Distr.: General
11 September 2017

English

United Nations Economic Commission for Europe

Conference of European Statisticians

Group of Experts on Population and Housing Censuses

Nineteenth Meeting
Geneva, Switzerland
4–6 October 2017
Item 2 of the provisional agenda
Innovations in census methodology and use of new data sources

The combined census model in Germany – origins, lessons learned and future perspectives

Note by the Federal Statistical Office, Germany[1]

Abstract

The history of population censuses in Germany is special for a number of reasons. The most obvious feature is that in the period from 1987 to 2011 no population census took place. The census in 2011 was prepared under the restrictions of a judgement of the German constitutional court that preceded the census in 1987 and imposed strict data protection rules. The court in particular prohibited any kind of population register correction based on findings from statistical collections. In 2011, a combined census model was launched integrating elements of register use, a conventional census (on housing), and a sample survey. The paper, in a first part, gives insight into the backgrounds to the creation of this specific model and provides an overview of the experiences made in the 2011 census. In its second part, the paper presents the lessons learned for the implementation of a similar combined model in 2021 as well as the future perspectives towards the introduction of more register-based elements in the post-2021 era.

[1] Prepared by Stefan Dittrich (stefan.dittrich@destatis.de) and Thomas Koerner (thomas.koerner@destatis.de)

I. Introduction

1. Introducing a register-based census model in Germany is not straightforward for several reasons. First, the availability of suitable registers is lesser than in other countries already following register-based approaches. Second, strict data protection regulations that were established in the context of the last traditional German census in 1987[2] make it challenging to find solutions to link registers from different areas. Due to these regulations neither a person ID nor a dwelling ID were introduced so far, which makes any linkage between registers a burdensome undertaking.

2. At the same time, already due to the size of the country, a traditional census based on interviewer-administered data collection is not popular among stakeholders due to the sheer size of the cost. Cost is an even more critical aspect as, given the federal structure of official statistics in Germany, the cost have to be born together by the federal government and the governments of the 16 regions (Länder), which used to be an issue of long debate in the past.

3. Since the year 1983, the traditional census data collection enjoys also only limited popularity among the respondents: In the preparation of the census 1983, a large social movement emerged, with more than 500 local initiatives expressed manifold concerns regarding the Census (Bergmann 2009). The debate was less pronounced when the Census finally took place in 1987, but resulted in a high degree of caution regarding the planning of further traditional censuses. Actually the census 1987 remained the last traditional census conducted in Germany.

4. As a consequence of this special context, the German combined census model was developed, tested in a large scale test in 2001 and finally implemented in 2011. This papers recapitulates the origins that lead to the creation of this specific census model (section 2), outlines the basic features of the combined model as well as the lessons learned during its implementation in 2011 (section 3), and provides an outlook as regards the perspectives for the post-2021 age in Germany (section 4).

II. Origins

5. The creation of the combined model for the German census can only be understood against the background of the difficult implementation of the last traditional census, which was stopped by the German constitutional court few weeks prior to its implementation in 1983 (for a short history of censuses in Germany before the 1980s see Scholz/Kreyenfeld 2016). It was implemented in modified form 1987. This section summarises the background of this development and its consequences of further censuses in Germany.

[2] In the German Democratic Republic (GDR) the last Census was conducted in 1981. The next scheduled Census in 1991 was canceled due to the reunification.

A. 1983: The census that did not happen

6. The census 1983 is specific in two ways: First, it was fully prepared (including the printing of the questionnaires), but never made it to the actual data collection. Second, it was already supposed to take place two years earlier, in 1981 (Würzberger/Störtzbach/Stürmer 1986): Initially, Germany had planned to carry out a population census in 1981, which was also the year laid down in directive no. 73/403/EWG of the European Council. Still, given that the federal government and the regions could not agree on the distribution of the cost before the end of the parliamentary term (which ended in 1980), the law could not be adopted in time.[3] This indicates that covering the cost of the census, which occur in larger intervals only, used to be one of the key challenges in the German history of population and housing censuses.

7. After the parliamentary election in 1980, the national census law was finally decided unanimously in the federal parliament in March 1982, interestingly enough without major public attention or press coverage. As test surveys among 80,000 persons revealed no serious issues, it was decided to wait with the information of the population until the (anticipated) federal elections in early 1983 had taken place. In the meantime, other than expected, a large social movement emerged, starting from peace activist groups in western Berlin.[4] One of the first activist groups used the slogan "If the government remains silent for atomic weapons, we remain silent for peace – Citizens do not reply!" The criticism of activist groups also has to be seen in the context of the increasing opportunities of information processing techniques that emerged since the 1970s. New mainframes allowed the storage of large quantities of data and improved the processing of and the access to data. Parallel to the census debate, centralised data bases were created that were used in the social area (e.g. for pension insurance) and by safety authorities (e.g. INPOL data base). The public became also more aware of the opportunities of modern data processing when the police started to cross-check several data bases due to searching for terrorists ("Rasterfahndung"). There were also attempts to introduce a universal personal identity number during that time. In this sense, many people in Germany understood the envisaged census as a continuation of this trend and so as an instrument of the state to collect as many information about individuals as possible. The protest was targeted against these developments. While the preparations of the census continued as planned, a several hundred of activist groups were founded and the topic discussed lively by the media. One of the main issues in the discussion was the planned comparison of the census data with the population registers, which aimed at correcting for errors in the registers.

8. The comparison with the population registers was also one of the points raised by more than 1200 complaints of unconstitutionality that were presented to the federal constitutional court in 1983, which stopped the implementation on 13 April 1983 by interim order, no more than 14 days prior to the planned census reference day. In its final judgement, delivered on 15 December 1983, the

[3] According to the German Federal Statistical law, the Federal Statistical Office and the State Statistical Offices have to cover the cost of their legally defined tasks. Exceptionally, for a large operation like the census, funds of the federal government can be allocated to the federal states, which is laid down in the census law and negotiated during the legislative procedure.

[4] The building up of atomic arms was a topic of large public debate in late 1982, including the largest protest demonstrations in the (western) German history.

constitutional court stated that the constitution generally allowed for conducting a census, but at the same time concluded that some provisions of the census law were unconstitutional, for instance the comparison of the census data with the population registers. The second major issue was the insufficient protection of (only formally anonymised) micro data that could be provided to a wide range of public bodies – statistical as well as others. For that reason the Census had to be postponed and did not take place earlier than 1987.

9. The judgement has had a major impact on data protection regulation in Germany until today (see, e.g., BfDI 2009). It stated that the right of informational self-determination directly follows from the fundamental right of personal freedom, guaranteed by article 2 of the constitution. Any data collection required from people therefore is only considered constitutional if justified by a legal basis, which needs to be specific and clear ("normenklar") as well as commensurate compared to the public interest at stake ("verhältnismäßig"). While data for administrative purposes must only be collected for specific, well justified and commensurate purposes, official statistics, given its specific task, is allowed to collect a certain stock of information that can be used for multiple purposes. Consequently, data collected for statistical purposes must be used for statistical purposes only ("Zweckbindung") and under no circumstances can be transferred to other public bodies ("Rückspielverbot"). More generally, any matching of registers that allows for a "catalogisation" of people was rejected as unconstitutional. Similarly, the constitutional court stressed that a universal personal ID number, which would facilitate the matching of different registers was seen as unconstitutional (BVerfG 65, 1).

10. In addition to these points, the constitutional court defined strict standards regarding the treatment of data that allow the identification of respondents (separate storage, deletion at the earliest possible point in time, possibility to provide the information by self-completion without interviewer involvement).

B. 1987: The last traditional census in Germany

11. Taking into account the 1983 judgement of the constitutional court, the census methodology was revised and a new census law decided by the federal parliament in 1985. The changes related to the judgement of the constitutional court include a clearer specification of the questionnaire questions in the census law, a distinction between the census variables and auxiliary variables needed to conduct the data collection (but deleted afterwards), a clear separation of the units in charge of the fieldwork from other administrative units, a strict selection of the interviewers, a redesign of the questionnaires, as well as a strict restriction regarding the possibilities of a transmission of (even formally anonymised) micro data to other entities (Würzberger/Störtzbach/Stürmer 1986: 931-935). In contrast, the list of variables to be collected underwent only marginal changes compared to 1983.

12. In particular the provision to use the census data to check the correctness of the entries in the population register, foreseen in the 1983 law, was completely removed from the law. In contrast to many other countries, there was therefore no opportunity to use the data from a complete enumeration to correct the population registers and consequently as means of transition towards a register-based census.

13. The census 1987 was carried out as a traditional census based on a complete enumeration of the population and its labour market participation ("Volks- und Berufszählung"), buildings and dwellings ("Gebäude- und Wohnungszählung"), as well as workplaces ("Arbeitsstättenzählung"). All three components of the census shared a common methodology and fieldwork organisation, in order to minimise the cost. The reference day was 25 May 1987.

14. The data collection was carried out with legal obligation to respond. The preferred data collection mode was the interviewer administered face-to-face interview with the possibility to choose a self-administered mode if required by the respondent (which was essential to guarantee the right of informational self-determination, according to the judgement of the constitutional court). In order to facilitate the implementation of the data collection, data from the population registers, the registers regarding property tax and the business registration register were transmitted to the units in charge of organising the data collection (usually the municipalities), but not to the statistical offices. The 1987 census law determines that the units in charge of organising the data collection must be locally, personally and organisationally separate from other administrative units.

15. Even though the protest against the census 1987 had somewhat diminished in comparison to 1983, the complete enumeration still lacked public acceptance. And again, a considerable movement was heard in the public debate asking the people not to participate in the data collection.

C. 2001: The census test preparing the combined model

16. Against the background of the experiences with preparing the censuses in 1983 and 1987, the Federal Government opposed a traditional complete enumeration like that of 1987 for reasons of cost and acceptance both in the 13th and 14th parliamentary term despite the European Union plans to conduct a Community-wide population and housing census in 2001. Instead of participating in the 2001 European census round with a full census, Germany engaged in developing a new census model that did no longer require a complete enumeration by making broader use of administrative registers.

17. In 1998, a working group of the Federal Statistical Office and the Statistical Offices of the Regions recommended a methodological change-over from a primary-statistical complete enumeration to largely register-based data collection. The basic idea was to use the data in the fields of demography and employment from the available administrative registers (for instance the population registers run by the municipalities and the employment statistics register of the Federal Employment Agency). Together with a complete enumeration of buildings and dwellings (as no sufficient register information was available in this area) and a supplementary sample survey (for variables on persons not available from registers), a "census-typical" data set5 was to be constructed.

18. In order to properly test and fine tune the suggested method, a large scale field test was launched in 2001, which had the objectives to investigate

[5] As a result, for every person the „census-typical" data set consists of demographic, employment and housing information as well as the household relationship.

- the quality of the population registers regarding over- and under-coverage
- the efficiency of statistical methods for adjusting population registers
- the differences in results between postal collection of dwelling data among the owners of buildings/dwellings (GWZ) and data collection through direct questioning of households (users of dwellings) by interviewers;
- the possibilities of further developing the methods of automated generation of household relationships through combined utilisation of population register data and the data collected by the census of buildings and housing and on the reliability of the results of household generation;
- the possible uses and the quality of the employment and unemployment registers of the Federal Employment Agency.

19. As a basic precondition, the methodology to be developed had to be compliant with the principles laid down in the 1983 judgement of the constitutional court, in particular the matching of registers without a personal ID number and the interdiction to use data from statistical collections to correct for errors in administrative registers.

Table 1

Models considered after the census test conducted in 2001 (Statistische Ämter des Bundes und der Länder 2004)

Model description	Register-based census and sample survey in all municipalities	Register-based census in all municipalities and sample survey only in municipalities with 10 000 and more inhabitants	Register-based census only in municipalities with less than 100 000 inhabitants and traditional census in large cities	Register adjustment and subsequent register-based census	Traditional population census
Variant 1.1	model 1	model 2	model 3	model 4	
Costs in EUR mn					
- model without coverage of additional characteristics	Variant 1.1 368	Variant 2.1 315	538	272 census + 400 adjustment	
coverage of additional characteristics for municipalities from 10 000 inhab.	Variant 1.2 386	336 Variant 2.2	in large cities only	–	1 020
- coverage of additional characteristics for all municipalities	Variant 1.3 464	–	–	–	
Variant 1.1					
Size of interviewer survey					
- model without coverage of additional characteristics	Variant 1.1 10.1 million persons	Variant 2.1 5.6 million persons	25.2 million persons	82.5 million persons (in case of register adjustment by general inspection)	
coverage of additional characteristics for municipalities from 10 000 inhab.	Variant 1.2 11.8 million persons	7.6 million persons	in large cities only	–	82.5 million persons
coverage of additional characteristics for all municipalities	Variant 1.3 20.4 million persons	–	–	–	
Additional data (not available in registers) on education, self-employed, etc.	only with enlarged sample survey, general, down to the municipality level	with enlarged sample survey only for municipalities with 10 000 and more inhabitants	for large cities only	none	general down to the block side
On average, distortion of the number of inhabitants determined	none	slight undercount for municipalities with less than 10 000 inhabitants	tendency towards undercount for municipalities with less than 100 000 inh.	none	none
Variation of the register errors among the municipalities	small	up to 10 000 inhabitants medium-sized, from 10 000 inhab. small	up to 100 000 inhabitants high, only for large cities very small	very small	very small

20. In total, four different models were considered:

- Register-based census and sample survey in all municipalities (model 1)
- Register-based census and sample survey in municipalities from 10 000 inhabitants (model 2)
- Combining register-based and traditional census (model 3)
- Adjustment of population registers followed by a register-based census (model 4)

21. In a large scale field test conducted in 2001, all methodological aspects of the census model were studied in detail. In the field of demographic data, the quality of the municipal population registers were a major element of the study. The results showed that both missing entries as well as outdated entries were more frequent in large municipalities compared to smaller ones, making it difficult to establish comparable register-based population figures (see figure 1). It should be noted that the results presented in figure 1 are average values that to some extent mask the considerable variability from one municipality to another (even within the size classes).

22. In consequence, the test led to the recommendation that the census should use a combined model consisting of a register-based component, drawing on data from the population registers, the registers of the Federal Employment Agency and other public registers, a postal census of buildings and dwellings and a primary sample survey of municipalities with 10,000 inhabitants or more (the approach of the combined census model is described in more detail in section 3.1).

23. The primary sample survey in municipalities with 10,000 inhabitants or more had the objective to statistically correct over- and under-coverage of the numbers of inhabitants obtained from the population registers. The approach accepted that, depending on the size class of the municipality, the number of inhabitants is determined using different statistical procedures. The supplementary sample survey had as a second objective to collect data for additional census variables, which are not covered in registers.

Figure 1

Census test 2001: Rates of outdated and missing entries in the population registers (after adjustment by temporarily outdated entries, check for multiple entries and household generation)

24. The model managed to combine data from several registers without a personal ID number in the registers and to base large parts of the census results on register data, which needed adjustment.

III. Present and lessons learned

A. The combined model implemented in 2011

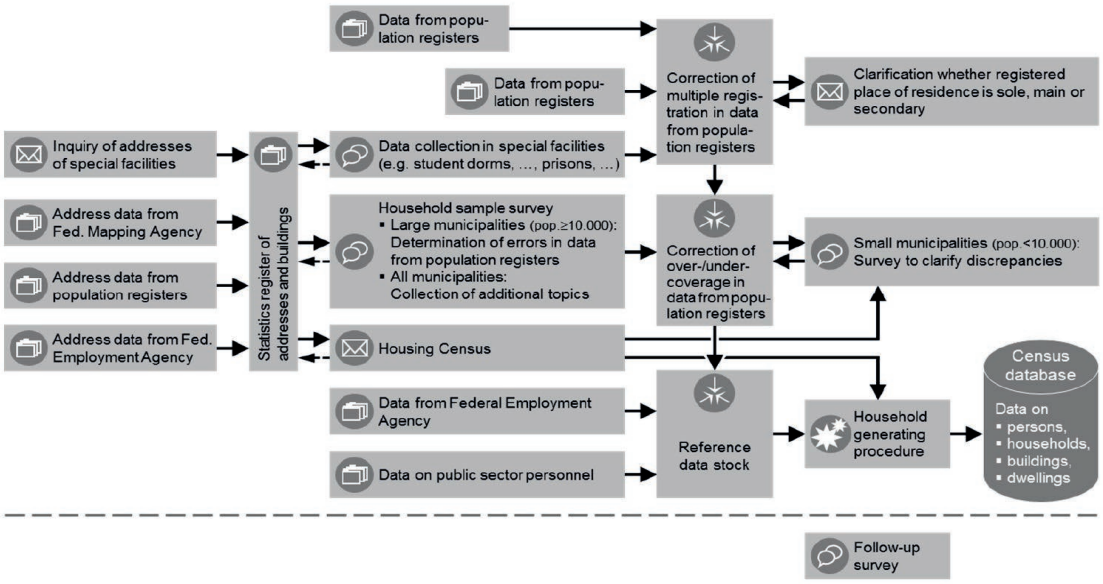
25. As suggested by the results of the census test and recommended by the statistical offices, the 2011 census used a combined model that put together data from registers, a complete enumeration of buildings and dwellings as well as a supplementary sample survey. The basic idea of the 2011 census was to use the demographic information available from the decentralised population registers and to complete – and where necessary, correct – this data by merging it with information from other registers and mandatory primary surveys. By combining different data sources and methods of automatic data generation, a distinct data set containing all required census information could be created for each person, each household and each building with dwellings.6

[6] The following presentation is based on the English summaries provided by Bechtold (2013, 2016). A more detailed (German) description of the methodology applied in 2011 can be found in Statistische Ämter des Bundes und der Länder (2015).

26. In order to merge the data of the different parts of the census data collection, first a basic register was established, containing a list of all addresses where buildings with residential space existed at the census reference day. This address and building register was the key link for all data collections during the census. It was also used as the statistical population for the sampling procedure of private households and for the housing census.

27. The main data sources used in the combined model were the following (see fig. 2):

Figure 2



B. The German Census Model in 2011 (from Bechtold 2016)

- The *population registers* provided the main demographic data as well as information on family relationships for all individuals that belong to the target population (about 86 million data records). The data from the municipal population registers were collected at the census reference day (9 May 2011) and were updated three months later in order to take into account delayed register entries and delayed deregistrations. The register data were merged in a nationwide data set and it was subsequently tested whether people were registered at more than one sole or main place of residence on the census reference day. If such cases were identified in large municipalities (with at least 10,000 inhabitants), they were automatically corrected by using the most current information. Multiple residences in small municipalities (with less than 10,000 inhabitants) were investigated using a postal inquiry. The same applies to cases where a person was registered at a secondary place of residence only.
- The *supplementary household* sample survey, covering almost 10 percent of the population was used to adjust the register data in municipalities with 10,000 inhabitants or more, after the registers have been corrected for multiple residences. For the calculation of the population of large

municipalities, the level of error of the population registers (over- and under-coverage) detected by the household survey was taken into account. The sample was designed to ensure that the population figures of large municipalities meet a 1 percent error margin target at a 95 percent confidence level. The method applied to optimise the sampling process was dedicated individually to each municipality and the sample size ranged between 2.1 percent and 45.6 percent and differed significantly even for municipalities of a similar size. For municipalities with less than 10,000 inhabitants, a survey was carried out among those households that had been identified as needing clarification.

- In addition to the objective to establish the population figures, the supplementary household survey was also used to cover further compulsory census variables of the EU that are not available from registers (in particular the labour market participation and the educational attainment). The additional census topics were collected in all municipalities (not just those with 10,000 inhabitants or more). The sample size was designed to allow publications at NUTS-3 level.
- For persons living in *special facilities*, e.g. a communal accommodation, care institution, dormitory or similar types of housing, census information was collected using a complete enumeration because fluctuation and missing registrations for this sub-population lead to high rates of error in the population registers. Addresses carrying stigmatising information, e.g. in the case of psychiatric hospitals or prisons ("confidential special facilities"), were distinguished from non-confidential special facilities, e.g. student dormitories. In confidential special facilities, the privacy of data collection was secured by a special procedure and only a reduced set of variables was collected.
- As there are no registers of buildings and dwellings covering the whole of Germany, the compulsory EU variables of the housing census needed to be obtained through a postal *survey of buildings and dwellings* that was conducted among all property owners (for the total of just under 20 million buildings with residential space, data were collected at approximately 19 million owners). In addition, the census of buildings and housing covers auxiliary variables (number of persons living in a dwelling and names of two persons) which were used in the household generation procedure (see below).
- A large part of information on the employment of the population has been taken from registers of the *Federal Employment Agency* (for about 36 million employees subject to social insurance contributions) and from the *administrative files of the public service* agencies with personnel (for about 3 million public officials, judges and soldiers). These registers were equally used to supplement the demographic information obtained from the population registers, the household sample survey and the survey of addresses with non-confidential special facilities. Together with the register of addresses and buildings, this information constituted the reference data stock.
- To obtain information about household and family structures and their housing conditions (that information is not included in registers) data

from the various census components had to be combined in a so-called *household generating procedure*. In this multistage procedure, information about persons from the population registers, the household sample survey and the survey conducted at special facilities was used to form households and to link them to dwellings collected in the housing census.[7]

28. Merging data sets from different sources for individual persons was one of the great challenges of the 2011 census, because it had to be accomplished without an existing personal identification number available in the different registers. An already existing set of ID numbers for the purpose of the tax authorities was available in some of the registers, but could not be used due to legal restrictions. Therefore individual and address-based information such as name, sex, date of birth, municipal code, post code, street name, and house number were used to link respective records of different data sets.

C. Lessons learned and modifications for 2021

29. Retrospectively, the modular concept of the German census 2011 combining register use and primary statistical data collections was successful. A qualitative evaluation came to the result that the model worked well, and (while identifying proposals for an improved implementation) should be the basis for the census 2021. At the same time, it was concluded that the quality of the population registers was still not considered sufficient for the purposes of a census so that the supplementary household sample survey was maintained as an element to correct for over- and under-coverage in the registers (and to collect the data for variables not covered by the registers). Against this background the household sample survey remains an integral elemental part with an opitimization of the model considering census2011 results. The model was scientifically accepted and achieved a high precision. At the same time the model reduced the burden and the cost on data collection for the statistical offices and the respondents compared to the former traditional census considerably. The household generating procedure was another new element which turned out for being a precise way to determine family and household data down to the local level.

30. Changes for the census 2021 therefore consider census 2011 experiences in quality aspects and possibilities to reduce complexity and thus to be more timely with results. Additionally, modifications aim to make the results easier to understand and raise general acceptance of the model. The main amendments for the census 2021 are:

- The interaction of the different census components need to be designed early on to allow a comprehensive technical approach that liaise the individual parts of the model together. The results of the different surveys and census components will therefore be linked in a central data stock

[7] For further details, see https://www.zensus2011.de/EN/2011Census/Methodology/Methodology_household_generating_procedure_node.html

instead of storing them separately as in 2011. In doing so, data can be cross-checked and validated at an early stage of data processing. Inconsistencies and implausibilities can be removed by rules or even by manual checks. This helps to improve data quality and helps reducing efforts to link the data with each other consecutively.

- The use of paper questionnaires has to be reduced by a rigorous "online-first" strategy. This is an important part in being on time in the next census round, which can not only contribute to an important cost reduction, but also decrease response burden because respondents are specifically guided through the questionnaire.
- Building up the address register has to start earlier and one of the data sources will not be used any more. In 2011, three main sources were leveraged to collect addresses: the Population Registers, data of the Federal Mapping Agency and data of the Federal Employment Agency. The latter will not be used in 2021 anymore as there were no further addresses added by this source, but many cross-checks were necessary due to different spelling of cities, streets and house numbers.
- In 2011, data of the Federal Employment Agency were furthermore used to generate data on employment: The data were of high quality but users complained the complexity of analyses, since different employment figures were released depending on whether they were based on the combined model or the household survey only. Looking at employment in a broader sense, this source had to be analyzed in combination with the household survey to cover self-employed or unemployed as well.
- Number of inhabitants: the different models of correcting people register data in big cities with 10,000 inhabitants or more and small cities was criticized by many municipalities. Even though the different models produced results with the quality expected from the beginning, different models influencing the calculation turned out to lack public acceptance. Furthermore the knowledge of the results today allow an optimization of the model. Therefore the model of correcting population registers in small municipalities has to be optimized.
- The weighting scheme of the supplementary household survey was targeted primarily at a highly precise number of inhabitants. The production of results for census variables that were not available from registers was only considered as a second priority in the development of the estimators. The weighting procedure needs to be optimized in order to minimize any risk of bias in case of the census variables not available from the registers.

IV. Future perspectives

31. Although the combined census model was implemented successfully, the Federal Statistcial Office is working on a number of further developments aiming at an increased register use in the period following the 2021 census round. These developments are driven by several considerations, which are presented in the following paragraphs.

32. As demonstrated by the German Statistical Council and recent discussions at the European level, users require census data more frequently, more timely, and in more differentiated regional breakdown (Eurostat 2016). The size of the operations used for data collection in traditional, but also many combined censuses goes along with rather long production times so that results can only be produced with some delay. As the experiences of countries with register-based census illustrate, production time can be shortened if the census is mainly based on registers. At the same time, a frequency of ten years is considered too long by many users. Providing annual results for a limited subset of census variables could help to remedy this concern. Finally, the potential of the census to inform local and regional decisions regarding population and housing can only be tapped if data are provided in grid-based form allowing for variable tabulations also for non-administrative areas.

33. Despite the fact that the combined census model in Germany already led to important cost reductions, its components related to traditional data collection (in particular the complete enumeration of buildings and dwellings and the relatively large supplementary household sample survey) still go along with relatively high cost. Experiences from countries with purely register-based censuses show that important cost reductions can be achieved.

34. With further efforts to make progress in the digitisation of public administration, the register infrastructure in Germany is under constant development. This development may lead to further harmonisation and linking of registers, which could open new opportunities for the use in official statistics and in particular the census. With new technologies applied for data protection and encryption, some of the legal challenges in connection with the constitutional courts judgement of 1983 could possibly be solved.

35. With a more frequent production of population figures in the years between the decadal census rounds also possible synergies with the regular updates of population statistics may become possible. This can not only lead to efficiency gains, but also an increased coherence of the data and longer break-free time series.

36. Taking these ongoing developments into consideration, the Federal Statistical Office started exploring the opportunities for the census for the post-2021 era. This work aims at increasing the use of registers, establishing an annual production of population figures between the decadal census rounds, retrieving information on buildings and dwellings from registers. Similarly, a register-based census provides new opportunities for an integration with the household surveys of official statistics with new methodological opportunities (e.g. for the use as a sampling frame).

37. The increased population register use for census data collection first and foremost requires additional efforts in quality assurance and adjustment procedures. In order to be accepted by the users, and given the important role census results play for various financial and political decisions, population figures need to be of high accuracy and comparable across municipalities and regions. Many efforts have already been made in this field, amongst others in connection with digitised administrative processes, but for some population groups (e.g. immigrants and emigrants) further improvements are required. The census 2021 will be one occasion to take stock of the progress made and develop proposal for further measures.

38. Assuming that the legal, organisational, and technological possibilities to link registers for statistical purposes will increase, this will also lead to new opportunities not only for data production, but also for consistency checks between the values included for the same units in different registers.

39. In order to replace the biggest traditional data collection in the German census – the complete enumeration of buildings and dwellings – the Federal Statistical Office is currently exploring whether at least an important part of the housing related information can be obtained from registers that either exist or are under preparation for administrative purposes. Once such a register of buildings and dwellings is available for the use by official statistics, a dwelling ID number could be established in order to facilitate the production of household level population data and to provide information on the housing situation of people.

40. Relating to the plans to establish a production of annual, geo-coded population figures after the 2021 census round, development work has already started. Also in this area, the objective is to achieve a purely register-based production system, which requires quality assurance and adjustment of the population registers. This work will also have impacts on the current procedures of population statistics, eventually leading to an integration of the existing intercensal population updates in order to avoid inconsistencies and double efforts.

41. Depending on the scope of the register-based system that could be achieved, the integration of the existing household surveys in the system is a further field of activity. Household surveys can benefit from a register-based census in various ways and experiences from other countries show that integration can largely improve the data infrastructure well beyond the census. Possible topics are the provision of improved sampling frames (with new opportunities for stratification), the collection of specific variables from registers and the improvement of more efficient weighting procedures. This is even more the case since some census variables will not be available from registers in Germany in the foreseeable future, so that a (reduced) supplementary sample survey will still be needed. This sample survey should however be consistent with the remaining household surveys of official statistics.

V. Conclusion

42. The German case is instructive in many respects. It first shows that a combined census model can be successfully implemented even under imperfect circumstances. The conditions imposed by tight legal restrictions, an incomplete register infrastructure, and the lacking comparability of the population register data finally could be managed. The combined census model helps to reduce the cost and the burden imposed on inhabitants and property owners.

43. The improvements developed after the evaluation of the 2011 census are instructive, as they show how critical processes can be managed better. Not all registers available need to be used, as the example of the employment register of the Federal Employment Agency shows, for which the effort was finally considered too high given the benefits that could be achieved. The improvements

also suggest that a broader use of web-based interviewing (in the online–first strategy) can help to reduce cost and response burden without already entering a completely register-based system.

44. The case finally illustrates that a combined census model cannot tap the entire potential associated with a fully register-based census. For Germany, therefore development work continues to use the progress made in digitised public administration and to move towards an increased register use in the post 2021 era.

References

Bechtold, S. (2013): Lessons learned from a mixed-mode census for the future of social statistics. Paper presented at the 97th DGINS Conference "New conceptual design for household and social statistics", Wiesbaden, 27 September 2011. Available at https://www.destatis.de/EN/AboutUs/Events/DGINS/Document_Destatis_MixedModeCensus.pdf?__blob=publicationFile (accessed 14 July 2017)

Bechtold, S. (2016): The 2011 Census Model in Germany. In: Comparative Population Studies D1-D9 (date of release: 04.08.2016). Available at DOI: 10.12765/CPoS-2016-07en (accessed 14 July 2017)

Bergmann, Nicole (2009): Volkszählung und Datenschutz. Proteste zur Volkszählung 1983 und 1987 in der Bundesrepublik Deutschland. Hamburg: Diplomica.

Bundesbeauftragter für den Datenschutz und die Informationsfreiheit, BfDI (2009): 25 Jahre Volkszählungsurteil Datenschutz – Durchstarten in die Zukunft!. Bonn.

Bundesverfassungsgericht (1983): Urteil des Ersten Senats vom 15. Dezember 1983 auf die mündliche Verhandlung vom 18. und 19. Oktober 1983. (BVerfG 65, 1) Available at https://www.zensus2011.de/SharedDocs/Downloads/DE/Gesetze/Volkszaehlungsurteil_1983.pdf?__blob=publicationFile&v=9 (accessed 4 July 2017)

Scholz, Rembrandt D. and Michaela Kreyenfeld (2016): The register-based census in Germany: historical context and relevance for population research. In: Comparative Population Studies - Zeitschrift für Bevölkerungswissenschaft 41 (2016), 2, pp. 175-204. Available at: DOI: http://dx.doi.org/10.12765/CPoS-2016-08en (accessed 14 July 2017)

Statistische Ämter des Bundes und der Länder (2004): Results of the census test. Statistisches Bundesamt: Wiesbaden.

Statistische Ämter des Bundes und der Länder (2015): Zensus 2011. Methoden und Verfahren. Statistisches Bundesamt: Wiesbaden. Available at https://www.zensus2011.de/SharedDocs/Downloads/DE/Publikationen/Aufsaetze_Archiv/2015_06_MethodenUndVerfahren.pdf?__blob=publicationFile&v=6 (accessed 14 July 2017)

Würzberger, Paul, Bernd Störtzbach and Bernd Stürmer (1986): Volkszählung 1987. Rechtliche Grundlagen und Konzept nach dem Urteil des Bundesverfassungsgerichts vom 15. Dezember 1983. In: Wirtschaft und Statistik 12/1986, pp. 927-957.