



# RatSWD

## *Working Paper Series*

Working Paper

No. 118

### Improvement of Access to Data Set from the Official Statistics

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Stefan Bender, Ralf Himmelreicher,  
Sylvia Zühlke and Markus Zwick

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August 2009

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## Working Paper Series of the Council for Social and Economic Data (RatSWD)

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The *RatSWD Working Papers* series was launched at the end of 2007. Since 2009, the series has been publishing exclusively conceptual and historical works dealing with the organization of the German statistical infrastructure and research infrastructure in the social, behavioral, and economic sciences. Papers that have appeared in the series deal primarily with the organization of Germany's official statistical system, government agency research, and academic research infrastructure, as well as directly with the work of the RatSWD. Papers addressing the aforementioned topics in other countries as well as supranational aspects are particularly welcome.

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# Improvement of Access to Data Sets from the Official Statistics

*Stefan Bender, Ralf Himmelreicher, Sylvia Zühlke and Markus Zwick*

## 1. Introduction

The four publicly funded research data centres (FDZ) in Germany – the Research Data Centre of the Federal Employment Agency at the Institute for Employment Research, the Research Data Centre of the German Pension Insurance (FDZ-RV), the Research Data Centre of the Statistical Offices of the Länder and the Research Data Centre of the German Federal Statistical Office – have made a significant improvement to the data and services available to researchers over the past few years.<sup>1</sup> Founded on a recommendation by the German Commission on Improving the Informational Infrastructure between Science and Statistics (KVI)<sup>2</sup> and funded in the project phases by the German Federal Ministry of Education and Research (BMBF), the centres have developed in a form that was not initially anticipated. Their services are widely used, empirical findings lead to refereed publications and the state of research in rendering microdata anonymous has made great leaps. Many policy decisions are now planned and evaluated on the basis of data originating from the data research centres. Germany has gone from the bottom of Europe's league with regard to the use of individual data produced by empirical research with public funding, to an innovative provider of new ideas, such as on access to individual data for teaching purposes and linked employer-employee datasets.

In 2007, the research data centres developed criteria for the specific design of research data centres in Germany in conjunction with the German Council for Social and Economic Data (RatSWD).<sup>3</sup> These criteria are based on the experiences of the four research data centres, which have now all been positively evaluated according to the regulations of the Leibniz Association. The criteria catalogue is designed as a guideline for other data producers planning to set up a research data centre.

Chapter II presents the key criteria representing a common working basis for the research data centres. Chapter III consists of more detailed descriptions of the four research data centres as they are today. These include the respective data provided alongside further services and usage intensity. The article closes with an outlook over future developments.

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1 Two data service centres – the German Microdata Lab (GML) at ZUMA and the International Data Service Center at IZA (IDSC) – were also set up as part of this development, and have also worked very successfully, see Schneider/Wolf 2008.  
2 Kommission zur Verbesserung der informationellen Infrastruktur zwischen Wissenschaft und Statistik (2001).  
3 [http://www.ratswd.de/download/publikationen\\_rat/RatSWD\\_FDZKriterien.PDF](http://www.ratswd.de/download/publikationen_rat/RatSWD_FDZKriterien.PDF).

## **2. The German Council for Social and Economic Data Criteria for Research Data Centres**

Research data centres are institutions with the main purpose of providing simple, transparent and high-quality access to microdata suitable for statistical analysis, while maintaining data protection and data security. Moreover, the research data centres are intended to contribute to improving cooperation between the data users from the scientific community and the respective data producers. The research data centres are thus an interface between the data producers' supply of data and the demand for these data from the science side. Strictly observing data protection regulations, they enable the following individual data access:

- anonymous microdata files
- controlled remote data access
- workplaces for guest researchers in the research data centres

In order to provide these central services, the four publicly funded research data centres have developed the following basic characteristics as criteria, in conjunction with the RatSWD:

1. The data made available to the scientific community arise for statistical purposes as part of public administration processes, research and evaluation, and are produced using public funding.
2. Access to the data is subject to the legal provisions of data protection and data security in the specific area. The task of the research data centres is to provide easier access through specific regulations.
3. Access to microdata is subject to legal regulations guaranteeing equal treatment of data users. Correspondingly, the research data centres ensure transparent and standardised access regulations. This also includes the regulation that no application for use shall be privileged or disadvantaged on grounds of its content. The research data centres do not undertake any evaluation of the content of the research projects applying for access, merely checking for data protection or contractual permissibility. Should there be contractual or legal restrictions on the analysis of the data, these shall be published simultaneously with the provision of the data. Evaluations that give no cause for concern on grounds of data protection – i.e., are contractually permissible – may be published independently and autonomously by the users.
4. As well as providing access possibilities, the research data centres also produce data products for easy analysis and comprehensive data documentations. Moreover, information is provided via the available data and via the research data centres in

standardised form through internet sites, data and method reports, and individual consulting. The research data centres' tasks also include organising and participating in academic events in order to present the available data material, and presenting the available data and access to potentially interested parties (particularly non-university research institutes, specialised colleges of higher education and universities). The research data centres actively participate in academic discussion on the potential for analysis of existing data and in dialogues on use and development possibilities of the data infrastructure for scientific purposes.

5. A specific amount of research must take place within the research data centres. Practical research is essential to become familiar with the data and the latest methodological and content-related discussions, and thus to be able to provide users with adequate advice and instructions. The work within the research data centres must not be restricted to service activities, as this would ultimately be equivalent to an exit from the scientific stage. Scientific research within the research data centres enables access to further skills and qualifications and participation in scientific events, and also the publication of own work in the relevant journals.
6. Research within the research data centres is not coupled with exclusive access for the data producers. The anonymous microdata is made available simultaneously to all researchers, at least via controlled remote data access or at workplaces for guest researchers.

### **3. The Four Publicly Funded Research Data Centres**

From 1999 to 2001, the German Commission on Improving the Informational Infrastructure between Science and Statistics developed proposals for improving the data infrastructure between the scientific and statistics communities, on behalf of the BMBF. One of this commission's central recommendations was to set up research data centres. There are currently four research data centres in Germany recommended by the RatSWD, which are described in detail below.

#### *3.1 Research Data Centre of the German Federal Statistical Office*

The Research Data Centre of the German Federal Statistical Office was the first research data centre to be set up on the recommendation of the KVI in 2001, and was positively evaluated in summer 2004. The core activity of the Research Data Centre of the German Federal

Statistical Office, processing user requests, is now funded completely from original in-house sources. The Research Data Centre also receives funding from the BMBF within scientific projects, for example for rendering panel data on economic statistics anonymous.<sup>4</sup>

The most important official statistics are now available in the Research Data Centres of the German Federal Statistical Office and the Statistical Offices of the Länder, as a joint service. Access to the data, which is growing in volume, is possible in four forms, differing with regard to the type of anonymity and form of data provided. Absolutely anonymous public use files (PUFs) and factually anonymous scientific use files (SUFs) can be used outside of the statistical offices (off-site use). Data rendered less anonymous and containing less reduced information are made available at workplaces for guest researchers on the premises. Moreover, there is also a possibility for researchers to work with formally anonymous individual data using their own syntax via controlled remote data access (on-site use). Information on data and forms of access is available at [www.forschungsdatenzentrum.de](http://www.forschungsdatenzentrum.de).

The most intensively used form of data is the SUFs. Approximately 710 standardised SUFs have been provided for 328 different projects since mid-2004, when the Research Data Centre of the German Federal Statistical Office was first evaluated. The most frequently used dataset is the microcensus. Overall, however, demand for standardised SUFs is stagnating, whereas demand for individual datasets at the workplaces for guest researchers and via controlled remote data access is increasing. Controlled remote data access is now widely popular as a form of access available to researchers abroad and to commercial users. 30 researchers have visited the research data centre since 2004, with controlled remote data access used in 55 projects. 18 further projects are currently taking place using the two forms of access.

The *RDC Working Papers* series was initiated to present the wide use of the official microdata. To date, nearly thirty working papers have been published in this series, available via the homepage. The Federal Statistical Office's book series *Statistik und Wissenschaft* also includes various volumes of articles reflecting the dialogue between the research data centre and the scientific community.

The Research Data Centre of the German Federal Statistical Office developed the series *CAMPUS-Files* especially for teaching at university level. These files consist of absolutely anonymous microdata, allowing students to learn methodological skills and analyse sociological and economic issues. These data are available free of charge via the website of

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4 For the problem of permanent establishment see Zwick (2006)

the Research Data Centres of the German Federal Statistical Office and the Statistical Offices of the Länder.<sup>5</sup>

The Research Data Centre's work focuses on further development of the access routes, anonymity methodology and conceptional development. In order to strengthen its anchoring in the scientific community, the research data centre is strongly present at relevant conferences (e.g. Statistische Woche, Jahrestagung des Vereins für Socialpolitik, Kongress der DGS). It also offers its staff the possibility to gain PhDs using the research data centre's resources, via two-thirds contracts.

### 3.2 *Research Data Centre of the Statistical Offices of the Länder*

The Research Data Centre of the Statistical Offices of the Länder took up work on 1 April 2002. Up to 2003, it focused on solving basic issues concerning funding, data access and conditions for use. The research data centre has been funded by the BMBF since the beginning of 2004. Its core task is to provide easier access to the individual data of the statistical offices of the Länder for scientific research. In order to realise this task, a regional infrastructure was set up, enabling nationwide access to official microdata for the scientific community in 16 regional locations. Moreover, a centralised data administration was established, which makes inter-regional use of the microdata of the Statistical Offices of the Länder simpler<sup>6</sup>.

The Research Data Centre of the Statistical Offices of the Länder was evaluated in October 2006. The assessors gave a positive evaluation of the services and recommended extending the project funding and establishing the research data centre on a permanent basis. The project's term was thus extended up to the end of 2009 on the basis of a new funding application. The second project phase focuses on integrating economic and environmental statistical data, implementing knowledge transfer at university level and improving ease of access to the regional locations by setting up branch offices at universities and other scientific institutions. The Research Data Centre of the Statistical Offices of the Länder is also working towards establishing its services on a permanent basis.

The activities of the Research Data Centre of the Statistical Offices of the Länder have lead to a broad range of microdata on various subjects for the scientific community. A total of over 60 statistics are currently available for use in academic research projects from the fields of social issues, the economy, agriculture, the environment, justice administration and

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5 For further information, see Zwick (2007)

6 For further information, see Zühlke et al. (2004) and Zühlke/Christians/Cramer (2007).



taxation. The range of data is continually extended to meet research needs. Demand in the field of economic and environmental statistical data has shown a particularly dynamic development. The demand for integrated datasets based on different statistics and survey years presents particular challenges. There are various access routes available for users. Information on the data and services provided is available at [www.forschungsdatenzentrum.de](http://www.forschungsdatenzentrum.de).

Use of the Research Data Centre of the Statistical Offices of the Länder has increased steadily since 2004, with the number of applications for use multiplying fourfold by 2007 from 31 to 133. On average, each application requires access to six different datasets, so that more than 2721 datasets have been provided for research purposes to date. Due to the decentralised infrastructure, most data use takes place at the workplaces for guest researchers or via controlled remote data access, and is thus particularly labour-intensive for the research data centre.

The previous work of the Research Data Centre of the Statistical Offices of the Länder has shown that the official statistical microdata are an important basis for innovative scientific analyses<sup>7</sup> and the users are very satisfied with the new range of services. The Research Data Centre of the Statistical Offices of the Länder is therefore working very hard to establish its services on a permanent basis.

### 3.3 *The Research Data Centre (FDZ-BA) of the Federal Employment Agency (BA) at the Institute for Employment Research (IAB)*

The FDZ-BA<sup>8</sup> was founded in December 2003, as there had been no systematic access to social data up until this point. Following a positive evaluation by the German Council for Social and Economic Data in April 2006, the FDZ-BA was permanently established as an independent research data centre of the BA at the IAB<sup>9</sup>. An evaluation by the German Council of Science and Humanities in 2007 confirmed that the FDZ-BA was an internationally unique institution: *“The Research Data Centre (focusing on methods and data access) is an internationally visible, indispensable service institution, unique in Europe and a prime example to other institutions, possessing large datasets of scientific importance.”* (Report of the German Council of Science and Humanities for the IAB 2007, p.55)

The FDZ-BA prepares individual datasets developed in the sphere of social security and in employment research and makes them available for research purposes – primarily for external

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7 Selective data sets are discussed in detail by Kaiser/Wagner (2007), Wirth/Müller (2006) and Zühlke/Christians (2006).

8 More information on the FDZ is available in Kohlmann (2005), Bender et al. (2008a).

9 The FDZ has basic financing for a Head (exempt from collectively agreed terms), five positions for (senior) researchers, and three for non-academic staff and student assistants (40 hours per week).

researchers. Using its website (<http://fdz.iab.de>), the documentation and working tools available online such as the FDZ Datenreport and FDZ Methodenreport, and its workshops and users' conferences, the FDZ-BA makes it easier for external researchers to work with datasets.

The FDZ-BA micro datasets include the IAB Establishment Panel, die IAB Employment Samples (IABS), the BA Employment Panel (BAP), the Integrated Employment Biographies Sample (IEBS), the Establishment History Panel (BHP), the Linked-Employer-Employee Dataset from the IAB (LIAB), the cross-sectional survey "Life Situation and Social Security 2005" (LSS 2005) and the first wave of the panel study "Labour Market and Social Security" (PASS).<sup>10</sup>

Before the FDZ-BA data can be used for the first time, researchers must submit a request to use the data. Following approval by the Federal Ministry for Labour and Social Affairs, a use agreement is concluded between the scientist and the IAB. The number of approvals for dataset and data access has increased continuously from 81 (in 2005) to 116 (in 2007). It should also be noted that the projects normally last for over a year and thus projects from 2005 and 2006 were also continued in 2007. Two other very important parameters are the number of cases of remote data access and the number of guest stays (normally lasting several days) at the FDZ-BA for on-site use. Both figures have approximately quadrupled or almost quintupled as compared to 2005 (on-site use rising from 22 in 2005 to 133 in 2007; remote data access from 359 in 2005 to 1328 in 2007). Up to 2007, researchers had published, for example, 246 articles or papers on the basis of the IAB Employment Sample, 82 using the LIAB and 1,999 using the IAB Establishment Panel, within and outside the IAB<sup>11</sup>.

The FDZ-BA serves not only the national but also the international market. One important step towards internationalisation in 2007 was releasing web pages in English and having nearly every data documentation translated. The use of the FDZ-BA by researchers abroad has thus increased.<sup>12</sup> In 2006, the FDZ-BA had 16 contractual partners based abroad, including two who visited as guest researchers. In 2007, the FDZ-BA counted 34 contractual partners based abroad and welcomed nine guest researchers from abroad. Guest researchers from abroad can access FDZ-BA data relatively easily. It is no more difficult for them than for researchers from Germany. Since the cost of a stay in Nuremberg for visitors from abroad is higher than it is for locals, the FDZ-BA set up a grant in 2007. In 2007, four guests made

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10 There is an English documentation on the web page for nearly every dataset and a publication in the data watch section of Schmollers Jahrbuch.

11 The figures refer to all publications with the relevant dataset since the dataset first became available in the IAB. Some of the datasets were already available within and outside the IAB long before the existence of the FDZ.

12 The categorisation of researchers abroad refers to their place of work, not to their nationality.

use of this service. The establishment of this grant was evaluated positively by the German Council of Science and Humanities in its report.

The FDZ-BA is now networking more strongly with research data centres in other countries. This ensures that new innovative developments can also be applied more quickly in the FDZ-BA. These include, for example, anonymisation of datasets through multiple imputation (Drechsler et al. 2007) or metadata databases.

For the quality of the data supply and the advisory service it is crucial, however, for FDZ-BA employees to carry out empirical research themselves. The FDZ-BA's research activities are well documented through its publication record. In both 2006 and 2007, FDZ-BA employees published a total of ten research articles. These also include two publications in top scientific journals listed in the Social Sciences Citation Index (SSCI). This picture has been completed by numerous lectures about their research activities given in Germany and abroad. In addition, the FDZ-BA participates in a number of externally funded projects, co-financed by the German Research Foundation (DFG), the Federal Ministry of Education and Research (BMBF) or the Leibniz Association and carried out in cooperation with universities, research institutes and, of course, with the other research data centres. Each of these externally funded projects also included funding for personnel.

#### *3.4 Research Data Centre of the German Federal Pension Insurance (FDZ-RV)*

The Research Data Centre of the German Pension Insurance was founded in January 2004 and is now based in Berlin and Würzburg. During its initial setup phase, the FDZ-RV was funded by the BMBF from 2004 to 2008.

The core task of the FDZ-RV is to recover the data treasures of the German federal pension insurance (Rehfeld / Mika 2006). Alongside the microdata itself, the research data centre provides methodological information and commentaries intended to help simplify analyses using data from the German federal pension insurance. Current information on the range of data, access routes, workshops and publications is available at [www.fdz-rv.de](http://www.fdz-rv.de).

The FDZ-RV has realised the projects it agreed to fulfil for the funding institution (BMBF). Firstly, it has established an infrastructure within the research data centre, and secondly, it has taken the research data centre from a pilot project to a permanent institution. Thirdly, the range of data and the use possibilities have been extended considerably. In both Berlin and Würzburg, the micro datasets of the federal pension insurance are processed in cooperation with the respective departments and the data users, to make them available to researchers particularly in the form of user-friendly scientific use files.

Figure 1 gives an overview of cross-sectional and longitudinal microdata from the German pension insurance in the fields of retirement, insured persons and rehabilitation, with the corresponding names of the microdata. This data, highlighted in grey, is generated from the FDZ-RV as anonymous SUFs, which scientists working in research units may access free of charge, the only requirement being a signed contract with FDZ-RV.

The statistics of the German Federal Pension Insurance can be divided into datasets that focus on biographical information in combination with retirement and insurance and in a special dataset for rehabilitation. The datasets listed with a reference period of one day mean that this day represents the monitoring date in a specific year. Some statistics have both daily and annual reference periods.

The data range offered by the FDZ-RV now also includes the SUFs of the two longitudinal datasets “Completed Insurance Biographies - Vollendete Versichertenleben 2005” and the “Sample of insured persons and their insurance accounts 2005 – Versicherungskontenstichprobe 2005” (Himmelreicher / Stegmann 2008). Please note that it is particularly complicated to prepare the longitudinal data as SUFs, as a great deal of modifications have to be undergone to render the longitudinal information anonymous (Stegmann / Himmelreicher 2008).

Figure 1: Microdata sets of the German Federal Pension Insurance

Topic of the microdata set				
Retirement			Insurance	Rehabilitation
Retirement inflow	Retirement stock	Retirement cash-stock		
<b>Cross-sectional data</b>				
<b>Pension awarded</b> within a certain period/ cessation of pension payment (reference period 31.12.)	<b>Pension payments</b> (reference period 31.12.)	<b>Pensioners with one or more pension payments</b> (reference period 30.06.)	<b>Insured persons</b> (reference period 31.12. and within reference year)	<b>Medical and occupational rehabilitation</b> (reference period 31.12. and within reference year)
<b>Longitudinal data</b>				
<b>Completed Insurance Biographies</b> (reference period 31.12.)			<b>Sample of insured persons and their insurance accounts</b> (reference period 31.12.)	<b>Longitudinal dataset for rehabilitation</b>

 Dataset available as SUF via FDZ-RV (September 2008)

Source: Following Himmelreicher / Radl (2006).

The extended data range provided free of charge by the FDZ-RV, which now also includes longitudinal data, represents a considerable improvement in usage possibilities for research. As the FDZ-RV data have now been used in numerous scientific disciplines by more than two hundred and fifty researchers and an increasing number of presentations and publications are being written on the basis of the data, the research data centre is becoming increasingly well known in the scientific community. However, once the BMBF funding expires at the end of 2008, it will become difficult to provide the familiar standard of services to an increasing number of researchers with fewer staff.

The services of the FDZ-RV and its plans for the future clearly show that the data research centre has recovered the large data treasures of the German Federal Pension Insurance for research use. The newly created institution is thus on the right path. It has considerably extended possibilities for scientific analysis, while deepening the empirical knowledge in the fields of pensions, demography and above all employment biographies.

#### **4. Outlook**

At the end of the phases funded by the BMBF, the research data centres are facing new challenges. The Research Data Centre of the Federal Employment Agency at the Institute for Employment Research has meanwhile been integrated into the Federal Employment Agency with all capacities from the funding phase, and now carries out its work as an organisational unit of the Federal Employment Agency at the Institute for Employment Research. The Research Data Centre of the Pension Insurance has been established as a permanent institution in the German Federal Pension Insurance, equipped with basic funding to meet the key infrastructural needs. Additional third-party funding has to be obtained for research projects. For the two Research Data Centres of the Federal Statistical Office and the Statistical Offices of the Länder, possibilities for establishment on a permanent basis are still under discussion.

The research data centres coordinate basic issues of data access for research purposes among each other, and work in close conjunction on various projects to extend the range of data available and the access routes. Further development of the data range will focus on integrating statistics in the near future. The projects “Amtliche Firmendaten für Deutschland” (official firm data for Germany – AFiD) and “Kombinierte Firmendaten für Deutschland” (combined firm data for Germany – KombiFiD) will extend the range of data in two directions: AFiD will bring together economic and environmental data from the Statistical Offices by means of the German Company Register (URS) on the microdata level. KombiFiD

goes one step further, uniting company data across the boundaries of the individual data producers as part of a feasibility study on a joint dataset. In addition, processes for statistical matching of survey and process-produced data are being tested, e.g. between longitudinal data of the Research Data Centre of the German Federal Pension Insurance and the DIW's SOEP (Rasner et al. 2007) or the IAB's longitudinal data or in several of the IAB's own projects (Bender et al. 2008b, to quote one example).

In the field of data access, the research data centres are looking into the procedure of remote data access. This access route has already been put to successful use in other European countries. The researchers are provided with direct access to the microdata at a specially set-up workplace in their own institutions via a secure internet connection. The research data centres are currently addressing the issue of requirements for introducing this access route in Germany.

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