Demographic Analyses of Church Records: The Case of Infant Mortality in the Hanseatic City of Rostock in the 19th Century

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Michael Mühlichen and Rembrandt D. Scholz

Abstract: This technical report documents the individual level data preparation of burial and baptismal registers of the church books of St. James in the Hanseatic city of Rostock, Germany, in order to analyze infant mortality in the 19th century. In addition to describing the digitalized registries, data quality, and the construction of variables, this paper presents a new classification of occupations that is also applicable to other historical data sets. The merging of the baptismal and burial data into an event history data set is outlined exemplarily for the time period of 1815 to 1829. The development of infant and perinatal mortality is illustrated by using this data collection.

Keywords: infant mortality, historical demography, church registers, social structure

1. Introduction[1]

Church books provide a useful basis for information on mortality in Germany before the introduction of official statistics. The preparation of these data, however, requires considerable effort, as the handwritten church records must first be transcribed. In this paper, we describe the preparation and editing of the burial and baptismal registers of St. James, the largest church in 19th century Rostock (see Figure 7 in the appendix), as well as the construction of a merged event history data set which contains all live births, stillbirths, and infant deaths registered in St. James between 1815 and 1829. This data set allows for the calculation of cohort-based infant and perinatal mortality rates, as well as models of event history analysis in order to measure the influence of social, demographic, and climatic factors. Furthermore, we present a new classification that can be used for grouping different types of occupations as well as sorting occupations by social class. The edited data are enclosed with this data report in Excel and SPSS format.

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[1] For more background information on the project, see Mühlichen & Scholz (2015).

2.   Data and Methods

Data on live births and infant deaths are necessary to calculate infant mortality. The live births are recorded in the baptismal registers, whereas the infant deaths are contained in the burial registers. St. James is the only parish in Rostock which has a digitalized version of its baptismal registries[2].

The historic city of Rostock consisted of four parishes: St. James, St. Mary, St. Nicolas and St. Peter. The parish of St. James was by far the largest, comprising more than half of the total city population among its members in 1905, which led to a division of the parish and the foundation of the Church of the Holy Ghost in 1908 (Schulz 2008: 24; Szołtysek et al. 2012: 10)[3]. St. James, however, was not only the largest parish, but was also most likely the most heterogeneous concerning the social structure of its members (Mühlichen & Scholz 2015). Although an analysis of all Rostock parishes would be necessary to gain knowledge on the entirety of Rostock's population, we consider the data of St. James to be very representative and a suitable sample for the entire city.

2.1   Burial Registers

The Max Planck Institute for Demographic Research (MPIDR) maintains a scanned catalogue of the burial registers of St. James from 1740 to 1911. From 1740 through 1786 the registry lists only the names of the deceased. Because the age of death was not recorded, this period could not be considered for the analysis of infant mortality. As of 1787, however, the burial register is listed in tabular form and includes the following items[4]: a running number[5], the date of death, the date of the funeral, the complete decedent's name including all (or most of the) first names, the decedent's age at death, the cause of death, as well as the parents' names and the father's occupation. The decedent's sex is not directly recorded but can be derived from the first name.

Up until and including 1846, if the parents were married, only information on the father was recorded. In the case of illegitimate births – if the mother was not married at the

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[2] The Max Planck Institute for Demographic Research maintains a database of church book scans from all Rostock parishes. Whereas many burial lists have been digitalized as electronic tables in Excel format, only the baptismal registries of St. James have (in parts) been typed as transcriptions.

[3] St. James no longer exists. Large parts of the church were destroyed in 1942 during a British bombing raid. The remaining structure was torn down in 1960 (Köppe 2010; Kuzia 2004).

[4] Figure 1 shows a section of the baptismal register from 1815 and a section of the burial register from 1816.

[5] This number is not a serial number which is identical for the same person across different registers, as is the case in modern panel data. It is simply a running number starting at 1 in each register for every church year. Thus, it holds no meaning to our analyses.

time of birth – the name and (in very few instances) the occupation of the mother was registered, whereas no information on the father was provided. Thus, the mother's marital status and the status of legitimacy of the birth can be deduced. From 1847 onwards, a column for the mother was introduced, and illegitimate births were marked. Also starting in 1847, the place of birth was documented. Beginning in 1831, the decedent's heirs were also registered, which is, however, irrelevant for infant deaths. Furthermore, if the funeral did not take place at St. James, this place was also recorded. Starting in 1800, stillbirths, which are necessary for the calculation of perinatal mortality rates, were also documented.

2.2   Baptismal Registers

The baptismal register is similarly structured and varies over time as well. The earliest period available as scanned documents at the MPIDR dates from 1761 to 1786 and is recorded in a textual form. For the period from 1787 to 1911, the register is listed in tabular form and contains the following items: a running number, the date of birth, the date of baptism, the complete names of the parents and their newborn child, the occupation of the father and (in very few instances) the mother, the name of the pastor conducting the baptism ceremony, as well as the names of the relatives who were present at or absent from the baptism. In some cases, the place of birth is mentioned as well, if different from Rostock. Moreover, in a few instances the parents' or relatives' place of origin is also recorded. In parallel to the burial register, stillbirths are also documented in the baptismal register, but only through the year 1876.

Figure 1 shows a section of the baptismal register from the year 1815 on the left and a section of the burial register from 1816 on the right. In the last row of both lists, we find the same person, a girl named Emma. She was born on 28 January 1815, baptized on 5 February 1815; she died at the age of 11 months on 31 December 1815 and was buried on 5 January 1816.

Figure 1: Sections from the baptismal and burial registers of St. James parish, Rostock

Source: Baptismal register of 1815 and burial register of 1816 of St. James parish, Rostock

2.3 Matching of the Burial and Baptismal Registers

All data on stillbirths and live births who died before their first birthday were transferred from the 1787-1910 burial registers of St. James into an Excel spreadsheet. Likewise, all cases from the baptismal registers of St. James were typed into a separate Excel sheet for the periods of 1815-1829, 1863-1879, 1881, 1898-1901, and 1903-1904. In addition, we counted the births according to sex and (from 1847 onwards) place of birth for the gap years, in order to be able to calculate infant mortality rates for the entire 19th century. All burial data and the baptismal data from 1815-1829 were subjected to a comprehensive process of error correction.

The next step was matching the two data sets for the period of 1815-1829. Such a matching process required great effort, as there is no personal identification number as a key variable in historical registries. Therefore, we matched the two data sets by name. The baptismal and burial lists contain the complete names of the infants and their parents, so it is possible to identify individuals who appear in both. However, the order of the first names, as well as the spelling of the first and last names often differed slightly in the two registers. This means that any programming for an automated matching procedure would not have produced fully reliable results. For this reason, we manually attached the infant death data from the burial data set to the baptismal data set after harmonizing the columns. Subsequently, we sorted the data set by last and first names of the infants in order to find identical cases. After transferring the additional information from those rows that contained the burial data into the rows that included the baptismal data, we deleted the attached rows.

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In the end, the merged data set included the following items: name, date of birth, date of baptism, date of death, date of funeral, sex, age at death, cause of death, name and occupation of the father, name and marital status of the mother (and in very few instances her occupation), name of the pastor performing the baptism, as well as other remarks and a list of relatives who were present at the baptism. Before publishing the data set online, however, we deleted all columns containing names for the purpose of anonymization. Further adjustments of the data set for the use of event history analysis are described in the following two sections and in Mühlichen et al. (2015).

After having completed the data preparation, the data set contains 2,794 live births from the period of 1815 to 1829. The number of infants who died in their first year of life is 351, or 12.78%, of all births. The number of stillbirths is 124, or 4.25%.

2.4 Data Quality

Immigration and emigration create deviations from the population at risk and, thus, distortions in the data of infant mortality. Immigrated persons are easy to find: They are listed in the burial but not in the baptismal registers. We know the dates of their death and their funeral, but we do not know the exact dates of birth and baptism. It is possible to exclude those cases from the analyses. However, we have no information on emigration; meaning we do not know which of the infants who were born in Rostock moved away and died in another place.

Another problem is the determination of live birth and stillbirth. In the 19th century there was no definition and presumably no consistent distinction between the two terms. In fact, it cannot be ruled out that regional differences in infant mortality in 19th century Germany were partly related to different distinction practices of live birth and stillbirth.

Moreover, there was also no uniform German classification of the causes of death. Especially at the beginning of the 19th century, the description of the causes of death was quite undifferentiated and inaccurate. In addition, the diagnosis was not made by a physician, but by the respective pastor. However, the pastors in the region of Mecklenburg-Schwerin, to which Rostock belonged, apparently had sound basic medical knowledge, as can be deduced from the clerical statute books of Mecklenburg-Schwerin (e.g. Gesenius 1839, 1847; Millies 1895, 1896, 1910). Over the course of the 19th century, as medical knowledge grew, the diagnoses improved.

All in all, the quality of the data is – with regard to the time they date from – quite good because (1) the date of birth is recorded, which is generally not a given in baptismal registers, and (2) because the father's occupation is recorded, which allows for consideration of certain socioeconomic influences.

2.5 Construction of Variables

In event history analysis, the dependent variable is the *hazard rate*, which is defined as the intensity at which events occur over time (see Allison 1984). The time of exposure to the risk of interest and the respective events are used for the calculation of the hazard rate. In our analysis, the risk of interest is the risk of death within the first year of life. Thus, the respective event is the onset of death and the time of exposure is the period from birth to the onset of death or to the time of censoring[6], respectively. The event variable is coded as a dummy variable, 1 meaning that an event occurred, e.g. the infant died within the first year of life, and 0 meaning that no event occurred, i.e. the newborn survived the first year of life. The analysis time is measured in days from 1 to less than 365. The time value is set to 99999 when no death occurred within the first year of life.

Explanatory variables in this data set are the sex, the season of birth, the legitimacy of birth, and the father's occupation. Other variables available in the data set are listed in Table 3 (appendix).

The sex is coded as 1=male and 2=female. In only one case – a stillbirth – the sex cannot be derived from the registers. The season of birth is coded as 1=spring, 2=summer, 3=autumn and 4=winter. The seasons are divided by the meteorological classification, i.e. spring lasts from March to May, summer from June to August, autumn from September to November, and winter from December to February. The legitimacy of birth is operationalized as 1=legitimate and 2=illegitimate. The second category also includes a few cases of married mothers in which the husband is not the father.

2.6 Classification of Occupations

The data set originally listed 377 different paternal occupations. First, variant forms of spelling were harmonized, which reduced the number of occupations to 269. These

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[6] There are two cases of right censoring in the data: First, the completion of the first year of life and, second, the migration out of the population at risk to another place. Concerning the latter point, we do not have any information on frequencies and survival probabilities of emigrated infants.

labels are listed in the accessible data set. In the next step, the classification of occupations (OCCHISCO) of the North Atlantic Population Project (NAPP), which is an adaptation from the Historical International Standard Classification of Occupations (HISCO) coding scheme[7], was applied to the data set, further reducing the number of occupations to 107.

The OCCHISCO does have some disadvantages for the social sciences, such as the great number of occupational groups and the missing orientation by social classes. Therefore, using the works of Brandenburg et al. (1991), Lorenzen-Schmidt (1996), and Brandenburg & Kroll (1998) for Northern Germany as well as historical lexica[8], we have created a classification that is more suitable for a Hanseatic city and allows aggregating by both occupational groups and social classes. The financial situation within occupational groups was quite different. Craftsmen, for instance, were a very heterogeneous group, with master and apprentice craftsmen, whereas merchants, brewers, jurists, and professors formed the economic elite in Rostock (Manke 2000: 369-371). In order to consider different socioeconomic statuses within occupational groups, we incorporated additional codes for master (--1) and apprentice (--2) craftsmen. In the groups of shipping and military we used this scheme as well in order to differentiate between statuses.

In the end, our new classification resulted in 65 occupations in the data set, which are assigned to 8 broad occupational groups and one residual category. An aggregation of the occupations by three social classes is described in Mühlichen et al. (2015).

The upper groups generated for the father's occupation are 1=trade, 2=craftsmanship, 3=services, 4=administration and higher status occupations, 5=agriculture, 6=food production, 7=shipping and military, 8=industry and 9=unknown or no occupation. The eighth upper group for industrial occupations is useful for later periods but is not relevant for our pre-industrial period of study. An overview of the upper groups, including their various manifestations, is shown in Table 1; a more detailed overview is shown in Table 4 (appendix).

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[7] More information on HISCO and the NAPP adaptation can be found, for instance, in Van Leeuwen et al. (2002), Roberts et al. (2003), Van Leeuwen & Maas (2011), and North Atlantic Population Project (2013).
[8] We used the historical German lexica of Adelung 1793-1801, Pierer 1857-1865, Meyers 1905-1909, and Brockhaus 1911 that are freely accessible through the online library Zeno.org.

Table 1: Frequencies and shares of the father's occupational groups and subgroups in
St. James parish, Rostock, from 1815 to 1829

| Occupational group | | | | | |
Code	German job title	English translation	N	%OG	%TOT
Trade					
100	Händler, sonstige	Tradesman, other	14	4.4	0.5
110	Kaufmann	Merchant	110	34.7	3.8
120	Drögköper	Grocer	36	11.4	1.2
130	Fuhrmann	Carter	103	32.5	3.5
140	Gastwirt, Herbergierer	Innkeeper	54	17.0	1.9
	Total		317	100.0	10.9
Craftsmanship					
200	Handwerker, sonstige	Craftsman, other	35	4.5	1.2
201	Handwerksmeister, sonstige	Master craftsman, other	1	0.1	0.0
202	Handwerksgeselle, sonstige	Apprentice craftsman, other	11	1.4	0.4
210	Bauhandwerker	Construction worker	64	8.3	2.2
211	Bauhandwerksmeister	Construction master	6	0.8	0.2
212	Bauhandwerksgeselle	Construction apprentice	8	1.0	0.3
220	Holzhandwerker	Carpenter	177	22.9	6.1
221	Holzhandwerksmeister	Master carpenter	15	1.9	0.5
222	Holzhandwerksgeselle	Apprentice carpenter	33	4.3	1.1
230	Schiffshandwerker	Ship carpenter	86	11.1	3.0
231	Schiffshandwerksmeister	Master ship carpenter	1	0.1	0.0
232	Schiffshandwerksgeselle	Apprentice ship carpenter	41	5.3	1.4
240	Textilhandwerker	Textile craftsman	67	8.7	2.3
241	Textilhandwerksmeister	Master textile craftsman	43	5.6	1.5
242	Textilhandwerksgeselle	Apprentice textile craftsman	5	0.6	0.2
250	Schuhmacher	Shoemaker	103	13.3	3.5
251	Schuhmachermeister	Master shoemaker	10	1.3	0.3
252	Schuhmachergeselle	Apprentice shoemaker	0	0.0	0.0
260	Metallhandwerker	Metalworker	43	5.6	1.5
261	Metallhandwerksmeister	Master metalworker	4	0.5	0.1
262	Metallhandwerksgeselle	Apprentice metalworker	1	0.1	0.0
270	Maler	Painter	19	2.5	0.7
271	Malermeister	Master painter	0	0.0	0.0
272	Malergeselle	Apprentice painter	0	0.0	0.0
	Total		773	100.0	26.5
Services					
300	Arbeitsmann	Laborer (not otherwise specified)	482	84.7	16.6
310	Lohndiener, Tagelöhner	Hired servant, day laborer	39	6.9	1.3
320	Träger	Porter	33	5.8	1.1
330	Musicus, Spielmann	Musician	15	2.6	0.5
	Total		569	100.0	19.5
Administration and higher status occupations					
400	Sekretär, Schreiber	Clerk, administrative secretary	13	6.2	0.4
401	Höherer Beamter	High-level official	62	29.5	2.1
402	Rathaus-/Kirchen-/Gerichtsdiener	Low-level official	35	16.7	1.2
410	Jurist	Jurist	55	26.2	1.9
420	Lehrer, Professor	Teacher, professor	22	10.5	0.8
430	Diakon, Pastor, Kantor	Clergyman	8	3.8	0.3
440	Mediziner	Physician	11	5.2	0.4
450	Adel, Gutsbesitzer	Nobleman, landowner	4	1.9	0.1
	Total		210	100.0	7.2

Occupational group					
Code	German job title	English translation	N	%OG	%TOT
Agriculture					
500	Ackersmann	Field worker	89	52.7	3.1
510	Fischer	Fisherman	42	24.9	1.4
520	Gärtner	Gardener	31	18.3	1.1
530	Hirte, Stalldiener	Shepherd, groom	7	4.1	0.2
	Total		169	100.0	5.8
Food production					
600	Koch	Cook	2	2.9	0.1
610	Bäcker	Baker	26	37.1	0.9
611	Bäckermeister	Master baker	2	2.9	0.1
612	Bäckergeselle	Apprentice baker	1	1.4	0.0
620	Bierbrauer	Beer brewer	8	11.4	0.3
630	Branntweinbrenner	Distiller	19	27.1	0.7
640	Müller	Miller	4	5.7	0.1
650	Lebensmittelfabrikant	Food manufacturer	1	1.4	0.0
651	Lebensmittelfabrikmeister	Master food manufacturer	4	5.7	0.1
652	Lebensmittelfabrikgeselle	Apprentice food manufacturer	3	4.3	0.1
	Total		70	100.0	2.4
Shipping and military					
700	Seefahrer	Sailor	7	1.8	0.2
710	Schiffer	Mariner	149	38.5	5.1
711	Kapitän	Ship's master	1	0.3	0.0
712	Steuermann	Steersman. ship's mate	30	7.8	1.0
720	Matrose	Seaman	166	42.9	5.7
730	Nachprahmer	Lighterman	21	5.4	0.7
740	Unteroffizier, Gefreiter	Non-commissioned officer	2	0.5	0.1
741	Hauptmann	Captain	3	0.8	0.1
742	Soldat	Soldier	8	2.1	0.3
	Total		387	100.0	13.3
Unknown or not employed					
900	Keine Angabe	Not specified	17	4.1	0.6
910	Pensionär	Pensioner	3	0.7	0.1
920	Nicht mehr berufstätig	No longer employed	11	2.6	0.4
930	Vater unbekannt	Father unknown	386	92.6	13.3
	Total		417	100.0	14.3
Altogether			2912	100.0	100.0

Abbreviations: N=Frequency, %=share in, OG=occupational group, TOT=total number

Source: Baptismal and burial registers of St. James parish, Rostock (authors' calculation and classification)

Whereas all kinds of merchants are contained in the first group, the second category includes craftsmen such as masons, carpenters, ship's carpenters, tailors, weavers, shoemakers, blacksmiths, locksmiths, and painters; excluding craftsmen in the field of food production (see sixth category). The third group contains persons who worked as laborers, hired servants, porters and musicians, whereas administrative secretaries, bailiffs, high-level officials, jurists, physicians, clergymen, teachers, and professors form the fourth group. The fifth occupational group consists of field workers, gardeners,

grooms, and fishermen. In the sixth category, bakers, millers, beer brewers, distillers, cooks, and tobacco and chicory manufacturers are included, whereas the seventh group contains sailors, mariners, shipmasters, steersmen, soldiers, petty officers, and captains. The residual category consists of unknown cases, pensioners, and people who are not employed any more. This group is widely congruent with the "illegitimate" category of the legitimacy variable.

Using the remarks from the registers coded as 1=no remarks, 2=deceased, 3=reported himself as father, 4=alleged father, 5=illegitimate, and 6=unknown, occupations can be recoded, e.g. in the case of illegitimate births, it is useful to code the alleged father's occupation as 930 (unknown), as the father's occupation can only have an influence on the survival of the child when he cares for his family.

2.7 Causes of Death

The International Classification of Diseases (ICD) could not be used for the classification of the causes of death because historical designations are not comparable to the present-day diagnoses. Other historical classifications, e.g. Kintner (1986), are not designed for the analysis of infant mortality.

Thus, we created a custom classification of the causes of death under the guidance of the medical historian Hans-Uwe Lammel[9] and on the basis of Höfler (1899). Our classification focuses on the location of the disease. It consists of the following groups: 1=respiratory disease, 2=stroke, 3=infectious disease, 4=gastro-intestinal disease, 5=atrophy and weakness, and 6=other cause, as well as the missing categories 8=stillbirth and 9=no infant death occurred. This variable can be recoded into dummy variables with the categories 0=did not die due to cause X and 1=died due to cause X, and can therefore be considered as the event variable in event history analysis or as the dependent variable in logistic regression models. This way, separate models can be analyzed according to individual causes of death.

Table 2 shows the variables sex, season of birth, legitimacy of birth, father's occupation, and cause of death along with their categories and frequencies, separated into infant deaths and survivors of the first year of life (without stillbirths).

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[9] Professor Hans-Uwe Lammel, Doctor of Medicine, University of Rostock, Medical Faculty, Institute of Medical History

Table 2: Number of deaths and survivors in the first year of life according to sex, season of birth, legitimacy of birth, father's occupation, and cause of death in St. James parish, Rostock, from 1815 to 1829

| Variable	Infant deaths	Survivors	Total
Sex			
Male	188	1298	1486
Female	163	1139	1302
Total	351	2437	2788
Season of birth			
Spring	86	602	688
Summer	89	591	680
Autumn	89	599	688
Winter	87	645	732
Total	351	2437	2788
Legitimacy of birth			
Legitimate	300	2051	2351
Illegitimate	51	386	437
Total	351	2437	2788
Father's occupation			
Trade	26	180	206
Craftsmanship	92	645	737
Services	66	575	641
Administration and higher status occupations	28	180	208
Agriculture	30	134	164
Food production	9	60	69
Shipping and military	53	315	368
Unknown or not employed	47	348	395
Total	351	2437	2788
Cause of death			
Respiratory disease	63	0	63
Stroke	18	0	18
Infectious disease	29	0	29
Gastro-intestinal disease	161	0	161
Atrophy and weakness	72	0	72
Other cause	8	0	8
No infant death	0	2437	2437
Total	351	2437	2788

Source: Baptismal and burial registers of St. James parish, Rostock (authors' calculations and classifications)

2.8 Birth Year Method

The infant mortality probability (internationally better known as *infant mortality rate*, or *IMR* for short) is the number of infant deaths, divided by the number of live births. However, there are several variants of calculating the IMR using different points in time as a reference. A simple variant is the *calendar year method* which means that the point of reference is the calendar year t. Therefore, the IMR according to the calendar year method is the number of infant deaths in the calendar year t, divided by the number of live births in the same calendar year t. This method, however, is not completely precise because

infant deaths take place not only in the calendar year of birth but also in the subsequent year t+1. This is the case when an infant born on 1 March 1815 died on 1 February 1816, for instance.

Figure 2: Birth cohorts, live births, and infant deaths (Lexis diagram)
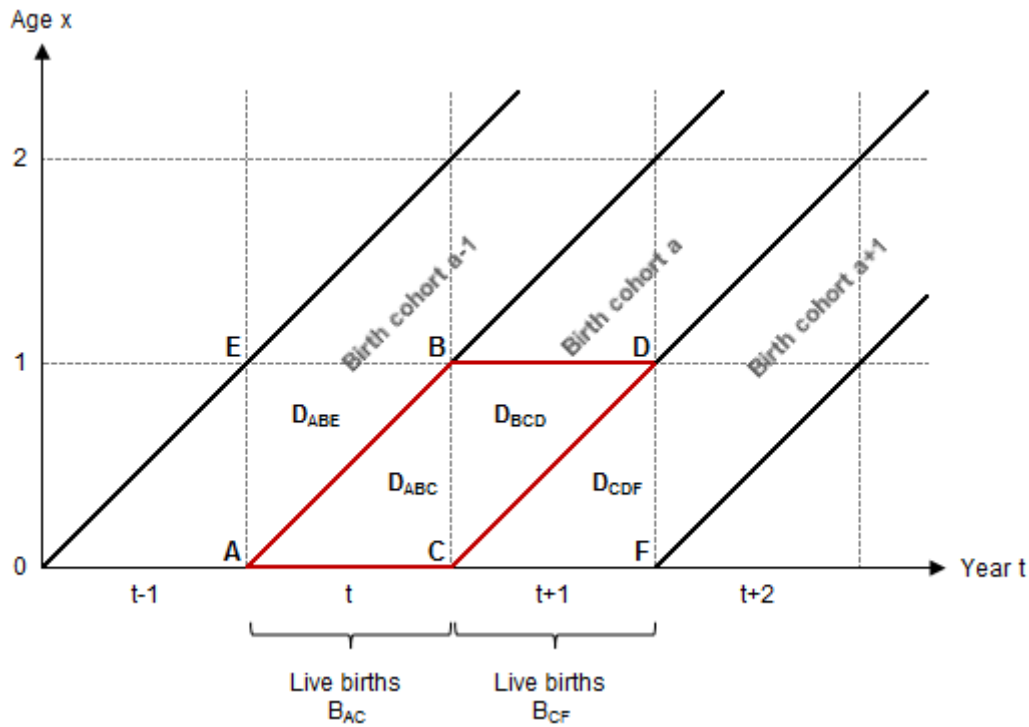
Source: Authors' design

The most precise variant is the *birth year method* developed by Becker (1869, 1874) and Zeuner (1869)[10]. The IMR $_1q_{0,t}$ according to the birth year method is the share of infant deaths in a certain birth cohort or, more specifically, the number of infant deaths $_1D_0$ of a birth cohort a, divided by the number of live births B from the same birth cohort a:

$$_1q_{0,t} = \frac{_1D_{0,a,t} + \ _1D_{0,a,t+1}}{B_{a,t}}$$

Whereas the live births of the birth cohort a are all born in the calendar year t, the infant deaths can happen in the calendar year t as well as in t+1. Thus, the birth year method pursues a cohort approach. Based on the Lexis diagram in Figure 2, the formula reads:

$$_1q_{0,t} = \frac{D_{ACDB}}{B_{AC}}$$

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10   For more information on different methods for the calculation of the probability of death, see Esenwein-Rothe (1982: 241-248).

3. Infant and Perinatal Mortality

The data set allows deaths to be counted according to year of birth and age at death (see Figure 3) as well as cohort based mortality measures such as infant and perinatal mortality to be calculated according to the birth year method of Becker and Zeuner (see Figures 4 and 5).

Figure 3: Frequency of deaths in the first year of life according to length of survival[11] in St. James parish, Rostock, for the birth cohorts from 1815 to 1829
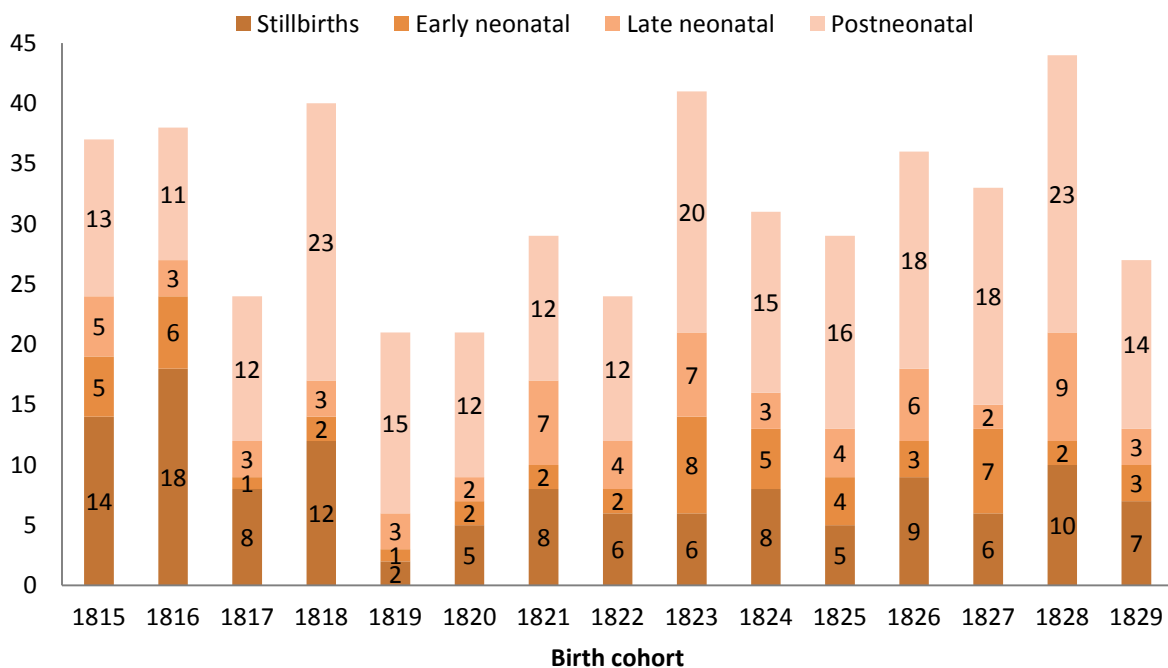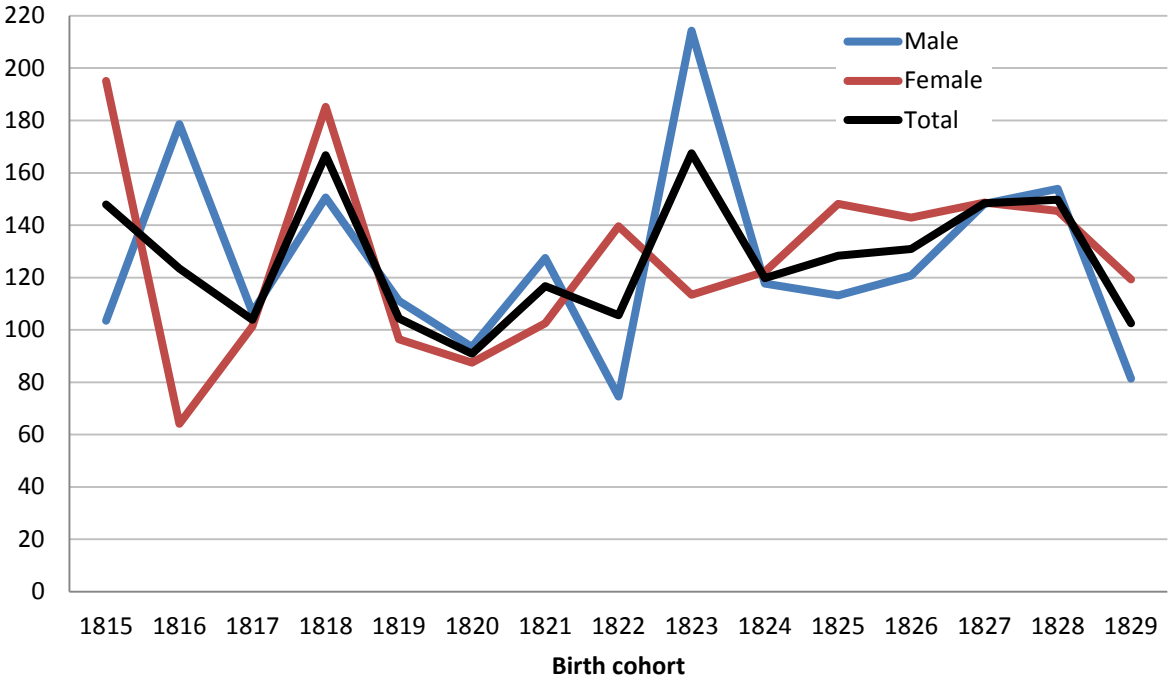

Source: Baptismal and burial registers of St. James parish, Rostock (authors' calculations)

Figure 3 shows the low and varying numbers of stillbirths and infant deaths and their inconsistent composition in the studied period according to the length of survival. The share of postneonatal deaths in the total number of deaths is the highest, except for the birth cohorts of 1815 and 1816, in which the number of stillbirths is comparatively high. In 1816, the number of perinatal deaths, i.e. the sum of stillbirths and early neonatal deaths, is greater than the number of infant deaths, which is the sum of early, late, and post-neonatal deaths.

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[11] Early neonatal mortality refers to deaths of live births within the first seven days of life, whereas late neonatal mortality refers to infant deaths at an age of 7 to fewer than 28 days of life. Postneonatal mortality involves all later infant deaths from day 28 up to fewer than 365 days of life (Gaber & Wildner 2011: 23).

Figure 4: Infant mortality rate (infant deaths per 1,000 live births) according to sex in St. James parish, Rostock, for the birth cohorts from 1815 to 1829

Source: Baptismal and burial registers of St. James parish, Rostock (authors' calculations)

Figure 5: Perinatal mortality rate (stillbirths and early neonatal deaths per 1,000 live births) in St. James parish, Rostock, for the birth cohorts from 1815 to 1829
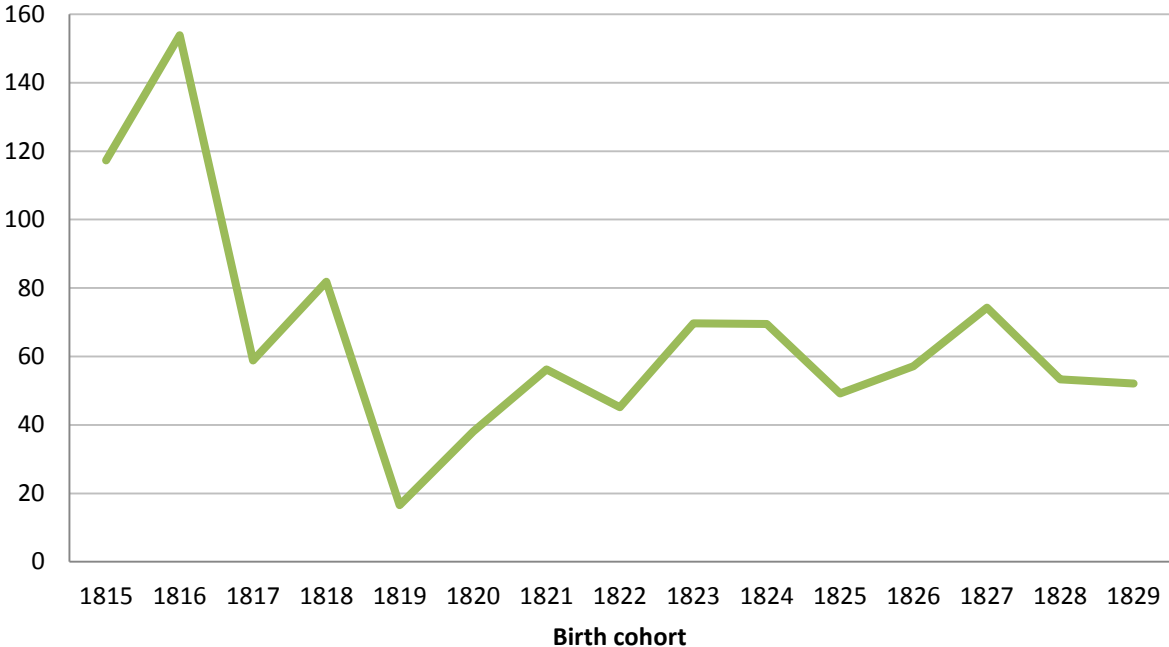
Source: Baptismal and burial registers of St. James parish, Rostock (authors' calculations)

Figure 4 shows the development of infant mortality from 1815 to 1829 in St. James parish in Rostock according to sex. In this period, no trend of infant mortality or

differences according to sex can be observed. For the period as a whole, the infant mortality rate is 127.8 deaths in the first year of life per 1,000 live births. For boys it is 127.7 and for girls it is 127.9.

With regard to perinatal mortality in St. James parish in Rostock (see Figure 5), a differentiation by sex is not useful because of the low numbers in perinatal deaths (3 to 24). Aside from the first two years, in which the perinatal mortality is comparatively high, no trend in perinatal mortality can be examined – also due to the short period of observation.

4.   Using the Data Set

First calculations of infant mortality rates, based on the church records of St. James, were conducted by Schulz (2008) and Mühlichen (2011). Mühlichen et al. (2015) calculated infant mortality rates according to an adjusted calendar year method in Rostock for the entire 19th century. In addition, they measured the influence of social class on infant mortality, using models of event history analysis on the basis of the data set published as part of this technical report. Additional publications focusing on causes of death are in progress.

In combination with marriage and confirmation registries, the non-anonymized data are useful for methods of family reconstitution, genealogic studies, as well as historical and demographic analyses, e.g. concerning questions of fertility and nuptiality. By matching all these data, it is possible to calculate birth intervals, family sizes, and the age of parents at the time of childbirth. A matching of the data with the Rostock censuses of 1819, 1867, and 1900 is also possible. Furthermore, the population numbers of Rostock are available for many years of the 19th century (see Figure 6), albeit the census methods did vary at that time (Manke 2000: 310-313).

In addition to this data set presented here, other historical data sets based on Rostock church records will soon be published online. For more information, please contact the authors of this paper.

5. Data description

The data covers all births and infant deaths registered in the St. James church in Rostock over the period 1815-1829. All church books for this period are available and to our knowledge complete.

The name of the data file is EN_Rostock_St_James_1815_1829.xls

The File includes the following variables:

Personal identification number; Year of Birth; Month of Birth; Day of Birth; Year of Christening; Month of Baptism; Day of Baptism; Year of Death; Month of Death; Day of Death; Year of Funeral; Month of Funeral; Day of Funeral; Age at Death in Days; Death (Yes/No); Perinatal Death (Yes/No); Season at Birth; Baptism; Immigration; Twins/Triplets (Yes/No); Sex; Cause of Death original; Cause of Death in our classification; Father's Occupation -our classification; Information the Father; Marital Status of the Mother at time of childbirth; Legitimacy of Birth; Information about the Mother; Occupational Group (usually of the Father).

Classifications for causes of death and occupations are given in the file.

References

Allison, Paul D. (1984): Event History Analysis. Regression for Longitudinal Event Data. Beverly Hills: Sage Publications

Becker, Karl M. L. (1869): Preussische Sterbetafeln, berechnet auf Grund der Sterblichkeit in den 6 Jahren 1859-64, auch Vergleich mit fremden Sterbetafeln. In: Zeitschrift des Königlich Sächsischen Statistischen Bureaus 9,17: 126-144

Becker, Karl M. L. (1874): Zur Berechnung von Sterbetafeln an die Bevölkerungsstatistik zu stellende Anforderungen. Berlin: Verlag des Königlichen Statistischen Bureaus

Brandenburg, Hajo; Gehrmann, Rolf; Krüger, Kersten; Künne, Andreas; Rüffer, Jörn (1991): Berufe in Altona 1803. Berufssystematik für eine präindustrielle Stadtgesellschaft anhand der Volkszählung. Kleine Schriften des Arbeitskreises für Wirtschafts- und Sozialgeschichte Schleswig-Holsteins, Band 1. Kiel: Arbeitskreis für Wirtschafts- und Sozialgeschichte Schleswig-Holsteins

Brandenburg, Hajo; Kroll, Stefan (1998): „Erwerbsstruktur" und „Beruf". Möglichkeiten und Grenzen einer Berufssystematik für präindustrielle Stadtgesellschaften. In: Krüger, Kersten; Kroll, Stefan (Hrsg.): Die Sozialstruktur der Städte Kiel und Altona um 1800. Demographie, Erwerbsstruktur und wirtschaftliche Leistungsfähigkeit. Studien zur Wirtschafts- und Sozialgeschichte Schleswig-Holsteins, Band 29. Neumünster: Wachholtz Verlag: 21-29

Esenwein-Rothe, Ingeborg (1982): Einführung in die Demographie. Bevölkerungsstruktur und Bevölkerungsprozess aus der Sicht der Statistik. Wiesbaden: Franz Steiner Verlag

Gaber, Elisabeth; Wildner, Manfred (2011): Sterblichkeit, Todesursachen und regionale Unterschiede. Gesundheitsberichterstattung des Bundes, Heft 52. Berlin: Robert Koch Institute

Gesenius, Heinrich J. F. (1839): Kirchliche Gesetzsammlung, enthaltend eine systematische Zusammenstellung der seit dem Jahre 1820 bis 1838 ergangenen, auf Kirche und Schulwesen bezüglichen Verordnungen und gesetzlichen Bestimmungen für Mecklenburg-Schwerin, nach Ordnung und als Fortsetzung des Siggelkowschen Handbuches, so wie der späteren Ackermannschen Sammlung. Parchim und Ludwigslust: Hinstorff'sche Hofbuchhandlung

Gesenius, Heinrich J. F. (1847): Fortgesetzte kirchliche Gesetzsammlung, enthaltend eine systematische Zusammenstellung der seit 1797-1820 und von 1839 bis Ostern 1847 ergangenen, auf Kirche und Schulwesen bezüglichen Verordnungen und gesetzlichen Bestimmungen für Mecklenburg-Schwerin, nach Ordnung und als Fortsetzung des Siggelkowschen Handbuches, so wie der späteren von 1820 bis 1839 gehenden Gesenius'schen Sammlung. Parchim und Ludwigslust: Hinstorff'sche Hofbuchhandlung

Höfler, Max (1899): Deutsches Krankheitsnamen-Buch. München: Piloty & Loehle. Nachdruck: Hildesheim: Georg Olms (1970)

Köppe, Tobias (2010): Kirchensprengung und -abriss in der Deutschen Demokratischen Republik. http://www.kirchensprengung.de/cms/kirchensprengung_rostock.html, accessed on 25 November 2013

Kuzia, Detlef (2004): Historische Rostocker Bauwerke. Rostocker Jakobi-Kirche. Reich und doch nicht erste Adresse. http://www.mv-terra-incognita.de/beitraege/denkmale/verlorene/jakobi/jakobi1.htm, accessed on 25 November 2013

Lorenzen-Schmidt, Klaus-Joachim (1996): Lexikon historischer Berufe in Schleswig-Holstein und Hamburg. Kleine Schriften des Arbeitskreises für Wirtschafts- und Sozialgeschichte Schleswig-Holsteins, Band 2. Kiel: Arbeitskreis für Wirtschafts- und Sozialgeschichte Schleswig-Holsteins

Manke, Matthias (2000): Rostock zwischen Revolution und Biedermeier. Alltag und Sozialstruktur. Rostocker Studien zur Regionalgeschichte, Band 1. Rostock: Ingo Koch Verlag

Millies, Ernst (1895): Circular-Verordnungen des Oberkirchenraths an die mecklenburg-schwerinsche Landesgeistlichkeit aus der Zeit 1849-1894. Schwerin: Herberger'sche Buchdruckerei

Millies, Ernst (1896): Die Kirchenbuchsführung in den mecklenburg-schwerinschen Kirchengemeinden. Nach amtlichen Quellen dargestellt. Schwerin: Sandmeyersche Hofbuchdruckerei

Millies, Ernst (1910): Zirkular-Verordnungen des Oberkirchenrats an die mecklenburg-schwerinsche Landesgeistlichkeit aus der Zeit 1895-1909. Schwerin: Herberger'sche Buchdruckerei

Mühlichen, Michael (2011): Säuglingssterblichkeit in Rostock im 19. Jahrhundert. Eine demografische Analyse anhand von Kirchenbuchdaten. Master's thesis at the Faculty of Economic and Social Sciences of the University of Rostock

Mühlichen, Michael; Scholz, Rembrandt D. (2015): Dokumentation der Aufbereitung historischer Kirchenbuchdaten am Beispiel der Säuglingssterblichkeit in der Hansestadt Rostock. BiB Daten- und Methodenberichte 2/2015. Wiesbaden: Bundesinstitut für Bevölkerungsforschung

Mühlichen, Michael; Scholz, Rembrandt D.; Doblhammer, Gabriele (2015): Social Differences in Infant Mortality in 19th Century Rostock. A Demographic Analysis Based on Church Records. In: Comparative Population Studies 2/2015 (pre-published online)

North Atlantic Population Project (2013): OCCHISCO. Occupation, HISCO Classification. https://www.nappdata.org/napp-action/variables/OCCHISCO#codes_section, accessed on 25 November 2013

Roberts, Evan; Woollard, Matthew; Ronnander, Chad; Dillon, Lisa Y.; Thorvaldsen, Gunnar (2003): Occupational Classification in the North Atlantic Population Project. In: Historical Methods 36,2: 89-96

Scholz, Rembrandt D. (2013): Zur demographischen Entwicklung der Hansestadt Rostock im 19. Jahrhundert. In: Busch, Michael; Kroll, Stefan; Scholz, Rembrandt D. (Hrsg.): Geschichte - Kartographie – Demographie. Historisch-Geographische Informationssysteme im methodischen Vergleich. Geschichte: Forschung und Wissenschaft, Band 45. Münster: LIT Verlag: 195-227

Schulz, Inga-Marie (2008): Die Säuglingssterblichkeit in Rostock im Zeitraum 1875-1910. Eine Studie auf Basis der Sterberegister der Kirchengemeinde St. Jakobi. Bachelor's thesis at the Faculty of Economic and Social Sciences of the University of Rostock

Szołtysek, Mikołaj; Gruber, Siegfried; Zuber-Goldstein, Barbara; Scholz, Rembrandt (2012): Living Arrangements and Household Formation in an Industrializing Urban Setting: Rostock 1867-1900. In: Annales de démographie historique 122,2: 233-269

Van Leeuwen, Marco H. D.; Maas, Ineke; Miles, Andrew (2002): HISCO. Historical International Standard Classification of Occupations. Leuven: Leuven University Press

Van Leeuwen, Marco H. D.; Maas, Ineke (2011): HISCLASS. A Historical International Social Class Scheme. Leuven: Leuven University Press

Zeuner, Gustav A. (1869): Abhandlungen zur mathematischen Statistik. Leipzig: Arthur Felix

Appendix

Table 3: Variables, values and labels in the data set of St. James parish, Rostock, 1815-1829

Variable	Variable label	Value range	Remark
PersNo	Personal number	Running from 1001 to 3912	
BYear	Year of birth	1815 until 1829	
BMonth	Month of birth	1 January until 12 December	
BDay	Day of birth	1 until 31	99 unknown
CYear	Year of christening	1815 until 1830	8888 not baptized; 9999 unknown
CMonth	Month of christening	1 January until 12 December	88 not baptized; 99 unknown
CDay	Day of christening	1 until 31	88 not baptized; 99 unknown
DYear	Year of death	1815 until 1830	
DMonth	Month of death	1 January until 12 December	
DDay	Day of death	1 until 31	99 unknown
FYear	Year of funeral	1815 until 1830	9999 unknown
FMonth	Month of funeral	1 January until 12 December	99 unknown
FDay	Day of funeral	1 until 31	99 unknown
Days	Age at death in days	0 stillbirth	
		1-357 Infant death	Life spans of only a few minutes or hours are entered as 1 day
		99999 No infant death	
Death	Death	1 Yes	Stillbirths and infant deaths
		0 No	
Perinatal	Perinatal death	1 Yes	Stillbirths and early neonatal deaths
		0 No	
Season	Season at birth	1 Spring	March until May
		2 Summer	June until August
		3 Autumn	September until November
		4 Winter	December until February
Christen	Baptism	1 Yes	
		2 No	
Immigration	Immigration	1 Immigrated	Cases that are only registered in the burial lists, not in the baptismal lists (except for stillbirths)
		2 Not immigrated	
Twin	Twins/Triplets	1 Yes	
		2 No	
Sex	Sex of birth	1 Male	
		2 Female	
		9 Not specified	
CauseDeath	Cause of death	Original German term after harmonizing variant forms of spelling	
CauseClass	Cause of death - own classification	1 Respiratory disease	
		2 Stroke	
		3 Infectious disease	
		4 Gastro-intestinal disease	
		5 Atrophy, weakness	
		6 Other cause	
		8 Stillbirth	
		9 Did not die during first year	
OccupationF	Father's occupation	Original German term after harmonizing variant forms of spelling	
OCCHISCO	Father's occupation	NAPP OCCHISCO classification	http://www.nappdata.org

Variable	Variable label	Value range	Remark
OccClass	Father's occupation - own classification	100-140 Trade	Details on sub-categories are listed in Table 4
		200-272 Craftsmanship	
		300-330 Services	
		400-450 Administration	
		500-530 Agriculture	
		600-652 Food production	
		700-742 Shipping, military	
		900-930 Unknown, other	
RemarkF	Remark on the father	1 None	
		2 Deceased	
		3 Reported himself as father	
		4 Alleged father	
		5 Illegitimate	
		6 Unknown	
MaritalStatus	Marital status of the mother at the time of childbirth	1 Married	
		2 Engaged	
		3 Unmarried	
		4 Divorced	
		5 Widowed	Father died before childbirth
		6 Married but illegitimate birth	The husband is not the father
		7 Widowed but illegitimate birth	
		8 Divorced, widowed or married but illegitimate birth	
Legitimacy	Legitimacy of birth	1 Legitimate	Mother was married or engaged to the child's father at the time of childbirth
		2 Illegitimate	Mother was neither married nor engaged to the child's father
RemarkM	Remark on the mother	1 None	
		2 Died after childbirth	
		3 Married child's father after childbirth	Incomplete since we don't have this information for all births
		4 Originated from another place	
		5 Madame	Related to husband's social rank
		6 Baroness	Wife of a baron/landowner
Other Remark	Other remarks	-	

Source: Authors' classifications

Table 4: Father's occupations in the data set of St. James parish, Rostock, 1815-1829

Upper group	Subgroup	Description
Trade	100 Tradesman, other	Tradesman, wine merchant, flour merchant etc.
	110 Merchant	
	120 Grocer	
	130 Carter	Carter, wagoner, carriage driver
	140 Innkeeper	
Craftsmanship	200 Craftsman, other	Several other craftsmen
	201 Master craftsman, other	
	202 Apprentice craftsman, other	
	210 Construction worker	Mason, stone mason, builder
	211 Construction master	
	212 Construction apprentice	
	220 Carpenter	Carpenter, cabinetmaker, cooper, sawyer, turner, wheelwright etc.
	221 Master carpenter	
	222 Apprentice carpenter	
	230 Ship carpenter	Ship's carpenter
	231 Master ship carpenter	
	232 Apprentice ship carpenter	
	240 Textile craftsman	Tailor, weaver, hat maker, cloth maker, sail maker
	241 Master textile craftsman	
	242 Apprentice textile craftsman	
	250 Shoemaker	Shoemaker, pantofle maker, boot maker
	251 Master shoemaker	
	252 Apprentice shoemaker	
	260 Metalworker	Blacksmith, locksmith, plumber, girdle maker, brazier etc.
	261 Master metalworker	
	262 Apprentice metalworker	
	270 Painter	No differentiation between crafts and arts
	271 Master painter	
	272 Apprentice painter	
Services	300 Laborer (not otherwise specified)	
	310 Hired servant, day laborer	
	320 Porter	
	330 Musician	
Administration	400 Clerk, administrative secretary	Secretary, copyist, academic book printer
	401 High-level official	Calculator, supervisor, counselor etc.
	402 Low-level official	Mayoral servant, beadle, grave-digger, bailiff
	410 Jurist	Advocate, notary, syndic, Doctor of Laws, protonotary, chancery director, chancery clerk
	420 Teacher, professor	
	430 Clergyman	Deacon, pastor, cantor
	440 Physician	
	450 Nobleman, landowner	
Agriculture	500 Field worker	
	510 Fisherman	
	520 Gardener	
	530 Shepherd, groom	

| Upper group	Subgroup	Description
Food production	600 Cook	
	610 Baker	
	611 Master baker	
	612 Apprentice baker	
	620 Beer brewer	
	630 Distiller	
	640 Miller	
	650 Food manufacturer	Chicory manufacturer
	651 Master food manufacturer	Master tobacco manufacturer
	652 Apprentice food manufacturer	Apprentice tobacco manufacturer
Shipping / military	700 Sailor	
	710 Mariner	
	711 Ship's master	
	712 Steersman, ship's mate	
	720 Seaman	
	730 Lighterman	
	740 Non-commissioned officer	
	741 Captain	
	742 Soldier	
Unknown / other	900 Not specified	
	910 Pensioner	
	920 No longer employed	
	930 Father unknown	

Source: Authors' classifications

Figure 6: Population development in Rostock from 1792 to 2013
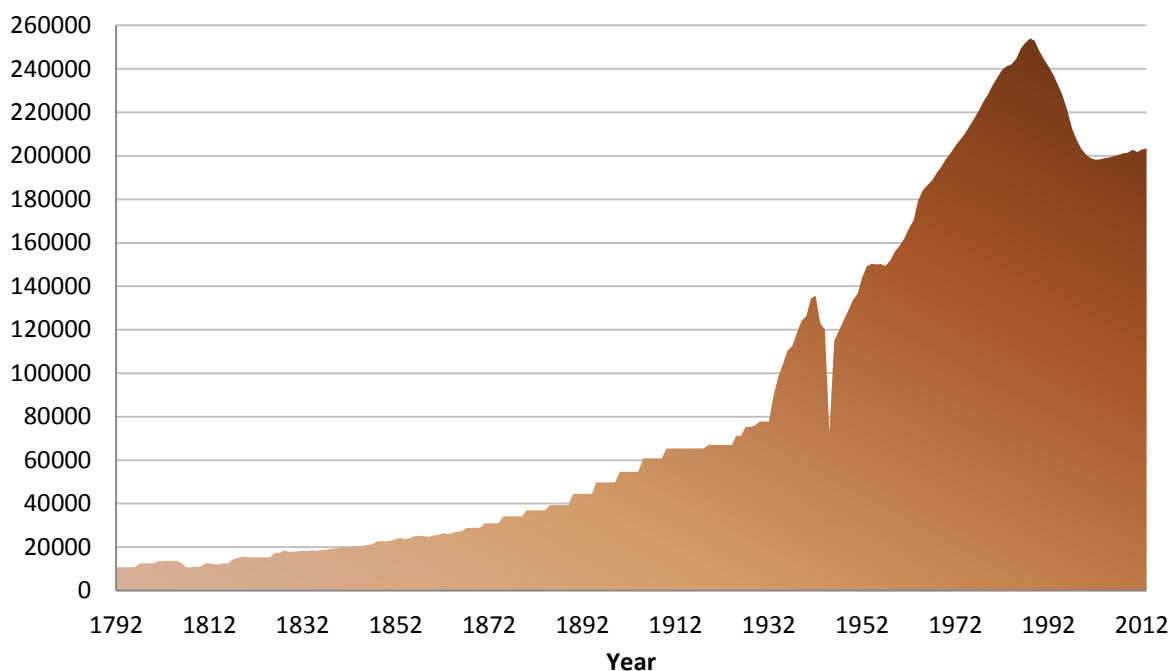
Source: Kommunale Statistikstelle der Hansestadt Rostock; Staatskalender von Mecklenburg-Schwerin

Figure 7: St. James's Church (Jakobikirche) in Rostock, around 1920
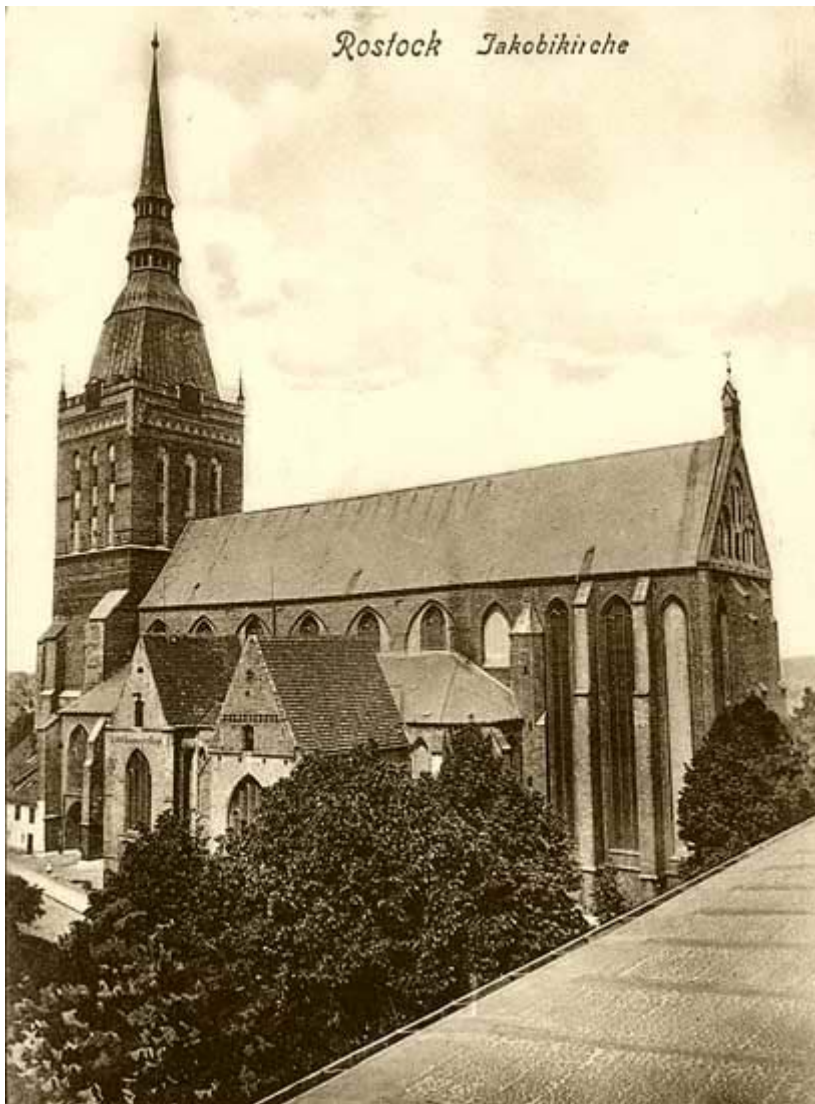
Source: Archiv Berthold Brinkmann (MV-Terra-Incognita.de)