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Fertility in Rostock in the 19th Century

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Introduction

Mortality and marriage patterns in Rostock in the 19th Century have already been analysed extensively (Scholz 2013; Mühlichen 2011; Oeppen and Toch 2010; Scholz and Gruber 2011a; Scholz and Gruber 2011b; Schulz 2009; Szołtysek, Gruber, Scholz, Zuber-Goldstein 2009; Szołtysek, Gruber, Scholz, Zuber-Goldstein 2011; Mühlichen and Scholz 2015; Mühlichen, Scholz, Doblhammer 2015), while fertility has attracted less attention until now (Lange 2010). This study will help fill this gap. It is also driven by the fact that at the end of the 19th Century a development began which led to permanent lower birth and death rates (known as the "demographic transition").

The situation concerning data needed for historical demographic and statistical research is comparatively good for Mecklenburg-Schwerin. The original manuscripts of several historical censuses dating back into the 19th Century, containing data on individual persons, are still available for the entire region. Church books documenting demographic events of specific individuals are available for many regions for nearly every year. Such data require a considerable amount of work before they can be used for quantitative research, because they must first be transcribed. Over the past 40 to 60 years it has been possible to include historical demographic data, either completely or as samples, in databases and to make these systematically accessible for some European countries.

In Germany there is still a considerable backlog demand concerning accessibility of such historical sources. Quantitative historical demography developed here quite slowly following WWII and only a few centres exist in which quantitative demographic research is being conducted.[1] The department of history at the University of Rostock has fostered contributions to quantitative historical demography during the last 20 years. The transcription of the census of Mecklenburg-Schwerin in 1819, including the city of Rostock and its analysis, is especially noteworthy.[2] From 2008-2011 the federal state of Mecklenburg-Vorpommern funded the "Rostocker Forschungsverbund Historische Demographie" – a co-operation between the University of Rostock and the Max Planck Institute for Demographic Research. This co-operation also included the transcription of handwritten manuscript sources of the censuses of Mecklenburg-Schwerin for the years 1867 and 1900 and of selected demographic events which were found in the church books of Rostock dating from the 19th Century.[3]

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[1] The works by A. Imhof and R. Gehrmann must be mentioned here, which are based on individual transcriptions and analyses of microdata for some regions of Germany.

[2] The pilot project named „Mecklenburg in the Demographic Transition of the 18th and 19th century" provided the framework for this analysis. Historians based at Rostock have published several results of the analysis of the urban population and social history at the beginning of the 19th century, as e.g. Krüger and Kroll 1998; Krüger 1998; Krüger 2000; Krüger 2003; Krüger 2007; Manke 1999; Manke 2000; Manke 2005a; Manke 2005b.

[3] See also Scholz 2013. The data transcribed in the framework of the project "Rostocker Forschungsverbund Historische Demographie" between 2008 and 2011 (census lists and church books) will be made available in a

The census data of the Grandduchy of Mecklenburg-Schwerin for the years 1819, 1867, and 1900 are completely preserved and can be used for scholarly research. Until now there have only been a few databases of microdata of complete urban populations in Germany which allow us to reconstruct demographic developments over a longer period of time. The analysis of the city of Rostock is not representative of Mecklenburg-Schwerin as a whole, but the modernization processes and the change over centuries of a society based upon estates can only be analysed in an urban society which is large enough to yield results which are generalizable. Only a few German-speaking cities have such readily available microdata, primarily because the effort needed to construct such a database is immense. The data for the censuses of 1819, 1867, and 1900 for the city of Rostock, which are used for analysis in this paper, have been standardized as part of the Mosaic-Project (www.censusmosaic.org), making a comparative analysis with other data of the Mosaic-Project and with microdata of international databases, such as NAPP (https://www.nappdata.org/napp/) and IPUMS (https://international.ipums.org/international/), possible (see also Szołtysek and Gruber 2016).

Population development in Rostock

A statistical source as a compilation of data of church districts (Präposituren) in Mecklenburg-Schwerin was published long before the establishment of public statistics in 1851. The "Mecklenburgische Staatskalender" was first published in 1784 and contained systematical demographic data, including population figures starting in 1796. Table 1 depicts population development for the time period 1795-1900. Population growth was steady for the city of Rostock throughout the entire 19th Century, which was primarily due to the high rate of immigration.

Table 1: Population development in Rostock 1795-1900

year	absolute population	relative population to 1795
1795	10,829	100
1810	11,543	107
1825	16,146	149
1840	19,673	182
1855	24,471	226
1870	29,855	276
1885	42,168	389
1900	60,454	558

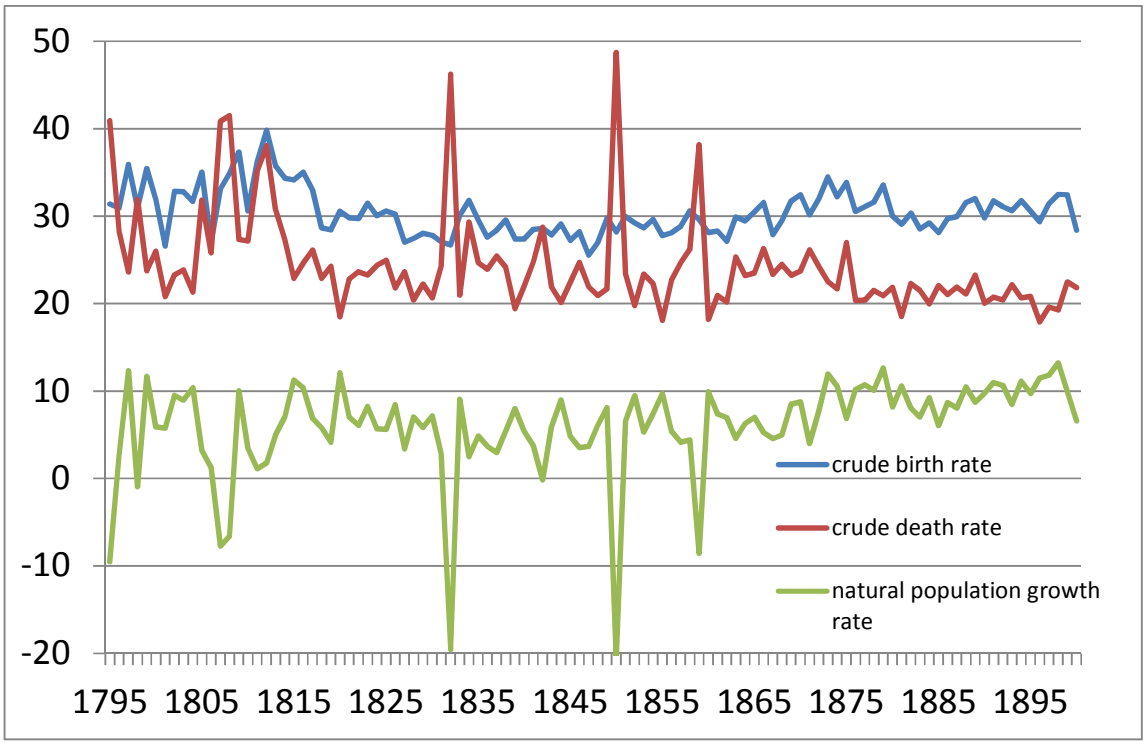
Source: Author's calculations based on Staatskalender (Scholz 2013).
Note: 5-year-moving averages with correction due to the change in territorial area in 1875.

In addition to the population figure, the numbers of demographic events (births and deaths) are also published yearly in the Staatskalender; therefore demographic rates can be computed. We can calculate the yearly net migration as well as the population growth. Mecklenburg-Schwerin was characterized by very high birth rates, high growth rates, and, starting in 1826, high and increasing

database of the Max Planck Institute for Demographic Research in Rostock as RAPHIS (Rostock's archive of historical demography).

rates of emigration (net migration was negative). In the same time period both birth rates and death rates decreased slightly (Scholz 2013). Natural population growth rates in Mecklenburg-Schwerin were quite high, but population growth in the 19th Century was below the average of the German Customs Union due to emigration (Marschalck 1984, 28 and 150). The city of Rostock, in contrast, was characterized by a consistently lower birth rate. Only at the end of the 19th Century did the number of births increase due to the population increase, while the birth rate remained almost the same (Scholz 2013). Demographic rates for Rostock in the time period 1795-1900 can be seen in Figure 1. Immigration was the primary cause of population growth for the full period. Three peaks of the mortality rate are outstanding (epidemics of cholera in 1832, 1850, and 1858), which represent a doubling of deaths compared to the previous years. In the following year these led to a higher immigration rate as well. The random fluctuations in the demographic development decreased in extent due to the population increase until the end of the century.

Figure 1: Birth rates, mortality rates, and natural population rates in % for the Hanseatic city of Rostock in 1795-1900



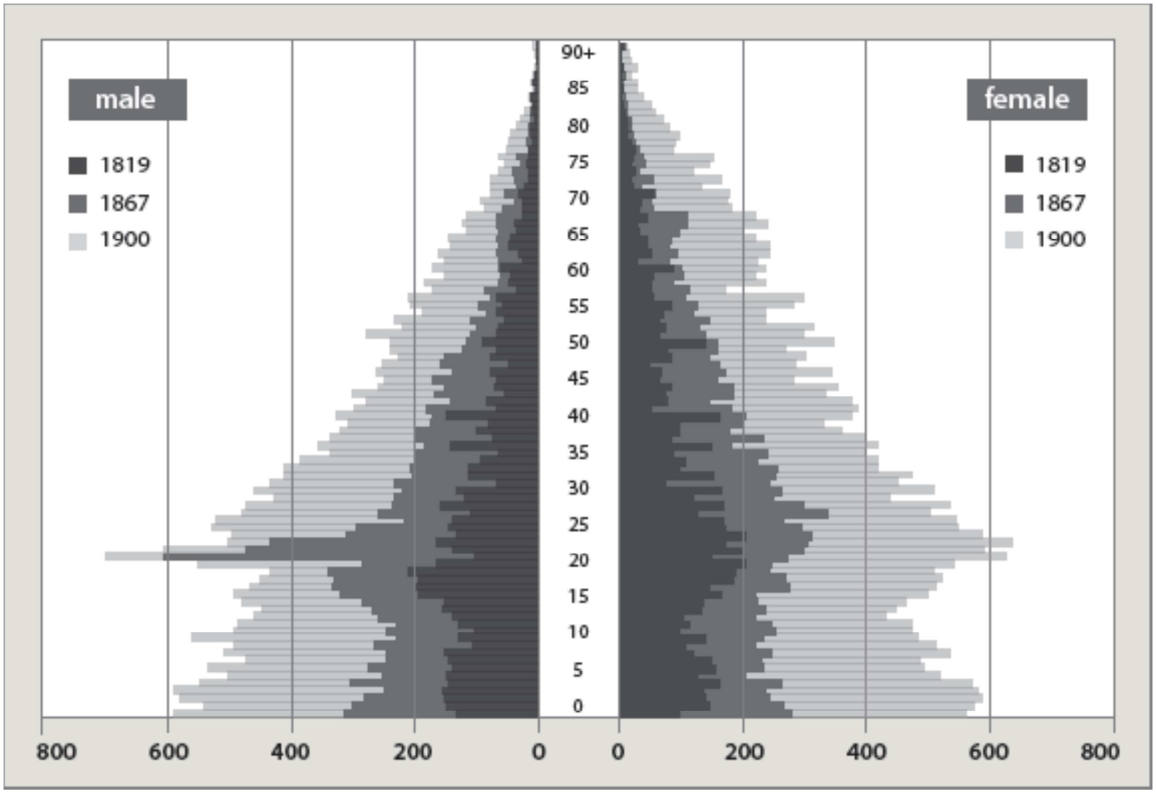
Source: Authors' calculations based on Mecklenburgischem Staatskalender 1795-1900; church district of Rostock, since 1875 recruiting district of Rostock.

Population structure in Rostock

The most important demographic characteristics of the population structure are sex and age. The age structure displays the effects of previous demographic events and developments. The supply of workforce in Rostock was met mostly by immigration. We can also find pupils, students, and soldiers in many households who were not born within the city walls. The censuses of 1819 and 1900 contain information about the place of birth, and therefore calculations about past immigration are possible.

The results show that the time since immigration and the age correlate highly. The time since immigration is especially valuable information (Szołtysek, Gruber, Scholz, Zuber-Goldstein 2009). It is clear that the city of Rostock experienced not only strong immigration at that time, but also strong emigration (Szołtysek, Gruber, Scholz, Zuber-Goldstein 2011).

Figure 2: Age pyramids of the population by sex in Rostock 1819, 1867, and 1900, absolute numbers



Source: Censuses 1819, 1867, and 1900 (Scholz 2013).

The change in the age structure is visible in comparing the three age pyramids in Figure 2. We see which age groups have especially profited from immigration and in which age groups growth has been especially high. At the same time the base of the population pyramid grows very strong as a consequence of the larger age group of women in the age bracket 25-40 years. In the age distribution of the census of 1819 the high but expected number of missing of children in their first year of life is striking.

The population of Rostock resided primarily in nuclear families: three quarters of the residents lived in such constellations. Solitaries comprised more than 15 percent of all households, but due to their small size they contained only five to six percent of the population. Complex family forms, e.g. extended families and multiple families, increased during the 19th Century. At the same time the proportion of persons living in institutional households, such as hospitals or military barracks, also increased.

Table 2: Household typology in percentages

	1819		1867		1900	
	households	persons	households	persons	households	persons
Solitaries	16.5	6.5	17.6	6.3	14.7	5.2
No family	1.6	1.1	2.2	1.5	2.2	1.6
Simple family household	76.8	84.4	71.8	77.2	73.6	75.9
Extended family household	4.0	5.8	6.2	8.8	6.8	9.2
Multiple family household	0.6	0.7	1.6	2.3	2.2	3.1
Institutional household	0.5	1.5	0.7	3.9	0.5	5.1
N	3,598	15,460	6,785	29,660	14,215	55,705

Source: Authors' calculations, Censuses 1819, 1867, and 1900 (see data references).

Note: The data for 1819 is of lower quality because the household borders in this census were not reported explicitly (Gruber, Scholz, Szołtysek 2011).

Marital status in Rostock

Another important demographic characteristic is marital status. The relationship of age, sex, and marital status can also be depicted as a population pyramid. During the period of analysis the proportion of different marital statuses is quite stable (Scholz 2013). The two earlier censuses yield very similar ages at marriage (SMAM: Hajnal 1953): 30.5 respectively 30.4 years for men and 27.4 respectively 28.3 years for women. Later the age at marriage decreases to 27.6 years for men and 25.4 years for women. The proportion of people who are single at age 30 is higher for women than for men. Widowhood is experienced more often by women than by men. This is caused by the younger age at marriage of women and the higher rate of remarriage among men, especially at younger ages. Divorced people appear only in the census of 1900, but they remain a very small group. A more elaborated comparison of marital status becomes interesting when the occupations of married people are included. We can observe that persons who were registered as ordinary workers in the census married at the youngest ages (Szołtysek, Gruber, Scholz, Zuber-Goldstein 2011: 241).

Mortality in Rostock

In addition to the trend in crude mortality rates, which compares the number of dead persons to the total population, infant and child mortality for the city of Rostock can also be analysed.[4] A mortality analysis including all age groups must consider the age structure of the entire population. The calculation of the mean life expectancy (adjusted mortality) enables more generalization and includes the deaths but also the population by age and sex. Three censuses, church registers, and

[4] During the last years several student theses using the microdata of the Hanseatic city of Rostock were written: Schulz 2009; Lange 2010; Prill 2010; Kohagen 2010; Mühlichen 2011.

cemetery lists provide appropriate data for Rostock, making it possible to calculate period life tables and life expectancies for the years 1819, 1867, and 1900. In Table 3 the period life tables for the city of Rostock according to the method proposed by Chiang (Chiang 1984) are presented for each census year and for both sexes. The exact number of persons and deaths in the age group up to one year of life is of high importance for overall life expectancy because of the influence of infant mortality on overall mortality. The numbers for the year 1819 have therefore been adjusted for under-registration (Scholz 2013).

Table 3: Period life table by age and sex, Rostock 1819-1900

		1819		1867		1900	
	age	l(x)	e(x)	l(x)	e(x)	l(x)	e(x)
men	0	100000	33.44	100000	33.22	100000	43.07
	1-14	59670	45.21	57572	46.39	72311	49.13
	15-34	58601	41.00	56193	42.48	71516	44.65
	35-59	50727	25.62	47159	28.33	63301	29.15
	60-79	27912	10.98	28282	12.64	39285	12.85
	80+	3470	5.01	4593	5.68	7881	4.98
women	0	100000	35.91	100000	36.57	100000	49.81
	1-14	71895	48.84	74273	48.14	83366	58.70
	15-34	58431	45.32	56402	47.96	74746	51.02
	35-59	52018	29.54	49889	32.58	68869	34.40
	60-79	34656	12.28	34883	15.18	52044	15.75
	80+	5882	3.93	10089	4.17	16465	4.91

Source: Authors' calculations based upon church registers (1816-1822), cemetery lists (1865-1871, 1898-1902), and census lists (1819, 1867, 1900) from the research project "Aging Society" Forschungsverbund Historische Demographie. Note: Information from the Staatskalender was used in order to adjust the mortality of the age group 1-14 years – in contrast to an earlier version for 1819 (see Scholz 2013). The results are slightly lower life expectancies for the year 1819.

A comparison of mortality for these three census years shows differences due to systematic changes. At the end of the 19th Century there were changes which especially affected children and young people. Mortality in middle and higher ages remained rather constant, and the difference between men and women is quite noticeable. The city of Rostock had very favourable life expectancy compared to other German cities – as did Mecklenburg-Schwerin compared to other German

regions. This life expectancy was comparable to Scandinavian countries. Comparing mortality respective to life expectancy of different social strata in Rostock in the 19th Century shows that the upper class did not always have the highest life expectancy. The city quarters were more decisive for life expectancy than the social stratum (Scholz and Gruber 2011a).

Fertility in Rostock

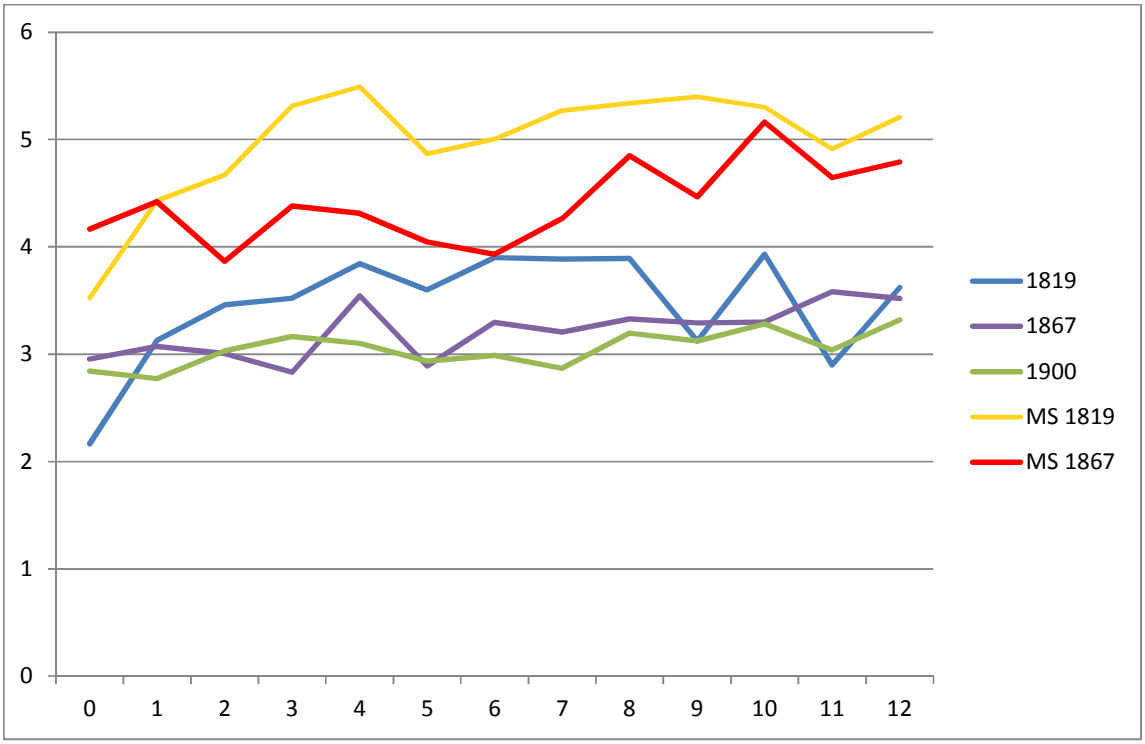
This study utilizes the Own-Children-Method (OCM) for analysing fertility (Breschi and De Santis 1997; Breschi, Kurosu, Oris 2003; Cho, Retherford, Choe 1986; Childs 2004). In this method, children are assigned to their mothers and then the average numbers of children by single ages for mothers by single ages are calculated. These figures are then used to calculate the age-specific fertility rates of past years. Correction factors have to be used in accounting for age-specific mortality rates of children and mothers and for those children who cannot be assigned to their mothers. These children are either orphans or foster children, or the information in the census does not allow them to be assigned to their mothers. Other possible factors such as under-registration of children in the census or wrong age information are not adjusted for in this paper. Correction factors for mortality have already been published for single ages of children (Breschi and De Santis 1997, 37). These will be applied in using the mortality displayed in Table 3.[6]

The data of a rural sample of the censuses of 1819 and 1867 for Mecklenburg-Schwerin is used as a comparison. This yields very similar results of 2.8 to 3.8 children born per woman in Rostock for the three censuses. Fertility decreases during the 19th Century and the yearly fluctuations become less pronounced. These developments mirror the development of fertility in Germany and Europe. The analysis of the rural data yields considerably higher numbers of children born per woman: 4.5 to 5.5 before 1819 and 4 to 5 before 1867 (decreasing at first and stable later on). The highest average number of children born was calculated for three to four years preceding the census of 1819. In the last years preceding the census, the number of children decreased, especially in the census year. This is similar to the situation in the city of Rostock. One reason for this result is that the census was not taken on December 31st, but earlier in the year. Therefore the number of children born in the census year is not complete (ages of children refer here to the year of birth and not to the exact age or date of birth, because very often only the year of birth is registered in the census lists). In 1867 and 1900 the census was taken at the beginning of December, therefore the number of children has been adjusted for the missing month of December. After that adjustment, no drop in fertility for the census year is to be seen. In 1819 no reference date was decreed, thus the census was taken at different dates in different settlements. A general adjustment is therefore not possible and the results for the census year are not correct. In the two years preceding the census, there was an under-registration of the youngest children, hence the calculated fertility is lower than the real one. Children under the age of five years were not counted in earlier population tallies of Mecklenburg-Schwerin, and therefore some time was needed to reach a complete enumeration of children.

[6] We apply the model West of the Coale-Demeny-Tables (Coale and Demeny 1983) with the following life expectancies at birth: 35 years (Rostock 1819 and 1867), 42.5 years (rural Mecklenburg-Schwerin 1867), 45 years (rural Mecklenburg-Schwerin 1819), 47.5 years (Rostock 1900).

The population of Rostock has fewer children than the population of rural Mecklenburg-Schwerin. Lower urban fertility has been found for the whole of Germany (Knodel 1974, 89-112). A study of Italian cities in the 19th Century using the Own-Children-Method (OCM) yields only for Cesenaa similar low average fertility (3.4 children) in 1811, while in Udine in 1833 (3.9 children) and Venice in 1865 (5.4 children) fertility is higher (Breschi, Derosas, Rettarolli 2003, 112). In the Belgian city of Tilleur (mining and heavy industry) the average number of children is 6.8 for the time period 1857-1866 (Oris 2003, 85). An analysis of Japanese villages yields an average number of 5.1 children per woman in the 19th Century (Kurosu 2003, 68), which is close to the results for rural Mecklenburg-Schwerin. In Tuscany in the 15th Century the average number of children is much higher: 7.8 children on average, and in the city of Florence it was as high as 8.6 children (Breschi and Serio 2003, 46).

Figure 3: Calculated average number of children born per women in Rostock and Mecklenburg-Schwerin 1819-1900



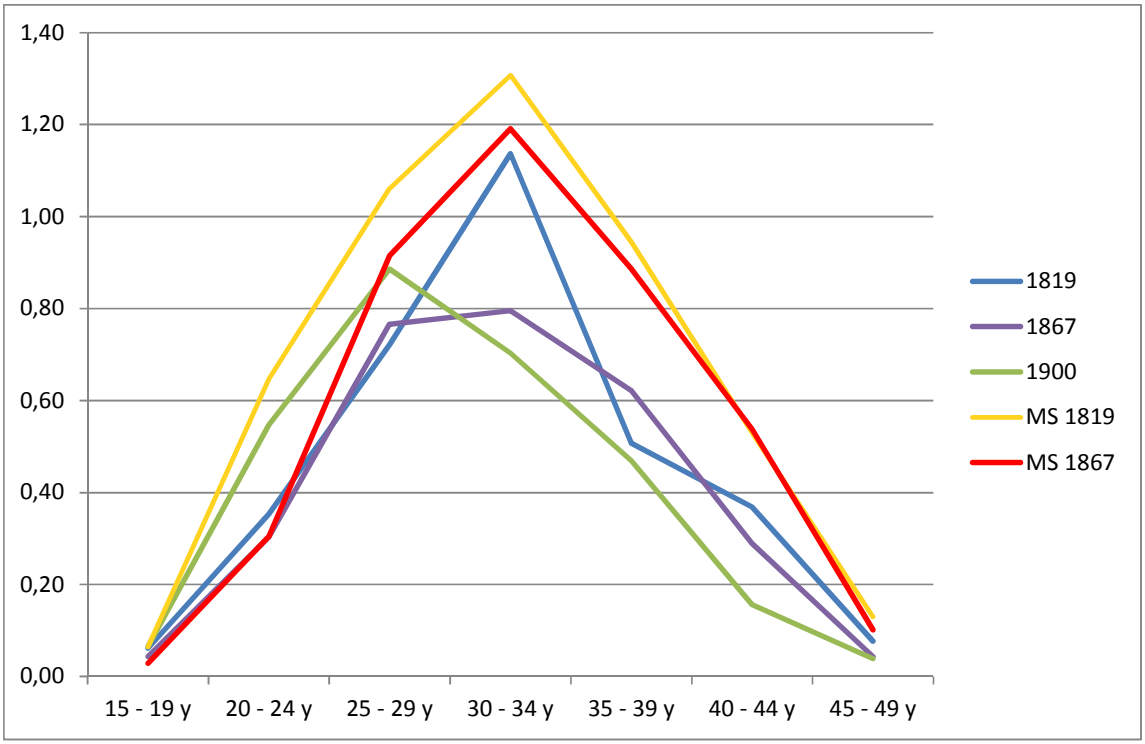
Source: Authors' calculations using OCM.
Note: Years preceding the respective census of 1819, 1867, and 1900 (see data references).

The permanent decline of general and marital fertility in Mecklenburg (both Grandduchies together) begins in 1892 and in Germany as a whole in 1895 according to the European Fertility Project (Knodel 1974, 62). In 1870 marital fertility in Mecklenburg is the second lowest among 71 regions of Germany (Knodel 1974, 54 and 272). General fertility in 1870 is also among the lowest within Germany and remains at about the same low level 30 years later, albeit with an up and down (Knodel 1974, 271). An analysis of two villages in Mecklenburg yields a decrease of the average number of born children

from 5.7 – 6.1 to 4.0 – 4.7 from the second half of the 18th Century to the second half of the 19th Century (Knodel 1974, 47).

In the next step we shall examine the age-specific fertility more closely to find possible reasons for the differential fertility between urban and rural populations. The analysis is based on children between one and five years old in the census years. This age group was chosen because the analysis of a single birth year would be influenced too much by random variations, and because the data of the census year is not complete (see above). The patterns for the rural population in 1819 and 1867 are very similar, with the highest fertility in the group of 30-34 years. The pattern of age-specific fertility in Rostock in the years preceding 1819 is quite similar to the rural pattern, but is lower in all age groups. The censuses of 1867 and 1900 have much lower maxima of fertility, and in 1900 the highest fertility is already in the age group of 25-29 years. This development is caused by the decreasing age at marriage. The decrease in fertility in older age groups is an outcome of the demographic transition which leads to permanently lower fertility.

Figure 4: Calculated age specific fertility compared, Rostock and Mecklenburg-Schwerin 1819-1900



Source: Authors' calculations using OCM of censuses 1819, 1867, and 1900 (see data references).

The majority of children are born in wedlock, so marital fertility is the most important component of general fertility. In the next analysis we shall therefore concentrate only on married women, whose husbands are present at the time of the census. Few women are married before age 20, and these women have disproportionally high fertility in Rostock. By excluding these young women from the analysis we see: there are about 5 children per woman in Rostock in 1900, about 6 children per woman in Rostock in 1819 and 1867, and about 7 children per woman in rural Mecklenburg-

Schwerin. These average numbers of children are much higher than those noted above, and the reason is the low proportion of married women at that time. In the age group 35-39 years, only two thirds of women are married in Rostock, only in 1900 is the proportion slightly higher. In contrast rural women are married much more often in this age group: 90 percent (1819) respectively 80 percent (1867). Decreasing ages at marriage in the last decades of the 19th Century can be seen in the proportions of married women in the age group 25-29 years: in 1819 and 1867 less than 40 percent are married, while in 1900 almost 60 percent are already married. The increase of married women partly compensates for the decrease in marital fertility.

The average number of co-residing children (defined as up to age 14 years) in the households is almost the same for all three censuses in Rostock. Half the households contain no children at all, 20 percent contain one child, about 15 percent contain two children, and about 16 percent contain three or more children. These numbers reflect the low fertility levels in Rostock. In rural Mecklenburg-Schwerin in 1819 and 1867 the proportions of households without any children are much lower, and the share of households with three or more children is much higher.

Table 4: Number of co-residing children in the household, in percentages, in Rostock and Mecklenburg-Schwerin 1819-1900

	Rostock 1819	Rostock 1867	Rostock 1900	Mecklenburg-Schwerin 1819	Mecklenburg-Schwerin 1867
0	49.1	48.3	48.6	39.7	27.6
1	20.1	20.0	20.8	17.7	22.0
2	14.0	14.6	14.6	16.9	20.6
3	8.6	9.0	8.7	11.6	14.4
4	4.7	4.7	4.4	8.1	8.9
5+	3.5	3.4	2.9	6.0	6.5
N	3,598	6,785	14,215	5,231	6,269

Source: Authors' calculations, Censuses 1819, 1867, and 1900 (see data references).

Occupational and social structure in Rostock

Extensive groundwork for classifying historical occupations in Northern Germany provided the basis for developing a classification of occupations in the censuses for Rostock in 1819, 1867, and 1900 (Brandenburg et al. 1991). Occupational titles have been classified by standardisation of spelling, combining synonymous titles, and the use of the coding scheme of the Historical International Standard Classification of Occupations (HISCO, see Van Leeuwen, Maas, Miles 2002). The large number of different occupations makes it necessary to group them into larger categories, without

which no statistical analyses would be possible.[7] The HISCO codes can be placed into major groups and economic sectors. Table 5 lists the major groups and economic sectors for men between the ages of 15 and 64 as percentages in the respective census year. Unspecific occupational titles such as "Arbeiter" or "Arbeitsmann" (worker) have been put into a separate category, which also represents the fastest growing sector in this time period. The census lists do not distinguish between employment in handicraft or industry, so we assume that most industrial workers are included in this category. Handicraft and industry employ about half of the male workforce of working age. The categories of trade and services each account for about 10 percent of the workforce, while the other sectors are of less importance.

Table 5: Economic sector of men aged 15-64 years in percentages, Rostock 1819-1900

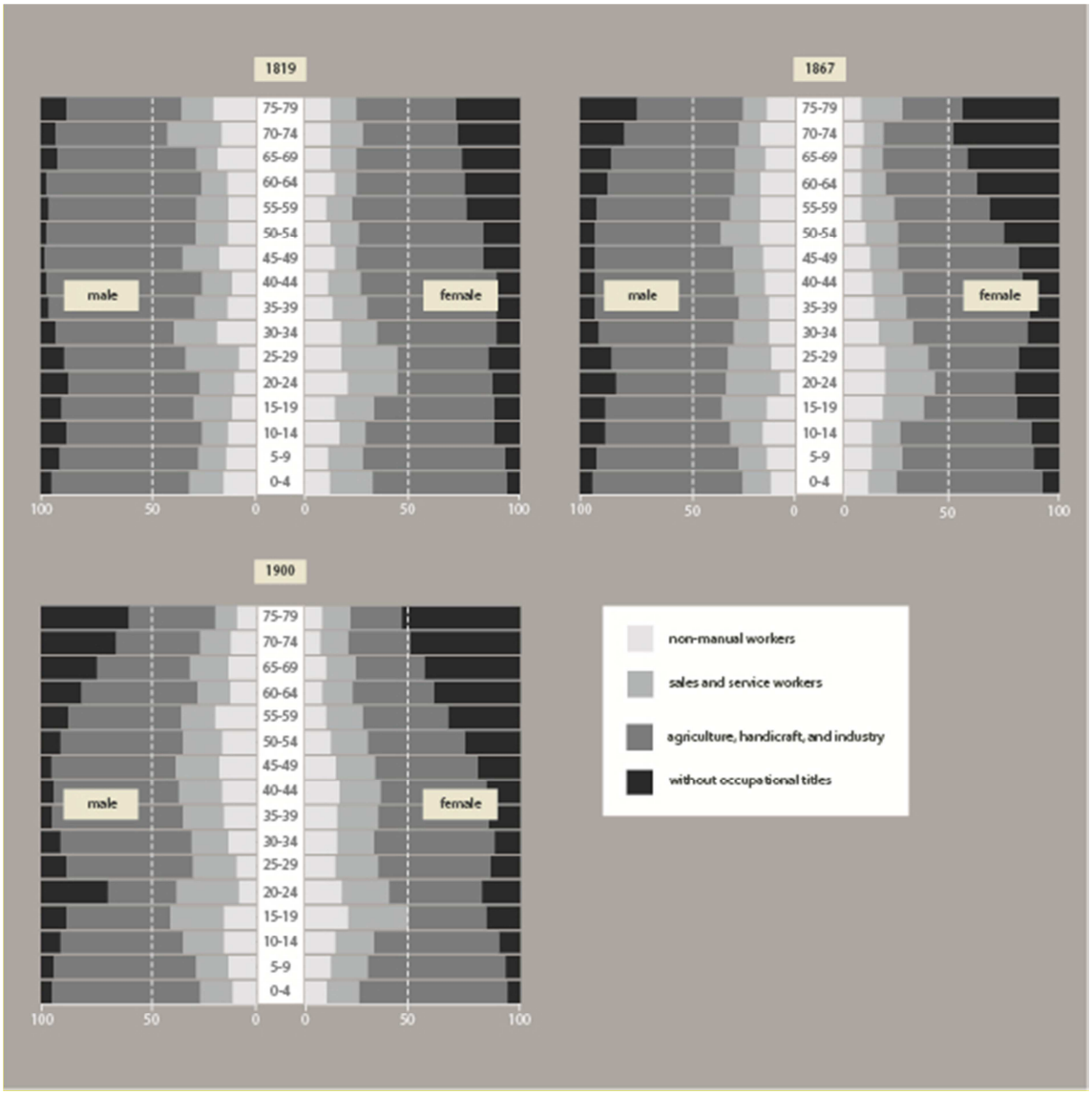
Major group in HISCO	Economic sector	1819	1867	1900
0/1	professional and technical	6.4	6.3	5.6
2	administrative and managerial	0.9	1.0	1.5
3	clerical	1.8	2.3	4.4
4	sales	8.7	7.3	10.5
5	services	12.2	16.8	8.9
6	agriculture	3.1	1.8	1.8
7-9	handicraft	43.9	33.6	33.3
9-99	worker	10.1	18.6	19.3
	without occupational title	12.9	12.3	14.8

Source: Authors' calculations, Censuses 1819, 1867, and 1900 (see data references).

Occupational titles have been recorded almost exclusively only for men, therefore the other members of the household have been assigned to the economic sector of theit head of household. Also, the economic sectors of Table 5 have been allocated into four groups, so that enough cases are available for analysis. The first three sectors are combined as "non-manual workers", the second group consists of sales and service workers, the third group contains agriculture, handicraft, and industry, and the final group includes the members of the population who have no occupational titles. The distribution of these four economic groups by age and sex can be seen in Figure 5. A clear gradation by age can be seen, which also includes the development towards a pension system for elderly persons.

[7] The North Atlantic Population Project (NAPP) uses a version of HISCO with fewer categories, hence we have applied this version of HISCO here.

Figure 5: Age pyramids of the population in Rostock by age, sex and occupational group in percentages, 1819-1900



Source: Authors' calculations, Censuses 1819, 1867, and 1900 (see data references).

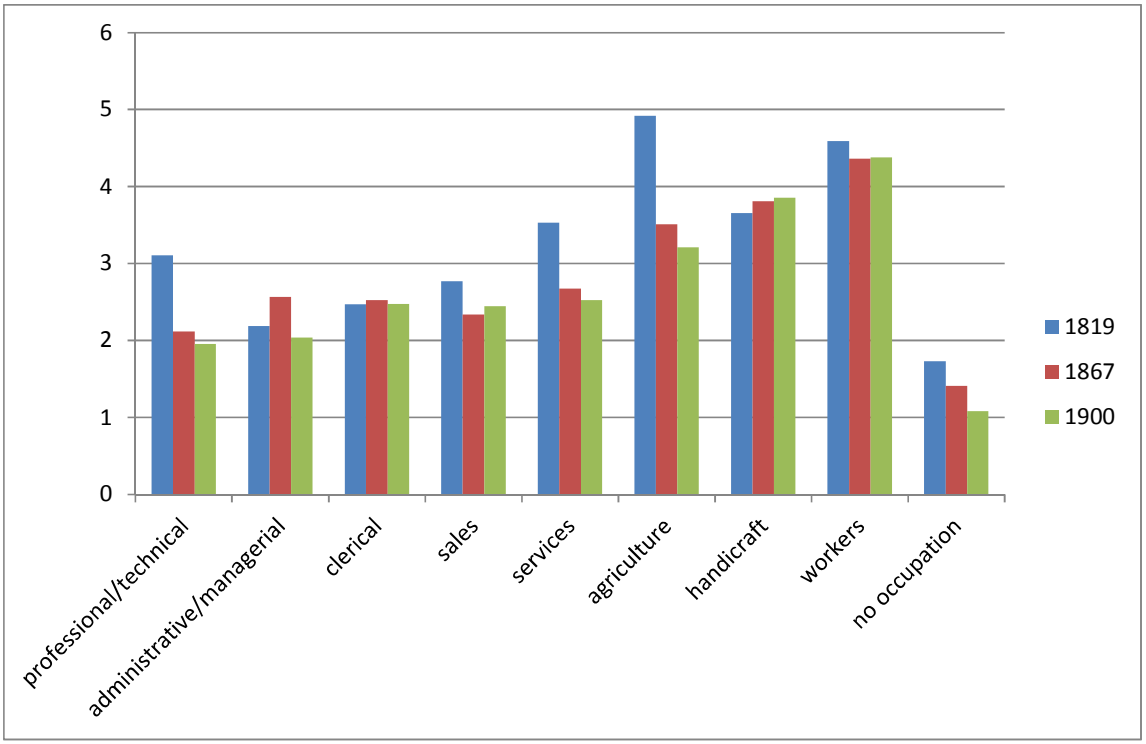
Fertility by occupational groups in Rostock

In a further step we shall examine whether these nine economic sectors in Rostock have different fertility patterns. We compare only the overall fertility, as some economic sectors are simply not large enough for a more detailed analysis. Overall fertility is rather constant for these economic sectors in these three census years, as can be seen in Figure 6. A considerable decrease in fertility can only be recognised for professional and technical and for agricultural workers. Overall fertility in the first five sectors is between 2 and 2.5 children (except for the year 1819), which is clearly too low for population growth in the city of Rostock. Workers have the highest fertility: four children on average.

The lowest numbers of children are reported for women in households whose head reported no occupational title: they have only between 1 and 1.5 children.

Prussian data from the end of the 19th Century report the highest fertility for men engaged in agriculture and mining, and the lowest fertility for men engaged in non-manual occupations (Knodel 1974, 115). Workers have the highest number of children among the non-agricultural population (Knodel 1974, 123-125). Persons in agriculture and mining experienced fertility decline later than persons engaged in other economic sectors (Knodel 1974, 117). Recent analyses of microdata have been conducted to check these results based on aggregate data. The generally assumed correlation between higher social class and higher fertility before the onset of the demographic transition can only partially be verified (Dribe, Oris, Pozzi 2014, 173). Upper and middle class are generally the forerunners of fertility decline during the demographic transition (Bras 2014; Dribe and Scalone 2014; Vézina, Gauvreau, Gagnon 2014), while workers and peasants follow later (Bengtsson and Dribe 2014; Breschi, Esposito, Mazzoni, Pozzi 2014; Maloney, Hanson, Smith 2014).

Figure 6: Calculated fertility by occupational groups in Rostock, 1819-1900



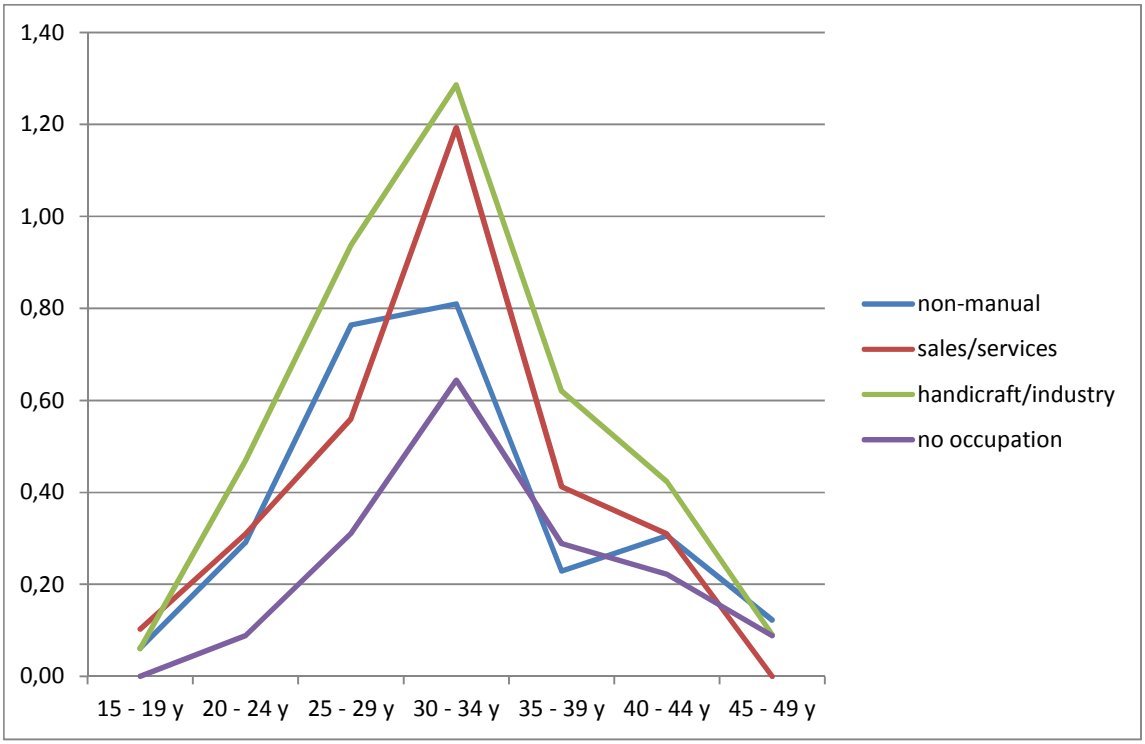
Source: Authors' calculations, Censuses 1819, 1867, and 1900 (see data references).

An analysis of age-specific fertility by occupational groups reveals on the one hand continuities and on the other hand changes over the course of the 19th Century. People employed in handicraft and industry have always had the highest fertility, in all age groups. Women in households without any occupational title have always had the lowest fertility in all age groups. Women from households with income from trade and services clearly had the second highest fertility in almost all age groups in 1819, but by 1900 they had become very similar to households with income from non-manual

work. In 1819 the highest fertility is achieved in the age group of 30-34 year old women, which is an effect of the high age at marriage. In 1867 the maximum in fertility of wives of craftsmen and workers is already in the preceding age group, while women of the other occupational groups have not yet changed their behaviour. In 1900 the age group of 25-29 year old women is clearly the one with the highest fertility in all occupational groups. Therefore, 1867 is the census in which the maximum in fertility is least accentuated. The proportion of married women in these occupational groups is an important factor for their overall fertility: craftsmen and industrial workers have always had considerably higher proportions of married women in all age groups than people employed in trade and services. This is also the reason for the extremely low fertility of people without any occupational title: only 10 to 20 percent of these women are married, most of them are not married yet or are widowed.

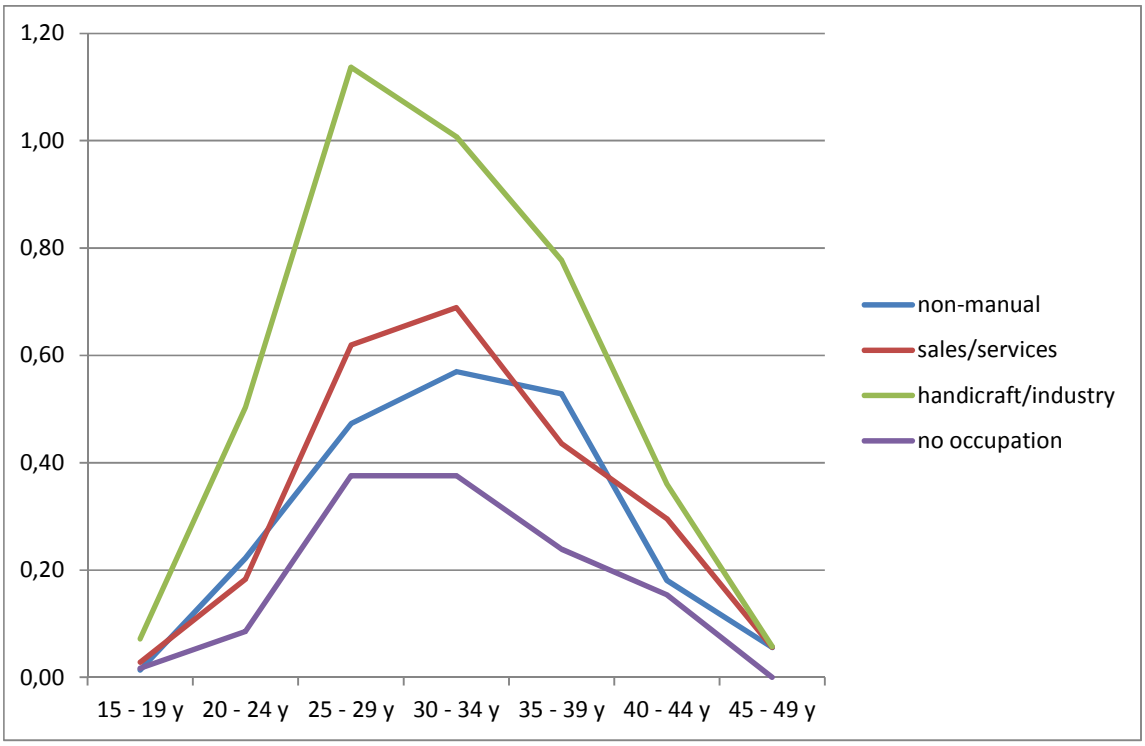
In Tilleur in Belgium an analysis using the same method for the time period 1857 to 1866 revealed that the middle class has the fewest children, while the workers in the coal mines have the most children (Oris 2003, 91). The level of fertility is generally much higher than in Rostock at that time. In Italy in the 19th Century the results are not so clear-cut: in Cesena and Venice the upper and middle class have the fewest children, while in Udine the differences are rather small (Breschi, Derosas, Rettaroli 2003, 114f.). The categories "other" and "unknown" have the lowest fertility in these analyses, too.

Figure 7: Calculated age-specific fertility by occupational groups, Rostock 1819



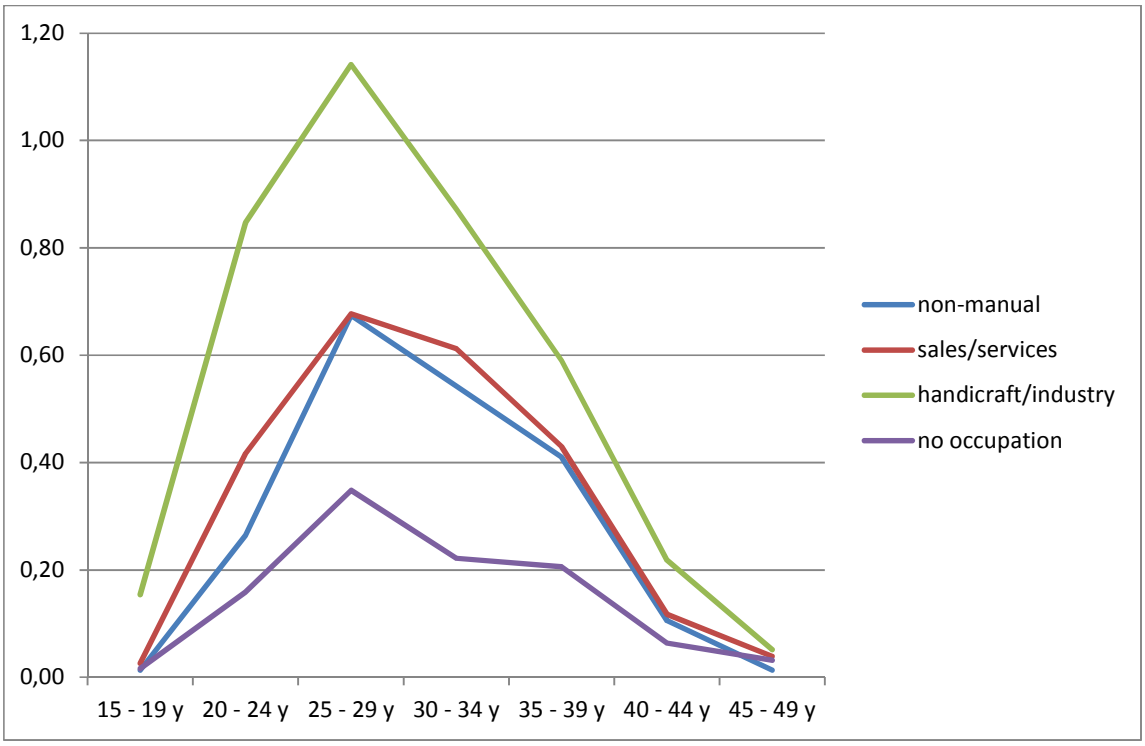
Source: Authors' calculations using OCM, census 1819 (see data references).

Figure 8: Calculated age-specific fertility by occupational groups, Rostock 1867



Source: Authors' calculations using OCM, census 1867 (see data references).

Figure 9: Calculated age-specific fertility by occupational groups, Rostock 1900



Source: Authors' calculations using OCM, census 1900 (see data references).

Conclusions

We have shown that the process of dissolution of the old estate-based traditions of handicraft with the development of industrial production in the 19th Century affected the structures and composition of households and families in the city of Rostock. The traditional family structures remained mostly stable, while mortality and fertility changes correlated with changing ages of marriage, childbirth, and death. Rural developments are time-delayed in comparison to urban developments. The city of Rostock grew steadily because of steady immigration, while fertility in Rostock was much lower than in the villages of Mecklenburg-Schwerin in the vicinity of the city. There were no children in half of the households in Rostock.

When analysed according to their occupational structure, people display major differences concerning the number of births. Workers and craftsmen have the most children, while people employed in non-manual jobs have fewer children. Two important factors which determine fertility are the age at marriage and the proportion of married women in each age group. The group of people without any occupational title is outstanding in its low proportions of married women and its low fertility.

The results of this analysis of fertility in the city of Rostock in the 19th Century generally reflect those of similar analyses of other cities, only the fertility in Rostock is lower. The differences between the social classes influence the demographic developments of the city. As the composition of the social classes within the city change, the demography and growth of the city does so as well.

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