none"> • ≥ 15 years old and either • at work for at least one hour (as employee or self-employed) or • with a job but not at work (formal job attachment) 	<ul style="list-style-type: none"> • 15 – 74 years old and • without work (or less than one hour) and • actively seeking job in the last four weeks and • currently available for work (2 weeks) 	<ul style="list-style-type: none"> • not employed and • not unemployed
Economically active population		Inactive population

4 This close link to the National Accounts also has consequences for the data analysis. As often argued, the employment status according to the ILO concept is more relevant for economists and has some limitations in social sciences and social policy analysis. In these areas it is helpful to supplement the results on the ILO employment status by additional indicators (see, e. g., Eurostat 2010, Rengers 2010).

Measuring the ILO employment status in household surveys and censuses is challenging in several respects. As mentioned in the introduction of this paper, translation is one of the main problems. The ILO defines employment in the broadest term, whereby one hour per work counts as being employed. A small job of one hour per week is enough. Such a definition will sometimes be in conflict with the respondent's everyday life perception. A student or a pensioner with a small side-job will often not consider themselves as being employed. Consequently, questionnaire design and fieldwork have to find ways to detect such small jobs as well.⁵

Already back in the 1980s, these problems have inspired some research regarding the measurement of the ILO employment status (see, e.g., Schwarz 1987; Hussmanns/Mehran/Verma 1990; van Bastelaer 1994). The latter publication even culminated in an EU resolution (no. 1897/2000) which stipulates that a whole sequence of questions is needed for a proper measurement within the LFS. The regulation also provides detailed practical principles for question wording and question order. Despite these common rules, the results of the LFS remained incoherent compared with other data sources in Germany, like administrative data or data from the National Accounts. These incoherences lead to further research with the German Labour Force Survey and the Mikrozensus. The results of this research revealed some new problems and resulted in a revised operationalisation of employment. This revised operationalisation will be used both in the Labour Force Survey but also in the household sample within the next German Census. The operationalisation for the census and the specific aspects in the context of a population census are presented in section 4.

3 Measuring Employment in the German LFS

The German Labour Force Survey is currently integrated in a large scale household survey covering one percent of the population every year, the "Mikrozensus" (German for "micro census"). The LFS and the Mikrozensus share the largest part of the survey variables, but have some important differences regarding the survey objectives (the LFS emphasising more on short-term labour market reporting). Survey participation to the Mikrozensus is required by law. As a result of the mandatory participation annual response rates of about 95 % are being achieved. The majority

5 Further problems arise for persons with a job, but not working during the reference week. However, these problems, as well as the whole area of the measurement of unemployment are beyond the scope of this paper.

of the interviews, 77 %, are carried out as computer assisted personal interviews (CAPI), whereas about 20 % of the interviews are still a self-administered paper-and-pencil questionnaire (for an overview on the methodological characteristics of the Mikrozensus, see Statistisches Bundesamt 2009). In contrast to the census, the Mikrozensus has a vast survey programme of more than 150 questions.

In recent years, the number of employed persons in the Mikrozensus and the LFS was subject to intensive debate. Users were confused about deviations of the results from Mikrozensus and LFS compared to other data sources. For example, in 2009 there were 40.17 million employed persons according to National Accounts, whereas the Mikrozensus had only 38.66 million persons, a difference of 1.5 million employed or 3.8 %. The incoherence largely varied regarding specific groups of the employed. While there were only minor differences for the self-employed, the Mikrozensus shows 2.3 % more (non-marginal) employees and 37 % less marginal employees. The reasons for these differences are manifold and concern not only the survey measurement in the Mikrozensus, but also the specific opportunities of estimation within the National Accounts (see Körner/Puch 2009; Körner/Puch 2011).

This paper focuses on questionnaire-related measurement problems in household surveys as one major source of these incoherences. It should be noted that the questionnaire design and wording is not the only factor impacting upon data quality. Further important sources of error include interviewer and mode effects, selection bias, bias due to the weighting scheme as well as non-response bias. This might pose a problem as the various sources of error do not stand side-by-side, but tend to interact with one another. For example, effects due to the wording of questionnaire will to some extent vary according to the data collection mode chosen. However, these other sources of error are not within the scope of this study.

3.1 Existing Measurement Problems

Measuring employment according to the guidelines of the ILO is not straightforward for several reasons. As already mentioned, the basic problem is that the definition of employment according to the ILO concept deviates from everyday life perception. For instance, people with side jobs still tend to perceive themselves as pensioner, pupil, or student first, while not always considering themselves as "employed". These people sometimes will be guided by their main social status and not report small side jobs (this phenomenon is referred to as main status effect in the following). Therefore, the questionnaire has to translate the ILO concept into everyday life concepts, so the respondents can understand.

In the Mikrozensus (and consequently in the LFS), there is a sequence of several questions trying to cover all sorts of small jobs (see figure 2). After an initial question asking whether the respondent has worked for pay or profit in the reference week, further questions ask for employment situations which are likely to be overlooked. These employment situations include working as an unpaid family member, being in marginal employment, or having a job without being at work in the reference week. A final question tries to catch all those employed yet still not covered by all these questions by asking "Even if employment is not the main activity, one can still work to earn some extra money. Did you have such a paid activity last week?" Since the year 2003, this sequence of questions has been gradually enlarged in the German LFS up to this present operationalisation, with the result that the difference between the Mikrozensus and the National Accounts decreased from 2.8 million in 2004 to 1.5 million in 2007, 2008, and 2009. Consequently, the comparability over time is restricted for instance in the year 2005 (for a detailed discussion see Körner/Puch 2009; Körner/Puch 2011).

Nevertheless, the sheer number of questions was not easy to deal with in the fieldwork as a number of respondents had the feeling that there was some redundancy in this block of questions (which in fact is true). It was concluded that further progress could only be made by developing a new approach of measuring the employment status. This new approach tried to take into account everyday life's perception of the respondents and tailoring the questions to the situation of different groups of respondents, without giving up the objective of strictly applying the criteria laid down in the resolutions of the ILO as well as the relevant EU regulations.

3.2 Results of a Follow-Up Survey

In order to analyse the measurement of the employment status with the current operationalisation, the Federal Statistical Office (together with several regional statistical offices) carried out a follow-up survey to the Mikrozensus in 2008. The follow-up survey had the objective to quantify the impact of (1) the main status effect, (2) the effect due to proxy interviews (the proxy rate in the Mikrozensus is about 25 %) and (3) misclassifications regarding marginal employment. The hypotheses regarding these effects had been developed during a telephone survey carried out on a monthly basis from 2005 to 2007 and were to be tested in the follow-up survey. In order to carry out this analysis, a new operationalisation was developed, which was deemed to measure particularly small jobs in a more comprehensive way.

The households that had participated in the Mikrozensus were recruited for the follow-up survey after the regular interview; about 20 % of the households agreed to participate. Between April and August 2008, about 4,000 persons from the age of 15 to 74 years were re-interviewed about their employment status using CATI and the revised operationalisation. Information was to be provided for the same reference week as in the regular interview. The survey instrument of the follow-up survey was specifically optimised with the aim to cover smaller secondary jobs and revised after a cognitive pretest at the Leibniz Institute for the Social Sciences (GESIS). When respondents had given their consent, the micro data from the follow-up survey were linked with the original data from the latest Mikrozensus interview. This link enabled comparative analyses and indicated groups of people for whom it is particularly difficult to record the ILO employment status in the Mikrozensus. In addition, the direct interviews of both the respondents who had participated personally in the initial interview and the proxy respondents made it possible to form control and reference groups. This way proxy effects and main status effects could be studied separately (for more details, see Statistisches Bundesamt 2008; for an English summary, see Köhne-Finster/Körner 2009).

Table 1 Employed in the Follow-Up Survey and in the Mikrozensus Interview (Adapted from Statistisches Bundesamt 2008)

	Cases in the follow-up survey	Thereof employed ...		Employment rate (in %)	
		... in the LFS	... in the follow-up survey	LFS (respondents in follow-up survey)	Follow-up survey
Pupils	210	41	64	20	31
Students	140	62	70	44	50
Pensioners	734	27	62	4	8
Registered unemployed	217	42	70	19	32

The follow-up survey provided many useful insights in various areas. Regarding the employment status, the most important points are as follows (see Statistisches Bundesamt 2008; Köhne-Finster/Lingnau 2008):

- For 8 % of the respondents a different employment status was identified compared to the regular interview. In most cases the status from the regular interview to the follow-up survey switched from unemployment or inactivity to employment: 20 % of the unemployed and 8 % of those economically not active indicated a kind of employment in the follow-up survey, but not in the Mikrozensus. There were also employed who no longer said to be employed

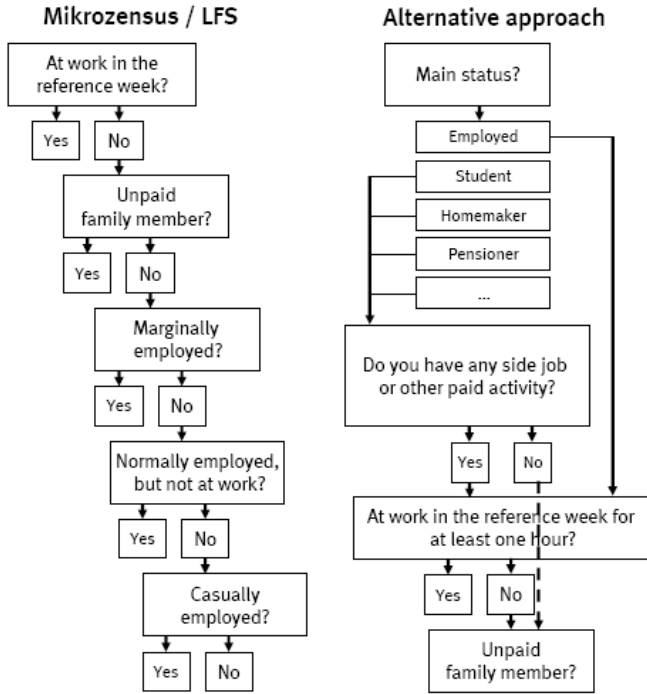
in the follow-up survey, but to a much lesser degree. In total, 3 % of the respondents indicated an employment in the follow-up survey, which they did not indicate in the initial interview.

- Not surprisingly, the largest parts of employment not indicated in the regular interview were small jobs or side jobs. For instance, the share of employed persons in all respondents (employment rate) was higher in the follow-up survey compared to the Mikrozensus interview (see table 1). The employment rate of pupils rose from 20 % to 31 %, of students from 44 % to 50 %, of pensioners from 4 % to 8 %, and that of registered unemployed from 19 % to 32 %. Note that, despite the small number of cases, all these differences are statistically significant.
- Due to the modest sample size of the follow-up survey, the effect of the differences on the total number of employed persons allowed a broad estimation only. Nevertheless, if one takes the differences for the various population groups as a starting point, one might conclude that the Mikrozensus currently understates the number of employed persons by about 900.000 persons (Statistisches Bundesamt 2008: 58).
- The analysis from the follow-up survey concluded that the differences in the results were to the largest part due to the main status effect, i. e. people with a minor job tend not to indicate this job in the survey, when their main status is not employment. In comparison, it was possible to show that the effects due to proxy interviews were not equally important. Whereas for the proxy interviews, in 11 % of the cases an employment was not detected in the Mikrozensus, it was not detected in the 7 % of the cases of the direct interviews. This confirms findings of other studies that proxy interviews slightly underestimate employment rates (see, e. g., Kleven/Lagerstrøm/Thomsen 2008; Thomsen/Villund 2011).

The follow-up survey came to the conclusion that the measurement of the employment status could be improved by an alternative questionnaire design. It should however be noted that the differences might partly also be due to diverging methodological choices in the follow-up survey and the Mikrozensus: The follow-up survey was carried out by CATI, while most Mikrozensus interviews use CAPI as a mode. Furthermore in the Mikrozensus, the interviews are simultaneously carried out for the entire household, while the follow-up survey focussed on individual people.⁶

6 An exact quantification of the effects will be possible in the Mikrozensus 2011. Here the introduction of the new operationalisation of the employment status is being accompanied by a split-ballot experiment. One tenth of the sample is randomly assigned as a control group. This group is continued to be interviewed with the old operationalisation. With this experimental design it will be possible for the first time to get a highly reliable estimate regarding the resulting break in the time series of the Mikrozensus.

Figure 2 Two Operationalisations of the Employment Status in the German LFS / German Census (Adapted from Köhne-Finster/Lingnau 2008)



3.3 A Revised Operationalisation of Employment

As the main effect of the differences was attributed to the changes in the questionnaire design, it was decided to adopt the new approach in the operationalisation of the employment status in the regular Mikrozensus and LFS from 2011 onwards and to use a similar approach in the German population census in 2011. The new approach radically changes the sequence of question. Instead of starting with a question regarding any paid work in the reference week, it uses the main status of the respondent as point of departure.⁷ The rationale for this change is to start the questions on employment with a question that the respondent can answer using

7 A similar approach was used in the 2006 round of the European Social Survey (see Erikson/Jonsson).

everyday life's perception. The respondents are asked to say what characterizes their current situation best (right side of figure 2, which gives a simplified outline of the sequence of the employment questions). All those who answer another item than any kind of employment are filtered to a further question, which (in the case of computer assisted interviewing) asks for various types of small jobs, casual jobs, jobs in the context of workfare programmes and side jobs. In contrast to the follow-up survey, the Mikrozensus could not tailor the questions according to the specific situation of various groups of respondents at this stage. For example, pensioners have been asked in the follow-up survey "Even as a pensioner, one can still have a side job to earn some extra money or to have an assignment. Do you have such a job?" The students were asked "Even as a student one can work in addition to studying to earn some money. Do you have such a job?" In the Mikrozensus these kind of questions tailored to specific groups of respondents is technically feasible, but has not been implemented in the revised questionnaire in 2011. Similar to the census approach (see below) all main status groups are now being asked an identical question concerning small jobs or any other kind of paid activity.

Only after having measured the main status and the existence of a side job, respondents are asked the traditional questions on the ILO employment status, namely whether the job was carried out in the reference week or not. Traditionally, it is assumed (although only rarely backed up by empirical evidence) that respondents tend to not answer questions regarding the ILO status correctly when they have previously been asked about their main status: "When the general question on the main activity is immediately followed by the question about currently working or having a job, the respondent is likely to interpret the latter question as also referring to the usual situation." (van Bastelaer 1994: 283). The results from the follow-up survey show that this is not necessarily the case. On the contrary, the distinct questions on the main status and small side jobs obviously clarify both concepts for the respondent and even lead to a more comprehensive measurement of employment.

The new operationalisation used in the follow-up survey necessitates a computer-assisted questionnaire as it would otherwise lead to very complex skip instructions. In preparing the implementation of the Mikrozensus, a simplified version was developed, which now can also be applied in a self-administered questionnaire. A cognitive pretest in the context of a register survey on marginal employment has led to encouraging results: Among 20 test persons (who were all known to have marginal or informal jobs), only one was not correctly classified. This test person was a registered unemployed with a full-time job in the context of a workfare programme ("Ein-Euro-Job"). This specific arrangement caused a misunderstanding in the questionnaire which was subsequently corrected.

4 Measuring Employment in the Next German Census

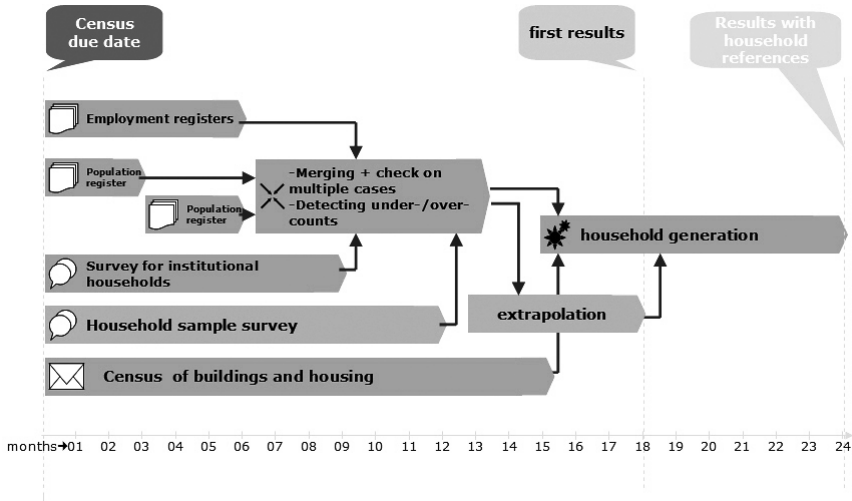
The intensive testing and ongoing work towards an improved set of questions for the measurement of employment for the Mikrozensus had crucial synergy effects also for the census questionnaire within the household sample survey. The measurement of employment according to ILO's labour force concept is one of the core topics within the European requirements and therefore within the German census (EU Commission Regulation no 1201/2009).

The 2011 German census is not traditional in the sense of a complete enumeration of the whole population via face-to-face interviews. In order to reduce cost and lower the burden on citizens, the German census is a combination of a register-based census, a conventional census and a sample survey. The information for the register-based census is drawn from different existing administrative registers, mainly the population registers of the municipalities and the registers of the Federal Employment Agency, combined with primary sources mainly the postal census of buildings and housing and the household sample survey (for more detailed information see Statistische Ämter des Bundes und der Länder 2011). For the organisational preparation a register of addresses and buildings was built. This register functions as a link between the different data sources and as a basis for buildings with living space which supports the primary surveys (Meder 2009: 2).

Data that cannot be drawn from registers are complemented by primary surveys: The census of buildings and housing gathers information via a mail questionnaire of all 17.5 million property owners and administrators of buildings with residential space. The household sample survey interviews a maximum of 10 % of the population via a face-to-face interview. Moreover, information about residents in special buildings (such as institutions or buildings providing collective accommodation) is also collected via face-to-face interviews. As information on household relationships is not directly available from population registers, the bodies of official statistics have developed a new approach, the household generation procedure. Here, resident household relationships are determined by means of characteristics from the population register and the census of buildings and housing which can be evaluated statistically (see Vorndran 2004).

The household sample survey (where the employment questions are being asked) is needed for the estimation of over- and undercounts in the population registers, and is mainly used for collecting information that is otherwise not available. The focus of the household sample survey is – besides the collection of socio-demographic information and information about religion and migration – the collection of information about education and employment.

Figure 3 Structure and Release Dates of the German Census 2011 (Overview)



4.1 Operationalising the Labour Force Concept for a Population Census

Within the questionnaire for the household survey the collection of employment data is the lengthiest and among the more complicated parts of the questionnaire. Measuring the employment status according to the labour force concept is particularly challenging for a census. Due to the large number of interviews, the questionnaire has to be kept as short as possible. Moreover, the response burden for the respondents has to be kept as low as possible. At the same time, a high quality standard has to be achieved during the data collection.

There are certain important methodological differences between labour force surveys and population censuses, which have to be taken into account while designing the employment questions. One difference and advantage is that the census questionnaire in general is quite short compared to the Mikrozensus questionnaire. Nevertheless, there are also several methodological challenges. The results of the follow-up survey proposed a more tailored design for the employment questions, adapting the wording to specific situations of different population groups. However, for the census 2011 household survey it will not be possible to introduce customised questions, for instance for pensioners or students due to the

fact that the household survey is conducted without computer assistance.⁸ Therefore, the possible difficulties with certain groups had to be solved in the questionnaire itself and by intensive interviewer training and by raising the awareness of the interviewers towards arising problems.

Moreover, the paper questionnaire had to be designed in a way that it can be done without the assistance of interviewers in a self administered way, e. g. via Internet. This is a difficult task from the questionnaire design point of view. Firstly, there are two different survey modes to consider in parallel. Secondly, it is not straightforward which instructions and other additional information (definitions, examples etc.) should be provided to the respondent in the questionnaire. The main task is keeping the balance between providing information necessary, while limiting the amount of information to a level that could still be taken in by the respondents. Otherwise, explanations in the questionnaire might lose their effect and even become misleading.

Furthermore, the follow-up survey showed no major effects of proxy interviews, which is in favour for a census where it would be very difficult, if not impossible to prevent all proxy interviews. Consequently, the employment questions were conducted in a similar way to the new implementation within the Mikrozensus. The approach is to gather the correct information about the respondents' main status first and in doing so to ensure that in this first question about employment the respondent is able to express his own everyday life's perception of his/her self-perceived main status.⁹

4.2 Testing the Questionnaire

In order to test the household sample questionnaire a two-stage pretest has been conducted. In a first step 18 qualitative, cognitive interviews have been carried out during summer 2009 in the cognitive laboratory of the FSO. The aim of this qualitative step was to test the overall comprehension of questions, filters and the design. Concerning the employment questions, the issue was to check whether the slightly shortened questions from the Mikrozensus questions worked in the intended way.¹⁰

Following the completion of the qualitative test, the questions were reworked where necessary and subjected to a second, quantitative field test from

8 The option to fill in the questionnaire via internet is also being provided.

9 For the final question wording and order please see figure 2.

10 In 2010, a further laboratory test focussed on the usability of the web option of the household sample questionnaire.

December 2009 until February 2010 with about 8.000 respondents in five federal states within Germany. The voluntary field test consisted of face-to-face interviews (17 %) and self-administered completion (83 %) where the respondents filled in the questionnaires at home without interviewer assistance. The sample was – with one exception – drawn from the access panel of German official statistics. The access panel ("Dauerstichprobe befragungsbereiter Haushalte") consists of former respondents from the Mikrozensus who are being asked after the completion of the final participating year whether they are willing to take part in further voluntary surveys of official statistics (Körner et al. 2006). One federal state (Bremen) used address data from administrative registers of the municipality. The face-to-face interviews were mainly conducted by experienced Mikrozensus interviewers. Only one federal state used prior unexperienced interviewers for the test in order to gain information for the later interviewing process and the practical fieldwork for the census 2011.

After the data collection for the field test, 60 interviewers were asked to participate in focus groups. Moreover, for the 17 % face-to-face interviews the interviewers filled in an additional short questionnaire where they have been asked about problems with the interview. Furthermore, to gather more in-depth information some selected interviewers conducted 94 additional interviews about how the respondents perceived the questionnaire and where problems occurred. The aim of the field test was to test some organisational aspects such as the automatic questionnaire image coding and to test the questions and the design on a larger scale. Apart from the Mikrozensus follow-up survey, the field test is the first larger field test of the new question design as described earlier in the paper.¹¹ This paper focuses on the test results that concern the employment questions of the census household sample questionnaire.

4.3 Laboratory Test Results

The laboratory test largely showed plausible results for the employment questions. In general, the intended, subjective decision process of respondents works when asking the main status question first. However, some groups such as people in parental leave (Elternzeit) or partial retirement (Altersteilzeit) or unemployed participating in a workfare programme (Ein-Euro-Job) are still unsure whether they should classify themselves as employed. For this reason in the quantitative field

11 A split ballot experiment would have been desirable but for organisational reasons was not feasible.

test questionnaire the people on parental leave and partial retirement were especially mentioned in the category in brackets. Consequently, there were no signs that the employment situation is not being accurately captured by the employment questions.

Moreover, to clarify the subject for people who interrupt their occupation (e. g. on parental leave or people in partial retirement) additional instructions were given under the question of the one-hour criteria. Those promising results validated the previous findings from the Mikrozensus follow-up survey and other cognitive tests once more. Nevertheless, in order to finally evaluate the new design the slightly adjusted questionnaire underwent the necessary field test.

4.4 Field Test Results

The objectives of the field test were manifold. Apart from a real life test of the technical and organisational procedure, the employment part mainly focussed on the effectiveness of the skip instructions and the accuracy of the measurement of the level and structure of employment. In the following, we present the key findings in these two areas.

For every questionnaire skip instructions are a challenge for the respondents as well as for the questionnaire designer. Because they entail complex cognitive processes (see, e. g., Redline/Dillman 2002), the aim is to reduce them as much as possible. Unfortunately, for the measurement of employment status, it is not possible to avoid skip instructions entirely. Against this background, during the development of the household sample questionnaire, skip instructions have been limited to a minimum. One of the objectives of the field test has been to investigate whether these skip instructions are functional and where they needed further improvement. When respondents disregard skip instructions, the flow of the interview is disturbed in any case. Regarding the accuracy of the data, one has to distinguish two cases: (1) When the respondents disregard skip instructions where they should have been regarded they respond to questions which do not apply to them. The result in this case is redundant information, but no missing data (item non-response). (2) The more problematic case are those where people have not answered questions which they should have (missing information) as they are compulsively needed for determining the employment status. The analysis of the skip instructions concentrated mainly on the latter problematic case. Nevertheless, even the extent of redundant information is an important indicator for the functionality of the questionnaire.

For the employment questions in general, the errors resulting from skip instructions are between 2 % and 5 %, where redundant information and missing information is about even.¹² This result can be considered as very satisfactory especially for postal surveys (83 % were mail out-mail in answers). Consequently, there are only minor problems for the calculation of the employment status due to missing data. However, it was quite problematic to guide employed respondents to the question for the occupational status. From 3.873 employed persons only 3.527 provided the necessary information, which led to 9 % non-respondents (346 cases). We concluded that the main reason for the high item non-response rate, in comparison with other questions was due to the specific questionnaire layout; the question on the occupational status was positioned at the beginning of a new page, without a separate heading. At the same time, the vast majority of the respondents had to skip a varying number of questions. As a solution for the final questionnaire there are now skip instructions indicated for all response categories, thus meaning that not only for the items where respondents have to skip, but also when the respondents are required to continue with the subsequent question. The idea is to provide help to those respondents who do not have to skip; an approach which is usually not applied in questionnaires of official statistics. Moreover, to clarify the topic on the following page, a clear and explicit heading was introduced as further guidance.

The results for the main status question showed multiple responses in some 1.5 % of the cases. In comparison with other questions in the questionnaire the 1.5 % multiple responses are not very large. Nevertheless, further analysis showed some explanation for possible reasons why respondents had difficulties to provide the information. The additional questionnaires (which the interviewer filled out after each interview) indicated that some respondents had problems deciding what their predominant status is. For instance, a retired woman was not sure whether she should tick housewife or retiree. Moreover, the additional interviews showed that some respondents missed additional categories like occupational disability, short-time work, self-employed or sickness-pay. Those cases were only rare exceptions and cannot be generalised, therefore they did not result in major changes. The only exception was a change providing further clarification for people with occupational disabilities, which have now been added in brackets for the category "none of the above". Another difficulty could be found in the data, which never-

12 As the focus in the field test was on methodological analysis, no plausibility checks were performed, i. e. the rates of item non-response and (for instance) redundant information presented in this paper could have been considerably reduced during the data processing.

theless remains inherent to the main status question itself: The respondents were asked to decide for themselves which their most important status was. The results show that for certain groups of respondents this choice does not always seem obvious. Results of the focus groups, for example, point out those respondents with more than one job have problems deciding which job they should refer to in the main status. Despite these problems, the item non-response rate for the main status question was not very large either (1.5 %).

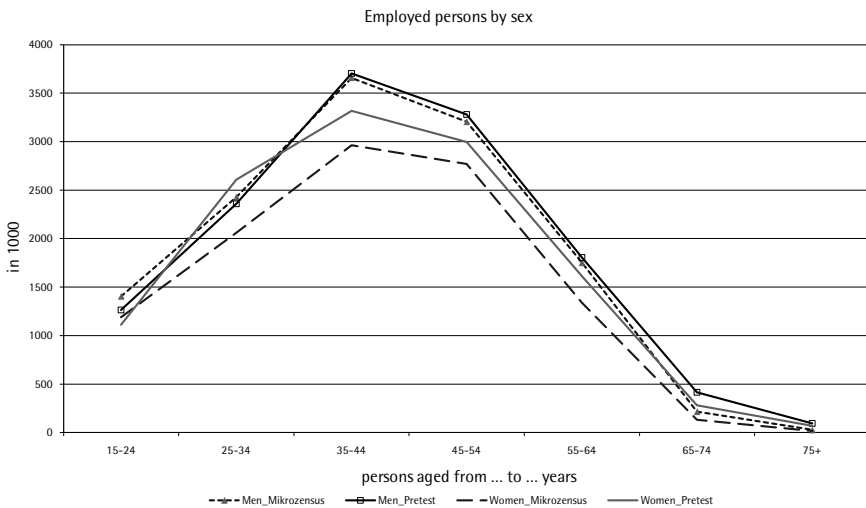
Nevertheless, another result is interesting: only 90 % of the employed respondents could be captured by the first question itself. This proves that the following question is definitely needed in order to capture especially the marginally employed persons. Analysing the following questions, it showed that there was still potential for improvement. Interestingly, the results of the focus groups also demonstrated that especially for people in marginal or small jobs there is a tendency not to declare the job. For instance, parents do not consider newspaper delivery of their children as paid work or pensioners do not declare their caretaker job. Some interviewers noted that a certain, albeit small, number of people can not be convinced to declare their small jobs. Therefore, in order to further improve the questionnaire, additional examples for jobs have been added for the question on small and side jobs. Concerning additional information given for the paper questionnaire in terms of the employment questions it was decided that it is best to reduce additional information and instructions to the minimum. Of course, additional information which could not be included in the questionnaire was provided to the interviewer during the training and also in an interviewer guidebook. With respect to the employment question, the main area focused on raising awareness for the reference date 9 May 2011, the reference week for employment, the importance of completely capturing minor jobs, and the explanation of terms and definitions.

For the evaluation of the new approach, the final results were extrapolated (using a simple post-stratification) and compared to other surveys such as the Mikrozensus and the Employment Statistics Register of the Federal Employment Agency (Beschäftigungsstatistik).¹³ Noting that the field test was a voluntary test and with respect to the modest sample size of 8.000 persons as well as the fact that no randomised experiment was conducted, the comparisons and the results have to be interpreted cautiously. Nevertheless, they at least show some directions regarding the effects of the new operationalisation. Through all age groups

13 Due to time restrictions, the post-stratification was based on results from the Mikrozensus 2008. This does however not significantly restrict the analysis as the population size and age structure does not show major changes from the annual average of 2008 to the turn-of-the-year 2009/2010.

there were – as expected – more employed persons captured through the field test than through the Mikrozensus 2008.¹⁴ Interestingly, there were relatively more employed in the age group of 65 to 74 years. This result corresponds with the Employment Statistics Register. By contrast the employment among the 15 to 24 year old was lower than expected. Generally and across all age groups, the field test indicated higher numbers of employed women, whereas the differences for employed males are less clear (see figure 4). The only exception is the age group from 65 to 74 years for which the field test yielded higher results in both cases.

Figure 4 Comparison of Persons in Employment by Sex for the Field Test and the Mikrozensus



Further analysis revealed that the difference among the 15 to 24 year old group was due mainly to full-time workers, yet the field test showed more 15 to 24 year old employed part-time. This result confirms the observation for the marginally

14 It should be noted that the reference period of the field test was in December 2009 and January 2010, while the data available from the Mikrozensus at the time of the analysis refer to an annual average of 2008 (and 30 June 2008 for the Employment Statistics Register). This does however not cause major restrictions, as the overall number of employed persons does not largely differ between these reference periods. According to the results from the monthly LFS, there were 38.5 million employed persons in December 2009 and January 2010 compared to 38.7 million in the year 2008. Consequently, the results from the field test slightly "underestimate" the number of employed persons in this comparison. Due to the large sampling error of the monthly results, it was however decided not to use the monthly Mikrozensus results for the comparisons by age group and status in employment or the extrapolation.

employed. The numbers of marginal employees are much lower in the Mikrozensus than in the Employment Statistics Register (see Körner/Puch 2009). In general, capturing the employment status of the age cohort in question fared better with the field test than the Mikrozensus and it is in accordance with the numbers of the Employment Statistics Register.¹⁵

This result is strengthened through further outcomes from the field test, showing the rate of persons holding side/marginal jobs beside their (higher) education or retired people, was higher than in the Mikrozensus. Concretely, the field test showed 21 % of pupils as being employed compared with the Mikrozensus showing 8 % only for this group.¹⁶ Likewise the situation for students, unemployed and retirees: here the field test showed 44 % versus 29 % in the Mikrozensus pertaining to employment in conjunction with their main status. Finally, the field test indicated that 27 % of unemployed and 8 % of retirees had side jobs while the Mikrozensus accounted for only 14 % and 4 % respectively.

Figure 5 Comparison of Persons in Marginal Jobs by Age Group



15 The Employment Statistics Register is not necessarily free of error. However, as the follow-up survey of the Mikrozensus has shown, it is likely that a major part of the difference between both sources might be attributed to measurement errors in the Mikrozensus. An ongoing study carried out in co-operation between the FSO and the Federal Labour Agency focuses in detail on the quantification of measurement errors in the Employment Statistics Register.

16 Note that the Mikrozensus includes the main status question from the year 2011 onwards only. For the comparisons presented in this contribution, the analysis had to draw on different other variables, which can be compared only to an approximate level.

Overall the results of the field test confirm the results of the qualitative test as well as for the follow-up study of the Mikrozensus. The chosen approach combines a respondent-friendly question technique with a better coverage of employed persons with marginal jobs. It should be mentioned that the conclusions drawn from the field test are somewhat limited due the design of the test. Further evidence will become available after the survey year 2011 of the Mikrozensus has been finished: In 2011, a randomised experiment is being integrated into the regular Mikrozensus in order to quantify the effects of the questionnaire change.

Only small adjustments had to be made concerning the question wording or given additional explanations. The field test findings certainly also pointed out that it was very important and a great challenge for the census to train the quite large number of interviewers in an effective and comprehensible way. The field test was conducted with probably more experienced respondents than the average respondent in a census and more importantly with trained Mikrozensus interviewers who know about the hints and potential pitfalls.

5 Conclusions

The results from the research carried out in the context of the Mikrozensus and the census have clearly shown that the measurement of the employment status according to the ILO labour force concept requires special efforts. The concept's deviation from everyday life's perception hampers the comprehensive coverage of small and minor jobs. Nevertheless, at least for international comparison, there is a broad consensus that there is no alternative to the main pillars of the labour force concept. Any other choice regarding the one-hour-criterion would be even more arbitrary and presumably less straightforward to measure (see Eurostat 2009; ILO 2009). Furthermore, the labour market statistics have to be adjusted to reliably portray the fringes of the labour market. In recent years many important changes pertain to the marginal employment sector, like the rise of atypical employment in the case of Germany.

Nevertheless, this paper demonstrates that there is an enormous potential for improvement while engaging with questionnaire design and working on quality issues. The operationalisation to be used in Mikrozensus/LFS and in the next German census reflect the requirement to speak the language of the respondents (by asking for the main status first) and at the same time achieving a more comprehensive picture of small side jobs as well. This paper also shows that simplistic rules like "never ask for the main status before you ask about work in the reference

week" are not appropriate for questionnaire design. Seemingly similar questions might provide radically different results and any solution needs thorough testing before its implementation. Our paper also gives some striking examples about the large potential of both laboratory and field testing.

Finally, the survey mode is important. Our results indicate that paper-and-pencil questionnaires are difficult to handle in combination with complex concepts like the employment status. First of all, the skip instructions needed to measure the employment status necessarily are quite complex. Our results show that an important share of respondents (about ten percent in our case) seems to be puzzled even by the modest skip instruction of the census household survey questionnaire. Secondly, only computer assisted questionnaires offer the possibility to tailor questions to the situation of various population groups and to use other information which has already been provided during the interview.

References

- Van Bastelaer, A., 1994: Differences in the Measurement of Employment in the Labour Force Surveys in the European Community. *Journal of Official Statistics* 10: 277-305.
- Brancato, G. et al., 2006: Handbook of Recommended Practices for Questionnaire Development and Testing in the European Statistical System. European Commission Grant Agreement 200410300002. Eurostat, Luxembourg. http://epp.eurostat.ec.europa.eu/portal/page/portal/research_methodology/documents/Handbook_questionnaire_development_2006.pdf (6.12.2010).
- Erikson, R. and J. O. Jonsson: European Social Survey Questionnaire Development Report. Chapter 2: How to ascertain the socio-structural position of the individual in Society. http://www.europeansocialsurvey.org/index.php?option=com_content&task=view&id=62&Itemid=96 (7.7.2011).
- Eurostat, 2009: Task Force on the Quality of the Labour Force Survey. Final report. Luxembourg: European Commission. http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-RA-09-020/EN/KS-RA-09-020-EN.PDF (7.7.2011).
- Eurostat, 2010: Task Force on Indicators to Supplement the ILO Unemployment Rate. Final Report, Luxembourg: European Commission. http://epp.eurostat.ec.europa.eu/portal/page/portal/labour_market/documents/Report_TF_indicators.pdf (7.7.2011).
- Hussmanns, R., M. Fahrhad and V. Vijay, 1990: Surveys of the Economically Active Population, Employment, Unemployment, and Underemployment. An ILO Manual on Concepts and Methods. Geneva: ILO.
- ILO, 1982: Resolution concerning statistics of the economically active population, employment, unemployment and underemployment. Adopted by the 13th International Conference of Labour Statisticians, Geneva: ILO.
- ILO, 1998: Guidelines concerning treatment in employment and unemployment statistics of persons on extended absences from work. Endorsed by the Sixteenth International Conference of Labour Statisticians, Geneva: ILO.
- ILO, 2009: Report of the Seminar "Employment and unemployment: Revisiting the relevance and conceptual basis of the statistics", Geneva, 4-5 December 2008. Geneva: ILO.

- Kleven, Ø., B. O. Lagerstrøm and I. Thomsen, 2008: A Simple Model for Studying the Effects of Proxy Interviewing: The Norwegian Labour Force Survey as a Case Study. *Statistics Norway* 2008. http://www.ssb.no/emner/06/90/doc_200802/doc_200802.pdf (7.7.2011).
- Köhne-Finster, S. and T. Körner, 2009: Microcensus Follow-up Survey – A Project of the Federation and the Länder to Measure the ILO Employment Status. *Methods, Approaches, Developments* 1: 3-6.
- Köhne-Finster, S. and A. Lingnau, 2008: Untersuchung der Datenqualität erwerbsstatistischer Angaben im Mikrozensus. Ergebnisse des Projekts „Nachbefragung im Mikrozensus/LFS“. In: *Wirtschaft und Statistik* 12: 1067-1088.
- Körner, T. and K. Puch, 2009: Der Mikrozensus im Kontext anderer Arbeitsmarktstatistiken. Ergebnisunterschiede und ihre Hintergründe. *Wirtschaft und Statistik* 6: 528-552.
- Körner, T. and K. Puch, 2011: Coherence of German Labour Market Statistics. The German Labour Force Survey in Comparison with the Employment Accounts and the Unemployment Register. *Statistics and Science* 19, Wiesbaden 2011 (forthcoming).
- Körner, T., A. Nimmergut, J. Nökel and S. Rohloff 2006: Die Dauerstichprobe befragungsbereiter Haushalte. Die neue Auswahlgrundlage für freiwillige Haushaltsbefragungen. *Wirtschaft und Statistik* 5: 451-467.
- Meder, N., 2009: Grundzüge des Zensus 2011. *DAGStat-Bulletin* Nr. 4: 2-3.
- Radermacher, W. and T. Körner, 2006: Fehlende und fehlerhafte Daten in der amtlichen Statistik. Neue Herausforderungen und Lösungsansätze. *Allgemeines Statistisches Archiv* 90: 553-576.
- Redline, C. D. and D. A. Dillman, 2002: The Influence of Alternative Visual Designs on Respondents' Performance with Branching Instructions in Self-Administered Questionnaires. In: Groves, Robert et al. (Eds.): *Survey Nonresponse*. New York: John Wiley.
- Rengers, M., 2004: Das international vereinbarte Labour-Force-Konzept. *Wirtschaft und Statistik*, 12: 1369-1383.
- Rengers, M., 2010: Some nine million people wishing to work (more). *StatMagazin* published on 29 June 2010. Wiesbaden. http://www.destatis.de/jetspeed/portal/cms/Sites/destatis/Internet/EN/Navigation/Publications/STATmagazin/2010/LabourMarket2010__06,templateId=renderPrint.psm!__nnn=true (7.7.2011).
- Schwarz, N., 1987: Cognitive Issues of Labour Force Surveys in a Multinational Context: Issues and Findings. Paper prepared for the OECD Working Party on Employment and Unemployment Statistics. Paris, 14-16 April 1987.
- Statistische Ämter des Bundes und der Länder, 2011. <https://www.zensus2011.de/> (7.7.2011).
- Statistisches Bundesamt, 2008: Ergebnisse der Nachbefragungen im Mikrozensus/Labour Force Survey. Ein Gemeinschaftsprojekt der Statistischen Ämter des Bundes und der Länder zur Qualitätssicherung im Mikrozensus/Labour Force Survey. Wiesbaden: Statistisches Bundesamt.
- Statistisches Bundesamt, 2009: Monthly Unemployment Statistics According to the ILO Concept. Quality Report. Wiesbaden. <http://www.destatis.de/jetspeed/portal/cms/Sites/destatis/Internet/EN/Content/Publikationen/QualityReports/Labourmarket/MonthlyILOConcept.property=file.pdf> (7.7.2011).
- Thomsen, I. and O. Villund, 2011: Using Register Data to Evaluate the Effects of Proxy Interviews in the Norwegian Labour Force Survey. *Journal of Official Statistics* 27: 87-98.
- UNECE, 2006: Conference of European Statisticians Recommendations for the 2010 Censuses of Population and Housing. Prepared in Cooperation with the Statistical Office of the European Communities (Eurostat). Geneva and New York: UNECE.
- Vorndran, I., 2004: Zensusstest-Verfahren und Ergebnisse der Haushaltgenerierung. *Wirtschaft und Statistik* 11: 1245-1255.

Legal Acts

- Council regulation (EC) No 577/98 of 9 March 1998 on the organisation of a labour force sample survey in the Community. Official Journal of the European Union, 14.3.1998, L 77/3.
- Commission regulation (EC) No 1897/2000 of 7 September 2000 implementing Council Regulation (EC) No 577/98 on the organisation of a labour force sample survey in the Community concerning the operational definition of unemployment. Official Journal of the European Union, 8.9.2000, L 228/18.
- Commission regulation (EC) No 1575/2000 of 19 July 2000 implementing Council Regulation (EC) No 577/98 on the organisation of a labour force sample survey in the Community concerning the codification to be used for data transmission from 2001 onwards. Official Journal of the European Union, 20.7.2000, L 181/16.
- Regulation (EC) No 763/2008 of the European Parliament and of the Council of 9 July 2008 on population and housing censuses. Official Journal of the European Union, 13.8.2008, L 218/14.
- Commission regulation (EC) No 1201/2009 of 30 November 2009 implementing Regulation (EC) No 763/2008 of the European Parliament and of the Council on population and housing censuses as regards the technical specifications of the topics and of their breakdowns. Official Journal of the European Union, 15.12.2009, L 329/29.

Addresses of the Authors Britta Gauckler
Statistisches Bundesamt
Zensus
Gustav-Stresemann-Ring 11
65189 Wiesbaden
britta.gauckler@destatis.de

Thomas Körner
Statistisches Bundesamt
Arbeitsmarkt
Gustav-Stresemann-Ring 11
65189 Wiesbaden
thomas.koerner@destatis.de