Industrialisation and the Demand for Mineral Commodities

- Online-Appendix -

Martin Stuermer

November 31, 2014

Contents

1 Additional figures **2**

2 Data sources and description **5**

3 Sensitivity analysis: additional regression results **35**

References **47**

1 Additional figures

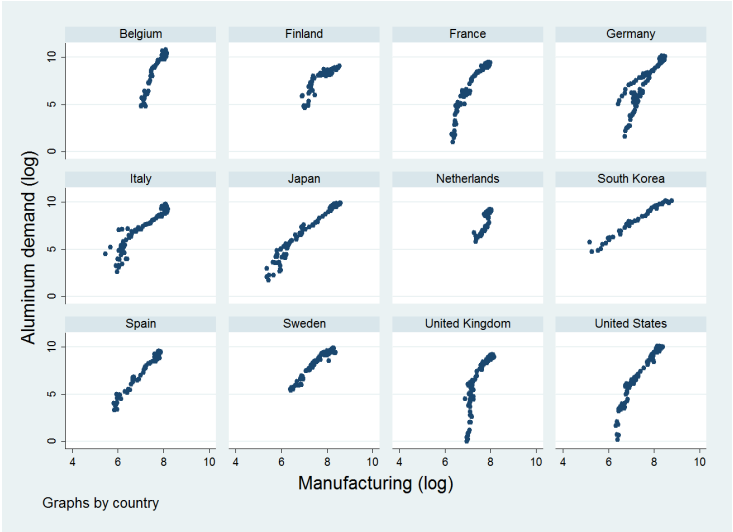

Figure 1: Scatter plot of log per capita value added by manufacturing (horizontal axis) and log per capita aluminum use (vertical axis).

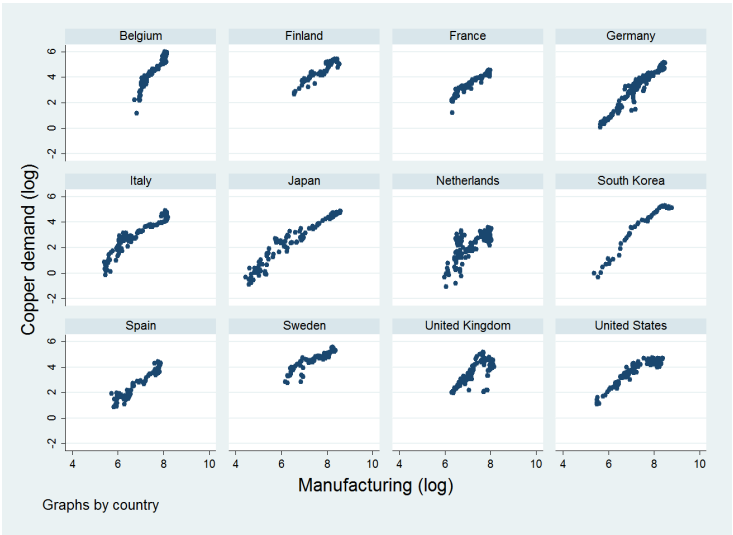

Figure 2: Scatter plot of log per capita value added by manufacturing (horizontal axis) and log per capita copper demand (vertical axis).

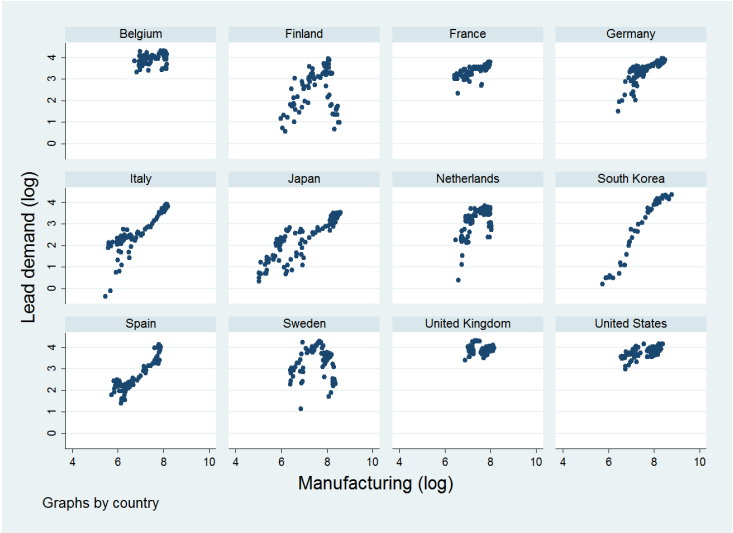

Figure 3: Scatter plot of log per capita value added by manufacturing (horizontal axis) and log per capita lead use (vertical axis).

Figure 4: Scatter plot of log per capita value added by manufacturing (horizontal axis) and log per capita tin use (vertical axis).

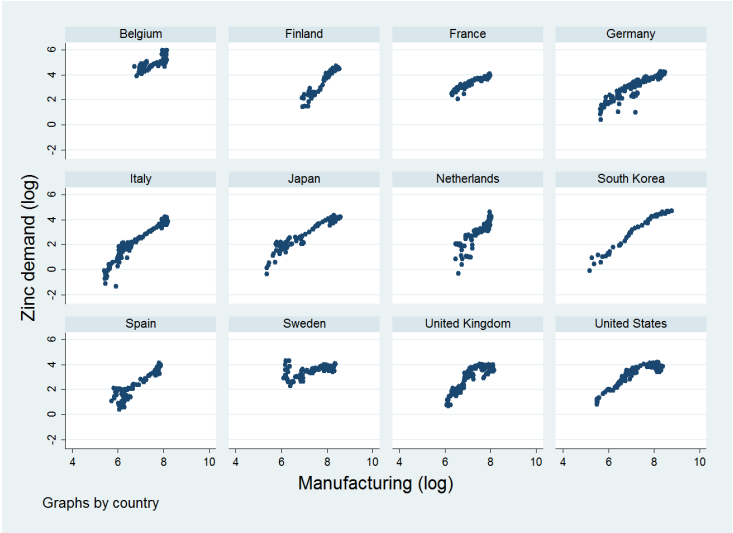

Figure 5: Scatter plot of log per capita value added by manufacturing (horizontal axis) and log per capita zinc use (vertical axis).

2 Data sources and description

Table 1: Data sources for the usage of aluminum.

Country	Time	Source	Notes
Belgium	1930-2010	BGR 2012a	Refined aluminum; including Luxembourg.
Finland	1946-2010	BGR 2012a	Refined aluminum.
France	1893-9	Metallgesellschaft 1905, p. 30	Computed from import, export, and production data for aluminum.
	1900-2010	BGR 2012a	Refined aluminum.
Germany	1892-5	Metallgesellschaft 1905, p. 30	Usage equals refined aluminum production; no imports and exports according to Metallgesellschaft; production includes Austria-Hungary and Switzerland as it is based on data of the Aluminium Industrie AG with production facilities in Neuhausen (Switzerland), Rheinfelden (Germany), and Lend-Gastein (Austria).
	1895-9	Metallgesellschaft 1905, p. 30	Computed from German exports and imports of refined aluminum and refined aluminum production for Austria-Hungary, Switzerland, and Germany, as it is based on data of the Aluminium Industrie AG with production facilities in Neuhausen (Switzerland), Rheinfelden (Germany), and Lend-Gastein (Austria).
	1900-9	Metallgesellschaft 1910, p. 16	Aluminum; estimates by Metallgesellschaft.
	1910-2	Metallgesellschaft 1913, p. 16	Aluminum.
	1913	Metallgesellschaft 1927, p. 4	Aluminum.
	1914-9	Metallgesellschaft 1922, p. 4	Aluminum.

	1920-2010	BGR 2012a	Refined aluminum. 1949-90: West Germany.
Italy	1908-2010	BGR 2012a	Refined aluminum.
Japan	1911-2010	BGR 2012a	Refined aluminum.
Netherlands	1946-2010	BGR 2012a	Refined aluminum.
South Korea	1962-2010	BGR 2012a	Refined aluminum. 1964: linear trend.
Spain	1938-2010	BGR 2012a	Refined aluminum.
Sweden	1929-2010	BGR 2012a	Refined aluminum.
U.K.	1890-1	Metallgesellschaft 1899, p. 32	Usage equal to production of aluminum. No data on imports and exports available. I assume no considerable amounts of imports and exports.
	1892-9	Metallgesellschaft 1905, p. 30	Usage equal to production of aluminum. No data on imports and exports available. I assume no considerable amounts of imports and exports. 1895: lin. trend.
	1900-2010	BGR 2012a	Refined aluminum.
U.S.	1890-1	Metallgesellschaft 1899, p. 32	Computed from imports and domestic production of aluminum. No export data available.
	1892-9	Metallgesellschaft 1905, p. 30	Computed from imports and domestic production of aluminum. Export data only in U.S.-$ terms. According to this data, quantities seem to be not considerable.
	1900-2010	BGR 2012a	Refined aluminum.

Note: Parts of the data described in the Table above and in Tables 2, 4, 5 are based on a revised and extended version of data used in figures in Stuermer and von Hagen (2012).

Table 2: Data sources for the usage of copper.

Country	**Time**	**Source**	**Notes**

Belgium	1900-2010	BGR 2012a	Refined copper.
Finland	1941-2010	BGR 2012a	Refined copper.
France	1881-4	Metallgesellschaft 1899, p. 53	Unwrought copper including changes in apparent stocks.
	1885-1902	Metallgesellschaft 1905, p. 51	Unwrought copper including changes in apparent stocks.
	1903-12	Metallgesellschaft 1913, p. 50	Unwrought copper including changes in apparent stocks.
	1913-2010	BGR 2012a	Refined copper.
Germany	1850-64	Bienengräber 1868, pp. 303-4, Schmitz 1979, p. 63	Computed from imports and exports of unwrought copper and brass (Bienengräber, 1868), and the production of primary copper (Schmitz, 1979).
	1865-6	Schmitz 1979, p. 63	Exports and imports: linear trends; computed from imports and exports and the production of primary copper (Schmitz, 1979).
	1867	Hirth 1869, p. 122, Schmitz 1979, p. 63	Computed from imports and exports of primary and secondary copper (Hirth, 1869), and the production of primary copper (Schmitz, 1979).
	1868-71	Hirth 1871, p. 560 and 670, Schmitz 1979, p. 63	Computed from imports and exports of primary and secondary copper (Hirth, 1871), and the production of primary copper (Schmitz, 1979); imports in 1871: linear trend; exports in 1870-1: linear trend.
	1872-5	Kaiserliches Statistisches Amt 1890, p. 144	Computed from imports and exports of primary and secondary copper, and the production of primary copper of the German Reich, excluding Hamburg.
	1876-80	Kaiserliches Statistisches Amt 1890, p. 131	Computed from imports and exports of primary and secondary copper, and the production of primary copper of the German Reich, excluding Hamburg. Hamburg joined the German customs area in 1881, but maintained a free trade zone. Copper production in Hamburg started in 1878 with a relatively small amount of 40t p.a.
	1881-4	Metallgesellschaft 1899, p. 49	Computed from imports, exports, and the production of unwrought copper of the German Reich, excluding Hamburg.
	1885-94	Metallgesellschaft 1913, p. 30	Computed from imports, exports, and the production of unwrought copper of the German Reich, excluding Hamburg.

	1895-9	Metallgesellschaft 1913, p. 45	Computed from imports, exports, and the production of unwrought copper of the German Reich, excluding Hamburg.
	1900-2010	BGR 2012a	Refined copper.
Italy	1881-4	Metallgesellschaft 1899, p. 55	Unwrought copper and copper alloys.
	1885-1902	Metallgesellschaft 1905, p. 53	Unwrought copper and copper alloys.
	1903-11	Metallgesellschaft 1913, p. 54	Unwrought copper.
	1912-2010	BGR 2012a	Refined copper.
Japan	1885-8	House of Commons 1892b, pp. 128-9, Mitchell 1998, p. 387	Computed from imports, exports (House of Commons, 1901), and the mine production of copper (Mitchell, 1998). 1886: linear trend.
	1889-91	House of Commons 1901, pp. 156-7, Mitchell 1998, p. 387	Computed from imports, exports (House of Commons, 1901), and the mine production of copper (Mitchell, 1998).
	1892-1900	House of Commons 1901, pp. 156-7, House of Commons 1914, p. 485	Computed from imports, exports (House of Commons, 1901), and the production of copper (House of Commons, 1914); Exports 1900: linear trend.
	1901-10	House of Commons 1914, pp. 238-9, BGR (2012b)	Computed from imports and exports of unwrought copper and the domestic production of refined copper.
	1911-2010	BGR 2012a	Refined copper.
Netherlands	1864-9	House of Commons 1874, pp. 40-5	Computed from imports and exports of unwrought copper; no domestic production.
	1870-80	House of Commons 1881, pp. 62-4	Computed from imports and exports of unwrought copper; no domestic production; no reasonable data in 1872.
	1881-90	House of Commons 1892b, pp. 82-5	Computed from imports and exports of unwrought copper; no domestic production; no reasonable data in 1882.
	1891-9	House of Commons 1901, pp. 92-5	Computed from imports and exports of unwrought copper; no domestic production.
	1900		Linear trend.
	1901-12	House of Commons 1914, pp. 136-9	Computed from imports and exports of unwrought copper; no domestic production.

	1913	House of Commons 1915, pp. 32-4	Computed from imports and exports of unwrought copper; no domestic production; quantities during the eleven months ended in November.
	1914-6	House of Commons 1917, pp. 26-8	Computed from imports and exports of unwrought copper; no domestic production.
	1918-20	House of Commons 1921, p. 38	Computed from imports and exports of unwrought copper; no domestic production.
	1921	House of Commons 1922, p. 34	Computed from imports and exports of unwrought copper; no domestic production.
	1924-2010	BGR 2012a	Refined copper.
South Korea	1964-2010	BGR 2012a	Refined copper.
Spain	1922-2010	BGR 2012a	Refined copper.
Sweden	1922-2010	BGR 2012a	Refined copper.
U.K.	1850	House of Commons 1852, pp. 87-9, Schmitz 1979, p. 209	Computed from imports of unwrought and partly wrought copper, exports of unwrought copper, and the domestic smelter production.
	1851	House of Commons 1853, pp. 99-100, Schmitz 1979, p. 209	Computed from imports of unwrought and partly wrought copper, exports of unwrought copper, and the domestic smelter production.
	1852	House of Commons 1854c, pp. 101-2, Schmitz 1979, p. 209	Computed from imports of unwrought and partly wrought copper, exports of unwrought copper, and the domestic smelter production.
	1853	House of Commons 1855, pp. 2-3, Schmitz 1979, p. 209	Computed from imports of unwrought and partly wrought copper, exports of unwrought copper, and the domestic smelter production.
	1854-80	House of Commons 1882, pp. 110-21, Schmitz 1979, p. 209	Computed from imports of unwrought and partly wrought copper, exports of unwrought copper, and the domestic smelter production. Production data from 1877-80: House of Commons (1884a, p. 44), copper produced (computed by source from copper ores and precipitat from mines in the UK, colonial and foreign ores imported, copper precipitate and regulus imported and burnt ores from imported cupreous pyrites, deducting British copper ores exported to foreign countries).

1881	House of Commons 1885a, p. 23, House of Commons 1884a, p. 44	Computed from imports of unwrought and partly wrought copper, exports of unwrought copper, and the domestic copper production (computed by House of Commons (1884a) from copper ores and precipitat from mines in the UK, colonial and foreign ores imported, copper precipitate and regulus imported and burnt ores from imported cupreous pyrites, deducting British copper ores exported to foreign countries).
1882	House of Commons 1884a, pp. 41-4	Computed from imports of unwrought and partly wrought copper, exports of unwrought copper, and domestic copper production (computed by source from copper ores and precipitat from mines in the UK, colonial and foreign ores imported, copper precipitate and regulus imported and burnt ores from imported cupreous pyrites, deducting British copper ores exported to foreign countries).
1883	House of Commons 1884b, pp. 43-5, House of Commons 1885b, p. 42	do.
1884	House of Commons 1885b, pp. 39-41	do.
1885	House of Commons 1886, pp. 39-41	do.
1885	House of Commons 1886, pp. 39-41	do.
1886	House of Commons 1887, pp. 45-7, House of Commons 1888, p. 33	do.
1887	House of Commons 1888, pp. 28-33	do.
1888-9	House of Commons 1891a, pp. 30-2	do.
1890	House of Commons 1891b, pp. 32-5	do.
1891	House of Commons 1892a, pp. 34-7	do.
1892-3	House of Commons 1894, pp. 42-6	do.
1894-5	House of Commons 1896, pp. 43-7	do.
1896-7	House of Commons 1898, pp. 187-90	do.
1898-9	House of Commons 1900, pp. 189-92	do.

	1900-2010	BGR 2012a	Refined copper.
U.S.	1847-9	House of Commons 1854b, p. 2, Carter et al. 2006	Computed from imports of unwrought copper from the U.K., and smelter production from domestic ores. No imports or exports from other countries declared.
	1850-5	House of Commons 1856, p. 351, Carter et al. 2006	do.
	1856-62	Secretary of the Treasury 1864, pp. 44-8, Carter et al. 2006	Computed from imports of copper from the U.K., exports of copper to different countries and smelter production from domestic ores. No imports from other countries declared.
	1863	House of Commons 1866, p. 357, Carter et al. 2006	Computed from imports of pig copper and smelter production from domestic ores. No exports declared.
	1864-8	Weed 1916, p. 1315, House of Commons 1868, p. 377, Carter et al. 2006	Computed from imports of pig copper, exports of refined copper, and smelter production from domestic ores. Imports 1866-8: linear trend.
	1869-78	U.S. Bureau of Statistics 1879, p. 73 & 92, Carter et al. 2006	Computed from imports of copper pigs, bars, ingots, old, and other unmanufactured, exports of pigs, bars, sheets and old, and smelter production from domestic ores. Export and import data: years ended June 30th.
	1879-81	U.S. Bureau of Statistics 1889, p. 87 & 102, Carter et al. 2006	Computed from imports of copper pigs, bars, ingots, old, and other unmanufactured, exports of ingots, bars, sheets and old, and smelter production from domestic ores. Export and import data: years ended June 30th.
	1882-8	U.S. Bureau of Statistics 1889, p. 87 & 102 Schmitz 1979, p. 210	Computed from imports of copper pigs, bars, ingots, old, and other unmanufactured, exports of ingots, bars, and old, and domestic smelter production. Export and import data: years ended June 30th.
	1889-98	U.S. Bureau of Statistics 1899, p. 196 & 168, Schmitz 1979, p. 212	Computed from imports of copper pigs, bars, ingots, old, and other unmanufactured, exports of pigs, ingots, bars, and old, and domestic smelter production. Export and import data: years ended June 30th.

	1899	U.S. Bureau of Statistics 1909, p. 437 & 406, Schmitz 1979, p. 212	Computed from imports of copper pigs, bars, ingots, plats, and old, exports of pigs, ingots, plats, and old, and domestic smelter production. Export and import data: years ended June 30th.
	1900-2010	BGR 2012a	Refined copper.

Table 3: Data sources for the usage of refined lead.

Country	**Time**	**Source**	**Notes**
Belgium	1900-2010	BGR 2012a	Including Luxembourg.
Finland	1929-2010	BGR 2012a	
France	1900-2010	BGR 2012a	
Germany	1900-2010	BGR 2012a	
Italy	1900-2010	BGR 2012a	
Japan	1900-2010	BGR 2012a	
Netherlands	1906-2010	BGR 2012a	
South Korea	1967-2010	BGR 2012a	
Spain	1909-2010	BGR 2012a	
Sweden	1927-2010	BGR 2012a	
U.K.	1900-2010	BGR 2012a	
U.S.	1900-2010	BGR 2012a	

Table 4: Data sources for the usage of tin.

Country	**Time**	**Source**	**Notes**
Belgium	1900-2010	BGR 2012a	Refined tin, including Luxembourg.
Finland			No data available.
France	1889-96	Metallgesellschaft 1899, p. 68	Unwrought tin.
	1897-1902	Metallgesellschaft 1907, p. 83	Unwrought tin.
	1903-2010	BGR 2012a	Refined tin.
Germany	1850-64	Bienengräber 1868, pp. 337-8, Neumann 1904, pp. 251-3	Computed from imports and exports of tin in bars, blocks, and old tin, and the production of tin.
	1865-6	Königlich Preussisches Statistisches Bureau 1868, p. 211, Neumann 1904, pp. 251-3	Computed from imports and exports of tin in bars, blocks, and old tin, and the production of tin.
	1867	Hirth 1869, p. 130, Neumann 1904, pp. 251-3	Computed from imports and exports of tin in bars and blocks, and the production of tin. Exports: linear trend.
	1868-9	Hirth 1871, p. 567, Neumann 1904, pp. 251-3	Computed from imports and exports of tin in blocks etc, and the production of tin.
	1870-1	Neumann 1904, pp. 251-3	Computed from imports and exports of tin in blocks etc, and the production of tin. Exports and Imports: linear trends.
	1872-83	Kaiserliches Statistisches Amt 1885, p. 144	Tin.
	1884-5	Metallgesellschaft 1899, p. 66	Unwrought tin.
	1886-1902	Metallgesellschaft 1905, p. 64	Unwrought tin.
	1903-5	Metallgesellschaft 1913, p. 81	Unwrought tin.
	1906-2010	BGR 2012a	Refined tin, 1949-90: West-Germany.
Italy	1889-96	Metallgesellschaft 1899, p. 27	Unwrought tin.

	1897-1902	Metallgesellschaft 1907, p. 84	Unwrought tin.
	1900-2010	BGR 2012a	Refined tin.
Japan	1902-2010	BGR 2012a	Refined tin.
Netherlands	1904-2010	BGR 2012a	Refined tin.
South Korea	1969-2010	BGR 2012a	Refined tin.
Spain	1900-2010	BGR 2012a	Refined tin.
Sweden	1900-2010	BGR 2012a	Refined tin.
U.K.	1850-96	Mitchell 1988, pp. 313-21, Schmitz 1979, pp. 164-8, House of Commons 1884a, p. 120	Computed from imports and exports (including re-exports) of unmanufactured tin and the production of metallic tin (equiv. to mine production).
	1897-9	Metallgesellschaft 1907, p. 81	Use of unwrougth tin including changes in apparent stocks.
	1900-2010	BGR 2012a	Refined tin.
U.S.	1853-8	House of Commons 1859, p. 29	Tin in pigs and bars; consumption equal to imports as there seems to be no production and exports at the time. Imports: Crude estimates based on the value of imports; year ended 30th June.
	1859-60		Linear trend.
	1861-2	House of Commons 1864, p. 341	Tin in pigs, blocks and bars; consumption equal to imports as there seems to be no production and exports at the time; year ended 30th June.
	1863	House of Commons 1866, p. 358	Tin in blocks and pigs; consumption equal to imports as there seems to be no production and exports at the time, supposed error in data source corrected; year ended 30th June.
	1864-5	House of Commons 1868, p. 378	Tin in blocks and pigs; consumption equal to imports as there seems to be no production and exports at the time, 1864: obvious error in data source corrected; year ended 30th June.
	1866-7	House of Commons 1870, p. 368	Tin in bars, blocks, or pigs; consumption equal to imports as there seems to be no production and exports at the time; year ended 30th June.

1868	National Bureau of Economic Research 2013	Tin; consumption equal to imports as there seems to be no production and exports at the time; year ended 30th June.
1869-78	U.S. Bureau of Statistics 1879, pp. 71 and 77	Tin in bars, blocks, pigs, grain, or granulated; consumption equal to imports as there seems to be no production and exports at the time; year ended June 30th.
1879-88	U.S. Bureau of Statistics 1889, p. 85	Tin in bars, blocks, pigs, grain, or granulated; consumption equal to imports as there seems to be no production and exports at the time; year ended June 30th.
1889-96	Metallgesellschaft 1899, p. 69	Use of unwrougth tin including changes in apparent stocks.
1897-9	Metallgesellschaft 1907, p. 81	Use of unwrougth tin including changes in apparent stocks.
1900-2010	BGR 2012a	Refined tin.

Table 5: Data sources for the usage of zinc.

Country	**Time**	**Source**	**Notes**
Belgium	1900-2010	BGR 2012a	Refined zinc; including Luxembourg.
Finland	1946-2010	BGR 2012a	Refined zinc.
France	1903-2010	BGR 2012a	Refined zinc.
Germany	1850-9	Bienengräber 1868, p. 310, Neumann 1904, p. 314	Computed from imports and exports of unwrought zin and the production of zinc.
	1860-78	Kaiserliches Statistisches Amt 1880, p. 136	Unwrought zinc.
	1879-83	Kaiserliches Statistisches Amt 1885, p. 144	Unwrought zinc.
	1884-8	Kaiserliches Statistisches Amt 1890, p. 131	Unwrought zinc.
	1889-96	Metallgesellschaft 1905, p. 56	Unwrought zinc.
	1897-9	Metallgesellschaft 1913, p. 65	Unwrought zinc, no scrap.
	1900-2010	BGR 2012a	Refined zinc; 1945-90: West Germany.
Italy	1889-94	Metallgesellschaft 1898, p. 57	Unwrought zinc.
	1895-1902	Metallgesellschaft 1905, p. 61	Unwrought zinc.
	1903-2010	BGR 2012a	Refined zinc.
Japan	1911-2010	BGR 2012a	Refined zinc.
Netherlands	1889-90	Metallgesellschaft 1897, p. 31	Unwrought zinc; estimate by Metallgesellschaft.
	1891-9	Metallgesellschaft 1901, p. 27	Unwrought zinc; estimate by Metallgesellschaft.
	1900-2010	BGR 2012a	Refined zinc.
South Korea	1962-2010	BGR 2012a	Refined zinc.
Spain	1900-2010	BGR 2012a	Refined zinc.
Sweden	1911-2010	BGR 2012a	Refined zinc.

U.K.	1840-9	Mitchell 1988, pp. 312-23	Computed from imports and exports of unmanufactured zinc. No domestic zinc production according to Neumann (1904) and Schmitz (1979) before 1855.
	1850-1	House of Commons 1853, p. 108, Mitchell 1988, pp. 320-3, Neumann 1904, p. 314	Computed from imports of zinc and spelter, and exports of unmanufactured zinc. No domestic zinc production according to Neumann (1904) and Schmitz (1979) before 1855.
	1852-4	Mitchell 1988, pp. 312-7	Computed from imports and exports of unmanufactured zinc. No domestic zinc production according to Neumann (1904) and Schmitz (1979) before 1855.
	1855-9	House of Commons 1882, pp. 17-21, Mitchell 1988, pp. 320-3, Neumann 1904, p. 314	Computed from imports of zinc or spelter, crude, and in cakes, exports of unmanufactured zinc, and the domestic mine production.
	1860-1	House of Commons 1882, pp. 17-21, Mitchell 1988, pp. 320-3, Schmitz 1979, p. 184	Computed from imports of zinc or spelter, crude, and in cakes, exports of unmanufactured zinc, and the domestic mine production.
	1862-9	House of Commons 1882, pp. 17-21, Schmitz 1979, p. 184	Computed from imports and exports of zinc or spelter, crude, and in cakes, and the domestic mine production.
	1870-6	House of Commons 1882, pp. 17-21, BGR (2012b)	Computed from imports and exports of zinc or spelter, crude, and in cakes, and the domestic smelter production; 1871: linear trend.
	1877-9	House of Commons 1882, pp. 17-21, Schmitz 1979, p. 184	Computed from imports and exports of zinc or spelter, crude, and in cakes, and the domestic mine production.
	1880	House of Commons 1882, pp. 17-21, Metallgesellschaft 1898, p. 16	Computed from imports and exports of zinc or spelter, crude, and in cakes, and the domestic unwrought zinc production.
	1881-3	House of Commons 1885a, p. 6 and p. 14, Metallgesellschaft 1898, p. 16	Computed from imports and exports of zinc or spelter, crude, and in cakes, and the domestic unwrought zinc production.
	1884-8	Mitchell 1988, pp. 312-23, Metallgesellschaft 1898, p. 16	Computed from imports and exports of unmanufactured zinc, and the domestic unwrought zinc production.
	1889-94	Metallgesellschaft 1899, p. 60	Unwrought zinc; no changes in apparent stocks included.

	1895-1901	Metallgesellschaft 1905, p. 58	Unwrought zinc; no changes in apparent stocks included.
	1902-2010	BGR 2012a	Refined zinc.
U.S.	1849-51	House of Commons 1853, p. 109	Usage equal to imports of British zinc or spelter. No production according to Mitchell (1988, p. 366) and Schmitz (1979, p. 184). No export data available. I suppose there have not been considerable amounts of exports.
	1852-3	House of Commons 1854a, p. 9	Usage equal to imports of British zinc or spelter. No production according to Mitchell (1988, p. 366) and Schmitz (1979, p. 184). No export data available. I suppose there have not been considerable amounts of exports. Imports 1852: linear trend.
	1854-8	House of Commons 1855, p. 9	Usage equal to imports of British zinc or spelter. No production according to Mitchell (1988, p. 366) and Schmitz (1979, p. 184). No export data available. I suppose there have not been considerable amounts of exports. Imports 1855-8: linear trend.
	1859	House of Commons 1862, p. 277, Jolly 1992, p. 20	Computed from imports of zinc and spelter and the domestic production of zinc. No export data available. I suppose there have not been considerable amounts of exports.
	1860-2	House of Commons 1862, p. 277, BGR (2012b)	Computed from imports of zinc and spelter and the domestic refined production of zinc. No export data available. I suppose there have not been considerable amounts of exports. Imports 1861-2: linear trend.
	1863	House of Commons 1866, p. 358, BGR (2012b)	Computed from imports of zinc in blocks and sheets and the domestic refined production of zinc. No export data available. I suppose there have not been considerable amounts of exports.
	1864-6	House of Commons 1868, p. 378, Carter et al. 2006, BGR (2012b)	Computed from imports of zinc in blocks and sheets, exports of refined zinc in blocks, pigs, and slabs, and the domestic refined production of zinc. Imports 1866: linear trend.
	1867-79	Carter et al. 2006, BGR (2012b)	Computed from imports and exports of refined zinc in blocks, pigs, and slabs, and the domestic refined production of zinc.
	1880-8	Carter et al. 2006, Metallgesellschaft 1898, p. 16	Computed from imports and exports of refined zinc in blocks, pigs, and slabs, and the domestic production of unwrought zinc.

1889-94	Metallgesellschaft 1899, p. 60	Unwrought zinc.
1895-1904	Metallgesellschaft 1905, p. 63	Unwrought zinc.
1905-2010	BGR 2012a	Refined zinc.

Table 6: Data sources for the manufacturing data.

Country	**Time**	**Source**	**Notes**
Belgium	1850-1988	Smits et al. 2009	GDP in current prices, total industry (incl. mining, manufacturing, energy, and construction).
	1989-94	OECD, 2012	GDP in current prices, total industry (incl. mining, manufacturing, energy, and construction).
	1995-2011	OECD, 2012	GDP in current prices, manufacturing.
Finland	1860-2001	Smits et al. 2009	GDP in current prices, manufacturing.
	2002-10	OECD, 2012	GDP in current prices, manufacturing.
France	1850-1913	Smits et al. 2009	GDP in current prices, total industry (incl. mining, manufacturing, energy, and construction).
	1920-38	Smits et al. 2009	GDP in current prices, total industry (incl. mining, manufacturing, energy, and construction).
	1950-60	United Nations, Statistical Office 1963, p. 270	GDP in current prices, manufacturing (incl. also fishing and the quarring of building materials).
	1961-9	United Nations, Statistical Office 1972	GDP in current prices, manufacturing.
	1970-98	Groningen Growth and Development Centre 2008	GDP in current prices, manufacturing.
	1999-2009	OECD, 2012	GDP in current prices, manufacturing.
	2010	OECD, 2012	GDP in current prices, manufacturing.
Germany	1850-1949	Hoffmann 1965	NDP at factor costs in constant 1913 prices, Industry and handcraft (incl. no mining, but possibly energy and construction); 1914-24 and 1939-49: linear trends.
	1950-90	Groningen Growth and Development Centre 2008	GDP at constant prices (base year = 1991); manufacturing; West Germany.

	1991-2011	Statistisches Bundesamt der Bundesrepublik Deutschland 2012	GDP in current prices, manufacturing.
Italy	1861-69	Baffigi 2011	GDP in current prices, manufacturing.
	1970-2010	OECD, 2012	GDP in current prices, manufacturing.
Japan	1885-1940	Timmer and de Vries 2007, p. 283	NDP in current prices, mining and manufacturing.
	1941-54	Ohkawa and Rosovsky 1973	NDP in current prices, manufacturing.
	1955-98	Ministry of Internal Affairs and Communication of Japan 2012	GDP in current prices, manufacturing.
	1999-2008	Japan Cabinet Office 2010	GDP in current prices, manufacturing.
	2009-2010	OECD, 2012	GDP in current prices, manufacturing.
Netherlands	1850-1912	Groningen Growth and Development Centre 2008	GDP in current prices, manufacturing.
	1913-39	Smits and Van der Bie 2001, pp. 90-3	GDP in current prices, manufacturing, data for the ceramic, glass, and diamonds sectors has been computed based on data from Smits et al. (2000).
	1948-55	United Nations, Statistical Office 1963	GDP in current prices, manufacturing, 1949: linear trend.
	1956-62	United Nations, Statistical Office 1966	GDP in current prices, manufacturing.
	1963-68	United Nations, Statistical Office 1977	GDP in current prices, manufacturing. 1964 and 1966: linear trend.
	1969-2010	OECD, 2012	GDP in current prices, manufacturing.
South Korea	1911-40	Smits et al. 2009	GDP in current prices, manufacturing.
	1953-2011	Bank of Korea 2012	Manufacturing as a percentage share of GDP.
Spain	1850-1954	Smits et al. 2009	GDP in current prices, manufacturing.
	1955-9	United Nations, Statistical Office 1966	GDP in current prices, manufacturing.
	1960-9	United Nations, Statistical Office 1972	GDP in current prices, manufacturing.
	1970-94	Groningen Growth and Development Centre 2008	GDP in current prices, manufacturing.

	1995-2009	OECD, 2012	GDP in current prices, manufacturing.
Sweden	1850-1969	Smits et al. 2009	GDP in current prices, manufacturing.
	1970-92	Groningen Growth and Development Centre 2008	GDP in current prices, manufacturing.
	1993-2010	OECD, 2012	GDP in current prices, manufacturing.
U.K.	1840-1919	Mitchell 2003a	GDP in current prices, total industry.
	1920-59	Mitchell 1988	GDP in current prices, total industry.
	1960-2010	OECD, 2012	GDP in current prices, total industry.
U.S.	1869-89	Smits et al. 2009	GNP in current prices, manufacturing, 1870-8 and 1880-8: linear trend.
	1890-8		Linear trend.
	1899-1937	Martin 1939	GNP in current prices, manufacturing.
	1938-46		Linear trend.
	1947-97	Groningen Growth and Development Centre 2008	GNP in current prices, manufacturing.
	1998-2010	OECD, 2012	GDP in current prices, manufacturing.

Table 7: Data sources for the mineral commodity prices.

Mineral Comm.	**Country**	**Time**	**Units**	**Sources**	**Notes**
Aluminum	U.K.	1904-75	£/mt	Schmitz 1979, pp. 263-5	1913-45: Ingots, 99-99.5% metal cont., London market; 1946-75: Ingots, min. 99.5% metal cont., London market.
	U.K.	1976-2010	US-$/mt	BGR 2011a	1976-Nov 78: Primary aluminum, cash, in London Metal Exchange (LME) warehouse, min. 99.5% metal content; Dec 1978-Jul 87: Primary aluminum, cash, in LME warehouse, min. 99.5% metal cont.; Aug 1987-2010: High grade primary aluminum, cash, in LME warehouse, min. 99.7% metal cont.
Aluminum	U.S.	1895-1976	US-$/mt	Schmitz 1979, pp. 263-5	1895-1945: Ingots, min. 99% metal cont., New York market; 1946-76: Ingots, min. 99.5% metal cont., New York market.
	U.S.	1977-98	US-$/mt	Sachs 1999, p. 3	1977-82: New York market, 1983-98: New York market, 99.7% pure aluminum ingot.
	U.S.	1999-2000	US-$/mt	U.S. Geological Survey 2001	New York market, 99.7% pure aluminum ingot.
	U.S.	2001-5	US-$/mt	U.S. Geological Survey 2007	New York market, 99.7% pure aluminum ingot.
	U.S.	2006-10	US-$/mt	U.S. Geological Survey 2011	New York market, 99.7% pure aluminum ingot.

Aluminum	Germany	1854-1975	Marks/mt	Schmitz 1979, pp. 263-5	1854-89: Continental European price, selling price of refined aluminum, Deville Co. France; 1858, 1860-3, 1865-73, 1875-7, 1879-83, 1887: linear trend; 1890-Mar 1958: Ingots, min. 99% metal cont., av. selling price of German primary aluminum; Apr 1958-75: Ingots, min. 99.5% metal cont., av. selling price of German primary aluminum; 1914: Jan-Jul only; 1915-8, 1942-7: Official max. price.
	Germany	1976-2010	US-$/mt	BGR 2011a	1976-Nov 78: Primary aluminum, cash, in LME warehouse Hamburg, min. 99.5% metal cont.; Dec 1978-Jul 87: Primary aluminum, cash, in LME warehouse Hamburg, min. 99.5% metal cont.; Aug 1987-2010: High grade primary aluminum, cash, in LME warehouse Hamburg, min. 99.7% metal cont.
Copper	U.K.	1840-1976	£/mt	Schmitz 1979, pp. 268-72	1790-1879: Tough copper, fire-refined, av. 99.25% metal cont., London market; 1880-1914: Best selected copper, fire-refined, av. 99.75% metal cont., London market; 1915-76: Electrolytic wirebars, min. 99.9% metal cont., London market; 1939: Price av. Jan-Aug only as LME dealings were suspended; Sep 1940-Aug 53: controlled selling price of the Ministry of Supply.

	U.K.	1977-2010	US-$/mt	BGR 2011a	Grade A, cash, in LME warehouse, min. 99.99% metal cont.
Copper	U.S.	1850-1976	US-$/mt	Schmitz 1979, pp. 268-72	1850-99: Lake copper, fire-refined, New York market, min. 99.9% metal cont.; 1900-1934: Electrolytic wirebars, min. 99.9% metal cont., New York market; 1935-1976: Electrolytic wirebars (domestic), net Atlantic seaboard refinery, min. 99.9% metal cont.; Sep 1967-Apr 68: U.S. producer strike, so 1967 is the average of Jan-June and 1968 is the average of May-Dec.
	U.S.	1977-90	U.S.-$/mt	U.S. Bureau of Mines 1981, 1987, 1993	Cathode, min. 99.99% metal cont., U.S. producer price.
	U.S.	1991-2010	U.S.-$/mt	U.S. Geological Survey 1996, 2001, 2007, 2011	Cathode, min. 99.99% metal cont., U.S. producer price.
Copper	Germany	1845-57	Marks/mt	Schmitz 1979, pp. 270-2	Price of Mansfeld copper, Berlin market; 1847-50: linear trend.
	Germany	1858	Marks/mt	Ministerium für Handel, Gewerbe und öffentliche Arbeiten 1859, p. 14	Price of Mansfeld copper, Berlin market.
	Germany	1859-1975	Marks/mt	Schmitz 1979, pp. 270-2	1859: lin. trend; 1860-1913: Mansfeld fire-refined copper ex-works; 1914-23: Source unknown; 1924-75: Electrolytic wirebars, FOB, av. selling price of German refineries; Oct 1939 - Jun 50 official max. price.

	Germany	1976-2010	US-$/mt	BGR 2011a	Grade A, cash, in LME warehouse Hamburg, min. 99.99% metal cont.
Lead	U.K.	1840-1976	£/mt	Schmitz 1979, pp. 226-37	1790-1886: English pig lead, mostly prices in provincial markets pre-1850, then mainly London prices; 1887-1945: Good soft pig lead, London market; 1946-76: Refined pig lead, min. 99.97% metal cont., London market; 1914: Average Jan-July and Nov-Dec only; 1940-Sept 52: Fixed selling price, Ministry of Supply.
	U.K.	1977-2010	U.S.-$/mt	BGR 2011a	Lead, min. 99.97% metal cont., cash, in LME warehouse.
Lead	U.S.	1840-1976	U.S.-$/mt	Schmitz 1979, pp. 274-8	1820-79: Pig lead, New York; 1880-1976: Common grade lead, min. 99.73% metal cont., New York.
	U.S.	1977-90	U.S.-$/mt	U.S. Bureau of Mines 1981, 1987, 1993	Min. 99.97% metal cont., North American producer price, delivered.
	U.S.	1991-2010	U.S.-$/mt	U.S. Geological Survey 1996, 2001, 2007, 2011	Min. 99.97% metal cont., North American producer price, delivered.
Lead	Germany	1840-1976	Marks/mt	Schmitz 1979, pp. 274-8	1840-98: Silesian lead, ex-works at Tarnowitz; 1899-1918: Rhenish refined lead ex-smelter, min 99.9% metal cont.; 1924-39: Good soft pig lead, min. 99.9% metal cont., Berlin Metal Exchange; Oct 1939-Aug 50: Officially regulated price; 1950-76: Soft pig lead, min. 99.9% metal cont.

	Germany	1977-2010	U.S.-$/mt	BGR 2011a	Min. 99.97% metal cont., cash, in LME warehouse Hamburg.
Tin	U.K.	1840-1976	£/mt	Schmitz 1979, pp. 240-1	1790-1837: Common refined tin, Cornwall; 1838-72: Standard tin, London market; 1873-1976: Standard tin, min. 99.75% metal cont., London market; 1914: Average price of Jan-July and Oct-Dec only; 1942-9: controlled price, Ministry of Supply.
	U.K.	1977-8	U.S.-$/mt	U.S. Bureau of Mines 1980, p. 915	Standard tin, min. 99.75% metal cont., London market.
	U.K.	1979-2010	U.S.-$/mt	BGR 2011a	Min. 99.85% metal cont., in LME warehouse, cash.
Tin	U.S.	1841-55	U.S.-$/mt	House of Commons 1853,	Computed from quantities and values of U.S. imports of tin in blocks and pigs; 1851-5: lin. trend.
	U.S.	1856-1962	U.S.-$/mt	Secretary of the Treasury 1864, pp. 46-8	Computed from quantities and values of U.S. imports of tin in blocks and pigs.
	U.S.	1863	U.S.-$/mt	House of Commons 1866, p. 358	Computed from quantities and values of U.S. imports of tin in blocks and pigs.
	U.S.	1864-9	U.S.-$/mt	House of Commons 1868, p. 378	Computed from quantities and values of U.S. imports of tin in blocks and pigs; 1866-9: lin. trend.
	U.S.	1870-1976	U.S.-$/mt	Schmitz 1979, pp. 293-8	1869-80: Block tin, New York; 1881-1919: Ordinary brands, min. 99% metal cont., New York; 1920-76: Straits tin, Grade A, min. 99.85% metal cont., New York; 1918: median price; 1976: av. Jan, Jul, & Dec.

	U.S.	1977-90	U.S.-$/mt	U.S. Bureau of Mines 1981, 1987, 1993	Contained tin, New York market.
	U.S.	1991-2010	U.S.-$/mt	U.S. Geological Survey 1996, 2001, 2007, 2011	Contained tin, New York market.
Tin	Germany	1840-1975	Marks/mt	Schmitz 1979, pp. 293-8	1840-1902: Saxon tin at Freiberg; 1903-14: Banca tin (from Dutch East Indies) in Frankfurt am Main; 1925-75: Banca and Straits tin, Hamburg, min. 99.9% metal cont.; Oct 1939-47: Official max. price; 1973: Jan-June average only; 1974: Mar-Dec average only.
	Germany	1976-8	U.S.-$/mt	U.S. Bureau of Mines 1980, p. 915	Standard tin, min. 99.75% metal cont., in LME warehouse Hamburg.
	Germany	1979-2010	U.S.-$/mt	BGR 2011a	Min. 99.85% metal cont., in LME warehouse Hamburg, cash.
Tin	Japan	1950-86	Yen/mt	Ministry of Internal Affairs and Communication of Japan 2012	Computed from data on the quantity and value of tin ore.
Zinc	U.K.	1840-1976	£/mt	Schmitz 1979, pp. 299-303	1823-1951: Ordinary brands zinc, London market; 1940-4: controlled price, U.K. Ministry of Supply; 1952-76: virgin zinc, min. 98% metal cont., London market.
	U.K.	1977-8	U.S.-$/mt	U.S. Bureau of Mines 1980, p. 981	Prime Western grade, min. 98% metal cont., London market.

	U.K.	1979-2010	U.S.-$/mt	BGR 2011a	Special high grade, min. 99.995% metal cont., cash, LME warehouse.
Zinc	U.S.	1872-4	U.S.-$/mt	U.S. Bureau of Mines 1883	U.S. import price of zinc in blocks or pigs.
	U.S.	1875-1976	U.S.-$/mt	Schmitz 1979, pp. 300-3	1875-99: Prime Western spelter, min. 98% metal cont., New York; 1900-76: Prime Western spelter, Saint Louis, min. 98% metal cont.
	U.S.	1977-90	U.S.-$/mt	U.S. Bureau of Mines 1981, 1987, 1993	1977-9: Prime Western spelter, delivered, min. 98% metal cont.; 1980-90: High grade, min. 99.9% metal cont., delivered.
	U.S.	1991-2010	U.S.-$/mt	U.S. Geological Survey 1996, 2001, 2007, 2011	Special high grade, delivered, min. 99.99% metal cont.
Zinc	Germany	1840-1975	Marks/mt	Schmitz 1979, pp. 299-303	1840-1914: Upper Silesian zinc ex-works at Breslau; 1924-34: Berlin Metal Exchange quotation for primary zinc, min. 97% metal cont.
	Germany	1977-8	U.S.-$/mt	U.S. Bureau of Mines 1980, p. 981	Prime Western grade, min. 98% metal cont., LME warehouse, Hamburg.
	Germany	1979-2010	U.S.-$/mt	BGR 2011a	Special high grade, min. 99.995% metal cont., cash, LME warehouse, Hamburg.

Note: Parts of the data described in the table above are based on a revised and extended version of data used in figures in Stuermer and von Hagen (2012).

Table 8: Data sources for the producer price indices.

Country	**Time**	**Source**	**Notes**
Belgium	1840-1980	Mitchell 2003a, pp. 857-8	Wholesale price index
	1981-2011	IMF, 2012a	Wholesale price index/ producer price index
Finland	1913-48	Mitchell 2003a, pp. 858-60	Wholesale price index
	1949-2011	IMF, 2012a	Wholesale price index/ producer price index
France	1850-1980	Mitchell 2003a, pp. 857-8	1850-1974: Wholesale price index; 1974-80: No general index published, producer price index for metals products.
	1981-96	IMF, 2012a	Producer price index for intermediate goods
	1997-2010	IMF, 2012a	Wholesale price index/ producer price index
Germany	1850-1991	Mitchell 2003a, pp. 857-8	Wholesale price index
	1992-2011	IMF, 2012a	Wholesale price index/ producer price index
Italy	1861-1981	Mitchell 2003a, pp. 857-60	Wholesale price index
	1982-2011	IMF, 2012a	Wholesale price index/ producer price index
Japan	1901-60	Mitchell 1998, pp. 945-8	Wholesale price index
	1961-2011	IMF, 2012a	Wholesale price index/ producer price index
Netherlands	1901-53	Mitchell 2003a, pp. 857-60	Wholesale price index
	1954-2011	IMF, 2012a	Wholesale price index/ producer price index
South Korea	1930-53	Mitchell 1998, pp. 945-8	Wholesale price index; value for 1952: crude estimate by author
	1954-2011	IMF, 2012a	Wholesale price index/ producer price index
Spain	1850-1948	Mitchell 2003a, pp. 857-60	Wholesale price index

	1949-2011	IMF, 2012a	Wholesale price index/ producer price index
Sweden	1860-1968	Mitchell 2003a, pp. 857-60	Wholesale price index
	1969-2011	IMF, 2012a	Wholesale price index/ producer price index
U.K.	1820-1913	Mitchell 1988, pp. 722-4	Rousseaux price index constructed from wholesale prices and unit-value of imports of vegetable, animal, agricultural, and industrial products.
	1914-59	Mitchell 1988, pp. 725-7	Sauerbeck-Statist price index constructed from wholesale prices and unit-value of food (vegetable and animnal) and raw materials (minerals, textile fibres, sundry).
	1960-2010	World Bank 2012	Wholesale price index
U.S.	1850-9	Mitchell 2003b, p. 702	Wholesale price index
	1860-1912	Hanes 1998	Wholesale price index
	1913-2010	U.S. Bureau of Labor Statistics 2011	Producer price index: all commodities.

Table 9: Data sources for the exchange rates between the British-£ and other currencies.

Country	**Currencies**	**Time**	**Source**	**Notes**
Belgium	British-£ per 1000 Guilders	1840-3	Denzel 2010, p. 21	
	British-£ per 1000 France	1844-1914	Denzel 2010, pp. 21-3	
France	British-£ per 1000 Old Francs	1840-1914	Denzel 2010, pp. 21-3	
Italy	British-£ per 1000 Piedmontese Lire Nuovo	1840-60	Denzel 2010, pp. 41-2	
	British-£ per 1000 Italian Lire	1861-1914	Denzel 2010, pp. 42-3	

Japan	British-£ per 100 Yen	1862-1914	Denzel 2010, pp. 533-4	No data available for 1872.
Netherlands	British-£ per 1000 Guilders	1840-1914	Denzel 2010, pp. 21-3	
Spain	British-£ per 100 Pesos de Plata Antigua	1840-7	Denzel 2010, p. 34	
	British-£ per 100 Pesos Duros	1848-98	Denzel 2010, pp. 34-5	
	British-£ per 1000 Pesetas	1899-1914	Denzel 2010, pp. 35-6	
Sweden	British-£ per 1000 Rixdollars Species	1840-57	Denzel 2010, pp. 346-7	
	British-£ per 1000 Rixdollars Rixmynt	1858-74	Denzel 2010, p. 347	
	British-£ per 1000 Crowns	1875-1914	Denzel 2010, pp. 347-8	

Table 10: Data sources for the exchange rates between the U.S.-$ and other currencies.

Country	**Currencies**	**Time**	**Source**	**Notes**
Belgium	Francs per U.S.-$	1915-9	Bordo 2001	
	Francs per U.S.-$	1920-99	Officer 2006	From 1927-40 the exchange rate is expressed in belgas.
	Euro per U.S.-$	2000-11	Officer 2011	
Finland	New Markaa per U.S.-$	1911-70	Bordo 2001	Bordo et al (2001) transformed the original Old Markaa data into New Markaa.
	New Markaa per U.S.-$	1971-99	Officer 2006	
	Euro per U.S.-$	2000-11	Officer 2011	
France	Old Francs per U.S.-$	1915-40	Officer 2006	
	Old Francs per U.S.-$	1941-4	Officer 2011	
	Old Francs per U.S.-$	1945-59	Officer 2006	
	Francs per U.S.-$	1960-99	Officer 2006	
	Euro per U.S.-$	2000-2011	Officer 2011	
Germany	Mark per U.S.-$	1976-1999	Officer 2006	
	Euro per U.S.-$	2000-2011	Officer 2011	
Italy	Lire per U.S.-$	1915-1940	Officer 2006	
	Lire per U.S.-$	1941-7	Bordo 2001	
	Lire per U.S.-$	1948-99	Officer 2006	
	Euro per U.S.-$	2000-11	Officer 2011	
Japan	Yen per U.S.-$	1915-55	Bordo 2001	

	Yen per U.S.-$	1956-2011	Officer 2011
Netherlands	Guilder per U.S.-$	1915-40	Officer 2006
	Guilder per U.S.-$	1941	Bordo 2001
	Guilder per U.S.-$	1945-99	Officer 2006
	Euro per U.S.-$	2000-11	Officer 2011
South Korea	Won per U.S.-$	1971-81	Bordo 2001
	Won per U.S.-$	1982-2009	Officer 2011
	Won per U.S.-$	2010	IMF, 2012a
	Won per U.S.-$	2011	Officer 2011
Spain	Loyalist Peseta per U.S.-$	1915-38	Officer 2006
	National Peseta per U.S.-$	1939-41	Officer 2006
	National Peseta per U.S.-$	1947-78	Bordo 2001
	National Peseta per U.S.-$	1979-99	Officer 2006
	Euro per U.S.-$	2000-11	Officer 2011
Sweden	Kronor per U.S.-$	1915-41	Officer 2006
	Kronor per U.S.-$	1942-5	Bordo 2001
	Kronor per U.S.-$	1946-99	Officer 2006
	Kronor per U.S.-$	2000-11	Officer 2011
U.K.	British-£per U.S.-$	1791-2011	Officer 2013

3 Sensitivity analysis: additional regression results

VARIABLES	MG	PMG	DFE	MG	PMG	DFE	MG	PMG	DFE
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	No	No	No	No	Yes	Yes	Yes
Manufacturing (log)	0.287	1.551***	1.542***	0.565	1.759***	1.439***	0.792	1.518***	1.353***
	(1.315)	(0.092)	(0.194)	(1.411)	(0.173)	(0.248)	(0.521)	(0.073)	(0.200)
Aluminum price (log)	-0.363	-0.706***	-0.919***	-1.076	-0.883***	-0.801**	-1.474***	-0.836***	-1.258***
	(1.621)	(0.184)	(0.267)	(0.809)	(0.221)	(0.322)	(0.526)	(0.236)	(0.355)
Constant	0.028	-0.056	0.014	2.291	1.411***	-0.413	0.169	0.054	-0.005
	(0.743)	(0.059)	(0.177)	(2.907)	(0.421)	(0.717)	(0.149)	(0.083)	(0.007)
Linear trend				0.006	-0.012*	0.005			
				(0.017)	(0.007)	(0.008)			
Adjustment coefficient	-0.124***	-0.117***	-0.080***	-0.150***	-0.113***	-0.083***	-0.189***	-0.142***	-0.107***
	(0.027)	(0.023)	(0.010)	(0.032)	(0.023)	(0.011)	(0.035)	(0.031)	(0.016)
Observations	973	973	973	973	973	973	973	973	973
Joint Hausman Test-stat.		2.161			3.115			3.024	
p-value		0.339			0.374			0.220	
Log likelihood		404.4			405.2			432.4	

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 11: Estimation results from the mean group (MG), pooled mean group (PMG), and dynamic fixed effects (DFE) estimators of the preferred ARDL(4,4,2) model for aluminum.

VARIABLES	MG	PMG	DFE	MG	PMG	DFE	MG	PMG	DFE
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	No	No	No	No	Yes	Yes	Yes
Manufacturing (log)	0.208	0.435***	0.436***	1.949***	0.675***	0.795***	1.971	0.745***	0.761***
	(0.202)	(0.057)	(0.144)	(0.664)	(0.110)	(0.256)	(1.657)	(0.112)	(0.259)
Lead price (log)	0.061	-0.220**	0.212	-0.174	-0.215***	0.186	1.893	-0.014	0.113
	(0.606)	(0.093)	(0.277)	(0.111)	(0.080)	(0.249)	(1.727)	(0.204)	(0.510)
Constant	0.128	0.048**	-0.061	9.787	0.393***	0.507	0.210	0.028	0.002
	(0.173)	(0.022)	(0.111)	(7.065)	(0.095)	(0.408)	(0.157)	(0.022)	(0.007)
Linear trend				-0.046**	-0.005***	-0.009			
				(0.023)	(0.002)	(0.006)			
Adjustment coefficient	-0.158***	-0.094***	-0.074***	-0.214***	-0.121***	-0.083***	-0.211***	-0.148***	-0.086***
	(0.028)	(0.021)	(0.015)	(0.029)	(0.026)	(0.017)	(0.047)	(0.033)	(0.017)
Observations	1,059	1,059	1,059	1,059	1,059	1,059	1,059	1,059	1,059
Joint Hausman Test-stat.		1.332			3.423			1.524	
p-value		0.514			0.331			0.467	
Log likelihood		474.7			476.9			435.3	

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 12: Estimation results from the mean group (MG), pooled mean group (PMG), and dynamic fixed effects (DFE) estimators of the preferred ARDL(4,4,2) model for lead.

VARIABLES	MG	PMG	DFE	MG	PMG	DFE	MG	PMG	DFE
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	No	No	No	No	Yes	Yes	Yes
Manufacturing (log)	-0.302	0.616***	-0.091	0.760***	0.712***	0.517*	0.397	0.295**	0.709***
	(0.475)	(0.035)	(0.151)	(0.226)	(0.080)	(0.268)	(0.445)	(0.141)	(0.273)
Tin price (log)	-0.109	0.169**	-0.569**	-0.138	0.110	-0.454*	-0.166	-0.384***	-0.216
	(0.248)	(0.085)	(0.284)	(0.166)	(0.084)	(0.237)	(0.303)	(0.046)	(0.157)
Constant	-0.820	-0.522**	0.241***	8.264	-0.149	0.944***	0.222*	0.006	0.008
	(0.756)	(0.209)	(0.093)	(7.147)	(0.118)	(0.338)	(0.123)	(0.026)	(0.006)
Linear trend				–0.017***	-0.004	-0.013**			
				(0.005)	(0.003)	(0.005)			
Adjustment coefficient	-0.268***	-0.095**	-0.061***	-0.341***	-0.105**	-0.072***	-0.196***	-0.096***	-0.071***
	(0.082)	(0.040)	(0.012)	(0.126)	(0.043)	(0.013)	(0.038)	(0.030)	(0.013)
Observations	1,142	1,142	1,142	1,142	1,142	1,142	1,142	1,142	1,142
Joint Hausman Test-stat.		7.675			11.37			0.672	
p-value		0.0215			0.00987			0.715	
Log likelihood		399.5			400.1			408.9	

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 13: Estimation results from the mean group (MG), pooled mean group (PMG), and dynamic fixed effects (DFE) estimators of the preferred ARDL(4,4,2) model for tin.

VARIABLES	MG	PMG	DFE	MG	PMG	DFE	MG	PMG	DFE
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	No	No	No	No	Yes	Yes	Yes
Manufacturing (log)	0.765***	0.734***	0.862***	1.059***	0.852***	0.898***	1.151	0.834***	0.905***
	(0.229)	(0.033)	(0.095)	(0.341)	(0.101)	(0.206)	(0.928)	(0.132)	(0.226)
Zinc price (log)	0.708	-0.064	0.042	0.186	-0.066	0.041	1.005	0.207**	0.123
	(1.223)	(0.088)	(0.253)	(0.397)	(0.084)	(0.253)	(1.540)	(0.083)	(0.116)
Constant	-1.247*	-0.204***	-0.269***	1.779	-0.090	-0.218	0.140	-0.017	0.002
	(0.719)	(0.055)	(0.103)	(4.597)	(0.062)	(0.275)	(0.135)	(0.022)	(0.005)
Linear trend				-0.007	-0.002	-0.001			
				(0.009)	(0.002)	(0.004)			
Adjustment coefficient	-0.216***	-0.113***	-0.085***	-0.286***	-0.119***	-0.085***	-0.137***	-0.085***	-0.083***
	(0.062)	(0.030)	(0.013)	(0.062)	(0.031)	(0.013)	(0.029)	(0.019)	(0.013)
Observations	1,216	1,216	1,216	1,216	1,216	1,216	1,216	1,216	1,216
Joint Hausman Test-stat.		0.759			14.68			0.248	
p-value		0.684			0.00211			0.883	
Log likelihood		579.2			579.8			518.9	

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 14: Estimation results from the mean group (MG), pooled mean group (PMG), and dynamic fixed effects (DFE) estimators of the preferred ARDL(4,4,2) model for zink.

VARIABLES	MG	PMG	DFE	MG	PMG	DFE	MG	PMG	DFE
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	No	No	No	No	Yes	Yes	Yes
Manufacturing (log)	2.216***	1.601***	1.737***	2.283***	1.750***	1.602***	1.123***	1.518***	1.371***
	(0.344)	(0.069)	(0.205)	(0.275)	(0.142)	(0.144)	(0.352)	(0.051)	(0.145)
Aluminum price (log)	-0.515**	-0.823***	-1.019***	-0.462	-0.913***	-0.879**	-0.881***	-0.771***	-0.786***
	(0.258)	(0.132)	(0.267)	(0.287)	(0.165)	(0.370)	(0.324)	(0.169)	(0.253)
Constant	-1.335***	-0.051	-0.078	2.709	0.986***	-0.591	0.038	0.066	-0.007***
	(0.508)	(0.064)	(0.219)	(3.520)	(0.364)	(0.786)	(0.135)	(0.107)	(0.003)
Linear time trend				-0.004	-0.007	0.006			
				(0.006)	(0.006)	(0.007)			
Adjustment coeff.	-0.192***	-0.135***	-0.082***	-0.224***	-0.131***	-0.085***	-0.284***	-0.200***	-0.128***
	(0.038)	(0.035)	(0.012)	(0.052)	(0.035)	(0.015)	(0.054)	(0.050)	(0.032)
Observations	1,018	1,018	1,018	1,018	1,018	1,018	1,018	1,018	1,018
Joint Hausman Test-stat.		3.583			3.668			1.153	
p-value		0.167			0.300			0.562	
log likelihood		206.1			206.5			280.0	

Notes: The table shows results from the mean group (MG), pooled mean group (PMG), and dynamic fixed effects (DFE) estimations of the ARDL(1,1,1) model. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 15: Estimated long-run manufacturing output and price elasticities of aluminum demand in the ARDL(1,1,1) model.

VARIABLES	MG	PMG	DFE	MG	PMG	DFE	MG	PMG	DFE
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	No	No	No	No	Yes	Yes	Yes
Manufacturing (log)	0.454***	0.349***	0.525***	1.553***	0.664***	0.975***	3.540	0.888***	0.966***
	(0.128)	(0.048)	(0.157)	(0.450)	(0.094)	(0.203)	(3.444)	(0.102)	(0.237)
Lead price (log)	0.140	-0.094	0.268	-0.081	-0.092	0.217	5.719	0.067	0.345
	(0.253)	(0.075)	(0.347)	(0.080)	(0.065)	(0.293)	(5.498)	(0.194)	(0.358)
Constant	-0.048	0.130***	-0.150	8.441	0.475***	0.829***	0.126	0.017	0.002
	(0.243)	(0.035)	(0.156)	(6.360)	(0.131)	(0.283)	(0.144)	(0.024)	(0.002)
Linear trend				-0.035**	-0.005***	-0.012***			
				(0.016)	(0.002)	(0.004)			
Adjustment coefficient	-0.204***	-0.128***	-0.098***	-0.255***	-0.148***	-0.111***	-0.205***	-0.152***	-0.117***
	(0.029)	(0.024)	(0.016)	(0.030)	(0.027)	(0.020)	(0.041)	(0.026)	(0.024)
Observations	1,110	1,110	1,110	1,110	1,110	1,110	1,110	1,110	1,110
Joint Hausman Test-stat.		2.541			6.082			2.514	
p-value		0.281			0.108			0.285	
log likelihood		405.6			410.0			358.8	

Notes: The table shows results from the mean group (MG), pooled mean group (PMG), and dynamic fixed effects (DFE) estimations of the ARDL(1,1,1) model. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 16: Estimated long-run manufacturing output and price elasticities of lead demand in the ARDL(1,1,1) model.

VARIABLES	MG	PMG	DFE	MG	PMG	DFE	MG	PMG	DFE
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	No	No	No	No	Yes	Yes	Yes
Manufacturing (log)	0.200	0.257***	0.083	0.683***	0.778***	0.560*	0.248	0.469***	0.814***
	(0.214)	(0.060)	(0.194)	(0.237)	(0.124)	(0.335)	(0.481)	(0.108)	(0.306)
Tin price (log)	-0.031	-0.061	-0.163	-0.014	-0.194**	-0.128	0.221	-0.364***	-0.124
	(0.100)	(0.115)	(0.168)	(0.107)	(0.099)	(0.130)	(0.534)	(0.040)	(0.155)
Constant	-0.757	-0.160***	0.057	5.927	1.505**	0.862	0.370**	0.015	0.005**
	(0.535)	(0.050)	(0.131)	(5.246)	(0.599)	(0.592)	(0.168)	(0.032)	(0.002)
Linear trend				-0.013*	-0.015***	-0.011*			
				(0.007)	(0.003)	(0.006)			
Adjustment coefficient	-0.254***	-0.118***	-0.089***	-0.292***	-0.127***	-0.102***	-0.267***	-0.137***	-0.100***
	(0.045)	(0.035)	(0.019)	(0.058)	(0.028)	(0.023)	(0.043)	(0.034)	(0.024)
Observations	1,194	1,194	1,194	1,194	1,194	1,194	1,204	1,204	1,204
Joint Hausman Test-stat.		-0.541			21.70			1.480	
p-value		1			7.53e-05			0.477	
log likelihood		233.4			236.7			299.4	

Notes: The table shows results from the mean group (MG), pooled mean group (PMG), and dynamic fixed effects (DFE) estimations of the ARDL(1,1,1) model. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 17: Estimated long-run manufacturing output and price elasticities of tin demand in the ARDL(1,1,1) model.

VARIABLES	MG	PMG	DFE	MG	PMG	DFE	MG	PMG	DFE
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	No	No	No	No	Yes	Yes	Yes
Manufacturing (log)	1.064***	0.818***	0.965***	0.951***	0.959***	0.945***	0.619	0.951***	1.012***
	(0.146)	(0.030)	(0.143)	(0.212)	(0.076)	(0.257)	(0.526)	(0.090)	(0.282)
Zinc price (log)	-0.288**	-0.148**	-0.178	-0.199*	-0.153**	-0.176	-0.199	0.174***	0.106**
	(0.118)	(0.073)	(0.173)	(0.102)	(0.070)	(0.165)	(0.720)	(0.050)	(0.045)
Constant	-1.495*	-0.319***	-0.399*	-1.528	-0.131	-0.440	0.204*	-0.008	0.002
	(0.827)	(0.069)	(0.208)	(2.594)	(0.086)	(0.299)	(0.122)	(0.023)	(0.001)
Linear Trend				-0.000	-0.003*	0.000			
				(0.005)	(0.001)	(0.004)			
Adjustment coefficient	-0.265***	-0.144***	-0.121***	-0.317***	-0.152***	-0.121***	-0.208***	-0.135***	-0.110***
	(0.069)	(0.030)	(0.022)	(0.069)	(0.032)	(0.022)	(0.037)	(0.024)	(0.019)
Observations	1,266	1,266	.	1,266	1,266	.	1,266	1,266	.
Joint Hausman Test-stat.		2.703			0.478			0.580	
p-value		0.259			0.924			0.748	
log likelihood		456.6			458.1			426.2	

Notes: The table shows results from the mean group (MG), pooled mean group (PMG), and dynamic fixed effects (DFE) estimations of the ARDL(1,1,1) model. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 18: Estimated long-run manufacturing output and price elasticities of zinc demand in the ARDL(1,1,1) model.

VARIABLES	MG	PMG	DFE	MG	PMG	DFE	MG	PMG	DFE
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	No	No	No	No	Yes	Yes	Yes
Manufacturing (log)	0.985*	1.528***	1.618***	1.017	1.740***	1.562***	1.089**	1.584***	1.493***
	(0.548)	(0.042)	(0.203)	(0.929)	(0.131)	(0.271)	(0.499)	(0.072)	(0.208)
Aluminum price (log)	-1.224**	-0.824***	-0.967***	-1.280**	-0.931***	-0.902***	-1.347**	-1.038***	-1.438***
	(0.482)	(0.138)	(0.277)	(0.624)	(0.175)	(0.348)	(0.549)	(0.242)	(0.376)
Constant	0.073	0.057	-0.019	0.956	1.738**	-0.228	0.110	0.077	-0.009
	(0.515)	(0.081)	(0.177)	(2.087)	(0.776)	(0.715)	(0.143)	(0.107)	(0.007)
Linear trend				0.006	-0.012*	0.003			
				(0.018)	(0.007)	(0.009)			
Adjustment coeff.	-0.151***	-0.134***	-0.076***	-0.175***	-0.125***	-0.077***	-0.192***	-0.142***	-0.104***
(0.054)	(0.051)	(0.010)	(0.054)	(0.044)	(0.011)	(0.037)	(0.032)	(0.015)	
Observations	980	980	980	980	980	980	980	980	980
Joint Hausman Test-stat.		0.934			11.31			0.985	
p-value		0.627			0.0102			0.611	
log likelihood		378.2			379.4			422.1	

Notes: The table shows results from the mean group (MG), pooled mean group (PMG), and dynamic fixed effects (DFE) estimations of the ARDL(3,3,3) model. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 19: Estimated long-run manufacturing output and price elasticities of aluminum demand in the ARDL (3,3,3) model.

VARIABLES	MG	PMG	DFE	MG	PMG	DFE	MG	PMG	DFE
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	No	No	No	No	Yes	Yes	Yes
Manufacturing (log)	0.382***	0.023	0.499***	1.609***	0.779***	0.833***	3.456	0.829***	0.813***
	(0.085)	(0.067)	(0.124)	(0.496)	(0.127)	(0.227)	(3.033)	(0.119)	(0.228)
Lead price (log)	0.070	-0.053	0.289	-0.062	-0.257***	0.244	6.764	-0.014	0.253
	(0.480)	(0.082)	(0.251)	(0.138)	(0.091)	(0.229)	(5.547)	(0.224)	(0.459)
Constant	0.150	0.287***	-0.126	6.902	0.692***	0.471	0.281	0.025	0.001
	(0.164)	(0.103)	(0.112)	(4.594)	(0.167)	(0.402)	(0.171)	(0.022)	(0.007)
Linear trend				-0.037**	-0.008***	-0.008			
				(0.018)	(0.002)	(0.005)			
Adjustment coefficient	-0.151***	-0.085***	-0.083***	-0.201***	-0.117***	-0.092***	-0.207***	-0.143***	-0.095***
	(0.019)	(0.026)	(0.015)	(0.017)	(0.023)	(0.016)	(0.043)	(0.026)	(0.016)
Observations	1,068	1,068	1,068	1,068	1,068	1,068	1,068	1,068	1,068
Joint Hausman Test-stat.		40.09			2.956			2.321	
p-value		1.97e-09			0.398			0.313	
log likelihood		490.8			491.7			444.8	

Notes: The table shows results from the mean group (MG), pooled mean group (PMG), and dynamic fixed effects (DFE) estimations of the ARDL(3,3,3) model. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 20: Estimated long-run manufacturing output and price elasticities of lead demand in the ARDL (3,3,3) model.

VARIABLES	MG	PMG	DFE	MG	PMG	DFE	MG	PMG	DFE
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	No	No	No	No	Yes	Yes	Yes
Manufacturing (log)	-0.203	0.611***	-0.010	0.988***	-0.490	0.815***	0.406	1.158***	0.834***
	(0.422)	(0.041)	(0.163)	(0.296)	(0.358)	(0.279)	(0.500)	(0.081)	(0.276)
Tin price (log)	-0.273	0.019	-0.736**	-0.224*	-0.229	-0.561**	-0.094	-0.124	-0.131
	(0.190)	(0.114)	(0.340)	(0.135)	(0.187)	(0.262)	(0.317)	(0.093)	(0.157)
Constant	-0.591	-0.388**	0.227**	6.782	1.001*	1.137***	0.213*	0.009	0.004
	(0.607)	(0.153)	(0.092)	(5.190)	(0.594)	(0.332)	(0.121)	(0.018)	(0.006)
Linear trend				-0.019***	-0.008	-0.018***			
				(0.007)	(0.009)	(0.006)			
Adjustment coefficient	-0.228***	-0.086**	-0.054***	-0.283***	-0.063*	-0.068***	-0.195***	-0.106***	-0.068***
	(0.060)	(0.035)	(0.011)	(0.081)	(0.032)	(0.012)	(0.035)	(0.026)	(0.013)
Observations	1,152	1,152	1,152	1,152	1,152	1,152	1,152	1,152	1,152
Joint Hausman Test-stat.		6.140			41.56			2.210	
p-value		0.0464			4.97e-09			0.331	
log likelihood		392.7			395.0			399.0	

Notes: The table shows results from the mean group (MG), pooled mean group (PMG), and dynamic fixed effects (DFE) estimations of the ARDL(3,3,3) model. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 21: Estimated long-run manufacturing output and price elasticities of tin demand in the ARDL (3,3,3) model.

VARIABLES	MG	PMG	DFE	MG	PMG	DFE	MG	PMG	DFE
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	No	No	No	No	Yes	Yes	Yes
Manufacturing (log)	0.885***	0.749***	0.866***	1.107***	0.894***	0.895***	-1.686	0.709***	0.934***
	(0.184)	(0.031)	(0.096)	(0.316)	(0.090)	(0.210)	(2.547)	(0.117)	(0.224)
Zinc price (log)	0.629	-0.085	0.025	0.188	-0.098	0.023	1.359	0.146*	0.102
	(1.017)	(0.085)	(0.269)	(0.400)	(0.080)	(0.270)	(1.393)	(0.082)	(0.114)
Constant	-1.094*	-0.207***	-0.266**	0.572	-0.056	-0.226	0.112	-0.007	0.001
	(0.566)	(0.062)	(0.106)	(3.655)	(0.063)	(0.279)	(0.110)	(0.015)	(0.005)
Linear trend				-0.007	-0.003	-0.001			
				(0.008)	(0.002)	(0.004)			
Adjustment coefficient	-0.190***	-0.114***	-0.084***	-0.260***	-0.121***	-0.084***	-0.136***	-0.090***	-0.084***
	(0.049)	(0.033)	(0.013)	(0.053)	(0.035)	(0.013)	(0.032)	(0.019)	(0.013)
Observations	1,224	1,224	1,224	1,224	1,224	1,224	1,224	1,224	1,224
Joint Hausman Test-stat.		1.664			12.12			1.377	
p-value		0.435			0.00697			0.502	
log likelihood		563.4			564.6			512.5	

Notes: The table shows results from the mean group (MG), pooled mean group (PMG), and dynamic fixed effects (DFE) estimations of the ARDL(3,3,3) model. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 22: Estimated long-run manufacturing output and price elasticities of zinc demand in the ARDL (3,3,3) model.

References

Baffigi, A. (2011). *Italian national accounts 1861-2011.* Banco d'Italia, Rome.

Bank of Korea (2012). Economic statistics system. principal indicators on national account (1953-1970). http://ecos.bok.or.kr/flex/EasySearch_e.jsp (accessed on April 24, 2012).

BGR = Federal Institute for Geosciences and Natural Resources (2011). *Price database.* Federal Institute for Geosciences and Natural Resources (Bundesanstalt fuer Geowissenschaften und Rohstoffe), Hanover.

BGR = Federal Institute for Geosciences and Natural Resources (2012a). *Database on the use of mineral commodities.* Federal Institute for Geosciences and Natural Resources (Bundesanstalt fuer Geowissenschaften und Rohstoffe), Hanover.

BGR = Federal Institute for Geosciences and Natural Resources (2012b). *Production database.* Federal Institute for Geosciences and Natural Resources (Bundesanstalt fuer Geowissenschaften und Rohstoffe), Hanover.

Bienengräber, A., editor (1868). *Statistik des Verkehrs und Verbrauchs im Zollverein für die Jahre 1842-1864.* Verlag von Alexander Duncker, Berlin.

Bordo, M. (2001). Financial crises. Lessons from the last 120 years. *Economic Policy*, 16(32):51–82.

Carter, S., Gartner, S., Haines, M., Olmstead, A., Sutch, R., and Wright, G., editors (2006). *Historical statistics of the United States. Earliest time to the present. Millennial Edition.* Cambridge University Press, New York.

Denzel, M. (2010). *Handbook of world exchange rates, 1590-1914.* Ashgate, Farnham.

Groningen Growth and Development Centre (2008). *10-sector database.* Groningen Growth and Development Centre, Groningen.

Hanes, C. (1998). *Business cycles since 1820. New international perspectives from historical evidence. Consistent wholesale price series for the United States, 1860-1990.* Edward Elgar, Cheltenham.

Hirth, G., editor (1869). *Staatshandbuch für Gesetzgebung, Verwaltung und Statistik des Norddeutschen Bundes und des Deutschen Zollvereins.* Commissions-Verlag von Stilke und van Muyen, Berlin.

Hirth, G., editor (1871). *Annalen des Deutschen Reiches für Gesetzgebung, Verwaltung und Statistik.* Commissions-Verlag von Stilke und van Muyen, Berlin.

Hoffmann, W. (1965). *Das Wachstum der deutschen Wirtschaft seit der Mitte des 19. Jahrhunderts.* Springer, Berlin/Heidelberg/New York.

House of Commons (1852). *Tables of the revenue, population, commerce, &c. of the United Kingdom and its dependencies. Part XX. 1950.* His Majesty's Stationery Office, London.

House of Commons (1853). *Tables of the revenue, population, commerce, &c. of the United Kingdom and its dependencies. Part XXI. 1951.* His Majesty's Stationery Office, London.

House of Commons (1854a). *Copper, &c. Account of the quantity of copper, tin, zinc, and zinc ore, imported and exported, in the year ending 5th January 1854.* House of Commons, London.

House of Commons (1854b). *Exports, imports, &c.* His Majesty's Stationery Office, London.

House of Commons (1854c). *Tables of the revenue, population, commerce, &c. of the United Kingdom and its dependencies. Part XXII. 1952.* His Majesty's Stationery Office, London.

House of Commons (1855). *Copper, &c. Account of the quantity of copper, tin, zinc, and zinc ore, imported and exported, in the year ending 5th January 1855.* House of Commons, London.

House of Commons (1856). *Imports and exports (Australia,&c).* His Majesty's Stationery Office, London.

House of Commons (1859). *Statistical tables relating to foreign countries. Part VI.* His Majesty's Stationery Office, London.

House of Commons (1862). *Statistical tables relating to foreign countries. Part VIII.* His Majesty's Stationery Office, London.

House of Commons (1864). *Statistical tables relating to foreign countries. Part IX.* His Majesty's Stationery Office, London.

House of Commons (1866). *Statistical tables relating to foreign countries. Part X.* His Majesty's Stationery Office, London.

House of Commons (1868). *Statistical tables relating to foreign countries. Part XI.* His Majesty's Stationery Office, London.

House of Commons (1870). *Statistical tables relating to foreign countries. Part XII.* His Majesty's Stationery Office, London.

House of Commons (1874). *Statistical abstract for the principal foreign countries in each year from 1860 to 1872.* His Majesty's Stationery Office, London.

House of Commons (1881). *Statistical abstract for the principal and other foreign countries in each year from 1870 to 1879-80.* His Majesty's Stationery Office, London.

House of Commons (1882). *Foreign trade, revenue, &c.* House of Commons, London.

House of Commons (1884a). *Mineral statistics of the United Kingdom of Great Britain and Ireland for the year 1882.* Eyre and Spottiswoode, London.

House of Commons (1884b). *Mines and minerals. Summaries of the reports of the inspectors of mines to Her Majesty's secretary of state, and mineral statistics of the United Kingdom of Great Britain and Ireland, including lists of mines and mineral works, for the year 1883.* Eyre and Spottiswoode, London.

House of Commons (1885a). *Foreign trade, revenue, &c.* House of Commons, London.

House of Commons (1885b). *Mining and mineral statistics of the United Kingdom of Great Britain and Ireland, including lists of mines and mineral works, for the year 1884.* Eyre and Spottiswoode, London.

House of Commons (1886). *Mining and mineral statistics of the United Kingdom of Great Britain and Ireland, including lists of mines and mineral works, for the year 1885.* Eyre and Spottiswoode, London.

House of Commons (1887). *Mining and mineral statistics of the United Kingdom of Great Britain and Ireland, including lists of mines and mineral works, for the year 1886.* Her Majesty's Stationery Office, London.

House of Commons (1888). *Mining and mineral statistics of the United Kingdom of Great Britain and Ireland, including lists of mines and mineral works, for the year 1887.* Her Majesty's Stationery Office, London.

House of Commons (1891a). *Mineral statistics of the United Kingdom of Great Britain and Ireland, with the Isle of Man, for the years 1888 and 1889.* Her Majesty's Stationery Office, London.

House of Commons (1891b). *Mineral statistics of the United Kingdom of Great Britain and Ireland, with the Isle of Man, for the years 1890.* Her Majesty's Stationery Office, London.

House of Commons (1892a). *Mineral statistics of the United Kingdom of Great Britain and Ireland, with the Isle of Man, for the years 1891.* Her Majesty's Stationery Office, London.

House of Commons (1892b). *Statistical abstract for the principal and other foreign countries in each year from 1880 to 1889-90.* His Majesty's Stationery Office, London.

House of Commons (1894). *Mineral statistics of the United Kingdom of Great Britain and Ireland, with the Isle of Man, for the years 1893.* Her Majesty's Stationery Office, London.

House of Commons (1896). *Mineral statistics of the United Kingdom of Great Britain and Ireland, with the Isle of Man, for the years 1895.* Her Majesty's Stationery Office, London.

House of Commons (1898). *Mines and quarries: general report and statistics for 1897. Part III. Output.* Her Majesty's Stationery Office, London.

House of Commons (1900). *Mines and quarries: general report and statistics for 1899. Part III. Output.* Her Majesty's Stationery Office, London.

House of Commons (1901). *Statistical abstract for the principal and other foreign countries in each year from 1889 to 1898-99.* His Majesty's Stationery Office, London.

House of Commons (1914). *Statistical abstract for the principal and other foreign countries in each year from 1901 to 1912.* His Majesty's Stationery Office, London.

House of Commons (1915). *Accounts relating to the trade and commerce of certain foreign countries and British possessions.* His Majesty's Stationery Office, London.

House of Commons (1917). *Accounts relating to the trade and commerce of certain foreign countries and British possessions.* His Majesty's Stationery Office, London.

House of Commons (1921). *Accounts relating to the trade and commerce of certain foreign countries and British possessions.* His Majesty's Stationery Office, London.

House of Commons (1922). *Accounts relating to the trade and commerce of certain foreign countries and British possessions.* His Majesty's Stationery Office, London.

IMF = International Monetary Fund (2012). *International financial statistics.* International Monetary Fund, Washington D.C.

Japan Cabinet Office (2010). National accounts for 2008. ttp://www.esri.cao.go.jp/en/sna/h20-kaku/20fcm3n_en.xls (accessed on August 26, 2010).

Jolly, J. (1992). *Materials flow of zinc in the United States 1850-1990.* U.S. Bureau of Mines, Washington D.C.

Kaiserliches Statistisches Amt, editor (1880). *Statistisches Jahrbuch für das Deutsche Reich.* Verlag von Puttkammer & Mühlbrecht, Berlin.

Kaiserliches Statistisches Amt, editor (1885). *Statistisches Jahrbuch für das Deutsche Reich.* Verlag von Puttkammer & Mühlbrecht, Berlin.

Kaiserliches Statistisches Amt, editor (1890). *Statistisches Jahrbuch für das Deutsche Reich.* Verlag von Puttkammer & Mühlbrecht, Berlin.

Königlich Preussisches Statistisches Bureau (1868). *Zeitschrift des königlich Preussischen Statistischen Bureaus.* Verlag von Ernst Kuehn, Berlin.

Martin, R. (1939). *National income in the United States.* National Industrial Conference Board Inc, New York.

Metallgesellschaft (1897). *Statistische Zusammenstellungen über Blei, Kupfer, Zink, Zinn, Silber, Nickel und Aluminium.* Metallgesellschaft, Frankfurt a.M.

Metallgesellschaft (1898). *Statistische Zusammenstellungen über Blei, Kupfer, Zink, Zinn, Silber, Nickel, Aluminium und Quecksilber.* Metallgesellschaft, Frankfurt a.M.

Metallgesellschaft (1899). *Statistische Zusammenstellungen über Blei, Kupfer, Zink, Zinn, Aluminium, Nickel, Quecksilber und Silber.* Metallgesellschaft, Frankfurt a.M.

Metallgesellschaft (1901). *Statistische Zusammenstellungen über Blei, Kupfer, Zink, Zinn, Aluminium, Nickel, Quecksilber und Silber. 1891-1900.* Metallgesellschaft, Frankfurt a.M.

Metallgesellschaft (1905). *Statistische Zusammenstellungen über Blei, Kupfer, Zink, Zinn, Silber, Nickel, Quecksilber und Silber.* Metallgesellschaft, Frankfurt a.M.

Metallgesellschaft (1907). *Statistische Zusammenstellungen über Blei, Kupfer, Zink, Zinn, Aluminium, Nickel, Quecksilber und Silber.* Metallgesellschaft, Frankfurt a.M.

Metallgesellschaft (1910). *Statistische Zusammenstellungen über Blei, Kupfer, Zink, Zinn, Aluminium, Nickel, Quecksilber und Silber.* Metallgesellschaft, Frankfurt a.M.

Metallgesellschaft (1913). *Statistische Zusammenstellungen über Blei, Kupfer, Zink, Zinn, Aluminium, Nickel, Quecksilber und Silber.* Metallgesellschaft, Frankfurt a.M.

Metallgesellschaft (1922). *Statistische Zusammenstellungen über Aluminum, Blei, Kupfer, Nickel, Quecksilber und Silber, Zink und Zinn.* Metallgesellschaft, Frankfurt a.M.

Metallgesellschaft (1927). *Statistische Zusammenstellungen über Aluminum, Blei, Kupfer, Nickel, Quecksilber und Silber, Zink und Zinn, Kadmium.* Metallgesellschaft, Frankfurt a.M.

Ministerium für Handel, Gewerbe und öffentliche Arbeiten, editor (1859). *Zeitschrift für das Berg- Hütten- und Salinenwesen in dem preussischen Staate*, volume 7. Ministerium für Handel, Gewerbe und öffentliche Arbeiten, Berlin.

Ministry of Internal Affairs and Communication of Japan (2012). *Historical statistics of Japan.* Ministry of Internal Affairs and Communication of Japan, Tokyo.

Mitchell, B. (1988). *British historical statistics.* Cambridge University Press, Cambridge.

Mitchell, B. (1998). *International historical statistics: Africa, Asia & Oceania, 1750–1993.* Palgrave Macmillan, Hampshire, N.Y.

Mitchell, B. (2003a). *International historical statistics: Europe, 1750–2000.* Palgrave Macmillan, Hampshire, N.Y.

Mitchell, B. (2003b). *International historical statistics: the Americas, 1750–2000.* Palgrave Macmillan, Hampshire, N.Y.

National Bureau of Economic Research (2013). NBER macrohistory database. http://www.nber.org/databases/macrohistory/contents/ (accessed February 12, 2013).

Neumann, B. (1904). *Die Metalle. Geschichte, Vorkommen und Gewinnung.* W. Knapp, Halle a.S.

OECD = Organisation for Economic Co-operation and Development (2012). *OECD Statistics.* Organisation for Economic Co-operation and Development, Paris.

Officer, L. (2006). Bilateral exchange rates. europe: 1913-1999. In *Historical statistics of the United States: Millennial edition.* Cambridge University Press, Cambridge.

Officer, L. (2011). Exchange rates between the united states dollar and forty-one currencies. http://www.measuringworth.com/exchangeglobal/ (accessed October 20, 2011).

Officer, L. (2013). Exchange rates between the United States Dollar and forty-one currencies. http://www.measuringworth.com/exchangepound (accessed April 05, 2013).

Ohkawa, K. and Rosovsky, H. (1973). *Japanese economic growth: trend acceleration in the twentieth century*. Stanford University Press Stanford.

Sachs, J., editor (1999). *Metal prices in the United States through 1998*. U.S. Dept. of the Interior, U.S. Geological Survey, Reston, V.A.

Schmitz, C. (1979). *World non-ferrous metal production and prices 1700-1976*. Frank Cass, London.

Secretary of the Treasury (1864). *Statistics of the domestic commerce of the United States. A resolution of the Senate of the United Statess, March 12, 1863*. Secretary of the Treasury, Washington, D.C.

Smits, J., Horlings, E., and van Zanden, J. L. (2000). *Dutch GNP and its components*. Groning.

Smits, J. and Van der Bie, R. (2001). *Tweehonderd jaar statistiek in tijdreeksen 1800-1999*. Centraal Bureau voor de Statistiek, Voorburg/Heerlen.

Smits, J., Woltjer, P., and Ma, D. (2009). A dataset on comparative historical national accounts, ca. 1870-1950: a time-series perspective. *Groningen Growth and Development Centre Research Memorandum*, GD-107.

Statistisches Bundesamt der Bundesrepublik Deutschland (2012). Genesis datenbank. https://www-genesis.destatis.de/ (accessed May 7, 2010).

Stuermer, M. and von Hagen, J. (2012). Der Einfluss des Wirtschaftswachstums aufstrebender Industrienationen auf die Märkte mineralischer Rohstoffe. DERA Rohstoffinformationen 12, Deutsche Rohstoffagentur (DERA) in der Bundesanstalt für Geowissenschaften und Rohstoffe, Berlin.

Timmer, M. and de Vries, G. J. (2007). A cross-country database for sectoral employment and productivity in asia and latin america. 1950-2005. *Groningen Growth and Development Centre Research Memorandum*, GD-98.

United Nations, Statistical Office (1963). *The growth of world industry 1938-1961*. United Nations, New York.

United Nations, Statistical Office (1966). *Yearbook of national account statistics*. United Nations, New York.

United Nations, Statistical Office (1972). *Yearbook of national account statistics*. United Nations, New York.

United Nations, Statistical Office (1977). *Yearbook of national account statistics.* United Nations, New York.

U.S. Bureau of Labor Statistics (2011). Producer price index: all commodities. http://www.bls.gov/ppi/ (accessed July 29, 2011).

U.S. Bureau of Mines (1883). *Mineral resources of the United States. 1882.* U.S. Bureau of Mines, Washington, D.C.

U.S. Bureau of Mines (1980). *Minerals yearbook. 1978-79. Metals and minerals.* U.S. Bureau of Mines, Washington, D.C.

U.S. Bureau of Mines (1981). *Minerals yearbook. 1980. Metals and minerals.* U.S. Bureau of Mines, Washington, D.C.

U.S. Bureau of Mines (1987). *Minerals yearbook. 1985. Metals and minerals.* U.S. Bureau of Mines, Washington, D.C.

U.S. Bureau of Mines (1993). *Minerals yearbook. 1990. Metals and minerals.* U.S. Bureau of Mines, Washington, D.C.

U.S. Bureau of Statistics (1879). *Statistical abstract of the United States. First number. 1878.* Government Printing Office, Washington D.C.

U.S. Bureau of Statistics (1889). *Statistical abstract of the United States. Eleventh number. 1888.* Government Printing Office, Washington D.C.

U.S. Bureau of Statistics (1899). *Statistical abstract of the United States. Twenty-first number. 1898.* Government Printing Office, Washington D.C.

U.S. Bureau of Statistics (1909). *Statistical abstract of the United States. Thirty-first number. 1908.* Government Printing Office, Washington D.C.

U.S. Geological Survey (1996). *Minerals yearbook 1995.* U.S. Geological Survey, Reston, V.A.

U.S. Geological Survey (2001). *Minerals yearbook 2000.* U.S. Geological Survey, Reston, V.A.

U.S. Geological Survey (2007). *Minerals yearbook 2005.* U.S. Geological Survey, Reston, V.A.

U.S. Geological Survey (2011). *Minerals yearbook 2010.* U.S. Geological Survey, Reston, V.A.

Weed, W. (1916). *The mines handbook.* Stevens Copper Handbook Co, New York.

World Bank (2012). World bank database. http://data.worldbank.org/ (accessed January 23, 2012).