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« **Building and Using Databases for Cliometric Research on Education and Demography: An Introduction to “HISTAT”.** »

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Building and Using Databases for Cliometric Research on Education and Demography: An Introduction to “HISTAT”.

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Abstract

The ‘Data Service for Historical Studies’ (‘Datenservice Historische Studien’) is part of the department ‘Data Archive for the Social Sciences (‘Datenarchiv für Sozialwissenschaften’, DAS), located at GESIS, a Leibniz Institute for the Social Sciences. The study and data inventory of this area are characterized by a very large heterogeneity of the data material collected in the archived studies, which are concerned substantially with aspects of the economic and social history of Germany. An important focus of the historical studies is on historical education statistics. A total of 121046 historical time series on the development of Germany’s educational system are currently on offer – free of charge – via the platform HISTAT (Historical Statistics). The data inventory on historical educational research shall be presented in this article.

Keywords

Cliometrics, Databases, Demography, Education, Germany.

JEL Classification: C8, N3.

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The ‘Data Service for Historical Studies’ (‘Datenservice Historische Studien’) is part of the department ‘Data Archive for the Social Sciences (‘Datenarchiv für Sozialwissenschaften’, DAS), located at GESIS, a Leibniz Institute for the Social Sciences. The study and data inventory of this area are characterized by a very large heterogeneity of the data material collected in the archived studies, which are concerned substantially with aspects of the economic and social history of Germany. An important focus of the historical studies is on historical education statistics. A total of 121046 historical time series on the development of Germany’s educational system are currently on offer – free of charge – via the platform HISTAT (Historical Statistics)². The data inventory on historical educational research shall be presented in this article.

1. GESIS – Leibniz Institute for Social Sciences: Historical studies in the GESIS data archive

The GESIS-Leibniz Institute for the Social Sciences is an infrastructure institution that is funded by the federal government of Germany and individual German states. As a service and research institute, GESIS provides fundamental nationally and internationally significant, research-based infrastructure services in the areas of empirical social research, archiving, documentation and information retrieval.

One of the objectives set by GESIS is to record social development processes also from a historical perspective (cf. GESIS statute of 19.06.2010, <http://www.gesis.org/das-institut/der-verein/satzung/>). GESIS meets this objective on the one hand in the framework of social indicator research and the online research and download system based on this research, SIMon (Social Indicators Monitor³). From the perspective of the Data Archive for the Social Sciences, this goal means that not only survey data, but also study data are acquired and archived, which were collected and processed to clarify historical questions. Quantitative studies from the fields of social and economic history and research results on Germany’s historical statistics, which illustrate the development in the form of long time series, therefore represent an important study segment of the data archive. Hence at GESIS Data

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² See website <http://www.gesis.org/histat/>. Under the leadership of Professor Rainer Metz and with the considerable contribution of Jürgen Sensch, the histat database was developed with long time series for studies of the social and economic history of Germany. Some use was made of the already available concepts by Ulrike Albrecht and Andreas Kunz (1990), however these were amended and extended. Subsequent programmatic implementation and support was provided by the company Data-Quest in Göttingen (<http://www.data-quest.de>). The project was funded by the GESIS-Leibniz Institute for the Social Sciences.

³ See GESIS website, Social Indicators Research Centre (ZSi): <http://www.gesis.org/en/social-indicators/products-of-the-zsi/>

Archive have been also acquired, archived and documented these historical studies. They are – together with the survey data – integrated with a study description into the central Data Inventory Catalog (Datenbestandskatalog, DBK)⁴ as central access to the data of the department Data Archive for the Social Sciences and can be researched at study level. In addition, there is a freely accessible research and download offer via the online database histat (www.gesis.org/histat/).

2. The collection of historical studies in the GESIS – Data Archive for the Social Sciences

The data of historical studies are characterized by a high degree of heterogeneity of the data material collected. The historical sources of these studies can be both text documents (e.g. church registers, court records, etc.) and official statistics or data from institutions such as the Deutsche Reichsbank.

This heterogeneity is reflected in the data inventory of the historical studies in the GESIS Data Archive. The data inventory comprises detailed studies with a strongly focused spatial and/or time-related reference as well as very comprehensive and wide-ranging spatial and time-related studies.

Studies with time series data make data accessible on the macro level. In these studies, data are compiled into groups at a higher spatial level (e.g. at municipality, state or Reich level). Furthermore, the developments of these summarized groups are reported over continuously and at the same intervals (monthly, annually) over a long period of time. “Time series data are [thus] a series of values of a variable that refers to consecutive points in time or periods of time.” (German definition: Gabler, <http://wirtschaftslexikon.gabler.de/Definition/zeitreihe.html>) Examples of such data include unemployment statistics or data on population development.

A significant part of the archived historical studies in the GESIS Data Archive are studies with time series data (ca. 80% of the historical studies). These data cover different topic areas, such as the economic development, the historical demography or the educational history of Germany. When answering their research questions, the primary researchers base their work on quantifiable indicators and avail of different statistical, official and unofficial sources when collecting data. Depending on the question, the time series of these studies refer to both the period of modern German history, from the 19th century, and also to the recent and contemporary history⁵ of Germany.

3. Data on the history of education in Germany

A large focus of the archived studies comes from the area of historical research on education. This compilation of studies comprises both individual studies, in which a research question is answered with the help of the analysis of especially collected data, and studies from the DFG Priority Program “Data Handbooks on Historical Education Research”. Each of the individual studies and each of the 11 published volumes of the DFG Priority Program is dedicated to a particular segment of the German

⁴ <https://dbk.gesis.org/dbksearch/>

⁵ Modern history covers the period from 1800 to the First World War. Recent history refers to the period after the First World War, from 1917. Contemporary history refers to periods for which there are still contemporary witnesses. The start of contemporary history can be placed after the Second World War and the beginning of the Federal Republic of Germany.

educational system and to a certain era within the last 200 years. The data inventory of these studies documents statistically the development of institutions, their use by pupils and students, the number of graduates, and the development of the teaching personnel. Moreover there is additional information about the population and in some cases about public revenue and education expenditure. This data inventory is described below, both in terms of its data structure and the context of its origin.

In the mid-1970s, in a work on social history and mobility research, Hartmut Kaelble (1975)⁶ addressed the subject of unequal opportunities in the educational sector as an aspect of social inequality. He concentrated on the development of academic education in the German Reich and in the Federal Republic of Germany from 1910 to 1960. He posed the question as to “whether economic growth in this phase of economic development in Germany could lead to changes in the distribution of educational opportunities or whether it was above all political decisions on educational policy that led to the dismantling of unequal opportunities in the academic educational sector.” (Kaelble, 1975, p. 121) With the help of published data from official statistics (Prussian statistics, university statistics, subject-matter series of the Federal Statistics Office) Kaelble describes the development of education in the academic area during the period from the late German Empire to the early years of the federal republic, in order to analyze by these means the efficiency of the educational policy of the different eras with regard to the distribution of opportunities in the educational sector. A short time later, a working group was formed, which examined the qualification crises in the educational sector. The term ‘qualification crises’ is attributed to the work by Detlef K. Müller⁷, who developed and analyzed this theory in his dissertation “Social Structure and the School System”. The starting point was the discussion conducted around 1880 among politicians and associations on overcrowding in the academic professions, universities and high schools. “Since the institutionalization of the modern school system at the beginning of the 19th century there is a discrepancy between the learning capacity of the individual and the usability of his qualification in society. Phases of general or specific mobility support [...] are followed by cycles of resistance and selection in the trough of ‘academic overproduction’. ... From the end of the 1870s, a surplus of graduates from high schools, colleges and universities, caused by different factors, leads to a radical limitation of school-related mobility opportunities. ... I call this process of an inflation in qualifications to be achieved in the educational system, which results from this surplus of supply, a qualification crisis.” (D.K. Müller, 1977, p. 26-28) In the context of the qualification crisis theory, a functional connection between the following lines of development is assumed: attendance or use of educational institutions, the discussion conducted within society about the use of the educational institutions, and political attempts at control. Above all the overcrowding situation or the switch to a lack of pupils, students and graduates in the educational institutions could be recorded empirically. As a multidimensional analytical model, questions arose from the qualification crises theory that stimulated the expansion of research to the long time period from 1800 to the present, as well as to all segments of the educational system. Thus the endeavor to conduct a precise statistical analysis of pupil and student flows, as well as the social-statistical classification of pupils and students stretched from the time of the German Empire to the present Federal Republic and the former German

⁶ Hartmut Kaelble (1975): Chancenungleichheit und akademische Ausbildung in Deutschland 1910-1960. In: Geschichte und Gesellschaft, 1975, S. 121-149.

⁷ Detlef K. Müller (1977): Sozialstruktur und Schulsystem. Aspekte zum Strukturwandel des Schulwesens im 19. Jahrhundert. Göttingen, Vandenhoeck & Ruprecht.

Democratic Republic. Peter Lundgreen provided a very good overview of the origins and the resulting research work in his paper “Historical educational research on a statistical basis”⁸.

The two most important centers of research on the qualification crises were located in Bochum (Detlef K. Müller) and Göttingen (H.G. Herrlitz, H. Titze, P. Lundgreen), each of which had clearly distinct empirical areas. While the area of higher and middle schools was addressed in Bochum, the universities formed the focus of interest in Göttingen. In each case the temporal starting point was the German Empire, to which the period up to 1945 was then added. The final phase was then the temporal expansion of the research to the present. It was also endeavored to collect regional statistics and thus to illustrate regional development processes. (cf. P. Lundgreen, 2006)

An important result of the DFG Priority Research Program are the 11 “Data Handbooks on German Educational History”, which provide a wide statistical basis for detailed analyses. The following published data handbooks are presented in histat for research and data download:

- ZA8142: Datenhandbuch zur deutschen Bildungsgeschichte: Das Hochschulstudium in Preußen und Deutschland 1820-1944.⁹

[Data Handbook on German Education History: College Studies in Prussia and Germany 1820 – 1944]

In the first volume of the data handbook the authors Titze, Herrlitz, Müller-Benedict and Nath dedicate themselves to university studies in Prussia and Germany. Data Handbook Volume I, Part 1 and Part 2, records attendance at colleges and universities statistically. With the help of the data gathered, the analysis of the so-called overcrowding crisis can be expanded from the school system to the training institutions of selected academic professional groups. Volume 1 comprises the historical student statistics in long time series, in which university attendance was documented at the level of the German state. The second volume contains the data on long-term university attendance at the level of the individual universities or colleges. The data of both studies have been integrated in the online database histat under a common title. In terms of time period, the student statistics refer to the German Empire, the Weimar Republic, the Third Reich and separately also to the individual state of Prussia. Special attention was given to the Prussian universities. The best primary statistical source material is available for universities in Prussia, in terms of the long-term nature of the data and the depth of their differentiation. Relatively complete time series, comparable in the long term, can be created for important feature complexes (e.g. the previous education and the social origin of the students) only in the case of the Prussian universities. In each data table, the students are divided according to regional origin, sex, field of study and university. In addition, the data of the students are separated into the

⁸ Peter Lundgreen (2006): Historische Bildungsforschung auf statistischer Grundlage. Datenhandbücher zur deutschen Bildungsgeschichte. In: Zeitschrift für Erziehungswissenschaft, 10. Jg., Beiheft 7/2006, S. 5-13.

⁹ Datafile: Titze, Hartmut; Herrlitz, Hans-Georg; Müller-Benedict, Volker; Nath, Axel (1996): Datenhandbuch zur deutschen Bildungsgeschichte: Das Hochschulstudium in Preußen und Deutschland 1820 - 1944. GESIS Datenarchiv, Köln. ZA8142 Datenfile Version 1.0.0, doi:10.4232/1.8142.

Publications: Titze, Hartmut; Herrlitz, Hans-Georg; Müller-Benedict, Volker; Nath, Axel (1987): Datenhandbuch zur deutschen Bildungsgeschichte. Band I: Hochschulen. Teil 1: Das Hochschulstudium in Preußen und Deutschland 1820 - 1944. Göttingen: Vandenhoeck & Ruprecht.

Titze, H. et.al. (1995): Datenhandbuch zur deutschen Bildungsgeschichte. Band I: Hochschulen. Teil 2: Wachstum und Differenzierung der deutschen Universitäten 1820 - 1944. Göttingen: Vandenhoeck & Ruprecht.

following sections:

- a) Occupation of the father.
 - b) Age of the students.
 - c) Previous education (i.e. form of entitlement to study: high school, grammar school, etc.).
 - d) Study support (the types of funding, such as stipends or deferred payments are presented according to the number of funded students and the overall financial value of the grant sums).
 - e) Semester attendance
 - f) Subjects (students according to the fields of study attended)
 - g) Change in faculty (students according to the frequency of subject or faculty change, and according to the direction of the change in faculty)
 - h) Population (the population level for each year is reported according to sex and age for both Prussia and for the German Empire)
- ZA 8240: Sozialgeschichte und Statistik des Schulsystems in den Staaten des Deutschen Reiches, 1800-1945. Höhere und mittlere Schulen.¹⁰
[Data Handbook on German Education History. Part I: Social History and Statistic of the School System in the States of the German 'Reich', 1800-1945.]
 - ZA 8478: Die Höheren Schulen für die männliche Bevölkerung im Staat Preußen und in den preußischen Provinzen 1832 – 1941.¹¹
[High Education for the male population in the state Prussia and in the Prussian Districts, 1832 to 1941]

The Data Handbook Volume II, Part 1 and Part 2, edited by D. Müller, B. Zymek and U. Herrmann, addresses the subject of higher and middle schools. Here, too, regional statistics were collected in order to illustrate regional development processes. The scope and the aim to include not only Prussia, but also the other states of the German Empire, in order to thus enable regional analyses, led to the division of Data Handbook Volume II into two parts (Part 1 and Part 2). The first part documents the development of the higher school system in the states of the German Empire from the time of the institutionalization of the modern educational system at the beginning of the 19th century to the end of the Second World War. The second part contains the basic and structural data of the higher schools for the male population in the state of Prussia and in the Prussian provinces. (cf. Lundgreen, 2006)

¹⁰ Datafile: Müller, Detlef K.; Zymek, Bernd (2006): *Datenhandbuch zur deutschen Bildungsgeschichte. Band II: Höhere und mittlere Schulen. Teil 1. Sozialgeschichte und Statistik des Schulsystems in den Staaten des Deutschen Reiches, 1800-1945. GESIS Datenarchiv, Köln. ZA8240 Datenfile Version 1.0.0, doi:10.4232/1.8240.* Publication: Müller, Detlef K.; Zymek, Bernd; Herrmann, Ulrich (1987): *Datenhandbuch zur deutschen Bildungsgeschichte. Band II: Höhere und mittlere Schulen. Teil 1: Sozialgeschichte und Statistik des Schulsystems in den Staaten des Deutschen Reiches 1800-1945.* Göttingen: Vandenhoeck & Ruprecht.

¹¹ Datafile: Müller, Detlef K.; Hermann, Ulrich G.; Zymek, Bernd (2011): *Die Höheren Schulen für die männliche Bevölkerung im Staat Preußen und in den preußischen Provinzen 1832 – 1941. GESIS Datenarchiv, Köln. ZA8478 Datenfile Version 1.0.0, doi:10.4232/1.10312.* Publication: Müller, Detlef K.; Hermann, Ulrich G.; Zymek, Bernd (2003): *Datenhandbuch zur Deutschen Bildungsgeschichte. Band II: Höhere und mittlere Schulen. Teil 2: Regionale Differenzierung und gesamtstaatliche Systembildung. S. 149-461: Die Höheren Schulen für die männliche Bevölkerung im Staat Preußen und in den preußischen Provinzen 1832 – 1941.* Göttingen: Vandenhoeck & Ruprecht.

In Volume II, Part 1 (ZA 8240), the number of schools in the German Empire as a whole is named. Then the individual types of school are specified in more detail. In total, the following statistical information is provided: number of schools according to school type, number of pupils according to school type, pupils according to denomination and grade level, number of pupils among the 10 to 18 year-old population according to grade level. Then statistical information is made available on those leaving and graduating from the higher schools, as well as an overview of the population development in the territorial units of the German Empire.

Volume II, Part 2 (ZA 8478) contains the basic and structural data of the higher schools for the male population in the state of Prussia and in the Prussian provinces. Nine tables are compiled for each catchment area, along a uniform structural principle, which serve both to document the basic data (absolute numbers) and to present the structural change of the higher schools (percentages): (1) system profile of the schools, i.e. percentage distribution of the school types; (2) system profile of the pupils, i.e. percentage distribution of the pupils among the school types; (3) denomination and domestic relationships; (4) class frequencies of the higher schools in total; (5) relative school attendance; (6) success rates of *Quartaners* (third-year high school pupils) in full-time high schools; (7) system profile of *Sextaners* (first-year high school pupils); (8) graduates of the full-status high schools. Examinations, age and denomination of the graduates and external candidates; (9) graduates of the full-status high schools, study and career aspirations.

- ZA8274: Akademische Karrieren in Preußen und Deutschland 1850-1945.¹²
[Academic Careers in Prussia and in Germany 1850 to 1945]

This Data Handbook, published by Müller-Benedict, highlights the career stages of selected academic professions in Prussia and Germany until 1945. The members of the examined academic professions are recorded statistically according to, among other things, inventory and age structure, as well as according to doctorates completed at universities. The focus of interest is on members of six professions from the mid-19th century to the mid-20th century: Protestant theologians, lawyers, doctors, higher-level teachers, engineers and chemists. The important stages during the course of the academic careers were documented. Therefore, in particular the duration of study, examination rates, doctorates, employment rates, etc. were collected in the framework of the project.

- ZA8570: Allgemein bildende Schulen in der Bundesrepublik Deutschland 1949 – 2010.¹³
[General secondary schools in the Federal Republic of Germany from 1949 to 2010]

¹² Datafile: Müller-Benedict, Volker (2008): *Akademische Karrieren in Preußen und Deutschland 1850 bis 1945*. *GESIS Datenarchiv, Köln. ZA8274 Datenfile Version 1.0.0, doi:10.4232/1.8274*.

Publication: Müller-Benedict, Volker, unter Mitarbeit von Jörg Janssen und Tobias Sander (2007): *Datenhandbuch zur Deutschen Bildungsgeschichte. Band VI: Akademische Karrieren in Preußen und Deutschland 1850-1945*. Göttingen: Vandenhoeck & Ruprecht.

¹³ Datafile: Köhler, Helmut; Lundgreen, Peter, (2014) *Allgemein bildende Schulen in der Bundesrepublik Deutschland 1949 – 2010*. *GESIS Datenarchiv, Köln. ZA8570 Datenfile Version 1.0.0, doi:10.4232/1.12378*.
Publication: Peter Lundgreen und Helmut Köhler, unter Mitarbeit von Thomas Rochow und Jürgen Schallmann

In many projects, the study timeframe was expanded from 1945 to the present. The Data Handbooks by Peter Lundgreen address different aspects of the German educational system during the period of the Federal Republic of Germany. In the Data Handbook on the general schools, the time series have three substantial areas of focus: (1) the institutions of the educational system are described (development of the school structure, extension of the schools); (2) school participation is presented (school attendance according to school type, school authorities and grade levels, pupils profiles (= percentage distribution) according to sex and nationality); (3) finally, information on graduates is presented (school-leavers according to type of qualification and school type).

- ZA8201: Berufliche Schulen und Hochschulen in der Bundesrepublik Deutschland 1949-2001 Teil I: Berufliche Schulen.¹⁴
[Vocational Schools and Universities in the Federal Republic of Germany 1949 to 2001: Part I: Vocational Schools in the Federal Republic of Germany (FRG) 1949-2001]
- ZA8202: Berufliche Schulen und Hochschulen in der Bundesrepublik Deutschland 1949-2001 Teil II: Hochschulen.¹⁵
[Vocational Schools and Universities in the Federal Republic of Germany 1949 to 2001: Part II: Universities in the Federal Republic of Germany 1949-2001]

In the Data Handbook on vocational schools and universities in the Federal Republic of Germany 1949-2001, Part 1 and Part 2, Peter Lundgreen et al acquired ca. 20,000 time series on vocational schools in Part 1 and on universities in Part 2 from information in the official statistics, which document in a very differentiated manner numerous variables with a wide spectrum of characteristics. Four substantial points of focus were recorded statistically: (1) institutions – a precise history of all type of vocational school and all types of university; (2) participation – pupils/students in these institutions (according to sex, nationality, age, relative school attendance, etc.); (3) qualification – pupils/students according to the professional/academic subject area of their education; (4) graduates – type of qualification and success rates of the pupils/students.

The data collection is rounded off with population data for the territory of the Federal Republic, which provides the age distribution of the population according to territory, nationality and sex.

(2014): Band VII: Allgemein bildende Schulen in der Bundesrepublik Deutschland 1949 – 2010. Göttingen: Vandenhoeck & Ruprecht.

¹⁴ Datafile: Lundgreen, Peter; Scheunemann, Jana (2008): *Berufliche Schulen in der Bundesrepublik Deutschland 1949-2001*. GESIS Datenarchiv, Köln. ZA8201 Datenfile Version 1.0.0, doi:10.4232/1.8201.
Publication: Lundgreen, Peter / Scheunemann, Jana (2008): Datenhandbuch zur Deutschen Bildungsgeschichte. Band VIII: Berufliche Schulen und Hochschulen in der Bundesrepublik Deutschland 1949-2001. Teil 1: Berufliche Schulen. Göttingen: Vandenhoeck & Ruprecht.

¹⁵ Datafile: Lundgreen, Peter; Schwibbe, Gudrun (2008): *Hochschulen in der Bundesrepublik Deutschland 1949-2001*. GESIS Datenarchiv, Köln. ZA8202 Datenfile Version 1.0.0, doi:10.4232/1.8202.
Publication: Lundgreen, Peter / Schwibbe, Gudrun (2008): Datenhandbuch zur Deutschen Bildungsgeschichte. Band VIII: Berufliche Schulen und Hochschulen in der Bundesrepublik Deutschland 1949-2001. Teil 2: Hochschulen. Göttingen: Vandenhoeck & Ruprecht.

- ZA8381: Schulen und Hochschulen in der Deutschen Demokratischen Republik, 1949 – 1989.¹⁶
[Schools and Universities in the German Democratic Republic, 1949 – 1989]

In Volume IX of the Data Handbook, Köhler and Rochow present the entire educational system of the German Democratic Republic statistically. For this purpose, the researchers accessed the previously unpublished data of the GDR educational statistics, some of which can only be found in archives. All of the compiled statistics begin first at the level of the GDR as a whole, followed by that of the individual states, and they then document the statistical development also at district level. The first section of the tables in the handbook concerns the general schools and the individual school types. Data on preschool education and nursery day care is presented in a second chapter. The third chapter is concerned with data on school and vocational education and training. Then, in the fourth section, the development of the colleges and universities is presented.

- ZA8380: Das Personal an den Hochschulen in der Bundesrepublik Deutschland 1953–2005.¹⁷
[The staff of the universities in the Federal Republic of Germany 1953-2005]

In Volume X of the Data Handbook, Lundgreen records the personnel in the universities of the Federal Republic of Germany (1953–2005). The personnel in the universities is described statistically in numerous time series. The basis for the data collection were official personnel statistics. Five large circumstances were processed here: (1) Personnel according to personnel groups – full-time scientific personnel, non-scientific personnel; (2) professors and research assistants according to subject group; (3) professors and research assistants according to age group; (4) number of newly-qualified lecturers annually; (5) research assistants according to their employment relationship and the type of funding.

- ZA8550: Die Lehrer an den Schulen in der Bundesrepublik Deutschland 1949–2009.¹⁸
[Teachers at Schools in the Federal Republic of Germany 1949 to 2009]

¹⁶ Datafile: Köhler, Helmut ; Rochow, Thomas (2014): *Schulen und Hochschulen in der Deutschen Demokratischen Republik, 1949 - 1989*. GESIS Datenarchiv, Köln. ZA8381 Datenfile Version 1.0.0, doi:10.4232/1.12139.

Publication: Köhler, Helmut / Rochow, Thomas (2013): *Datenhandbuch zur Deutschen Bildungsgeschichte. Band IX: Schulen und Hochschulen in der Deutschen Demokratischen Republik 1949–1989*. Göttingen: Vandenhoeck & Ruprecht.

¹⁷ Datafile: Lundgreen, Peter; Schwibbe, Gudrun; Schallmann, Jürgen (2010): *Das Personal an den Hochschulen in der Bundesrepublik Deutschland 1953–2005*. GESIS Datenarchiv, Köln. ZA8380 Datenfile Version 1.0.0, doi:10.4232/1.8380.

Publication: Lundgreen, Peter, unter Mitarbeit von Gudrun Schwibbe und Jürgen Schallmann (2009): *Datenhandbuch zur Deutschen Bildungsgeschichte. Band X: Das Personal an den Hochschulen in der Bundesrepublik Deutschland 1953–2005*. Göttingen: Vandenhoeck & Ruprecht.

¹⁸ Datafile: Lundgreen, Peter; Schallmann, Jürgen (2013): *Die Lehrer an den Schulen in der Bundesrepublik Deutschland 1949 bis 2009*. GESIS Datenarchiv, Köln. ZA8550 Datenfile Version 1.0.0, doi:10.4232/1.12379.

Publication: Lundgreen, Peter; Schallmann, Jürgen (2013): *Datenhandbuch zur Deutschen Bildungsgeschichte. Band XI: Die Lehrer an den Schulen in der Bundesrepublik Deutschland 1949–2009*. Göttingen: Vandenhoeck & Ruprecht.

In his publication, long series on the numbers of teachers in the schools of the Federal Republic of Germany are documented in 406 tables. In the process, statistics are shown both for the number of teachers and for upcoming teachers. The number of teachers is divided statistically according to (1) school type (in general and vocational schools, according to sex and federal state), (2) scope of employment (in general and vocational schools, according to school authority and school type, as well as sex), (3) teaching posts (in general and vocational schools; according to sex and federal state), (4) age and (5) entries to and departures from the teacher stock (reasons for the entries and departures according to sex).

For the statistical series on upcoming teachers, information was collected on (1) university course (2) qualification (according to sex and teaching post), (3) teaching practice and (4) school service. Finally, (5), information was gathered on unemployment (according to sex, teaching post, duration and age).

Another approach to the subject of education development comes from the field of quantitative historical economic research. A long tradition exists in recording and predicting the temporal course of economic growth as precisely as possible with the help of elaborate statistical methods. The aim is to work out the relative importance of the individual economic sectors of agriculture, industry and services in their overall context. Against this background, research on the relationship between education and economic growth should also be categorized here. The scientific controversy as to whether the educational level is a cause or a consequence of economic development provided the impulse for the comprehensive Data Handbook by Claude Diebolt:

- ZA8221: Die langfristige Entwicklung des Schulsystems in Deutschland im 19. und 20. Jahrhundert.¹⁹

[The long-termed development of the German school system in the 19th and 20th century]

In this Data Handbook, the primary researcher Claude Diebolt constructed more than 900 long time series from 1775 to 1989 on the development of the German educational system. It is a comprehensive compilation of the different levels of the educational system (preschools, community schools, higher schools and universities), the German economy (national income, education expenditure, wholesale and retail prices, costs of living) and the population, divided regionally according to German federal states. A key goal was to form continuous time series. However, complete statistics for the period of examination become ever rarer, the more they extend back into the time periods prior to the foundation of the German Empire, or where they reach time periods that are marked by upheavals and revolutions. The author closed gaps in the time series based on his own calculations. Furthermore, with this Data Handbook he has created a data basis that allows the empirical

¹⁹ Datafile : *Diebolt, Claude (2005): Die langfristige Entwicklung des Schulsystems in Deutschland im 19. und 20. Jahrhundert. GESIS Datenarchiv, Köln. ZA8221 Datenfile Version 1.0.0, doi:10.4232/1.8221.*

Publication : Diebolt, Claude (1997): L'évolution de longue période du système éducatif allemand: 19e et 20e siècles. Cahiers de l'ISMÉA. Économies et Sociétés. Série: Histoire quantitative de l'économie française. A.F. no. 23, 1997.

examination of the relationship between investments in the educational system and the formation of human capital.

Below, an excerpt from the data material recorded is listed, for example:

1) Degrees of literacy

- Proportion of illiterates among the recruits of the German Army as a percentage

2) Student and pupil numbers

- Number of students in universities in Prussia as a whole, according to university type and disciplines selected
- Number of male pupils in the higher educational institutions or secondary schools for boys in the Prussian provinces according to school type
- Number of pupils and students in Germany
- Number of students in the universities in Germany according to university type

3) Teachers

- Number of teachers in the middle schools and in the higher educational institutions.
- Number of teachers in the community schools in Prussia according to sex
- Number of teachers in Germany

4) Schools and universities

- Number of higher educational institutions, as well as community and middle schools in total and according to the individual provinces.
- Schools in Germany

5) Expenditure according to educational institution

- Expenditure for primary schooling and for higher educational institutions in Prussia
- Expenditure for universities in total and according to areas of spending in Prussia
- Operational expenditure per university in Prussia
- Public expenditure for education in total and for community school education, higher school education and university education in Prussia
- Public education expenditure in Germany

6) Economic parameters

- National income in Prussia in thousand marks
- Gross national product and national income in Germany in thousand marks
- Wholesale and retail prices indices in Germany
- Price index for the cost of living

7) Population

- Population of Prussia according to age group and province
- Total population according to age group and employed population in Germany

- ZA8174: Bildungsausgaben in Deutschland, Frankreich, Großbritannien, Spanien und Japan von 1815 bis 1989.²⁰

[Public Expenditure on Education in Germany, France, Great Britain, Spain and Japan, 1815 –

²⁰ Datafile: Diebolt, Claude (2003): *Bildungsausgaben in Deutschland, Frankreich, Großbritannien, Spanien und Japan von 1815 bis 1989*. GESIS Datenarchiv, Köln. ZA8174 Datenfile Version 1.0.0, doi:10.4232/1.8174. Publication: Diebolt, Claude (2000): „Die Erfassung der Bildungsinvestitionen im 19. und 20. Jahrhundert. Deutschland, Frankreich, Großbritannien und Spanien im Vergleich“. In: Zeitschrift für Erziehungswissenschaft, 3. Jahrg., Heft 4, (2000) S. 517-538.

1989]

The thematic focus of this study by Claude Diebolt is on public expenditure on education – in current and constant prices – in an international comparison between Germany, France, Spain and Great Britain from 1815 to 1989. For Spain, public education expenditure is divided additionally according to educational establishment and national income. With the objective of analyzing the connections between the development of the educational system and economic growth, a total of 40 statistical series are collected on the education spending in Germany France, Great Britain and Spain. The starting point is research work by neo-Schumpeterians, who examine the question as to whether growth weaknesses in the economies of western industrial societies are connected to the lack of technological innovation. Claude Diebolt takes up this idea and expands the studies with his comparative analysis of human capital expenditure for the area of education in different countries.

- ZA8178: Bildungsausgaben für Berlin 1829-1914)²¹
[Expenditures on Education in Berlin between 1829 and 1914]

In the framework of a study on the development of the German educational system, taking the example of Berlin, a total of 32 time series were collected by the primary researcher Claude Diebolt on public education expenditure for Berlin in the period 1829-1914. In addition, Diebolt collected data on population numbers, pupil numbers, and overall net spending. The education expenditure was divided into spending for primary and secondary schools. To calculate the public education expenditure in constant (i.e. inflation-adjusted) prices, Diebolt reverted to the index for wholesale prices and the price index for living costs, as education expenditure was composed to a great degree (ca. two-thirds) of wages.

- ZA8241: Das Bildungssystem der ehemaligen Deutschen Demokratischen Republik (DDR) von 1950 bis 1989.²²
[School System in figures. The Educational system of the former DDR from 1950 to 1989]

As early as 1998, Claude Diebolt compiled time series on the educational system of the former German Democratic Republic. He used the information from official statistics and produced a total of 43 time series on pupil numbers, teacher numbers and student numbers. Furthermore, the population is presented according to age group, while total public

²¹ Datafile : Diebolt, Claude (2004): *Bildungsausgaben für Berlin 1829-1914*. *GESIS Datenarchiv, Köln*. ZA8178 Datenfile Version 1.0.0, doi:10.4232/1.8178.

Publication : Diebolt, Claude: *Économies et Sociétés. L'Évolution de Longue Période du Système Éducatif Allemand XIX et XX Siècles*, Février-Mars 1997.

²² Datafile : Diebolt, Claude (2006): *Schule in Zahlen. Das Bildungssystem der ehemaligen Deutschen Demokratischen Republik (DDR), 1950 – 1989*. *GESIS Datenarchiv, Köln*. ZA8241 Datenfile Version 1.0.0, doi:10.4232/1.8241.

Publication : Diebolt, Claude : *L'Ecole En Chiffres. Le système éducatif de l'ancienne République Démocratique d'Allemagne, 1950-1989*. In: *Savoir. Education - Formation*, Jg. 10, No. 2/3/4. S. 148-165.

expenditure by the GDR as a whole and for education are also given.

The influence and controlling possibilities of politics in the area of science were analyzed by Pfetsch und Borscheid in the framework of the studies. Scientific policy influences two components, the training of young scientists and research. For the study timeframe a period was chosen in which the German Empire developed from being a somewhat underdeveloped country economically into a leading economic and scientific nation.

- ZA8051: Staatliche Finanzierung der Wissenschaft in Deutschland 1850 – 1975.²³
[Data Handbook on the Development of Science; Government funding of science in Germany from 1850 to 1975]

This “Data Handbook on Scientific Development” is connected with the study “Development of Scientific Policy in Germany”²⁴. In this study, F.R. Pfetsch published scientific statistical time series for the years 1850 to 1914. The key question was how the initially underdeveloped German Empire was able to ascend in the course of the 19th century to become a center of science and ultimately managed “to separate from the technological dominance of the leading industrial nation, England, and later exert its own influence on the development of that country?” (Pfetsch, 1974, p. 5). “State scientific policy is expressed in expenditure on science and technology. The order of preferences of political decisions is reflected in the structure of state spending.” (Pfetsch, 1974, p. 43) Scientific expenditure was defined as spending on universities, extramural research institutes and scientific projects. This expenditure was collected for the years from 1850 to 1914 from the budgets of the largest states and the Empire. The Data Handbook, published in 1985, documents a treatment and expansion of the historical scientific-statistical time series into the 1970s. The Data Handbook compiles an excerpt from the area of possible input indicators on scientific development:

“Data on the state funding of science in Germany were evaluated.

- Until the period of the Second World War, the activities of the Empire were determined in full, and those of the federal states in part, i.e. in relation to the five largest regional authorities.

- Until the period of the Second World War, scientific expenditure was recorded annually, thereafter [...] only in a five-year cycle.” (Pfetsch, F.R., 1985, p. 5) The study offers:

- 1) Selected structural tables on the development of state expenditure as a percent of the national income and the gross national product; scientific expenditure according to institutional and project funding; Overall scientific expenditure according to target areas.
- 2) Sum of scientific expenditure according to regional authority: regional authorities in the German Empire; regional authorities in the Federal Republic; scientific expenditure by the

²³ Datafile: Pfetsch, Frank R. (2010): *Datenhandbuch zur Wissenschaftsentwicklung; Staatliche Finanzierung der Wissenschaft in Deutschland 1850 – 1975*. GESIS Datenarchiv, Köln. ZA8051 Datenfile Version 2.0.0, doi:10.4232/1.10145.

Publication: Pfetsch, F.R. (1985): *Datenhandbuch zur Wissenschaftsentwicklung. Die staatliche Finanzierung der Wissenschaft in Deutschland 1850 - 1975*. 2. Aufl. Köln: Zentrum für historische Sozialforschung e.V.

²⁴ Pfetsch, F.R. (1974): *Zur Entwicklung der Wissenschaftspolitik in Deutschland 1750-1914*. Berlin: Duncker & Humblot.

regional authorities in relation to the gross national product, to the national income, to the population and to the budget.

3) Sum of all scientific expenditure according to subgroups: institutional areas; functional areas; discipline groups; scientific activities; scientific objectives; budget values in 1000 M/RM – national-international for the German Empire and for Prussia as well as for the Federal Republic.

- ZA8472: Entwicklung der Wissenschaftspolitik in Deutschland bis 1914. ²⁵
[The Development of Germany's science policy until 1914]

“Science, as a social system of thought and action, is embedded in a national, social and economic field of interest. ‘Scientific’ activity should be understood from the national and socioeconomic system of action. The field of activity within the triad economy-science-state is in turn influenced by environmental factors. ... Determining factors for the scientific and political-economic system of action are general economic, military, social, cultural and international conditions.” (Pfetsch, 1974, p. 16, 20) The author conducts a quantitative analysis of scientific funding by the state administration and expands his analytical concept with an action-analytical examination by collecting data on the foundation of the first significant extramural scientific institution of the Empire. Furthermore, the economic sector is of particular interest, so that the connection between scientific and economic development is analyzed separately by Pfetsch. At the core is the question regarding the type and extent of the economic applicability of scientific results. The expression and instrument of a scientific policy includes institutions that serve the promotion of scientific aspirations. Therefore, the development of scientific societies will be analyzed. The following data is collected for the German Empire and the five largest states of Prussia, Bavaria, Saxony, Württemberg and Baden from 1850 to 1914:

- 1) On state scientific funding, on scientific and economic growth (indicators of economic development levels; academic personnel in the chemical industry and compared to total employed; frequency of basic innovations; timespans between the average occurrence of inventions and the time of commercialization; proportion of production-related scientific funding in relation to the budget and to the gross national product)
- 2) On scientific organizations (scientific organizations in Germany according to status and period; scientific organizations founded between 1750 and 1914; etc.)
- 3) On the Gesellschaft Deutscher Naturforscher und Ärzte (Association of German Natural Scientists and Doctors) (development of the sections; membership development; German natural scientific and medical specialist societies)

²⁵ Datafile: Pfetsch, Frank R. (2011): *Entwicklung der Wissenschaftspolitik in Deutschland bis 1914*. GESIS Datenarchiv, Köln. ZA8472 Datenfile Version 1.0.0, doi:10.4232/1.10410.

Publication: Pfetsch, F.R. (1974): *Zur Entwicklung der Wissenschaftspolitik in Deutschland 1750 – 1914*. Berlin: Duncker & Humblot.

- ZA8444: Naturwissenschaft, Staat und Industrie in Baden 1848 - 1914.²⁶
[Natural sciences, state and industry in Baden, 1848 to 1914]

The study by Peter Borscheid can be categorized in the area of the analysis of the historical development process of state scientific policy. Here, too, answers are provided to the question as to why Germany, at first economically backward, was able to take a leading role in the field of science and science-dependent industry over the course of the 19th century. The interrelation between economy, society, technology and science forms the focus of this work. Particular reference is made to the close bonds between the scientific and economic development as a consequence of external scientific control. The region examined is the Grand Duchy of Baden in period from 1848 to 1914. Some of the data collected in the course of this study include: development of state expenditure on education in Baden; new matriculation of chemists and percentage proportion of total new matriculations; share of extraordinary spending on natural scientists in relation to the overall expenditure of the University of Heidelberg; ratio of chemists to worker at BASF; comparison: employees in the chemical industry and chemists employed in industry in Germany; average wages at BASF according to profession; extraordinary expenditure on chemistry and physics at the universities of Freiburg, Heidelberg and TH Karlsruhe; percentage proportion of extraordinary expenditure on chemistry and physics in relation to the overall university budget of Baden.

- ZA8190: Bildungsentwicklung im internationalen Vergleich, 1800 bis 1975.²⁷
[Educational development in international comparison, 1800 to 1975]

In the projects “Quantitative analysis of modernization” and “Historical indicators of western European democracies”, Peter Flora collected data to describe the modernization process in a comparison of countries. One indicator of modernization is the expansion of education. The period from 1815 to 1975 was covered. Data was collected for the following countries: Belgium, Denmark, Finland, France, Germany and within its respective borders (= Prussia, German Empire, Federal Republic of Germany), Austria, Ireland, Italy, The Netherlands, Norway, Sweden, Switzerland, England and Wales, Scotland, the United States, Russia, Japan. The data part of the project, which refers to education, is the subject of this compilation. Information is given primarily on the number of pupils in primary schools, secondary schools and universities. The data refer only to general school education. In order to make the absolute numbers of the different countries comparable with each other, the ‘enrolment rates’ or the relative school/university attendance of an age group was given. The content was supplemented by time series on the total populations in the countries and information

²⁶ Datafile: *Borscheid, Peter (2011): Naturwissenschaft, Staat und Industrie in Baden 1848 - 1914.. GESIS Datenarchiv, Köln. ZA8444 Datenfile Version 1.0.0, doi:10.4232/1.10304.*

Publication: Borscheid, P. (1976): *Naturwissenschaft, Staat und Industrie in Baden 1848 – 1914.* Stuttgart: Ernst Klett Verlag.

²⁷ Datafile: *Flora, Peter (2007): Bildungsentwicklung im internationalen Vergleich. GESIS Datenarchiv, Köln. ZA8190 Datenfile Version 1.0.0, doi:10.4232/1.8190.*

Publication: Flora, Peter (1975): *Bildungsentwicklung im internationalen Vergleich, 1800 bis 1975.* Aus: Peter Flora: *Indikatoren der Modernisierung.* Ein historisches Datenhandbuch. Opladen: Westdeutscher Verlag.

on literacy levels. Due to the very broad thematic nature of the project, the educational data do not exist in a detailed, structured version, so that for example pupils, teachers and schools are not divided according to individual school types. For the sake of comparability, no detailed structure was chosen when collecting the data for these 17 countries.

As well as the large projects, individual studies should also be mentioned, which have collected valuable data on the German educational and economic system and which supplement the GESIS data inventory in histat.

- ZA8544: Die Entwicklung des Lehrkörpers der deutschen Universitäten und Hochschulen 1864 – 1953.²⁸
[Development of universities teaching staff on German Universities and Colleges, 1864 to 1953]

This study by Ch. von Ferber concerns a statistical examination of the professional conditions of German university lecturers. The development of teaching personnel according to subject and university are collected using the personnel files of the universities. "The core of the study is the representation of the development of the university sciences and their staffing problems from the mid-19th century to the First World War. [...] It is dedicated in the first instance to the problems of faculty structures, which characterize university development between 1864 and 1910." (Ferber, Christian von, 1956, p. 23, p. 31) The focus of the statistical collection of material is on the faculties of the universities and colleges, divided according to subject areas (1864 - 1938). As well as the division of the material according to "subject areas", the faculty is also divided into 45 individual subjects. A separate table leads the period of study into the 1950s in the Federal Republic of Germany (with the sample years 1931, 1938, 1949 and 1953 and the territorial distinction 'West Germany', 'Central Germany' and 'eastern regions').

- ZA8175: Die Expansion der Universitäten 1870 – 1985. Ein internationaler Vergleich.²⁹
[The Expansion of the Universities between 1870 and 1985. An international Comparison]

The expansion of the universities between 1870 and 1990 I analyzed for five countries: Germany, Italy, France, USA and Japan. In the last hundred years these countries have led the process of industrialization and modernization and demonstrate a greatly expanding university system during this period. Two hypotheses that explain this growth are tested: the human capital theory and the theory of individual status competition. The analysis is concentrated on the interaction between the educational system and the economic system,

²⁸ Datafile: Ferber, Christian von (2013): *Die Entwicklung des Lehrkörpers der deutschen Universitäten und Hochschulen 1864 bis 1953*. GESIS Datenarchiv, Köln. ZA8544 Datenfile Version 1.0.0, doi:10.4232/1.11730. Publication: Ferber, Christian von (1956): *Die Entwicklung des Lehrkörpers der deutschen Universitäten und Hochschulen 1864 – 1954*. Göttingen: Vandenhoeck & Ruprecht.

²⁹ Datafile: Windolf, Paul (2004): *Die Expansion der Universitäten 1870 – 1985. Ein internationaler Vergleich*. GESIS Datenarchiv, Köln. ZA8175 Datenfile Version 1.0.0, doi:10.4232/1.8175. Publication: Windolf, P. (1997): *Expansion and Structural Change. Higher Education in Germany, the United States, and Japan, 1870 – 1990*. Boulder: Westview Press.

especially during an economic crisis. The data present in the histat database refer to the enrolment rates in the group of 20-24 year olds, as well as the number of diplomas after a regular study period of four years in the USA, Germany, Italy, France and Japan.

- ZA8484: ifo Datenbank Preußische Wirtschaftsgeschichte.³⁰
[The ifo Prussian Economic History Database (iPEHD)]

The ifo database on Prussian economic history contains a comprehensive summary of variables at district level in Prussia for the nineteenth century. These data come from the printed publications of the Royal Statistical Office of Prussia. They are the data of numerous censuses that were conducted in the period from 1816 to 1901. These data provide a unique information source for micro-regional empirical research into economic history, in order to analyze the significance of education, religion, fertility and many other influencing factors on the economic development of Prussia in the 19th century.

Data have been collected on the topics of agriculture, education, industry, employment, population, religion and wages for the period from 1816 to 1901. The data originate from censuses, so they are not continuous time series. In order to have comparable data for an analysis at regional level, the scientists kept the administrative borders of the districts stable over the time period.

The “Data Service Historical Studies” team also compiles additional, thematically specialized data compilations as so-called “added value”, in order to close targeted gaps in the statistical content of the archived studies. To date, such histat data compilations have been assembled only at the level of the German Empire or at the level of the federal German state.

- ZA8220: Bildung in Deutschland: Bildungsstatistische Zeitreihen von 1960 bis 2000 zur Schüler- und Studentenzahl, zum Lehrpersonal und zu den Bildungsausgaben.³¹
[Education in Germany: Education-statistical time series from 1960 to 2000 on number of pupils and students, on teaching staff and on educational expenditures, 1960–2000]

The objective of this data collection is to make long series available on individual partial areas of the German educational system. For this purpose, data was collected on selected variables, mainly from the areas of primary and secondary schooling, professional training, the university system, and selected economic figures. The official education statistics of the Federal Statistics Office serves here as the main source, as data are available over a long period of time thanks to continuous data collection and regular reporting. Federal education statistics were established only in the 1950s, so that the data series refer primarily to the period from 1960 to 2000. The data compilations present time series on the areas of general schools (schools, classes, pupils and teachers), universities (universities, students, lecturers, figures), professional training (vocational schools, pupils, classes, teachers), the funding of

³⁰ Datafile: *Woessmann, Ludger; Becker, Sascha O. (2014): Die ifo Datenbank Preußische Wirtschaftsgeschichte (iPEHD). GESIS Datenarchiv, Köln. ZA8484 Datenfile Version 1.0.0, doi:10.4232/1.12140.*

³¹ Datafile: *Franzmann, Gabriele (2006): Bildungsentwicklung in Deutschland: Allgemeinbildende Schulen 1960 bis 2000. GESIS Datenarchiv, Köln. ZA8220 Datenfile Version 1.0.0, doi:10.4232/1.8220.*
Data compilation assembled by Gabriele Franzmann, 2006. Online publication at <http://www.gesis.org/histat/>.

pupils and students, expenditure on education, population according to nationality and age group. The time series data refer to the territory of Federal Republic of Germany in its respective borders.

- ZA8266: Berufsausbildung und Studium in der ehemaligen Deutschen Demokratischen Republik (DDR) von 1960 bis 1989. Ein Überblick anhand der amtlichen DDR-Statistik.³² [Vocational education and studies in the former German Democratic Republic (DDR). An overview by means of the official Statistic of the DDR]

This data compilation connects to the ZA Study ZA8241, “The educational system of the Former German Democratic Republic (GDR) from 1950 to 1989” by Claude Diebolt. In his study, Diebolt compiled long series on selected indicators of the GDR educational system. This compilation is dedicated to the system of professional training and university education in the GDR and presents these areas from the perspective of the GDR statistics. The data in this study refer to the level of the GDR state, in contrast to the study by Köhler and Rochow: “Schools and universities in the German Democratic Republic, 1949 – 1989” (published 2008), which reports on individual states and in some cases at district level.

The relationship between demographic development and educational development has often been the subject of scientific analysis. Education can be determined by population development if one can assume that persons with a higher level of education have fewer children. How does a change in population growth affect the average educational level of a population? What influence do ethnic composition, age composition and changed birth rates have on the educational level of a population? The online research and download system histat offers studies with time series data on different subjects, in order to provide the user with the possibility to research, download and analyze data for his own individual question. In the context of education, the subject of population should be mentioned here, since the areas of education, economy and population influence each other mutually. On the topic of population, histat offers a total of 35 studies with 29,656 time series in all. A complete overview of these studies is not given here, but instead only selected studies shall be presented, whose time series can be analyzed together with series on education statistics, as long as the geographic area to which the time series refer correspond.

- ZA8295: Grunddaten der Bevölkerungsstatistik Deutschlands von 1871 bis 1939.³³ [Germanies population: Basis data from 1871 to 1939]

The objective of this data collection by Christoph Besser is to prepare systematically and comment on the basic data of the population statistics – especially the population level and

³² Datafile: Franzmann, Gabriele (2006): *Berufsausbildung und Studium in der ehemaligen Deutschen Demokratischen Republik (DDR) von 1960 bis 1989. Ein Überblick anhand der amtlichen DDR-Statistik.* GESIS Datenarchiv, Köln. ZA8266 Datenfile Version 1.0.0, doi:10.4232/1.8266. Data compilation assembled by Gabriele Franzmann, 2006. Online publication at <http://www.gesis.org/histat/>.

³³ Datafile: Besser, Christoph (2008): *Grunddaten der Bevölkerungsstatistik Deutschlands von 1871 bis 1939.* GESIS Datenarchiv, Köln. ZA8295 Datenfile Version 1.0.0, doi:10.4232/1.8295. Data compilation assembled by Christoph Besser, 2008. Online publication at <http://www.gesis.org/histat/>.

population movements – for the German Empire, the states of the German Empire and the Prussian provinces within each of their respective borders from 1871 to 1939, in 5,200 time series. The data collection is based on official published data of the Royal Statistical Office or the Imperial Statistical Office. The data on mean population according to state, province and administrative district are of particular interest.

- ZA8270: Bevölkerungswellen und Wechsellagen im Deutschen Reich von 1871 bis 1910.³⁴
[Population development and economic cycles in the German 'Reich' from 1871 to 1910]

In his study, August Lössch examines the connections and interrelations between population waves and economic fluctuation. He addresses the question as to what extent changes in the population development can affect economic development and vice versa: to what extent does economic development influence population development. In principle he assumes that time of great adversity, such as wars or epidemics, have a negative influence on birth rates, at the end of which, however, a rise in births can be established. In industrialized societies, population growth can serve as an impulse or stimulation for economic growth. For his analyses, the author collected population series according to age, sex and marital status. Series were also compiled on the population that was willing and able to work.

- ZA8276: Quellen zur Bevölkerungsstatistik Deutschlands 1815-1875.³⁵
[Sources of Germany's Population Statistics 1815-1875]

With 1,290 time series, the work of Antje Kraus represents a material collection on the population, on population movements and on the population structure according to age group (under 14 / 15 years, over 14 / 15 to under 60 years, 60 years and older) and sex. The study is divided into the individual member states of the German Federation on the territory of the future German Empire, the Prussian provinces and the German Empire as a whole. The values for the variables inhabitants, marriages, births, deaths not including stillbirths, and deaths are contained in the A tables. The inhabitant numbers according to the sex and age categories of the inhabitants are in the B tables. The A and B tables contain both absolute and relative numbers.

³⁴ Datafile: Lössch, August (2007): *Bevölkerungswellen und Wechsellagen im Deutschen Reich von 1871 bis 1910*. *GESIS Datenarchiv, Köln*. ZA8270 Datenfile Version 1.0.0, doi:10.4232/1.8270.

Publication: Lössch, August (1936): *Bevölkerungswellen und Wechsellagen*. Beiträge zur Erforschung der wirtschaftlichen Wechsellagen Aufschwung, Krise, Stockung (Hrsg. von Arthur Spiethoff), Heft 13. Jena: Verlag von Gustav Fischer.

³⁵ Datafile: Kraus, Antje (2007): *Quellen zur Bevölkerungsstatistik Deutschlands 1815-1875*. *GESIS Datenarchiv, Köln*. ZA8276 Datenfile Version 1.0.0, doi:10.4232/1.8276.

Publication: Kraus, Antje (1980): *Quellen zur Bevölkerungsstatistik Deutschlands 1815-1875*, Band I; in: *Quellen zur Bevölkerungs-, Sozial- und Wirtschaftsstatistik Deutschlands 1815-1875*, herausgegeben von Wolfgang Köllmann, Boppard am Rhein.

- ZA8171: histat-Datenkompilation online: Geschichte der deutschen Bevölkerung seit 1815³⁶
[History of the German Population since 1815. Datacompilation on the basis of published Studies using official Statistics and Sources.]

The comprehensive data compilation by Jürgen Sensch comprises 740 time series, in which time series were compiled for the following areas:

- A. Population level and population structure
 - A.1 Population size and population growth
 - A.2 Population development in international comparison
 - A.3 Breakdown of the population according to age groups
 - A.4 Breakdown of the population according to sex
 - A.5 Breakdown of the population according to parish size
 - A.6 Breakdown of the population according to social features (marital status, denomination)
 - A.7 Breakdown of the population according to states/regions, or states of the FRG, GDR
- B. Population movements
 - B.1 Statistics on marriages and divorces
 - B.2 Birth and fertility statistics (natality and fertility)
 - B.3 Statistics on deaths, including infant mortality (general mortality)
- C. Migration statistics
- D. Household size and family structure

- ZA8200: histat-Datenkompilation online: Bevölkerungsstand, Bevölkerungsbewegung, Haushalte und Familien in der Bundesrepublik Deutschland 1947 bis 1999³⁷
[Population, Population movement, Households and Families in the Federal Republic of Germany 1947 to 1999]

With this study the author continues on from the population study for the German Empire and adds the data for the Federal Republic of Germany from 1947 to 1999. Statistics are compiled in 1,920 time series on:

- A. Level and development of the population;
- B. Natural population movements;
- C. Private households;
- D. Families;
- E. Women at the age of 15 years and older: marital status, number of children.

³⁶ Datafile: Sensch, Jürgen (2007): *Geschichte der deutschen Bevölkerung seit 1815. Datenkompilation auf der Basis von publizierten Textsammlungen und Untersuchungen, die sich auf amtliches statistisches Quellenmaterial stützen. GESIS Datenarchiv, Köln. ZA8171 Datenfile Version 1.0.0, doi:10.4232/1.8171.* Datacompilation assembled by Jürgen Sensch, 2007. Online-Publication in <http://www.gesis.org/histat/>.

³⁷ Datafile: Sensch, Jürgen (2008): *Bevölkerungsstand, Bevölkerungsbewegung, Haushalte und Familien in der Bundesrepublik Deutschland 1947 bis 1999. GESIS Datenarchiv, Köln. ZA8200 Datenfile Version 1.0.0, doi:10.4232/1.8200.*

Publication: Sensch, Jürgen: histat-Datenkompilation online: Bevölkerungsstand, Bevölkerungsbewegung, Haushalte und Familien in der Bundesrepublik Deutschland 1947 bis 1999. Online-Publication. <http://www.gesis.org/histat/>.

- ZA8146: Religionszugehörigkeit in Westdeutschland von 1939 bis 1987³⁸
[Religious Affiliation in Western Germany 1939-1987]

In the study, Christoph Wolf compiled information on the religious affiliation of the population of the (old) Federal Republic of Germany and its 11 federal states, including Berlin (West). The initial data comes from the population censuses of the years 1939 to 1987. Two levels of aggregation are considered: information on the distribution of religious affiliation for the Federal Republic (West) as a whole and information on the distribution of religious affiliation in the 11 (old) federal states. The data come from the population censuses of the years 1939, 1950, 1961, 1970 and 1987.

- ZA8599: Religionszugehörigkeit in Deutschland 1871 – 2012³⁹
[Religious Affiliation in Germany 1871-2012]

This data collection on religious affiliation in Germany summarizes the information from the population censuses of the prewar (1871 to 1933) and post-war (1950 – 2011) periods, as well as the census of 2011. The information on the two denominations (Protestant, Roman Catholic) and “other denominations” (including “no religious affiliation”) are divided by federal state. It must be stated in limitation of the comparison of the cross section that the 2011 census does not provide any reliable information on the religious minorities in Germany. Members of these religions (Islam, Hinduism, Buddhism) may have availed disproportionately of the opportunity to ignore the question of religious affiliation.

- ZA8617: Histat-Datenkompilation: Bevölkerung nach Alter in Jahren und nach Geschlecht für das Deutsche Reich, die frühere Bundesrepublik und Deutschland, 1871-2010.⁴⁰
[Histat-Data Compilation: Population by Age in years and by gender for the German Reich, the former Federal Republic of Germany and for Germany (after 3rd October 1990), 1871-2010]

Age is a natural structural feature of the population. The age structure is of decisive importance when assessing the potential of a population in different social areas such as work, economic development, and the need for special institutions in the education and

³⁸ Datafile: *Wolf, Christof (1999): Religionszugehörigkeit in Westdeutschland 1939-1987. GESIS Datenarchiv, Köln. ZA8146 Datenfile Version 1.0.0, doi:10.4232/1.8146*

Publication: Wolf, C., 1999: Religiöse Pluralisierung in der Bundesrepublik Deutschland. In: Jürgen Friedrichs und Wolfgang Jagodzinski (Hg.): Soziale Integration. Opladen: Westdeutscher Verlag, S. 320-349. Wolf, C., 2000: Religionszugehörigkeit im früheren Bundesgebiet 1939 bis 1987. In: *Wirtschaft und Statistik*, 3/2000, S. 201-207.

³⁹ Datafile: *Sensch, Jürgen (2015): histat-Datenkompilation: Religionszugehörigkeit in Deutschland 1871-2012. GESIS Datenarchiv, Köln. ZA8599 Datenfile Version 1.0.0, doi:10.4232/1.12309. Online-Publication. <http://www.gesis.org/histat/>.*

⁴⁰ Franzmann, Gabriele (2015): Histat-Datenkompilation: Bevölkerung nach Alter in Jahren und nach Geschlecht für das Deutsche Reich, die frühere Bundesrepublik und Deutschland, 1871-2010. GESIS Datenarchiv, Köln. ZA8617 Datenfile Version 1.0.0, doi:10.4232/1.12313. Datacompilation assembled by Gabriele Franzmann, 2015. Online-Publication in <http://www.gesis.org/histat/>.

health sectors. Furthermore, the age structure can influence the emergence and implementation of technical progress. This data collection compiled the population of the German Empire, the earlier Federal Republic of Germany and reunited Germany according to sex and age in years, as well as age in 5-year groups. The numerous historical border shifts in Germany presents the problem as to what the age structure of the population of the Federal Republic prior to its foundation – the period of the German Empire – should be compared with, as there were also a number of changes to borders during the German Empire. Therefore, the territories to which the time series refer have been extended artificially into the past for the earlier Federal Republic of Germany (old states and West Berlin) and for Germany after 3 October 1990 (old and new states):

- For the territory of the earlier Federal Republic, the population was calculated back according to sex and age to 1871, in the period of the German Empire, allowing a theoretical comparison over the time period for a geographically constant territory.
- A similar method was used for the territory of German within the border after 3 October 1990. The series of the age composition go back to 1950 here.
- In contrast, the information on the age structure of the population in the Germany Empire refer to the actual borders of the German Empire in each case.

The studies with time series data presented here provide an insight into collective education and population processes. Historical developments and their causes, and the mutual dependence of structures can be analyzed at the macro level with these data. Thus long series on education participation in Germany from 1800 can be used as an indicator for the degree of modernization of a society (W. Zapf), or they can serve to describe education periods, with their phases of growth and stagnation (A. Nath, H. Titze, R. Metz⁴¹). Time series continue to provide the possibility to “categorize the present comparatively in the course of historical development” and to “explain historical developments by attempting to identify influencing factors and patterns of interaction between different development processes”. (R. Metz, 2012, p. 32⁴²) Examples of this include studies on the connection between demographic development and education processes⁴³ or on the relationship

⁴¹ Nath, Axel (2001): Perioden des modernen Bildungswachstums. In: Apel, H.J./ Kemnitz, H./ Sandfuchs, U.(Hrsg.): Das öffentliche Bildungswesen. Historische Entwicklung, gesellschaftliche Funktionen, pädagogischer Streit. Bad Heilbrunn, S. 14-48.

Nath, Axel (2003): Bildungswachstum und äußere Schulreform im 19. Und 20. Jahrhundert. In: Zeitschrift für Pädagogik 49, 1, S. 8-25.

Titze, Hartmut (2004): Bildungskrisen und sozialer Wandel 1780-2000. In: Geschichte und Gesellschaft, Bd. 30, H. 2, S. 339-372.

Metz, Rainer (2006): ‘Lange Wellen’ im deutschen Bildungswachstum? In: Zeitschrift für Erziehungswissenschaft, 10. Jahrg., Beiheft 7/2006, S. 15-51.

⁴² Rahlf, Th.; Metz, R.; Sensch, J.; Franzmann, G.; Suchi, S.; Noack, A.; Witali, M. (2012): histat – Zeitreihen zur Historischen Statistik von Deutschland online. GESIS – Technical Reports 2012|09.

http://www.gesis.org/histat/docs/TechnicalReport_2012-09.pdf oder

<http://www.ssoar.info/ssoar/handle/document/32599>.

⁴³ Becker, S.O.; Cinnirella, Francesco; Woessmann, Ludger (2012): The effect of investment in children’s education on fertility in 1816 Prussia. In: *Cliometrica* (2012) 6, S. 29-44. DOI 10.1007/s11698-011-0061-8.

Becker, S.O.; Cinnirella, Francesco; Woessmann, Ludger (2013): Does women's education affect fertility? Evidence from pre-demographic transition Prussia. In: *European Review of Economic History* (2013) 17 (1): 24-44. doi: 10.1093/ereh/hes017

between education and economic growth.⁴⁴ Yet time series data cannot help us to address questions posed at the level of individual behavior and individual attitudes, since the information content contained there is located at the macro level. Questions on the attitudes, behavior and decisions of individuals in their respective social context can be addressed only with individual data. One example of a question located at the individual level is a study by Lundgreen, in which he analyzes the individual educational and mobility opportunities of the population in one city.⁴⁵

4. Access to the data via the online database histat

4.1 The data structure in in histat

The database system histat was developed in 2004 at GESIS, in the department “Data Service for Historical Studies”. The aim is to make time series from historical economic and social research accessible via histat, whereby access should be as easy as possible. At the same time it is important that the presentation of the studies and data complies with scientific standards. Histat was conceived as a hierarchical, study-centered system. That means that access to the time series data is possible only via the prior selection of a study. This ensures that the data section is always accessed in connection with the name of the primary researchers and his publication.

⁴⁴ Demeulemeester, Jean-Luc; Diebolt, Claude (2011): Education and growth: what links for which policy. In: *Historical Social Research* 36, 4, pp. 323-346. URN: <http://nbn-resolving.de/urn:nbn:de:0168-ssoar-363142>.
Diebolt, Claude; Litago, Javier (1997): Education and economic growth in Germany before the Second World War: an econometric analysis of dynamic relations. In: *Historical Social Research* 22, 2, pp. 132-149. URN: <http://nbn-resolving.de/urn:nbn:de:0168-ssoar-32044>

⁴⁵ Lundgreen, P.; Kraul, M.; Ditt, K. (1988): *Bildungschancen und soziale Mobilität in der städtischen Gesellschaft des 19. Jahrhunderts*. Göttingen: Vandenhoeck & Ruprecht.

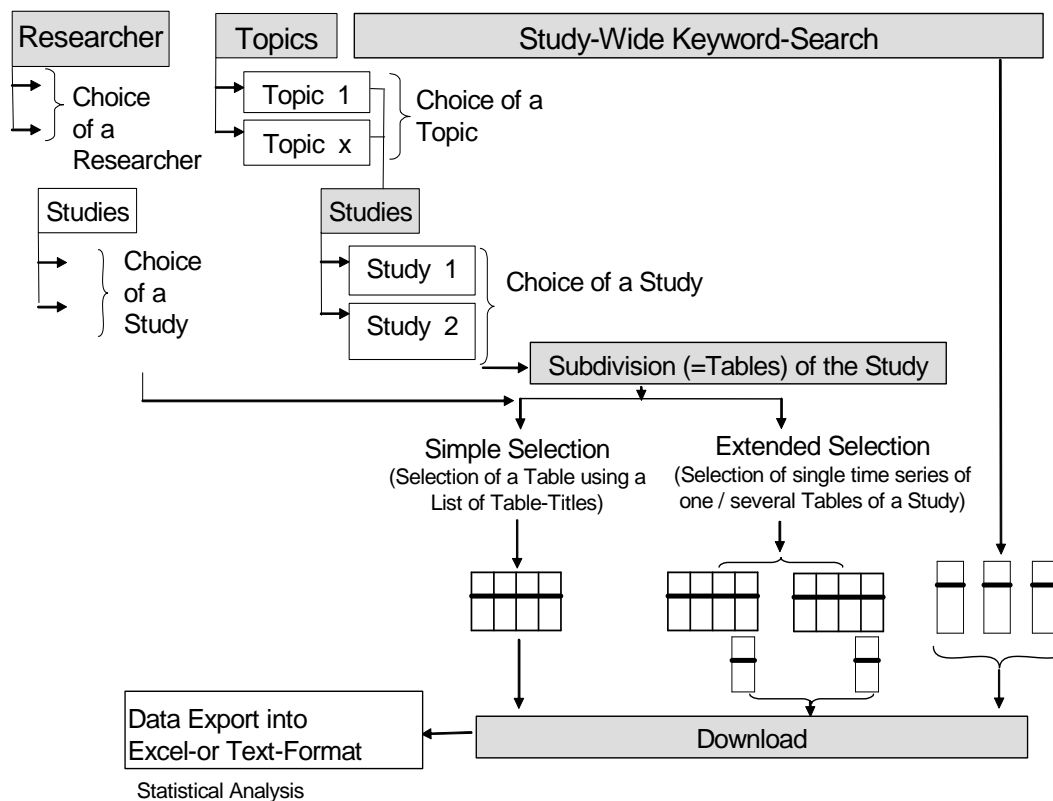


Figure 1: Diagram of the hierarchical structure of the research and download system histat

The objective of the description and preparation of a study for histat is to make available the background of the origin of the study and the context information about the data series of the study. The studies are presented in histat according to a uniform study description scheme and with a uniform structure of data tables.

The key question of the study and the subdivision of the study data are presented in a detailed study description. A detailed annotation of the entire study, containing notes on the methodology of data collection or estimation used, follows the content description. This the study description has the following categories: title of the study, name of the primary researcher, content or key question of the study, subdivision of the data part or list of data tables, period of examination, area of examination, notes on methodology and data, and sources used. In addition, further documents on this study are made available to download as a PDF document. These usually contain a very long annotation and more detailed lists of sources.

Finally, the data set itself must be annotated so that the significance of the data is clear. As well as the unambiguous naming of the time series, annotations are necessary for every single time series and in some cases for individual values. During the preparation of the data section, the time series of a study are imported into histat tables. The tables are structured according to a uniform scheme, so that all of the information necessary for secondary analysis can be attributed to the time series.

A data table in histat consists of two areas, the data area, into which the time series values are entered, and the labelling area, consisting of a table header and pre-column (first column on the left-hand edge of the table), in which the data are described. The labelling area should include both the

title of the table, with information on the content and a spatial and temporal reference. Furthermore, specific names of features are listed, under which a fact or characteristic is described (e.g. federal state / sex). In addition, the table header contains the name of the forms of division (e.g. federal state: Bavaria / sex: male, female). Finally, the source notes and annotations on each time series and the table number are entered into the table header. The uniform structure of a data table in histat therefore looks as in the following illustration:

The diagram shows a table with the following structure:

- Pre-Column:** (Definition of characteristics)
- Table-Title:** Table Title, Table-Nr. and Table-Title (eg: A.03 Population in Germany by federal states and sex (1950-1980))
- Table-Head:** (Definition of individual time series)
 - Specification of characteristic (eg: federal state)
 - Specification of characteristic (eg: gender)
 - Measurement unit
 - Sources
 - Annotations
 - Table
- Data Rows:** Time (eg: Year; Interval) with Value columns.

Figure 2: Labelling area of a data table in histat

4.2 Access to the data – research options in histat

Time series data can be researched in four different ways:

1) Research by subject:

At the beginning of the data import, an individual study is allocated to a certain higher-level topic. The current list of topics is available to the user under the menu point “Topics”. Currently available individual studies are listed under each topic, with the respective study title and the name of the primary researcher. For each study within a topic area, the user has two display options: the option “Description” (blue button) opens up a text view with the study description (including detailed source notes and annotations, as well as a downloadable PDF document). The orange button showing the number of time series and tables leads to the subdivisions (i.e. to the data tables) of a study. Here the user can select complete data tables for this study or individual time series from the

different data tables of the study. The selection made is first shown as a result. From here the selection can be saved on the local PC as an Excel or text file (csv). This enables the direct use of researchable time series for secondary analysis. Where necessary, the catalog of topics is supplemented successively with the integration of additional studies into the database.

There are currently 28 topics on offer. These topics are:

Arbeit (Labour, Occupation)	Hanse (Hanseatic League)	Staatsfinanzen (Public Finances)
Bauen (Housing Construction)	Industrie (Industry)	Städte (Cities, Urban Development)
Bevölkerung (Population)	Innovation (Innovation)	Umwelt (Environment)
Bildung (Education)	Konjunktur (Economic Situation)	Unternehmen (Enterprises, Business)
Einkommen (Wages, Income)	Kriminalität (Criminality)	Verbrauch (Consumption)
Energie (Energy)	Kultur (Culture)	Verkehr (Traffic)
Geld (Money)	Landwirtschaft (Agriculture)	Versicherungen (Insurances)
Gesundheit (Health)	Preise (Prices)	VGR (National Accounts)
Handel (Commerce)	Sozialstaat (Welfare State)	Wahlen (Elections)

The term 'Übergreifend' ('General') contains studies whose data refer to many topic areas.

2) Research by name of primary researcher:

An alphabetical list of the names of the primary researchers can be found under the menu point "Names". The studies are listed according to the names of the primary researchers. As in the "Topics" menu, the studies are made available with the respective study title and the display options "Description" and "Time Series".

3) Selection of studies by time era:

The menu point "time periods" offers a choice of all studies with data for a selected era. The following eras are offered in the selection menu:

from 16th C

from 17th C

from 18th C

1800s	1860s	1920s
1810s	1870s	1930s
1820s	1880s	1940s
1830s	1890s	1950s
1840s	1900s	1960s
1850s	1910s	1970s

Many studies often cover a number of time periods offered in the list above. Examples include:

- ZA 8082: *Abel, Wilhelm*: Agrarkrisen und Agrarkonjunktur. Eine Geschichte der Land- und Ernährungswirtschaft Mitteleuropas seit dem hohen Mittelalter. Dritte, neu bearbeitete und erweiterte Auflage. Hamburg und Berlin: Verlag Paul Parey, 1978.
[Crises and Economic Cycles in Agriculture. A history of agricultur and nutrition of central Europe since the High Middle Ages]
▶ Period of investigation: 1201 - 1951
- ZA8270: *Lösch, August*: Bevölkerungswellen und Wechsellagen. Beiträge zur Erforschung der wirtschaftlichen Wechsellagen Aufschwung, Krise, Stockung (Hrsg. von Arthur Spiethoff), Heft 13. Jena: Verlag von Gustav Fischer 1936.
[Population development and economic cycles in the German 'Reich' from 1871 to 1910]
▶ Period of investigation: 1803 – 1913
- ZA8179: *Metz, Rainer*: Säkulare Trends der deutschen Wirtschaft. In: North, Michael (Hrsg.): Deutsche Wirtschaftsgeschichte – ein Jahrtausend im Überblick. C.H. Beck, München, 2005.
[Secular Trends of the German Economy]
▶ Period of investigation: 1800 – 2003.
- ZA8523: *Nitsch, Meinolf / Gudermann, Rita*: Agrarstatistik der Provinz Westfalen 1750-1880. Paderborn: Verlag Ferdinand Schöningh, 2009.
[Agricultural Statistics of the Province Westfalia (1750-1880)]
▶ Period of investigation: 1559 - 1913
- ZA8388: *Pfenning, Winfried; Flora, Peter*: Städteentwicklung und Urbanisierung in Westeuropa 1815 – 1975. In: Flora, P. u.a., 1983: State, Economy, and Society in Western Europe 1815-1975. A Data Handbook in Two Volumes. Volume II: The Growth of Industrial Societies and Capitalist Economies. Chapter 3: Cities and Urbanization. Frankfurt/Main: Campus, S. 247-282.
[Development of cities and urbanization in western europe 1815 to 1975]
▶ Period of investigation: 1815 – 1975.
- ZA8503: *Sensch, Jürgen*: Zur Entwicklung der Arbeitszeit in Deutschland von 1800 bis 2010. histat-Datenkompilation online.
[The Development of Working Hours in Germany from the Industrialization to the Present

Time]

- ▶ Period of investigation: 1800 – 2010

Upon selection of a period (e.g. the 1800s), all studies are shown that have time series that begin within the selected period (thus, in our example, those that begin between the years 1800 and 1809). Selecting the 1800s from the aforementioned studies would produce the following studies:

- ZA8270: *Lösch, August*: Bevölkerungswellen und Wechsellagen. Beiträge zur Erforschung der wirtschaftlichen Wechsellagen Aufschwung, Krise, Stockung (Hrsg. von Arthur Spiethoff), Heft 13. Jena: Verlag von Gustav Fischer 1936.
[Population development and economic cycles in the German 'Reich' from 1871 to 1910]
▶ Period of investigation: 1803 – 1913
- ZA8179: *Metz, Rainer*: Säkulare Trends der deutschen Wirtschaft. In: North, Michael (Hrsg.): Deutsche Wirtschaftsgeschichte – ein Jahrtausend im Überblick. C.H. Beck, München, 2005.
[Secular Trends of the German Economy]
▶ Period of investigation: 1800 – 2003.
- ZA8503: *Sensch, Jürgen*: Zur Entwicklung der Arbeitszeit in Deutschland von 1800 bis 2010. histat-Datenkompilation online. GESIS Datenarchiv, Köln. histat. Studiennummer ZA8503, Datenfile Version 1.0.0
[The Development of Working Hours in Germany from the Industrialization to the Present Time]
▶ Period of investigation: 1800 – 2010.

4) Research with the help of a cross-study keyword search:

Histat allows keyword-led, cross-study search by time series data. In this case the data inventory is accessed in the form of a cross-study full-text search. The keyword search can be made either in the study details or in the data section, i.e. in the table headers of the data tables. Studies and time series that can be allocated to the keyword are listed and made available for download, whereby the clear reference of each time series to the corresponding study and to the primary researcher is always maintained. By these means, histat enables the targeted access to individual time series and thus also the compilation of data from different topic areas, whereby – and it is important to us to mention this – the allocation of each time series selected to the corresponding studies and primary researchers is always maintained. Naturally, only those studies shall be imported to histat and thus released for download that have been approved by the primary researcher and data provider for the purpose of further analysis.

4.3 Characteristics of histat

The essential characteristics of the histat database can be summarized as follows:

- | | |
|-------------------|--|
| Study orientation | - Studies, arranged according to topic areas.
- Within a study: division according to sub-topics. |
|-------------------|--|

Documentation of the individual study	- Study description: Study title, primary researcher, description of the content, source types used, list of sources, annotations
Supplementary texts to the study for download	- Supplementary materials to the study: publications, detailed source list, detailed annotations, method reports
Metadata on individual time series	- For every single time series: definition, sources used, annotations, table number and table title from the publication; notes on individual values in the time series.
Data export from a study	- Publications requiring citation; - All metadata on the selected time series are exported together with the data.
Search function:	- by topic and study title - by name of the primary researcher or data provider - by time period - Keyword search: cross-study full-text research, data export of this selection incl. all metadata on the individual time series.

Figure 3: Features of the histat database

Histat is structured hierarchically. Access to the data is always via the study and the primary researcher. This means that all studies that are imported into histat are allocated to a topic or a subject area. Within the studies, the data are subdivided according to subtopics.

Each study is comprehensively documented. This is implemented by means of the study description, which contains the study title, primary researcher, description of the study content, as well as the sources used and annotations for the entire study.

Supplementary material to the study is made available to download in the form of a PDF document. These are usually very comprehensive annotations, long source lists and methodology reports.

The data section is prepared separately. Metadata are added to each time series, in which definitions, sources used, notes on the time series and, where necessary, on individual values are documented.

Histat allows the data export, free of charge, from an individual study as an Excel or text file. The exported files contain information on the publication (which requires citation), should the files be used for secondary analysis in the user's own publication. All metadata on the selected time series are exported, so that the numbers section is clearly defined and understandable.

Histat offers different search function that allow comfortable and targeted access to the data.

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