

SOURCES FOR REVENUE DATA

Revenue figures concern income from taxation collected by national governments. Loan income was subtracted whenever possible. I use abbreviations to denote different series for revenue (REV1, REV2,...) and population (POP1, POP2,...). Other abbreviations are Mitchell's *British Historical Statistics* (BHS) and *International Historical Statistics* (IHS). The complete data set is available at the Global Price and Income History Group's website: <http://gpih.ucdavis.edu/>. For additional details, see Mark Dincecco, "Fiscal Centralization, Limited Government, and Public Revenues in Europe, 1650-1913," Forthcoming, *Journal of Economic History*, 2009.

Austria-Hungary. REV1 is central government revenue in Austria, 1781-1913, from Mitchell, IHS. The series covers Austria-Hungary through 1847 and from 1850-1867 and Cisleithania only (i.e. the Austrian portion) for 1848-1849 and from 1868 onwards. Lombardy is included through 1858 and Venetia through 1865. Total yields are for fiscal receipts only to 1864 and ordinary receipts from 1865-1875. From 1876 onwards, they include certain extraordinary receipts. From 1875-1890, the Mitchell data include cash *saldi* and loan proceeds. Hence, for those years I used corrected figures (i.e. without *saldi* or loan proceeds) as provided by Michael Pammer. REV2 is central government revenue in Transleithania (i.e. the Hungarian portion), 1868-1913, from Mitchell, IHS. The series of Austria-Hungarian central government revenues consists of REV1: 1781-1867; REV1 + REV2: 1868-1913.

POP1 is population of Austria for 1818, 1821, 1824, 1827, 1830, 1834, 1837, 1840, 1843, 1846, 1851, 1857, 1869, 1880, 1890, 1900, 1910, from Mitchell, IHS. Figures are for the civil population of Cisleithania only. POP2 is population of Lombardy for 1832-1840, 1842-1844, 1846-1854, provided by Pammer. POP3 is population of Venetia for 1832-1840, 1842-1844, 1846-1854, also provided by Pammer. For POP2 and POP3, years 1841, 1845, and 1849-1850 were interpolated. The data for 1832 were used for years 1818-1831 and the data for 1854 were used for years 1855-1858 (Lombardy) and 1855-1865 (Venetia) due to data limitations. POP4 is population of Hungary for 1787, 1793, 1804, 1817, 1843, 1846, 1850, 1857, 1869, 1880, 1890, 1900, 1910, from Mitchell, IHS. Figures are for Transleithania. The Austria-Hungarian population series consists of POP1 + POP2 + POP3 + POP4: 1818-1847, 1850-1858; POP1 + POP2 + POP3: 1848-1849; POP1 + POP3 + POP4: 1859-1865; POP1 + POP4: 1866-1910. All intermediate years were interpolated.

The *gulden* became the general monetary unit in Austria-Hungary after the War of Austrian Succession and was set at the Convention of 1753 with one *gulden* equal to 60 *kreuzer*. Austria-Hungary decimalized in 1857, adopting a system of one *gulden* to 100 *kreuzer*.¹ I converted Austria-Hungarian revenues into grams of gold as follows. First, revenues in *gulden* were converted into revenues in *kreuzer* by multiplying by 60. Second, revenues in *kreuzer* were transformed into revenues in silver by multiplying by the yearly exchange rate provided by Giovanni Federico and Pammer. Third, revenues in

¹ Since one pre-1858 *gulden* was equal to 1.05 *gulden* from 1858 onwards, I multiplied the pre-1858 *gulden* series by 1.05.

silver were transformed into revenues in gold by dividing by the silver for gold price ratio according to Officer, "Price." Lastly, I divided by the Austria-Hungarian population to find per-capita revenues in grams of gold. The *kreuzer*-silver exchange rate series ended in 1878 and the *kroner*-pound one began. I converted Austria-Hungarian revenues into grams of gold from 1879 onwards as follows. First, revenues in *kronen* were transformed into revenues in pounds by multiplying by the yearly exchange rate. Second, revenues in pounds were transformed into revenues in grams of gold by dividing by the market price of gold in ounces. Third, revenues in ounces of gold were transformed into revenues in grams of gold by multiplying by 28.35. Lastly, I divided by the Austria-Hungarian population to find per-capita revenues in grams of gold.

Belgium. REV1 is central government revenue, 1831-1912, from Mitchell, IHS. Data are unavailable for 1913. The series of Belgian central government revenues consists of REV1: 1831-1912.

POP1 is population of Belgium from Mitchell, IHS. The Belgian population series consists of POP1: 1816, 1831, 1846, 1856, 1866, 1880, 1890, 1910. All intermediate years were interpolated.

Belgium adopted the French monetary system during French Revolutionary and Napoleonic times with one Belgian *franc* equal to one French *franc*.² Hence, I used the Paris market price of gold in *francs* per gram provided by Jean-Laurent Rosenthal.

Denmark. REV1 is central government revenue, 1853-1913, from Mitchell, IHS. Revenue figures include the Duchies of Schleswig, Holstein, and Lauenburg from 1853-1864. The series of Danish central government revenues consists of REV1: 1873-1913.

POP1 is the population of Denmark from Mitchell, IHS. The Danish population series consists of POP1: 1769, 1787, 1801, 1834, 1840, 1845, 1850, 1855, 1860, 1870, 1880, 1890, 1901, 1906, 1911. Population figures include the Duchies of Schleswig, Holstein, and Lauenburg from 1853-1864. All intermediate years were interpolated.

I converted Danish revenues into grams of gold as follows. Denmark joined the Scandinavian Monetary Union in 1872 and adopted the gold standard in 1873 at one pound sterling equal to 18.1595 *kroner*. I first transformed *kroner* into pounds by dividing by 18.1595. I then transformed Danish revenues in pounds into Danish revenues in gold by dividing by the London market price of gold in pounds per fine ounce taken from Officer, "Price." Danish revenues in ounces of gold were transformed into revenues in grams of gold by multiplying by 28.35. Lastly, I divided by the Danish population to find per-capita revenues in grams of gold.

England (Britain). REV1 is total revenue to the English crown, 1650-1824, from O'Brien, "Total Revenue." REV2 is net receipts of the public income for Great Britain, 1692-1801, from Mitchell, BHS. REV3 is central government revenue for Great Britain, 1750-1801, and for the United Kingdom, 1802-1913, from Mitchell, IHS. The series of British central

² Morys, "Emergence," pp. 38-44.

government revenues consists of REV1: 1650-1691; REV2: 1692-1749; REV3: 1750-1913. Years 1654 and 1660 were interpolated.

POP1 is population of England, from Mitchell, BHS. These figures do not include Wales.³ POP2 is population of Wales for 1701, 1751, 1781, 1801, 1831, from Deane and Cole, *British Economic Growth*. POP3 is population of Scotland. The 1650 figure is from De Vries, *European Urbanization*; the 1701 figure from Brown, *Society*, 33; and the 1755 figure from Mitchell, BHS. All intermediate years for Wales and Scotland were interpolated. POP4 is the estimated mid-year home population of the British Isles, from Mitchell, BHS. The British population series consists of POP1: 1650-1691; POP1 + POP2 + POP3: 1692-1801; POP4: 1802-1913.⁴

The British official price of gold in pounds per fine ounce, 1650-1717, and the London market price of gold in pounds per fine ounce, 1718-1913, is from Officer, "Price." With the exception of French Revolutionary and Napoleonic times, both series are nearly identical. British revenues in ounces of gold were transformed into revenues in grams of gold by multiplying by 28.35.

France. REV1 is ordinary revenues of the French monarchy, 1650-1695, from Bonney, "Categories." REV2 is total royal revenue in France from various sources converted into *livres tournois*, 1660-1775, from Bonney, "Total Royal Revenue." REV3 is French ordinary revenue, 1727-1814, from Bonney, "French Ordinary Revenue." REV4 is French revenue, 1650-1870, provided by François Velde. REV5 is ordinary central government revenue, 1815-1913, from Mitchell, IHS. REV6 is extraordinary central government revenue, 1815-1890, from the *Annuaire Statistique*. The series of French central government revenues consists of REV1: 1650-1656, 1662; REV2: 1661-1703, 1705-1715, 1727-1750, 1757-1758, 1761, 1763, 1773-1774; REV3: 1751-1754, 1764-1765, 1768, 1780-1781, 1788-1796, 1806-1813; REV4: 1716-1726, 1759-1760, 1766-1767, 1769, 1772, 1775-1779, 1782-1787, 1791-1805, 1814; REV5 + REV6: 1815-1890; REV5: 1891-1913. Years 1657-1660, 1755-1756, 1762, and 1770-1771 were interpolated.⁵

³ See Wrigley and Schofield, *Population History*, p. 10.

⁴ One must distinguish between institutional innovations in England itself and for Britain as a whole. To control for such differences, I used the population for the relevant political entities when calculating per-capita figures. As discussed in appendix 1, Acts of Union assimilated England with Wales in 1536, with Scotland in 1707, and with Ireland in 1800. From 1650-1691, revenue data for the English crown was used since British data was unavailable. To convert it into per-capita terms, I divided by the English population only. Due to data unavailability, neither Wales nor Scotland was included, though at the time the English crown collected revenues from those domains. By making the pre-1692 population denominator smaller than it actually was, both decisions bias against the hypotheses that limited government resulted in an increase in revenues. Revenue data are for Great Britain (i.e., England, Scotland, and Wales) from 1692-1801 and for the United Kingdom (i.e. Great Britain and Ireland) from 1802-1913. Accordingly, population figures were used for England, Scotland, and Wales from 1692-1801, and England, Scotland, Wales, and Ireland from 1802-1913.

⁵ Massive inflation, which occurred in France from 1794-1796, resulted in per-capita revenue calculations that were abnormally large. I thus interpolated the revenue figures for those years based on the 1793 and 1797 tallies.

POP1 is population of France from Dupaquier, *Histoire*, vol. 2. POP2 is population of France from Mathias and O'Brien, "Taxation." POP3 is population of France from Blayo and Henry, "Population." POP4 is population of France at censuses from Mitchell, IHS. The French population series consists of POP1: 1650, 1670, 1680, 1690, 1710; POP2: 1715, 1725, 1730, 1735; POP3: 1740, 1745, 1750, 1755, 1760, 1765, 1770, 1775-1776, 1780-1781, 1785-1786, 1790-1791, 1795-1796, 1800-1801, 1805-1806, 1810-1811, 1815-1816, 1820-1821, 1825-1826, 1830-1831, 1835-1836, 1840-1841, 1845-1846, 1850-1851, 1855-1856, 1860-1861; POP4: 1866, 1872, 1876, 1881, 1886, 1891, 1896, 1901, 1906, 1911. All intermediate years were interpolated.

Rosenthal provided the Paris market price of gold in *francs* per gram, 1650-1913.

Italy. REV1 is central government revenue, 1862-1883, 1886-1913, from Mitchell, IHS. The series of Italian central government revenues consists of REV1: 1862-1913. Years 1884-1885 were interpolated.

POP1 is population of Italy from Mitchell, IHS. The Italian population series consists of POP1: 1861, 1871, 1881, 1901, 1911. All intermediate years were interpolated.

The *lira* was adopted as the monetary unit of Italy in 1862 with one *lira* equal to one French *franc*.⁶ Hence, I used the Paris market price of gold in *francs* per gram provided by Rosenthal.

The Netherlands. REV1 is total tax revenues in the Dutch Republic, 1572-1795, from Fritschy et al., "Provincial Finances." Wantje Fritschy assisted with this remarkable data set. The computation method was as follows. First, provincial tax streams for Drenthe, Friesland, Groningen, Holland, Overijssel, and Utrecht were tallied. The sums included income from direct and indirect taxes but excluded that from land sales and loans. Totals for Brabant and Gelderland were calculated according to Wantje Fritschy. Official quotas for Overijssel and Gelderland were 3.60 percent and 5.61 percent, respectively. Totals for Gelderland were computed as $(5.61 / 3.60) = 1.56$ times the totals for Overijssel. Those totals were also used for Brabant. Data for Zeeland as well as its Admiralty come from Veenstra, *Geld; Gewestelijke*. His admiralty figures included customs (*convooien en licenten*) as well as tonnage (*lastgeld*) and ship (*veilgeld*) taxes. Data on customs taxes for the four other Admiralties (i.e. Amsterdam, Friesland, Noorderkwartier, Rotterdam) were taken from Hovy, *Het voorstel*.⁷ Admiralty figures also included annual payments of 364,000 *guilders* made by the Dutch East India Company. Total tax revenues for the Republic as a whole were computed as sums of the previous categories. For additional details, see text. REV2 is income of the Batavian Republic and its successors, 1803-1810, 1814, from Van Zanden and Van Riel, *Strictures*. REV3 is income during the reign of Willem I, 1814, 1821, 1826, 1831, 1836, 1840, from Van Zanden and Van Riel, *Strictures*. Their totals for years 1815-1830 include Belgium. To account for its

⁶ *Global Financial Database*, "Italy (GHOC)."

⁷ Wietse Veenstra provided these data.

contribution, I subtracted average net Belgian transfers per year.⁸ The resulting figures matched up well with interpolated figures as found in Fritschy and Van Der Voort, “Fragmentation.” REV4 is central government revenue, 1845-1913, from Mitchell, IHS. The series of Dutch central government revenues consists of REV1: 1720-1795; REV2: 1803-1810; REV3: 1814-1840; REV4: 1845-1913. Years 1841-1844 were interpolated.

POP1 is population of the Netherlands from De Vries, *European Urbanization*. Jan Luiten van Zanden provided the population data used in the per-capita revenue series for Holland that appears in figure 2. POP2 is population of the Netherlands from Mitchell, IHS. The Dutch population series from 1650-1913 consists of POP1: 1650, 1700, 1750, 1800; POP2: 1816, 1829, 1839, 1849, 1859, 1869, 1879, 1889, 1899, 1909. All intermediate years were interpolated. Consistent with the revenue figures, population numbers exclude the Southern Netherlands.

W.L. Korthals Altes provided the Dutch market price of gold in *guilders* per gram, 1719-1913. Years 1749 and 1759, which were missing, were interpolated.

Portugal. REV1 is effective central government revenue, 1852-1913, from Mata, *Finanças públicas*. Figures do not include revenues from loans.⁹ The series of Portuguese central government revenues consists of REV1: 1852-1913.

POP1 is population of Portugal from Mitchell, IHS.¹⁰ The Portuguese population series consists of POP1: 1841, 1854, 1858, 1861, 1864, 1878, 1890, 1900, 1911. All intermediate years were interpolated.

I converted Portuguese revenues into grams of gold from 1852-1913 in the following way. First, revenues in *contos* were transformed into *mil-reis* by multiplying by 1000. Second, revenues in *mil-reis* were transformed into revenues in pounds by dividing by the exchange rate. Yearly averages of monthly exchange rates were used. Third, revenues in pounds were transformed into revenues in grams of gold by dividing by the market price of gold in ounces. Fourth, revenues in ounces of gold were transformed into revenues in grams of gold by multiplying by 28.35. Lastly, I divided by the Portuguese population to find per-capita revenues in grams of gold.

Prussia. REV1 is net revenues, 1688-1806, from Korner, “Total Revenue.” For 1688-1713, revenue figures came from the military treasury only. REV2 is total ordinary revenues, 1807-1913, from Mauersberg, *Finanzstrukturen*.¹¹ The series of Prussian central government revenues consists of REV1: 1688-1806; REV2: 1821, 1829, 1841,

⁸ As described in Van Zanden and Van Riel, *Strictures*, p. 99. For instance, the net transfer from Belgium from 1814-1820 was 11,800,000 *guilders*, or 1,966,666 *guilders* per year over the 6-year period. Hence, I subtracted this amount (1,966,666 *guilders*) from total income each year from 1814-1820. I did the same for 1821-1825 and 1826-1830.

⁹ Rui Esteves provided these data. Figures are for fiscal years 1851-1852, 1852-1853, and so on. Hence, I took an average of the two surrounding fiscal years to compute annual revenues.

¹⁰ The Azores and Maderia were included from 1841 onwards.

¹¹ Mark Spoerer provided these data.

1847, 1850, 1855, 1860, 1867, 1868, 1870, 1874, 1875, 1880, 1885, 1890, 1900, 1905, 1910. All intermediate years were interpolated.

POP1 is population of Prussia provided by Peter Brecke. Note that these figures incorporate Prussian territorial changes over the seventeenth to the nineteenth centuries as best as possible. POP2 is population of Prussia from Mauersberg, *Finanzstrukturen*. The Prussian population series consists of POP1: 1688-1865; POP2: 1870, 1874, 1875, 1880, 1885, 1890, 1895, 1900, 1905, 1910. All intermediate years were interpolated.

I converted Prussian revenues into grams of gold as follows. *Thaler* units were first transformed into silver ones by multiplying by 16.667.¹² I then transformed revenues from silver units to gold ones by dividing by the silver for gold price ratio found in Officer, "Price." Lastly, I divided by the Prussian population to find per-capita revenues in grams of gold. Note that revenues were given in *marks* from 1857-1913, where one *mark* was worth one-third of a *thaler* following de Vanssay, "Monetary Unions." Hence, for this period I transformed *mark* units into *thaler* ones by dividing by 3 before proceeding through the steps just described.

Spain. REV1 is ordinary and extraordinary revenues, 1703, 1713, from Lynch, *Bourbon Spain*. REV2 is ordinary and extraordinary revenue categories to the Spanish crown, 1753-1788, from Gelabert, "Revenue." REV3 is *Ingresos Totales del Estado*, 1801-1842, from Carreras and Tafunell, *Estadísticas*. REV4 is *Derechos Reconocidos y Liquidados Totales*, 1845-1913, from Carreras and Tafunell, *Estadísticas*. The series of Spanish central government revenues consists of REV1: 1703, 1713; REV2: 1753-1788; REV3: 1801-1807, 1813-1820, 1822, 1824-1839, 1841-1842; REV4: 1845, 1849-1913. Years 1714-1752, 1789-1800, 1808-1812, 1821, 1823, 1843-1844, and 1846-1848 were interpolated.

POP1 is population of Spain from De Vries, *European Urbanization*. POP2 is population of Spain from Nogal and Prados de la Escosura, "decadanza." POP3 is population of Spain from Lynch, *Bourbon Spain*. POP4 is population of Spain from Mitchell, IHS. The Spanish population series consists of POP1: 1650, 1700, 1850; POP2: 1750, 1787; POP3: 1717, 1797; POP4: 1768, 1857, 1860, 1877, 1887, 1897, 1900, 1910, 1920. All intermediate years were interpolated.

The Spanish market price of gold or silver was not available over the 16th to 19th centuries because buying and selling bullion outside the Spanish mint was forbidden.¹³ Hence, I converted Spanish revenues into grams of gold as follows. First, the pounds for *pesos* exchange rate was transformed into pounds for *pesetas* by multiplying by five.¹⁴ Second, revenues in *pesetas* were transformed into revenues in pounds by dividing by the

¹² Giovanni Federico alerted me to this conversion.

¹³ Maria Del Pilar Nogués Marco alerted me to this fact.

¹⁴ I employed the London Pound for Madrid *Peso* (1698-1913) data set from the Global Financial Database to do so. Yearly averages of monthly exchange rates were used. Since the Spanish revenue data were in *pesetas*, I made the following conversion: 1 *peso* = 20 *reales* and 1 *peseta* = 4 *reales*, meaning that 1 *peso* = 5 *pesetas*. See Vicens Vive, *Economic History*, pp. 582-83, 713-15; and Tortella, *Development*, p. 158, for details.

exchange rate. Yearly averages of monthly exchange rates were used. Third, revenues in pounds were transformed into revenues in grams of gold by dividing by the market price of gold in ounces. Fourth, revenues in ounces of gold were transformed into revenues in grams of gold by multiplying by 28.35. Lastly, I divided by the Spanish population to find per-capita revenues in grams of gold.

Sweden. REV1 is central government revenue, 1881-1913, from Mitchell, IHS. The series of Swedish central government revenues consists of REV1: 1881-1913.

POP1 is the population of Sweden from Mitchell, IHS. The Swedish population series consists of POP1: 1750, 1760, 1770, 1775, 1780, 1785, 1790, 1795, 1800, 1805, 1810, 1815, 1820, 1825, 1830, 1835, 1840, 1845, 1850, 1855, 1860, 1870, 1880, 1890, 1900, 1910. All intermediate years were interpolated.

I converted Swedish revenues into grams of gold from 1881-1913 in the following way. As for Denmark, Sweden adopted the gold standard in 1873 as part of the Scandinavian Monetary Union at one pound sterling equal to 18.1595 *kronor*. I first transformed *kronor* into pounds by dividing by 18.1595. I then transformed Swedish revenues in pounds into Swedish revenues in gold by dividing by the London market price of gold in pounds per fine ounce taken from Officer, "Price." Lastly, I divided by the Swedish population to find per-capita revenues in grams of gold.

OTHER VARIABLES

Urbanization. The urbanization variable calculates the urban population as a percentage of the total population for each sample country annually. All urban population figures are from De Vries, *European Urbanization*. Figures for 1650, 1700, 1750, and 1800 are from appendix 3, pp. 305-337, and figures for 1850, 1890, and 1980 are from table 4.8, pp. 44-47, for cities with populations of at least 10,000 inhabitants through 1850, with at least 20,000 inhabitants in 1890, and with at least 100,000 inhabitants in 1980.¹⁵ All intermediate years were interpolated. For country population sources, see appendix 2.

Per-capita GDP. The per-capita GDP variable, taken from Maddison, *World Economy*, measures per-capita GDP in 1990 international Geary-Khamis dollars for sample countries from 1650-1913. Data are available for 1600, 1700, and 1820-1913. All intermediate years were interpolated.¹⁶

¹⁵ De Vries provides urbanization figures for Germany rather than for Prussia and for Scandinavia rather than for Denmark or Sweden. Urbanization figures for Austria include Bohemia.

¹⁶ A lack of data led me to substitute German per-capita GDP figures for Prussia.

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