

Appendix B: Birth, Death and Natural Increase (Sources and Methodology)

B1. Births, deaths and natural increase per 1000 for the Jewish and total populations of Poland-Lithuania (Galicia and Posen) 1777-1873 (Sources for Table 6)

Data for births and deaths in PL or and GA is scanty prior to the 19th century. The earliest comparative births and deaths data for Jews and total population that we found is from the end of the 18th century.¹ Budzyński (1993) provides data for 9 cities in Galicia.² The data, as Budzyński himself recognizes, has potentially some flaws. Nonetheless, it is adduced by scholars as indicative of the differences between the Jews and the total population.³ In table 6 we calculate the average of Budzyński's twenty-six sets of data from nine cities for the years 1777-1799.

For table 6 we also used in Bergmann's study of the Prussian province of Posen. In the German states data on births and deaths is available from early 19th century and in Prussia from 1816.⁴ Since part of Poland was annexed to Prussia in the 18th century partitions, we take advantage of the Prussian data in order to obtain some data for former Polish areas. We use Bergmann's census data of the Posen province for 1824-1873. The complete data sets for Galicia and Posen are presented in table below.

Table 6: Births, deaths and natural increase per 1000 for the Jewish and total populations of Poland-Lithuania (Galicia and Posen only) 1777-1873

Year	Locality	Births Jews	Births Total Population	Deaths Jews	Deaths Total Population	Natural increase Jews	Natural increase Total Population
1777	Jasło	37.2	33.4	18.6	22.1	18.6	11.3
1777	Nowy Sącz	33.0	27.1	15.0	20.6	18.0	6.5
1777	Przemysł	45.6	36.6	25.4	30.8	20.2	5.8
1778	Zhovkva (Żółkiew)	31.7	38.2	22.7	30.8	9.0	7.4
1780	Belz	54.9	60.9	15.0	24.7	39.9	36.2

¹ Some data on the total population birth and deaths rates in (mainly the second half of) the 18th century has been published in *History of Poland in Numbers* (2014, p. 83, table 9). Data for Gdańsk is cited for as early as mid-17th century. For the urban areas, the rates of births and deaths are very close, yielding almost zero natural increase rate. For the rural areas, the data cited in the above work shows the average birth rate of 43.65 and the average death rate of 34.25. We think these data sets, however accurate or inaccurate they may be, are not inconsistent with the comparative data sets presented in table 6.

² Budzyński (1993, vol. 1, p.108, table 7).

³ See for instance Hundert (2004, p. 24).

⁴ See Vögele (1999 discussion paper, pp. 1-2).

1790	Rzeszów	30.7	30.7	23.5	30.5	7.2	0.2
1790	Sambir (Sambor)	40.7	40.8	26.3	26.4	14.4	14.4
1790	Sanok	25.4	27.8	21.7	26.2	3.7	1.6
1795	Lvov	36.5	34.8	16.1	26.9	20.4	7.9
1795	Przemys l	36.2	34.6	20.6	33.5	15.6	0.9
1798	Jasło	38.8	33.0	16.0	19.5	22.8	13.5
1798	Nowy Sącz	41.9	31.1	11.8	18.6	30.1	12.5
1798	Rzeszów	43.3	36.0	20.2	27.7	23.3	8.3
1798	Zhovkva (Żółkiew)	27.8	38.0	29.3	32.3	-1.5	5.7
1799	Jasło	39.1	35.5	15.0	20.3	24.1	15.2
1799	Nowy Sącz	42.3	30.3	22.0	23.6	20.3	6.7
1799	Rzeszów	31.9	37.6	20.9	21.7	11.0	15.9
1799	Sanok	35.2	33.6	24.9	20.1	10.3	13.5
1799	Zhovkva (Żółkiew)	35.5	40.8	21.5	23.1	14.0	17.7
1800	Jasło	36.9	35.7	19.5	22.3	17.4	13.4
1800	Nowy Sącz	38.0	26.9	15.1	32.3	22.9	-5.4
1800	Przemys l	40.5	38.7	20.4	23.7	20.1	15.0
1800	Rzeszów	32.1	34.6	20.2	20.0	11.9	14.6
1800	Sanok	29.6	28.8	19.8	23.9	9.8	4.9
1800	Zamość	35.8	37.4	24.2	31.6	11.6	5.8
1800	Zhovkva (Żółkiew)	29.1	38.0	20.0	27.4	9.1	10.6
1824- 1873	Posen province	35.3	41.1	22.2	30.0	13.1	11.1
Average		36.5	35.6	20.3	25.6	16.2	10.0

Sources: For 1777-1800 based on Budzyński (1993, vol. 1, p.108. table 7). For Posen, the calculation is based on von Bergmann (1883, p. 136).

B2: Births, deaths and natural increase per 1,000 for the Jewish and total populations in pre-industrial Germany-Austria (prior to 1870) (Sources for Table 7)

For GA Jewish and total population prior to 1870 we present the data from Prussia, Hessen and Bohemia. The census data from Prussia is summarized by Lestschinsky and the data from Hessen has been reviewed, corrected and summarized by Schmelz. We consider the census data from Prussia and Hessen reliable. Table 4.2 presents average aggregates. The complete breakdown of our data is presented in table 7 below. **Table 7: Births, deaths and natural increase per 1,000 for the Jewish and total populations in pre-industrial Germany-Austria (prior to 1870)**

Region / Year	Births Jews	Births Total Population	Deaths Jews	Deaths Total Population	Natural Increase Jews	Natural Increase Total Population
Prussia						
1822-1840	35.5	40.0	21.6	29.6	13.9	10.4
1840-1864	35.1	39.6	18.9	29	15.8	10.6
Average	35.3	39.8	20.25	29.3	15.05	10.5
Hessen (Darmstadt)						
1863-1864	28	34	18	24	10	10
1865-1869	31	35	18	25	13	10
Average	29.5	34.5	18	24.5	11.5	10
Bohemia						
1869	29.5	37.2	16.8 ^a	27.6 ^a	12.7	9.6

Sources: For Prussia 1822-1864, see Lestschinsky (1926, p. 26, table VIII). The calculation for Prussia in 1840-1864 is based on Silbergleit (1930, pp.14-15, table 8). For Hesse, see Schmelz (1996, p. 108, table 3.1, p.112, table 3.5). For Bohemia, see Vobecka (2013, p.92, table 7.5; p.105, table 8.4).

The birth and death rates data from Bohemia was recently studied by Vobecka (2013). Birth and death data for the Jewish population in Bohemia is available from 1785.⁵ Vobecka proposes a reconstruction of the birth and death rates of the Jews in Bohemia in the late 18th and the first half of the 19th century. Vobecka concludes that Jewish birth and death numbers must have been intentionally underreported by the Jews since they don't match the rates of annual growth rates.⁶ She nonetheless reconstructs the

⁵ Vobecka (2013, pp. 77 ff.).

⁶ Vobecka (2013, pp. 77-8, 99-100).

Jewish birth rates for the period 1793-1849 based on the population growth rates and on reported death rates. In our calculations of her reconstruction of the birth and death rates of the Jews, the average birth and death rates of the Jews in 1793-1849 are 32.99 and 23.48 respectively (see table B1.1 below), i.e. 0.95 natural increase.⁷

For total population in Bohemia we use Ludmila Fialová, Zdeněk Pavlík and Pavel Vereš (1990)'s study of fertility on the territory of the Czech Socialist Republic (CSR) in the 19th and 20th centuries. Their (reconstructed) data yields the average birth and death rates of 41 and 32.14 respectively in 1800-1850, that is, 0.88 natural increase. The difference in the average natural increase is small but the pattern of lower Jewish fertility and mortality is there as well. A small but growing increase in the natural population growth of the Jews during the first half of the 19th century is evident from the raise in the share of the Jews in the total population (see Appendix A Table 5).⁸

Table 7.1 Births, deaths per 1000 for the Jewish and total populations of Bohemia

Year	Jews	Total	Jews	Total
	births	births	deaths	deaths
1793	35.36		25.7	
1800	34.74	42.3	25.17	36.4
1805	34.3		24.73	
1809	33.97		24.39	
1810	33.88	43.4	24.3	34.7
1814	33.55		23.96	
1819	33.12		23.55	
1820	33.03	41.4	23.45	28.2
1829	31.98		22.5	
1830	32.21	39.2	22.64	31.3
1839	31.49		21.92	
1840	31.42	38.7	21.84	30.1
1849	30.71		21.13	
Average	32.99	41	23.48	32.14

Source: Calculations for Jews are based on Vobecka (2013, p. 105 table 8.4; pp. 178-184, appendix 3); for total

⁷ Our calculations are based on Vobecka (2013, p. 105 table 8.4; pp. 178-184, appendix 3).

⁸ See Vobecka (2013, p. 47, table 4.1) for population growth numbers.

population: Fialova, Ludmila, Zdeněk Pavlík, and Pavel Vereš. "Fertility decline in Czechoslovakia during the last two centuries." *Population Studies* 44.1 (1990): 89-106.

We did not include Vobecka's reconstruction of the early period in table 7 (but see fn. 37 in the paper). We included her data only starting from 1869 when comprehensive census data becomes available in the Habsburg Empire and the data becomes more reliable.

B3: Births, deaths and natural increase per 1,000 for the Jewish and total populations in Poland-Lithuania and in Germany-Austria :1870-1910 (sources for Table 8).

In table 8 we combine data from PL and GA territories. The census data from the GA territories of Prussia, Hessen and Bohemia is considered to be reliable. The data for Galicia, former PL territory, comes from the census data of the Habsburg administration is also considered to be reliable as the accuracy of the censuses increases after 1869. The data from the European Russia, including the Pale of Settlement is also considered to be reliable because it comes from the census of 1897 and later. The breakdown of the data sets for table 8 is presented below in tables 8.1 and 8.2 below.

Table 8.1 Birth and death rates per 1,000 for the Jewish and total populations in Poland-Lithuania in 1870-1910

Region / Year	Births Jews	Births Total Population	Deaths Jews	Deaths Total Population	Natural Increase Jews	Natural Increase Total Population
Galicia						
1882	46.2	48.0	29.4	36.4	16.8	11.6
1896-1900	40.4	44.3	20.8	28.1	19.6	16.2
1901-1902	38.1	44.0	19.2	26.9	18.9	13.1
1904, 1907, 1910	34.6	40.9	16.8	25.3	17.8	15.6
Average	39.8	44.3	21.5	29.2	18.3	15.1
European Russia						
1896-1897	35.9	50.2	17.6	32.4	18.3	17.8
1900-1904	34.4	48.6	16.7	30.9	17.7	17.7
Average	35.15	49.4	17.15	31.65	18	17.75

Sources: Kuznets (1975, pp. 63- 64, table 6).

Table 8.2 Birth and death rates per 1000 in Germany-Austria: 1870-1910⁹

Region / Year	Births Jews	Births Total Population	Deaths Jews	Deaths Total Population	Net Increase Jews	Net Increase Total Population
Prussia						
1876-1880	31.7	38.9	17.6	23.6	14.1	15.3
1886-1890	23.9	37.3	16.1	24.3	7.8	13.0
1896-1900	20.4	37.1	14.3	21.4	6.1	15.7
1906-1910	17	32.5	13.7	17.3	3.3	15.2
Average	23.25	36.45	15.4	21.65	7.8	14.8
Hesse						
1870-1874	31	37	19	25	12	12
1875-1879	31	37	18	24	13	13
1880-1884	26	32	16	22	10	10
1885-1889	24	31	16	22	8	9
1895-1899	19	32	15	19	4	13
1900-1904	18	33	14	18	4	15
1905-1909	18	30	14	16	4	14
Average	23.9	33.1	16	20.9	7.9	12.3
Bohemia						
1880	27.3	37.2	16.5	28.3	10.8	8.9
1896-1900	20.9	33.5	15.9	24.3	5	9.2
1901-1905	17.6	36.1	15.2	23.1	2.4	13
1906-1910	14.2	30.6	13.8	19.9	0.4	10.7
Average	20	34.35	15.35	23.9	4.65	10.45

Sources: For Prussia, we use Kuznets (1975, pp. 63- 64, Table 6). For Hessen, see Schmelz (1996, p. 108, table 3.1, p. 112, table 3.5). For Bohemia, see Vobecka (2013, p. 92, table 7.5; p. 105, table 8.4).

B4: Births, deaths and natural increase per 1000 in Poland-Lithuania and Germany-Austria: 1911-1930 (Sources for Table 9)

In table 9 we present the data from Prussia, Hessen and Bohemia which come from reliable censuses. The census data from the newly reestablished state of Poland was less accurate and had to be corrected. Fogelson corrected the census data which is summarized by Marcus (1983) cited by us. The breakdown of the data sets is presented below in tables 9.1 and 9.2.

¹⁰ A local study of the Juncew parish by Anna Czop (“Ruch naturalny ludności w parafii juncewskiej w latach 1801–1870 (na podstawie ksiąg metrykalnych),” *Książka Przeszłość demograficzna Polski* 29(2010):99-139) provides data for the total population infant mortality in 1801-1870. The infant mortality rate for the ages 0-1 is 243 (p. 123, table 21) and for the ages 0-5 – 464 (p. 123, table 22). Czop considers these infant mortality data even undervalued (p. 122). We note however that they are quite similar to the Posen data and may actually not too far from the actual situation.

Table 9.1: Birth and death rates per 1000 in Poland-Lithuania: 1911-1930

Region / Year	Births Jews	Births Total Population	Deaths Jews	Deaths Total Population	Natural Increase Jews	Natural Increase Total Population
Poland						
1921-1925	30.1 ^a	34.7	14.5 ^a	18.5	15.6	16.2
1926-1930	27.5 ^a	32.3	14.0 ^a	16.8	13.5	15.5
Average	28.8	33.5	14.3	17.6	14.5	15.9

^a Based on the corrected figures suggested by Fogelson and accepted by scholars, rather than the official census data. Sources: For Jews in Poland, we use Marcus (1983, p. 173, table 25). For the total population in Poland, see GUS (2003, p.361, table 90 (355)).

Table 9.2: Birth and death rates per 1000 in Germany-Austria: 1911-1932

Region / Year	Births Jews	Births Total Population	Deaths Jews	Deaths Total Population	Natural Increase Jews	Natural Increase Total Population
Prussia						
1911-1913	15.3	28.9	13.8	15.9	1.5	14
1921-1925	14	23	13	14	1	9
Average	14.7	26	13.4	14.5	1.3	11.5
Hessen						
1914-1919	10	17	17	19	1	-2
1920-1924	16	22	15	13	1	9
1925-1929	10	19	14	11	-4	8
1930-1932	8	16	16	10	-8	6
Average	11	18.5	15.5	13.25	-2.5	5.25
Bohemia						
1926-1930	8.2	18.7	14.9	14.3	-6.7	4.4

Sources: For Prussia, we use Kuznets (1975, pp. 63- 64, table 6); for Bohemia, we use Vobecka (2013, p.92, table 7.5; p.105; table 8.4); and for Hessen, we use Schmelz (1996, p. 108, table 3.1, p.112, table 3.5).

B 5: Infant and child death rates (Sources for Table 10)

The best source for comparative infant and child mortality data before 1870 is Bergmann's study of Posen.¹⁰ His study is valuable because Posen is a former PL territory and because Bergmann provides

¹⁰ A local study of the Junczew parish by Anna Czop ("Ruch naturalny ludności w parafii junczewskiej w latach 1801–1870 (na podstawie ksiąg metrykalnych)," *Książka Przeszłość demograficzna Polski* 29(2010):99-139) provides data for the total population infant mortality in 1801-1870. The infant mortality rate for the ages 0-1 is 243 (p. 123, table 21) and for the ages 0-5 – 464 (p. 1232,

us with detailed breakdown by ages 0-5.

Table 10: Infant and child mortality rates among Jews and the total population per 1,000 live births in the Province of Posen: 1819-1863

Age of death	Jews	Total Population	Percent difference
Just before or at birth	24	29	-17
From birth till one year old	146	200	-27
Total until one year old	170	229	-26
1-3 years old	91	107	-15
3-5 years old	33	47	-30
Total 1-5 years old	124	154	-20
Total from birth to 5 years old	294	383	-23

Sources: The calculations are based on Bergmann's data (1883, p. 158 and Appendix F after p. 260).

The main source for child and infant mortality remains Schmelz (1971). Schmelz presents data from different areas – cities, regions and countries. In tables 4.6-4.8 we included only data from regions and countries and calculated the aggregate averages to obtain a more reliable macro picture. In the tables B4.1-B4.6 we present all the available data sets consulted by us. Wherever, Schmelz does not supply data for total population, we supplement the missing data from Mitchell (2003). The distinction between Christian confessions (Catholics, Protestants) has been dispensed with for the sake of simplicity. Even though there are certainly confessional differences in child and infant mortality among Protestants and Catholics, we combine these two as we are mainly interested in the differences between Jews and non-Jews or between Jews and the total population.

Table 11: Infant mortality rates among Jews and the total population per 1,000 live births in Poland-Lithuania and in Germany-Austria up until 1870

Region/ Period	Jews	Total Population	Difference in percent
Russia (European)			
1867-1869	154	272	-45
Galicia			
1851	213	217	0
Cracow			
1851	196	167	+15
Bohemia			
1851	162	257	-35
Moravia			

table 22). Czop considers these infant mortality data even undervalued (p. 122). We note however that they are quite similar to the Posen data and may actually not too far from the actual situation.

1851	163	226	-30
Prussia			
1822-1840	129	174	-25
Prussia Eastern Provinces			
1819-1870	136	208 ^a	-35
Westphalia			
1819-1870	96	140 ^a	-30
Baden			
1857-1863	174	268	-35
1864-1870	199	282 ^a	-30
Magdeburg			
1827-1856	135	225	-40
Average	160	221	-28

^a Non-Jews.

Sources: For the total population in Russia between 1867 and 1869, see Mitchell (2003, p. 122, table A7). For the rest of the data, see Schmelz (1971, pp.15-25, table 3). Wherever Schmelz provided data for two denominations (i.e. Catholics and Protestants), their average is calculated for the sake of simplicity.

Table 12: Infant mortality rates among Jews and the total population per 1,000 live births in Poland-Lithuania and in Germany-Austria: 1870-1910

Region/ Period	Jews	Total Population	Difference in Percent
Russia (European)			
1870-1874	141	268	-45
1875-1879	133	271	-50
1880-1884	143	275	-50
1885-1889	135	260	-50
1890-1894	137	278	-50
1896-1897	130	268	-50
1897	151	274	-45
1900-1904	119	254	-55
Average	133	265	-50
Leningrad (St. Petersburg)			
1900-1904	109	260 ^a	-60
1905-1909	117	262 ^a	-55
Average	113	261	-57
Vilna			
1897-1907	231	205 ^a	+15
Lvov			
1891-1892	233	210 ^a	+10
1894-1896	163	205 ^a	-20
1897-1900	147	136 ^a	+10
1901-1902	134	130 ^a	+5

1906-1910	125	153 ^a	-20
Average	160	167	-4
Cracow			
1888-1889	168	218 ^a	-25
1891-1893	148	206	-25
1894-1896	155	171 ^a	-10
1901-1904	130	172 ^a	-25
1905-1909	114	164 ^a	-30
Average	148	206	-77
Baden			
1871-1873	182	264 ^P 293 ^c	-30 -40
Bavaria			
1878	152	296	-50
Francfort-on-Main			
1891-1894	74	160	-55
1895-1899	68	156	-55
1900-1904	85	162	-50
1905-1909	66	142	-55
Average	73	155	-53
Munich			
1894-1897	71	286	-75
1898-1901	114	274	-60
1902-1905	81	232	-65
Average	89	264	-66
Vienna			
1894-1899	66	62	5
1900-1904	80	71	15
1905-1909	86	86	0
Average	77	73	0.5
Breslau			
1906	62	217	-70

^a Non-Jews. Wherever Schmelz provides data for two denominations (i.e. Catholics and Protestants), their average is calculated for the sake of simplicity.

Sources: For the total population of Russia between 1870 and 1894, see Mitchell (2003, p. 122, table A7). For the rest of the data, see Schmelz (1971, pp. 15-25, table 1).

Table 13: Infant mortality rates among Jews and the total population per 1,000 live births in Poland-Lithuania and in Germany-Austria: 1911-1930

Region/ Period	Jews	Total Population	Difference in Percent
USSR			

1926	57	174	-65
Leningrad (St. Petersburg)			
1910-1914	78	244 ^a	-70
1922-1924	78	178 ^a	-55
Average	78	211	-63
Poland			
1926-1930	64	160 ^a	-60
Lvov			
1921-1925	96	141 ^a	-30
Warsaw			
1921-1925	136	159 ^a	-15
1926-1930	104	144 ^a	-30
Average	120	152	-21
Lódź			
1921-1923	117	192	-40
1924-1926	147	184	-20
1927-1929	169	184	-10
Average	144	187	-23
Lithuania			
1927	35	156	-80
1928-1930	36	159	-75
Average	36	158	-77
Latvia			
1926-1927	38	89	-55
1928-1930	47	97	-50
Average	43	93	-54
Carpatho-Russia			
1921-1923	108	178	-40
1924-1926	106	182	-40
1927-1929	112	182	-40
Average	109	181	-40
Bohemia			
1921-1923	71	179	-60
1924-1926	61	163	-65
1927-1929	42	163	-75
Average	58	168	-65
Moravia			
1921-1923	62	182	-65
1924-1926	64	164	-60
1927-1929	80	157	-50
Average	69	168	-59
Hessen			
1920-1922	50	93	-45

1923-1925	50	87	-40
1926-1929	47	68	-30
Average	49	83	-41
Bavaria			
1925-1929	42	124	-65
Berlin			
1924-1926	40	100	-60
1928-1931	32	77	-60
Average	36	89	-60
Breslau			
1925	53	134	-60

^a Non-Jews. Wherever Schmelz provides data for two denominations (i.e. Catholics and Protestants), their average is calculated for the sake of simplicity.

Sources: Schmelz (1971, pp. 15-25, table 1).

Table 14: Child mortality rates for ages 0-4 among Jews and the total population per 1,000 live births in Poland-Lithuania and in Germany-Austria until 1870

Region/ Period	Jews	Total Population	Difference in percent	Type of rate
Galicia				
1851	389	339	+15	I
Cracow				
1851	251	272	-10	I
Baden				
1851-1870	242	348	-30	II
Bohemia				
1851	253	365	-30	I
Moravia				
1851	256	337	-25	I
Prussia, eastern provinces				
1819-1833 ^b	273	333 ^a	-20	II
1834-1848 ^b	273	360 ^a	-25	II
1849-1863 ^b	230	370 ^a	-40	II
Westphalia				
1819-1863	183	285 ^a	-35	II
Average in all regions	261	334	-22	

^a Non-Jews. ^b Including stillbirths.

I – Deaths in the year indicated per 1,000 births in that same year.

II – Proportion dying within x years per 1,000 births, according to follow-up after birth.

Sources: Schmelz (1971, pp.28-33, table 3).

Table 15: Child mortality rates for ages 0-4 among Jews and the total population in Poland-Lithuania and in Germany-Austria: 1870-1910

Region/ Period	Jews	Total Population	Difference in percent	Type of rate
Galicia				
1882	361	426 ^a	-15	I

^a Non-Jews, wherever Schmelz provides data for two confessions (i.e. Catholics and Protestants), their average is calculated for the sake of simplification.

I - Deaths in the period indicated per 1,000 births during that same period.

Source: Schmelz (1971, pp.28-33, table 3).

Table 16: Child mortality rates for ages 0-4 among Jews and the total population in Poland-Lithuania and Germany-Austria: 1911-1930

Region/ Period	Jews	Total Population	Difference in percent	Type of rate
Bohemia				
1921-1923	71	179	-60	I
1924-1926	61	163	-65	I
1927-1929	42	163	-75	I
Average	58	168	-54	I
Moravia				
1921-1923	62	182	-65	I
1924-1926	64	164	-60	I
1927-1929	80	157	-50	I
Average	69	168	-59	
Carpatho-Russia				
1921-1923	157	258	-40	I
1924-1926	143	246	-40	I
1927-1929	160	254	-35	I
Average	153	253	-40	

I – Deaths in the period indicated per 1,000 births during that same period.

II – Proportion dying within x years per 1,000 births, according to follow-up after birth.

Sources: Schmelz (1971, pp.28-33, table 3).