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The German Time Series Dataset, 1834–2012

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1 Introduction

In recent years, a renewed scientific, political, and public interest in historical macro-data, especially on long time series, can be internationally observed. A closer inspection highlights that Germany has been largely neglected in large, worldwide syntheses, simply because available reference statistics were lacking. The situation is similar with detailed studies and in special subject areas: it has been proven that the required macro-data have either gone out of date decades ago or have to be selected from several alternatives. So far, there are no up-to-date and unambiguous data for a lot of subjects. The present article describes a project that set out to improve this situation. The article is structured as follows: first, the background (prerequisites and historiography) for the project is explained, then follows a description of the content. The next paragraphs explain the structure of the dataset as well as the data documentation and data access options. Finally, some “highlights” are outlined.

2 Background

We are not the first who endeavour to compile the “most important” historical time series for Germany. Note: For details see Rahlf (2014). There have been six fields of preparatory work:

1. In the context of official statistics, there have been several collections of statistics for longer time periods. There are “long series” in the official and regular reports, but those only date back to 1950 at most (consumer price indexes to 1948); with some dating back to 1970 or 1975 and some only to 1991. It was 1958 when a first publication with long series from 1871 to 1957 appeared (Statistisches Bundesamt 1958). For several statistics in this

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publication, data for a fictional area of the Federal Republic were calculated back to 1925. In 1972, „Bevölkerung und Wirtschaft“ (Population and Economy) was issued as a separate publication on the occasion of the 100-year anniversary of central official statistics. This compilation included approximately 1,400 time series of different lengths (Statistisches Bundesamt 1972). Aside from a demographic addition (Statistisches Bundesamt 1985), this volume has not had a sequel to this day. The Federal Statistical Office has not been active in the field of historical statistics since.

2. One work that to this day has remained just as essential as controversial for economic history research is Walther G Hoffmanns “German Economic Growth Since the Mid-nineteenth Century” (Hoffmann 1965). In their monumental publication, Hoffmann and his assistants essentially covered everything that the German historic schools, business cycle research, and official statistics had produced by that time. In contrast to other publications by official statistics and scientific research of their time, extensive estimations and interpolations were applied here. For example, to be able to supply information on income of self-employed workers in the fields of “Industry and Trade”, the available data on earned income for workers and technical staff are multiplied by a factor of 1.3. Hoffmann estimates the value for agricultural buildings by subtracting the values for vacant agricultural land from the sale prices for agricultural farms. To be able to supply production values for freshwater fish before 1909, they are extrapolated with the available data for meat prices. Such substitutions can be found in various places. In economic history research, many of those estimates have at times been heavily criticised and have in some cases been followed up with new estimates (e. g. Holtfrerich 1983; Ritschl/Spoerer 1997; Burhop/Wolff 2005; Fremdling 2007).
3. Interest in historical time series also came from German sociology. In the early 1970s, Wolfram Zapf and Peter Flora started to devote themselves to the possibilities of their analysis. Referring to Anglo-American research, they demanded a stronger cooperation between historians and social scientists (Zapf/Flora 1971). Based on these first efforts, which they themselves considered a “pilot study”, several major projects developed over the following years. From 1979 to 1984, the Volkswagen Foundation sponsored the project “Comparative Analyses of the Social Structure with Mass Data” („Vergleichende Analysen der Sozialstruktur mit Massendaten“; VASMA). Another project sponsored by the VolkswagenStiftung as early as the 1970s was Wolfgang Zapf and Peter Floras “Historical Indicators of the Western European Democracies” (HIWED), which first evolved into a historical data handbook that predominantly focussed on the development of education in

international comparison, but more importantly evolved into the two-volume data compendium “State, Economy, and Society in Western Europe 1815–1975”, published in 1983 und 1987 (Flora et al. 1983/87). The use of their data was found to be problematic though, since the documentation printed in the volumes was limited to a 4-page bibliographical summary in the second volume.

4. In the area of historical research, one work should especially be named aside from the previously mentioned one by Walther G Hoffmann: a multi-volume piece with the series title Statistical Workbooks for Recent German History („Statistische Arbeitsbücher zur neueren deutschen Geschichte“) that was published between 1978 and 1987 and that still sets the standards for historical statistics of Germany (esp. Fischer et al. 1982; Hohorst et al. 1978; Petztina et al. 1978; Falter/Lindenberger/Schumann 1986; Rytlewski/Op de Hipt 1987a, 1987b). While these volumes were originally intended for schools and universities, in retrospect, their scope actually far succeeded this. In contrast to the previously mentioned works, these are integrative publications: almost all chapters combine carefully compiled historical statistics with substantiated historical interpretations. They were entirely written by renowned historians and also well-received in the scientific disciplines. Furthermore, two extensive third-party funded projects were financed in the past decades to compile and process historical statistical data in the area of economic and social history. To date, ten data handbooks have developed from the project alliance German Education Statistics 1800–1945, which was first sponsored by the German Research Foundation (DFG) from 1977 to 1981. This project alliance reconstructed and analysed the long-term structural change of the educational system in Germany on a broad empirical statistical basis. From 1981 to 1991, a priority programme on the topic Sources and Research on the Historical Statistics of Germany was also sponsored by the DFG. As a result, 25 voluminous books of tables were published between 1987 and 2001.¹ In retrospect it has to be noted that the format of the priority programme was not sufficiently suitable, given its open approach that allowed for independent creation of almost any applications under the set main topic. Therefore, the programme also produced results for rather arbitrary and marginal topics, while the volumes on more important topics such as public finance, foreign trade, or banking are still lacking today. Aside from those, there have not been any major efforts to create systematic historical statistics from Germany. Only in the context of a project by the Federal Ministry of Labour

¹ See Lundgreen (2006), Kunz (1997). Up-to-date references for both projects in the German National Library: <http://d-nb.info/551253630> and <http://d-nb.info/016337417>.

and Social Affairs and the Federal Archive, in which a History of Social Policy in Germany since 1945 was created, were two Statistical Overviews to Social Policy in Germany since 1945 compiled; these were initially conceptualised for the project team and, contrary to what the title suggests, exceeded the narrow area of social policy (Berl 1999; Steiner et al. 2006). The time series were only published as PDF files, not as datasets.

5. Historical statistics of Germany were also created in the context of two international publications. In 1975, the first edition of a historical statistics for Europe was compiled by BR Mitchell (Mitchell 1975) and was later extended to the three-volume “International Historical Statistics” in 1983, with six updated versions published by 2007.² For Germany, Mitchell predominantly used official statistical data for the first edition, as well as the compilation of the Federal Statistical Office from 1976 and data by Hoffmann (1965). Subsequent editions predominantly extended the data with updates towards the present only. The results of the priority programme were just as neglected as the data handbooks on the history of education and any provisional new estimation of Hoffmanns data. In all cases, data were adopted as they were found. Mitchell did not provide any new calculations or adaptations. This is not the case for Angus Maddisons data and the second International Historical Statistics. Between 1965 and 2003, Maddison published eight studies for the OECD Development Centre. These are not independent publications, but largely additions and updates to the previous ones, so that the relevant data are contained in the last volume (Maddison 2003). The compilations concern statistics on the national product and population data for a plethora of countries and extraordinarily long periods of time. In contrast to Mitchell, Maddisons central concern is to make all data internationally and intertemporally comparable. For the first half of the nineteenth century, population data were used to extrapolate data available for the Prussians to the entire Reich; the following data largely originate from Hoffmann. In the process, Maddison made extensive “adjustments” to take the numerous territorial changes into account. While early versions of the data used the borders of the Federal Republic of Germany until 1989 as a basis, the current edition is based on the reunified Germany. Maddisons works were then and are still continued by his colleagues at the Groningen Growth and Development Centre. In the current dataset, the recalculations by Burhop and Wolff were taken into account (Burhop/Wolff 2005; Bolt/van Zanden 2014).

² The publisher first offered an electronic version in 2013, which contain data up to 2010 (Palgrave Macmillan Ltd 2013).

3 Contents

Our dataset comprises 120 XLSX-tables with a total of 1,073 time series on 22 different topics for Germany in its different borders from 1834 – when the Customs Union (Zollverein) was formed – until 2012.³ The current purpose of compiling the data was a publication issued in cooperation with the German Federal Agency for Civic Education (Bundeszentrale für Politische Bildung) (Rahlf 2015a). The project was limited to 1. the compilation of published data, 2. to do so in the perspective of long time series and 3. without regional differentiation within Germany.

The aim of the project was to identify and compile scattered existing historical time series and to complement or update them at reasonable expense. In doing so, the “best possible” or “most important” data were to be compiled. Time series were only to be included, if data for the entire period from 1834 to 2012 was at least theoretically available. For the project, it is constitutive that the same “variables” are maintained throughout. Therefore there are no changes in the nomenclature of the individual segments between 1834 and 2012. If the meaning of the series changes over time within the period for which data are provided, then the corresponding documentation or the print publication will indicate that. In the context of this project, inclusion and compilation was limited to those time series, for which a continuous nomenclature was justifiable. Furthermore, it was up to the individual authors to determine the extent to which statistics from the GDR could be sensibly included in the meshwork of historical statistics of Germany for their topic, or whether additional research was needed and should therefore be reserved for a potential new edition. The primary aim was not to provide individual GDR statistics as such, but to supplement existing series with GDR data where appropriate and useful. Ultimately, it was possible to include data for the GDR for a considerable number of time series. Any statistics for the GDR that were incompatible with the “all of Germany” view used in this instance were only considered in special exceptional cases and only included if they still appeared to be conceptually justified. This was the case with the social insurances, the professionals in industry, trade and building sector, as well as the balance of payments (41 series in total).

An integral aspect of the concept of our project is the combination of data with critical commentaries of the time series by established expert scientists.

³ Generally, 2012 is the latest data point considered. Systematical exceptions are data for federal elections, which were included until 2013.

Data were predominantly processed and compiled between 2011 and 2013, when the author was head of the team “Data Service Historical Studies” at the GESIS Leibniz-Institute for the Social Sciences. The project was partially supported by GESIS. The coordination took place in the context of an author conference financed by the Thyssen foundation in 2013. At least 50 people in 25 locations were involved in the project.

In the publication of the Federal Agency (Statistisches Bundesamt 1972), all time series were printed in tables, where as we use a lot of visualizations to show the main tendencies. Every contribution further consists of approximately six pages of explanatory text as well as a comment on the availability and type of data used. Table 1 lists the topics, the number of processed time series for the respective topic, and the respective authors.

Table 1: Topics, number of time series, and authors.

Topic	N of Time Series	Author
Environment, climate, and nature	54	Paul Erker
Population, households, families	52	Georg Fertig/Franz Rothenbacher
Migration	47	Jochen Oltmer
Education and Science	50	Volker Müller-Benedict
Health service	60	Reinhard Spree
Social policy	61	Marcel Boldorf
Public finance and taxation	47	Mark Spoerer
Political participation	52	Marc Debus
Crime and justice	40	Dietrich Oberwittler
Work and income, and standard of living	37	Toni Pierenkemper
Culture, tourism, and sports	68	Heike Wolter/Bernd Wedemeyer-Kolwe
Religion	25	Thomas Grossbölting/Markus Goldbeck
National accounts	45	Rainer Metz
Prices	37	Rainer Metz
Money and credit	51	Richard Tilly
Transport and communication	48	Christopher Kopper
Agriculture	50	Michael Kopsidis
Business, industry, and craft	58	Alfred Reckendrees
Building and housing	42	Günther Schulz
Trade	72	Markus Lampe/Nikolaus Wolf
Balance of payments	23	Nikolaus Wolf
International comparisons	54	Herman de Jong/Joerg Baten
	1,073	

Which data were used? „Bevölkerung und Wirtschaft“ of the Federal Statistical Office was our starting point (Statistisches Bundesamt 1972). This publication is predominantly based on results from official surveys that were compiled from the official publications of the central agencies for statistics (yearbooks, annual volumes etc.) and supplemented with statistics from other official or “semi-official” sources for some of the topics. Since the publication date is over four decades ago and since several topics were either never covered (such as environment, culture, leisure, sports) or only covered very short time series, the first step was to select series from this stock, to extend them, to add GDR data where possible, and to decide what other series/topics should be included. In the end, this particular publication was used to a varying extent in 12 of the 22 chapters. Additionally, around 700 further publications – mainly yearbooks, subject-matter series (Fachserien) from statistical and other agencies, associations and societies – were consulted. Hoffmanns data were used in 8 chapters, since despite all critique, there are for some subjects no alternatives for the periods he analysed, or at least parts of them (1850–1959): work and income (18 of 37 series contain Hoffmanns data), construction and housing (5 of 43), finance and tax (2 of 47), money and finance (12 of 52), trade (1 of 72), agriculture (10 of 50), prices (19 of 37), and national accounts (35 of 45). The data volumes of projects concerning educational history and the DFG priority programme (see fn. 1) were systematically considered for inclusion by us. Data from Flora et al. 1983/87 were, with one exception, not included. The remaining data originated from several dozen journal articles, book chapters, or books from the field of economic and social history. Almost all series contain data for the (old) Federal Republic, 80 % of the series contain data for the time prior to the Second World War, and about half contain data for the nineteenth century, albeit with gaps and/or beginning only towards the end of the century. Still, 110 series begin before the middle of the nineteenth century. For approximately a third of the series, GDR data could also be captured (differing between chapters). In Rahlf (2015a) the used sources are summarised.

4 Dataset structure

Basically, the structure of a dataset is guided by the tables in the print publication by the Federal Agency. The print publication allowed for four to eight tables for each of the 22 chapters, which means the data record is correspondingly made up of 120 tables in total. The inner structure of the dataset is a consequence of a German idiosyncrasy: the numerous territorial changes. In international comparison, those certainly do not make Germany one of the simple cases for historical

statistics spanning a period of almost two hundred years. This already becomes clear when looking at the most basic of statistics: the population counts. In 1834, approximately 23.8 million people lived in the territory of the Customs Union (Zollverein); in 1866, it was 31.4 million. The territorial expansion until 1866 alone added 4.6 million people, around 15 %. By 1871, the same Customs Union territory from 1866 was home to 37.3 million people, then the territorial extension over the course of the foundation of the German Reich increased the population to 41 million in total. This means that the territorial expansion added another 10 % to the population. As a result of the First World War – aside from the loss of approximately three million military and civilian lives – territories with seven million people no longer belonged to Germany. From these territories, approximately one million people migrated into the Reich over the subsequent years. As a consequence of the Second World War, approximately 7 million Germans lost their lives. Approximately 9.6 million people lived in the Eastern Territories in 1939. In 1946, the Soviet Occupation Zone, which later became the GDR, was home to approximately 18.1 million people; the territory that was to become the Federal Republic was home to 45.3 million. When looking at historical developments for “Germany” as a continuum from the German Federation via the German Reich to the Federal Republic, these serious changes have to be adequately considered. Despite a continuous natural population growth (between 1834 and 1913 approximately 1.2 % per year), the population decreased as a result of wars and loss of territory from 67.8 million in 1914 to 62.9 million in 1919 (7.2 % decline), and from 67.8 million in 1937 to 45.3 million in 1946 (decline by one third). To account for this idiosyncrasy, we decided on a four-fold data structure. Four territorial units with their respective data are therefore differentiated in each table in separate columns between:

Table 2: Territorial units and time periods covered.

Code	Territory
A	German Confederation/Custom Union/German Reich (1834–1945)
B	German Federal Republic (1949–1989)
C	German Democratic Republic (1949–1989)
D	Germany since the reunification (since 1990)

Years in parentheses should be considered as a guideline only.⁴ It is possible that series for the territory of the old Federal Republic or the new federal states were continued after 1990 or that data for all of Germany before 1990 were

⁴ Territories that did not become part of the German Reich were not included in the statistics.

available or reconstructed.⁵ All time series are identified by a distinct ID consisting of an “x” and a four-digit number (numbers under 1,000 begin with a zero). The time series that exclusively contain GDR data were identified with a “c” prefix instead of the “x”.⁶ For the four territorial units, the time series are arranged in four blocks side by side within the XLSX files. That means: listed first are all time series for the territory and the period of the Custom Union and German Reich, then the next columns contain side by side all time series for the territory of the German Federal Republic / the old federal states, then – if available – follow the time series for the territory of the German Democratic Republic / the new federal states, and finally the reunified Germany. There is at most one row for each year. Dates may be missing if no data for the respective year are available in either of the tables time series, however, no date will appear twice. The four territorial units and the resultant time periods cause a “stepwise” appearance of the data tables (see Figure 1).

Figure 2 is an example of a time series consisting of the four mentioned parts. Depicted are parallel data for “extramarital births” from the German Trade Union/German Reich, the Federal Republic and the GDR, and beginning 1990 from Germany as a whole.

5 Data documentation

Given the scope and partially complex structure of source citations, data documentation was not included within the data set or in the print publication, but rather in a separate publication (Rahlf 2015b). The documentation shows a graphic for each individual time series followed by the references for the individual years and their respective concrete territorial unit.⁷ We have generally avoided statements such as “different years”, as can be found in some statistical publications; instead, in most cases the exact page references

5 A conceivable case could be to continue values for Germany in the borders from 1937 after 1945, or values for the territory of the Federal Republic or the Democratic Republic before 1949. However, such numbers were not gathered or reconstructed in the context of this project.

6 The logic for this is as follows: a series beginning with “x” can (potentially) contain data for all territorial units/time periods A, B, C, and D, whereas series beginning with “c” only contain data for the GDR (see Table 2).

7 We tried to differentiate the territorial units A, B, C, D into further categories wherever it was possible. For example B1: 1946-1956: FRG excluding Berlin and excluding Saarland; B2: 1946-1956: FRG including Berlin, but excluding Saarland; and so forth.

Dataset structure...

... and Areas

Figure 1: Dataset structure.

for each year have been provided. An English translation of all time series titles is available in the documentation as well.

6 Highlights

Although it was not the intention of our project to produce new research results there are nevertheless some “highlights”. To name a few:

The chapter on the German Population for the first time depicts long time series running over a period of 180 years, starting with the German Tariff Union. The time series cover not only the German Empire (and data reconstructed for that territory back to 1834) and the Federal Republic of Germany, but also the German Democratic Republic and reunited Germany. Rather new are time series on the proportion of persons married at young ages, replacing and extending back in history time series on the average age at (first) marriage; the same is

Figure 2: Example series.

true for time series on persons never married at higher ages (celibacy rates). Completely new is the calculation of remarriage rates of widowed and divorced persons, showing the continuous decline of remarriages for both family statuses over time. In addition, the section on households and families – both usually not addressed in population chapters – presents some new information and also extends existing time series farther back into history.

The analysis of time series data on Political Participation and on the share of the vote of parties with a specific ideological background shows that the share of inhabitants in Germany who had the right to vote increased significantly over time (from 18.7% in 1871 to 76.1% in 2013). Moreover, the results show that there is also significant variation both in the turnout rates in the time period between 1871 and 2013 and between the share of the vote for parties representing the socialist, Christian democratic, liberal, and conservative party families over time.

The chapter on Crime and Punishment collects previously scattered time series starting in 1836 and incorporates several criminal justice systems. The resulting series spanning 175 years reflect both changes in criminal behaviors as well as changing legal definitions and law enforcement. Special care has been taken to harmonize long series as much as possible, e. g. by re-calculating rates

based on constant definitions of population. The chapter also presents the most complete and up-to-date series of capital punishment in Germany between 1834 and 1981, when the last offender was sentenced to death and executed in the GDR.

The chapter on Culture, Leisure, and Sports enters new territory in several aspects. Cultural and tourism history are subfields of history that – for most of the time period incorporated – only sporadically entered statistics. This publication seeks to present long time series and thus detailed insights into cultural developments between the middle of the nineteenth century and nowadays, notwithstanding intermittent data and changing references. But new findings on topics like newspapers/magazines, theatres, cinemas, books, and libraries as well as tourism are not only enabled by single long time series, but especially by comparison: for a better understanding of choices in leisure activities that show (ed) multiple interdependencies. In the sports section of the chapter culture, previously scattered data of the association and membership development in gymnastics and sport from the 1860s to the present day are presented. The series permit a clear synopsis of comparable data over a long period of time.

The section on Agriculture presents long time series on all main agricultural indicators starting around 1870 until today for the first time. This allows for the reconstruction of German agricultural growth and the environmental impact of agriculture in a historical perspective. For the period 1950–1990 agricultural development in the two German states can be compared.

The chapter Companies, Industry, and Crafts provides, for the first time, a comprehensive overview of joint stock companies from 1886 until 2010 and of financial results from 1909 until 1991. Compared to previous publications the series is substantially extended and revised; it also gives an overview of limited liability companies. The chapter includes new time series for industrial products like beer and passenger cars, which together with extended time series on traditional goods like coal, steel, and electricity show the production cycles and structural changes between 1871 and 2012. The craft sector is represented since the beginning of its statistical observation in the mid-1920s.

The section on Retail and Foreign Trade for the first time shows the degree of trade openness of the German economy from 1850 to 2010. It also presents long-run data on the imports and exports of individual industries such as textiles and road motor vehicles.

Finally, we offer time series for the German Balance of Payments that cover the 1880s into modern times. This includes time series of the current account, its main components such as the trade balance, and the capital and financial account.

7 Data access

The German Time Series Dataset is freely available. There are two possible ways to acquire the data: A German version can be downloaded from the histat database of the GESIS Leibniz Institute for the Social Sciences. (DOI:10.4232/1.12202, Rahlf et al. 2015a). The online-database histat was developed by GESIS and published in 2004 via the GESIS-Website (<http://www.gesis.org/histat>). histat serves as an access-platform of time series data collected in the framework of economic and social historical research (for details see Rahlf et al. 2012). Thus far, the data base encompasses about a quarter of a million time series from over 400 studies. Altogether, the time series contained in the database histat enclose about seven million values. All time series are organized in tables, which are bundled by the study. The tables can be viewed online and downloaded in XLS, XLSX, or CSV-format. The German Times Series Dataset consists of 120 tables within this data base. Additionally, there is an English edition of the dataset (English versions of the table and variable names) available at figshare (DOI:10.6084/m9.figshare.1450809, Rahlf et al. 2015b). Data and metadata of the German Time Series Dataset are covered under the creative commons license variant Attribution-ShareAlike 3.0 Germany (CC BY-SA 3.0 DE). Data documentation is published separately in open access (Rahlf 2015b). The publication of the Federal Agency (Rahlf 2015a) can be obtained as a print copy from the Agency on payment of a supply fee, or downloaded free-of-cost from EconStor.⁸ News and errata are published on a dedicated website:

www.deutschland-in-daten.de

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⁸ <http://hdl.handle.net/10419/124185>.

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