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An Estimate of Imperial Austria's Gross Domestic Fixed Capital Stock, 1870-1913: Methods, Sources and Results

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Abstract

Research into the origins of economic growth in the late nineteenth century Habsburg Empire has so far suffered from a lack of evidence on the evolution of the capital stock. As a first step towards a more comprehensive documentation of the role played by factor inputs in the Habsburg growth experience, this paper presents annual estimates of the gross domestic fixed capital stock in imperial Austria, distinguishing between buildings (residential, agricultural, commercial, public), infrastructure (railway tracks, roads), vehicles (railway rolling stock, ships) and machinery.

1. Introduction

As for many other 19th century economies, the scarcity of essential historical data poses severe conceptual and empirical problems for the derivation of capital stock time series for Austria. While, in line with current practice in most statistical offices, the perpetual inventory method would be the preferred technique of estimating capital stock levels as the sum of past real investments that have survived up to the period under consideration (O'Mahony, 1996: 165), the lack of both investment figures and appropriate producer goods price indices for most types of assets renders this not viable in the present case. Of course, in some cases investment series could be constructed from changes in directly observed historical stock levels as documented in censuses or official reports, e.g. residential dwellings or railway rolling stock inventories. Yet to use such

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investment series as an input into perpetual inventory calculations of the capital stock would add very little and, as Broadberry (1998: 399) has pointed out, 'involve some circularity of argument'. In the following, the perpetual inventory method was used only to estimate the gross stock of machinery and equipment. In all other cases, the estimates build on contemporary observations of capital stock levels. Accordingly, it is only for machinery and equipment stocks that the choice of asset lifetime assumptions becomes a practical issue. Maddison (1995: 137-140) argues for using standardized asset lives in cross-country comparisons and assumes asset lives which approximate those in the USA (39 years for non-residential structures, 14 years for machinery and equipment) for all six economies in his study. Focusing on the analysis of catch-up with the leading economy, the point is to correct for the impact of differing asset live assumptions on the comparative levels and growth of capital stocks. At the aggregate level, such standardization can lead to problems, for instance, of inter-country differences in capital per worker being incompatible with observed inter-country differences in output per worker (Broadberry, 1998: 399). Hence no attempt was made at standardization along the lines suggested by Maddison.[1]

There is much debate in the literature on whether to choose gross or net measures of fixed capital stocks in productivity computations and comparisons (cf. O'Mahony, 1996: 166). In the present case, the nature of the available data suggests that gross measures can be re-constructed in a far more coherent and consistent fashion than net measures. Fellner's (1915) wealth survey provides the starting point for the approximation of Austria's gross domestic fixed capital stock in 1913 and its extrapolation back to 1870. The new estimates comprise buildings,

[1] See O'Mahony (1996) for a careful comparative evaluation of the impact of alternative asset life assumptions on capital stock growth and capital's contribution to both labour productivity levels and growth for the post-1950 period.

machinery and equipment, vehicles and infrastructure. They exclude livestock, inventories and work in progress.

2. Components and Measures

Buildings.

Of all the capital stock series derived here, this is probably the most conjectural as the lack of data on stock composition, in particular, forced recourse to some restrictive assumptions. The new estimates for the stock of buildings were derived in six stages:

(1) Drawing on the Austrian official buildings taxation records, Fellner estimated the net value of buildings in 1910. These estimates have been amended here, first, by converting the net values back into gross values (Fellner reports the allowances he made for depreciation), second, by adding an estimate of the gross value of non-taxed, state-owned buildings and, finally, by adjusting them to 1913 prices using the general price index of Mühlpeck et al (1979). The estimate for state-owned buildings rests on the assumption that their proportion in the gross value of all tax-free buildings in Austria matched that in Hungary. Note that the number of buildings tax assessed in 1910 is lower than the total number of buildings recorded in the census of that year and part of this gap is likely due to the non-inclusion of buildings owned by central government and its agencies in the building taxation records (Fellner, 1915: 529). Other publicly-owned, tax-free buildings are covered in Fellner's calculations. However, his data do not permit further decomposing the total stock directly into residential and non-residential buildings. Hence separate benchmark estimates were prepared for other building categories and then 'slotted' into the frame provided by Fellner's (adjusted) aggregate for 1910.

(2) A time series of the gross value of commercial and industrial buildings was derived as a function of the machinery stock (see below) and an index of the share of machinery in the total stock of physical capital in industry and commerce. According to Hoffmann (1965: Table 34), machinery and equipment accounted for approximately 60 per cent of physical capital invested in 'Gewerbe' at around the turn of the century. This percentage has been used here as well for the 1910 benchmark. However, while there are very good reasons to think of trend growth in both machinery and buildings stocks, there are no grounds to assume that they expand at the same or even similar rate over the longer term (Kuznets, 1961; De Long, 1992). To avoid an overestimation of the stock of non-residential and non-agricultural structures, the percentage share was, therefore, extrapolated back using the average rate of change of the 'Maschinendominante' (i.e. the share of machinery in fixed assets) for a sample of Austrian industrial corporations (Mosser, 1980: 125). The result is, over time, a declining proportion of buildings in total fixed assets of industry and commerce. Note that the underlying machinery stock series (net of agricultural machinery) is composed of trend values to eliminate the effects of short-run hikes in machinery investment on the building stock estimate.

(3) With 1910 benchmark values (in 1913 prices) available for the total gross building stock (Fellner, 1915), public and commercial buildings (estimated above) and farm buildings (Pribram in Sandgruber, 1978: Table 54; deflated using the general price index of Mühlpeck et al, 1979), the 1910 gross value of non-agricultural residential dwellings was obtained as a residual.

(4) In the next step, a time series of the number of all inhabited buildings was derived, using the official census counts for 1869-1910 (annual issues SJB, ÖSH) and interpolating for the years between the (decadal) censuses. The series was then adjusted for population size to

correct for the effects of unrecorded changes in the average size of dwellings.[2]

(5) The adjusted series was then decomposed into two sub-series for agricultural buildings and non-agricultural residential dwellings. According to the 1910 census, 58 per cent of all inhabited buildings (main buildings, annexes and auxiliary structures) were used for agricultural purposes (ÖSH 1914). This corresponds with Pribram's contemporary estimate of the value of farm buildings (Pribam in Sandgruber, 1978: Table 54) that is equivalent to c. 56 per cent of the value of all residentially used buildings as estimated above. The 1910 share of farm buildings in the total was extrapolated, using an annual index of agriculture's share in the total population (Census 1869-1910; Sandgruber, 1978). The changing proportion of non-agricultural residential dwellings was approximated in the same manner, drawing on an index of the non-agricultural population share. Multiplying each of the two series with the adjusted stock series for all inhabited buildings (as estimated under (4) above) yielded indices for farm buildings and non-farm residential dwellings. These were then linked to the respective 1910 value estimates.

(6) Finally, it was assumed that the share of all public, i.e. tax-free, buildings in the total stock remained constant over time at the 1910 level of 7 per cent observed by Fellner. This seems a broadly reasonable simplification in light of the small variations reported, for example, in the equivalent German data (Hoffmann, 1965: Tables 29, 34, 39).

[2] That such adjustment is required is, for example, evident from the decline over time in the ratio of population to homes (flats, houses) across Austrian cities (Eichwalder, 1979: 573-4).

Machinery and equipment.

As a first step in deriving a perpetual inventory based stock estimate, an investment series for machinery was constructed for 1870-1913. The series draws on Schulze (1996: Tables A.10, A.12; 2000: 332) for domestic production in mechanical and electrical engineering and a machinery price index. The official foreign trade statistics have been used for net imports of machinery (for sources and methods employed to isolate Austrian as distinct from total Austro-Hungarian machinery trade see Schulze, 1996: Appendix D). Note that no estimates for machinery production are available for the years prior to 1870. The next step involved computing a three-year moving average of the ratio of machinery investment to industrial output (Schulze, 2000: Table A.1), which rose over time, and fitting a log-linear time trend to the observations. The estimated coefficients were then used to produce a backward 'forecast' of the machinery investment/industrial output ratio for 1830-1869. An estimate of machinery investment in constant 1913 prices was then derived by applying the estimated investment/output ratios to Komlos' (1983: Tables E.4, E.6) index of Austrian industrial production that has been compositionally adjusted to match with the secondary sector output estimates used in the ratio calculations (Schulze, 2000: Table A.1). The estimates of fixed capital formation so obtained were then cumulated to arrive at a stock estimate for the point in time when the oldest assets still in the stock were scrapped. Accounting for further annual additions through investment and exits through scrapping yields a series of the gross stock of machinery. Here it is assumed that all assets were scrapped when their service lives expired (rectangular retirement) and that the average service life of machinery was 28 years. These 28 years approximate to a compromise between Feinstein's (1988: 278, 284, 297-8) various asset life observations for nineteenth century farm machinery and implements (20-25 years), plant and machinery in mining and quarrying (30 years), and machinery and equipment in manufacturing (30-40 years). Groote et al. (1996: 9-10) report asset lives of 20 years as appropriate for machinery in the Netherlands prior to the First World War. Table 1 below contrasts the effects of alternative asset life assumptions on the estimated level and growth of the gross machinery stock in Austria.

[Table 1 here]

While estimated stock levels are strongly affected by the choice of expected service lives, there are only minor differences in terms of growth.

<u>Vehicles.</u>

(1) Cargo ships, passenger liners, fishing boats.

The official statistics report the net tonnage of steam and sailing ships on the register (annual issues SJB, ÖSH). A 1913 price for steam ships was derived from the new construction data of the Austrian Lloyd shipping company (ÖSH), the largest of the shipping firms operating under the Austrian flag (Bachinger, 1973: 313; Grailer, 1949: 521) The records show that the price per gross registered ton varied substantially in the short run, even if measured in constant 1913 crowns, reflecting likely changes in the type and quality of vessels built. To account at least partially for these variations, a weighted 1907-11 price was computed and adjusted to 1913 levels by use of a general machinery price index (Schulze, 1996: Table A.12). Note that no price data are available for 1912-13. On the basis of the pre-war sterling/crown exchange, the price so obtained (594 crowns per gross registered ton) lies 29 per cent above the average 1913 value per gross ton estimated by Feinstein (1988: Table 15.12) for British steam vessels and about 65 per cent above the weighted average price per ton Feinstein (1988: 346) derived from the records of the Liverpool Steamship Owners' Association. In light of the substantial productivity lead the British shipbuilding industry held, the estimates for Austria look both plausible and reasonable. The standard factor of 1.64 (Feinstein, 1988: 347) was used to convert net into gross tonnage before multiplying tonnage with the estimated 1913 price to obtain an estimate of the stock of capital embodied in Austrian sea-going and coastal steam ships. The value of Austrian sailing ships was calculated on the basis of net tonnage and the assumption that the price *ratio* between British-made steam and sailing ships (about 63 per cent; Feinstein, 1988: Table 15.12, Figure 15.3) applied also to the Austrian case. Since gross and net tonnage are taken to have been broadly equal for sailing ships (Feinstein, 1988: 352), no further adjustment was made and a price of 374 crowns per ton was used to value the net tonnage.

(2) *Inland navigation.*

The physical capital used in inland navigation was approximated on the basis of data from the Danube Steam Shipping Company (annual issue SJB, ÖSH), at the time the world's largest inland navigation company (Pisecky, 1970). Its total assets were valued at 90 million crowns just before the First World War (Bachinger, 1973: 310), by far the most of it invested in its steamers, tug boats and barges. Here, the 1913 level of assets was linked to an index of the fleet's goods carrying capacity, measured in tons, to obtain an estimate of the capital stock employed in Austrian inland navigation. The data for 1884 to 1913 show that the carrying capacity per barge increased significantly over time. For 1870 to 1883, though, only the number of barges is available.

(3) *Locomotives.* The value of Austria's stock of locomotives was estimated in three stages. The available statistics do not report the composition of locomotive output or, for that matter, stocks by size or weight Yet we know that the weight of newly constructed locomotives

increased substantially over the course of the nineteenth century and have to capture this increase in any constant unit price computation. Hence, as a first step, a log-linear time trend was fitted to weight data on new types of locomotives that were produced by Austrian firms and entered service on Austrian railways between 1844 and 1908 (Greggio, 1980: Appendix, 228-244). Note that domestic producers were, by a very large margin, the main providers of rolling stock on Austrian railways (*Eisenbahnstatistik*). The coefficients so obtained were used to compute a weight index spanning the whole period under review. This index was then employed as an input in the current price regression set out below and alongside the general machinery price index which is, in essence, a weighted material input price index (Schulze, 1996: Table A.12). Second, the data from the three leading Austrian manufacturers of locomotives (Sigl, Wiener Neustadt; Wiener Lokomotivfabriks-AG, Floridsdorf; Staatseisenbahngesellschaft, Vienna) cover the *total* value of their output of engines and tenders and their respective numbers, but not their unit prices or product-specific turnover figures (HGK Vienna, annual issues). Hence for the purpose of stock valuation, unit prices had to be estimated. In conjunction with the weight and (material) price indices set out above, the company data for 1875-1913 were used to estimate the equation below, with the log of output of locomotives and tenders in current crowns as the dependent variable (OLS):

[Table 2 here]

This equation was used to fill in the gaps with missing value observations (1870-1874). Further, it yields relative unit prices of locomotives and tenders and simple transformation allows deriving absolute unit prices. The coefficients on the weight and price indices, which reflect the elasticities with which current price output responds to changes in the weight of locomotives (and tenders) and changes in material input prices, serve as weights in the computation of a weight-adjusted price index. This price index was used to convert current price output into output in constant 1913 prices. The next step involved the derivation of absolute unit prices for locomotives and tenders in constant 1913 crowns for each year, drawing on the information on relative prices, the value of output and the number of items produced. Note that for the years with overlaps (1902-1911), the current unit prices drawn from the output observations, i.e. the producers' side, match fairly closely with those implicit in the railway companies' rolling stock purchases (annual issues *Lokomotiveisenbahnen*, *Eisenbahnstatistik*). Finally, the 1913 unit prices so obtained were used to value the *additions* (net of exits which are not reported in the official railway statistics) to the stock of locomotives and tenders in each year from and including 1870 (annual issues *Hauptergebnisse*, *Lokomotiveisenbahnen*, *Eisenbahnstatistik*; also SJB and ÖSH). The 1869 stock levels are valued on the simplifying assumption that they have been built up in constant and equal increments over a 28-year period – this is approximated by using 1855 weight-adjusted equivalents of 1913 unit prices for locomotives and tenders. Starting from the 1869 levels and cumulating these net additions then yielded the stock estimates for each year up to 1913.

(4) *Railway passenger and freight cars.*

The official railway statistics report the number of passenger and freight cars in use for the whole period under review (annual issues SJB, ÖSH). From the turn of the century, data on their average weight and purchase cost are also available (annual issues *Lokomotiveisenbahnen*, *Eisenbahnstatistik*). In a first step and drawing on the data pertaining to new additions to the stock, an average 1911 price per ton was computed for passenger and freight cars, respectively. Over 1902-11, the average weight of railway cars in the stock rose gradually which is indicative of size growth. To capture such increases likely occurring also in the earlier period it was assumed that the same rate of growth in weight per car applied in the years before 1902. For each type of car the stock was weight-adjusted and then valued at the 1911 price.

Infrastructure.[3]

(1) *Roads and bridges*.

The stock estimates are based on the official statistics which report the length of four classes of roads: state roads, land roads, district roads and municipal roads (annual issues SJB, ÖSH). According to Fellner (1915: 535), the cost of constructing one kilometre of state and land roads was 22,176 crowns in 1910; one kilometre of district road cost 11,352 crowns and of municipal roads 3,190 crowns, respectively. In the absence of a more specific construction price index, these figures were adjusted to 1913 price levels drawing on Mühlpeck's (1978: 676-9) general consumer price index and then used to value the stock on the basis of road length. Fellner (1915: 531, 535-6) provides a lower bound estimate of the value of road bridges in 1911 (52 million crowns) which, because of regionally incomplete underlying data, is little more than the book value of Budapest's bridges alone (and about 65 per cent of the total estimated value of Hungary's bridges). Fellner's estimate for Austrian bridges are, by his own admission, implausibly low in light of Austria's more mountainous terrain and, one might add, her overall much longer road network than Hungary's. Here it was assumed that, in value terms and as a likely lower bound, the total stock of bridges in Austria accounted for the

[3] No estimates have been produced for the postal, telegraph and telephone systems as well as waterways and naval architecture. This is for want of sufficiently detailed data needed to extrapolate Fellner's 1911 benchmark figures. Overall these asset categories taken together account for less than 4 per cent of the total capital stock in 1911.

same proportion of the road stock as in Hungary (c. 9.9 per cent in 1911) and that this ratio held broadly over time.

(2) *Railway track.*

The estimates are based on track length (in kilometres) and 1913 cost of construction per kilometre. From the mid-1890s, actual track length on main lines and local railways (including double and multiple track as well as sidings) is reported in the official railway statistics. For the earlier years, route length has been converted into track length, using track-route ratios of 30 per cent for multiple track and 33 per cent for sidings, railway yards and stations. The proportion of double track among the so-called 'Kleinbahnen' (which by the end of the period made up 3 per cent of total route length) was 44 per cent on average over 1903-1913 (annual issues *Eisenbahnstatistik*). Here, the length of sidings was approximately 16 per cent on average of route length. The cost of constructing one kilometre of track in 1913 was 152,000 crowns (Komlos, 1983: 288).

Table 3 below reports the annual capital stock estimates for 1870-1913 by asset type.

[Table 3 here]

3. Some Observations and Comparisons

According to the new evidence, imperial Austria's fixed capital stock grew at a significantly lower rate over the late nineteenth century than that of neighbouring Germany (Table 4). The growth differential was even more pronounced with respect to imperial Hungary: Katus' (1970) spot estimates for 1867 and 1913 suggest a 1.5 percentage point difference. However, the initial capital stock level in the economically less developed eastern half of the Habsburg Empire was much lower in comparison, adding up to less than thirty per cent of the Austrian level in 1870. By 1913, this proportion had risen to c. 53 per cent. Hence there is evidence of intra-empire catching-up in terms of capital formation that corresponds well with the evidence on relative GDP and GDP per capita growth (Schulze, 2000). By 1913, the wide initial gap in capital-output ratios between the two halves of the Habsburg Empire had also narrowed substantially, with Hungary reaching c. 80-90 per cent the level of Austria's physical capital per unit of output.

Level comparisons with German capital stock estimates are problematic, given the lack of suitable capital stock price-converters and a common benchmark year. However, a very rough approximation based on (own currency) capital-output ratios and GDP converted into purchasing-power adjusted 1990 international dollars (Maddison, 2003) would suggest that in 1870 imperial Austria's capital stock was about one-sixth the size of the German stock, with a slight relative decline to 1913. Though diminishing somewhat over time, Austro-German differences in physical capital per unit of aggregate output remained pronounced: by 1913, the German capital-output ratio was still more than 70 per cent above the equivalent Austrian ratio. Given a low rate of labour force growth in Austria (0.60 per cent p.a. versus 1.36 per cent in Germany), capital intensity grew more rapidly in Austria (1.96 per cent per annum) than Germany (1.51 per cent), albeit from a much lower level. However, this advance did not translate into a subsequent narrowing of Austria's lag in output per worker or output per head of population (measured in 1990 international dollars) that had opened by 1870.

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Table 1: Gross Stock of Machinery in Constant 1913 Prices (mill. K), Alternative Asset Life Times

	1870	1890	1910	Δ 1870-1910 (% p.a.)
28 years	**698.1**	**2,133.3**	**7,265.7**	**6.03**
40 years (Feinstein max.)	796.9	2,413.1	8,211.6	6.00
20 years (Groote et al.)	591.4	1,821.7	6,389.9	6.13
14 years (Maddison)	474.0	1,338.3	5,230.5	6.19
Note: Reflecting the underlying production data, the stock levels reported here include locomotives. Drawing on different sources, locomotives (which account for a small proportion of total machinery stocks) are separated out and included under vehicles in Table 3.				
Sources: see text.				

Table 2: Current Price Regression – Locomotives and Tenders

	coefficient	**t-ratio** [prob]
Constant	8.8660	48.5002 [.000]
Logloco	.74865	8.3863 [.000]
Logtender	.25216	3.9186 [.002]
weight index	.024183	11.7426 [.000]
price index	.004368	2.0066 [.053]
N = 39		
Adj. R^2 = .9696	F(4, 34)= 270.737	DW = 2.2087

Table 3: Gross Stock of Domestic Reproducible Fixed Assets in Constant 1913 Prices (Mill. K)

	Infrastructure		**Vehicles**		**Machinery**	**Buildings**				**Total**	**Total Non-Resident.**
	railway tracks	roads & bridges	rolling stock	ships		agricultural	public	commercial	residential		
1913	5543.53	1553.42	1745.48	519.74	8425.69	8007.95	1424.81	4530.86	6458.65	38210.12	31751.48
1912	5495.67	1528.12	1683.99	517.63	7881.31	7931.36	1401.75	4437.26	6321.36	37198.45	30877.09
1911	5439.47	1503.74	1618.61	484.68	7272.44	7853.34	1377.62	4342.05	6172.85	36064.82	29891.96
1910	5386.65	1491.94	1591.94	461.25	6803.51	7778.40	1354.75	4245.63	6039.30	35153.37	29114.07
1909	5289.77	1483.13	1553.07	434.81	6393.54	7698.93	1329.41	4148.34	5878.19	34209.19	28331.00
1908	5159.97	1473.00	1481.33	425.56	5994.79	7623.09	1305.68	4050.50	5735.42	33249.34	27513.92
1907	5083.04	1464.77	1415.95	399.44	5551.48	7547.28	1281.75	3952.39	5590.33	32286.41	26696.09
1906	5041.71	1444.40	1357.28	366.33	5151.10	7472.18	1258.02	3854.28	5447.14	31392.46	25945.31
1905	4890.96	1435.92	1321.08	361.76	4822.77	7395.07	1233.06	3756.41	5289.35	30506.39	25217.04
1904	4789.21	1422.63	1302.06	346.84	4528.99	7326.82	1212.64	3658.98	5182.78	29770.95	24588.16
1903	4715.27	1412.08	1279.33	339.49	4258.18	7253.14	1189.23	3562.18	5041.01	29049.91	24008.90
1902	4612.97	1399.05	1247.46	331.63	4019.27	7180.84	1166.41	3466.20	4905.16	28329.00	23423.84
1901	4498.15	1385.54	1200.96	312.48	3801.59	7108.56	1143.51	3371.17	4767.12	27589.07	22821.96
1900	4416.38	1373.44	1145.09	277.93	3603.77	7036.31	1120.54	3277.23	4626.96	26877.65	22250.70
1899	4305.88	1364.16	1089.35	251.98	3410.93	6968.16	1097.37	3184.51	4478.88	26151.23	21672.35
1898	4154.36	1349.00	1030.48	237.01	3216.76	6903.82	1075.94	3093.11	4348.93	25409.40	21060.47
1897	3962.45	1337.65	974.86	233.71	3028.31	6840.71	1055.11	3003.12	4224.35	24660.28	20435.93
1896	3828.15	1317.01	920.91	212.89	2845.52	6778.14	1034.55	2914.62	4101.22	23953.02	19851.80
1895	3747.76	1301.50	891.61	197.09	2662.53	6716.10	1014.25	2827.68	3979.54	23338.07	19358.53
1894	3716.67	1284.97	863.39	182.86	2496.72	6657.31	995.55	2742.36	3874.32	22814.14	18939.82

1893	3631.78	1270.71	878.02	183.17	2315.80	6601.03	978.09	2658.70	3781.50	22298.79	18517.29
1892	3573.24	1257.25	840.92	177.43	2169.44	6542.51	959.56	2576.74	3674.92	21772.01	18097.09
1891	3553.19	1242.69	807.60	179.48	2040.35	6490.49	944.23	2496.53	3602.72	21357.28	17754.56
1890	3479.82	1212.87	821.88	177.99	1897.50	6434.23	926.85	2418.07	3505.72	20874.91	17369.20
1889	3441.44	1203.13	787.75	175.97	1781.58	6388.98	910.94	2341.39	3415.51	20446.69	17031.18
1888	3371.80	1194.97	752.09	174.11	1684.44	6342.24	893.52	2266.51	3304.80	19984.47	16679.67
1887	3224.78	1177.85	730.98	179.46	1589.91	6297.66	877.94	2193.42	3214.79	19486.80	16272.00
1886	3103.63	1170.79	714.11	186.41	1524.56	6252.66	861.96	2122.13	3118.00	19054.23	15936.24
1885	3033.55	1160.79	700.42	182.67	1471.04	6209.05	847.16	2052.64	3033.80	18691.13	15657.33
1884	2990.82	1148.88	671.40	184.45	1410.08	6166.46	833.22	1984.94	2958.17	18348.41	15390.24
1883	2782.53	1141.03	638.34	180.11	1349.63	6122.73	818.24	1919.02	2868.10	17819.72	14951.62
1882	2711.46	1133.58	601.97	179.45	1284.81	6080.37	804.42	1854.86	2790.36	17441.28	14650.92
1881	2656.82	1113.85	578.37	177.87	1213.29	6037.94	790.51	1792.46	2709.68	17070.78	14361.10
1880	2591.38	1101.02	559.98	176.48	1144.40	5997.20	778.04	1731.78	2644.83	16725.11	14080.27
1879	2573.06	1063.94	549.74	172.60	1091.56	5935.01	764.27	1672.81	2582.44	16405.42	13822.99
1878	2554.30	1060.40	545.05	168.73	1043.18	5868.32	749.42	1615.52	2508.48	16113.42	13604.94
1877	2542.28	1056.10	536.12	165.29	986.95	5809.41	736.59	1559.90	2451.94	15844.58	13392.64
1876	2433.76	1049.00	526.80	166.42	944.47	5749.85	723.68	1505.90	2393.35	15493.24	13099.89
1875	2337.60	1047.81	512.79	163.46	897.72	5683.84	709.24	1453.51	2319.24	15125.22	12805.98
1874	2195.55	1045.70	475.57	165.95	860.05	5618.48	695.04	1402.70	2246.07	14705.12	12459.05
1873	2115.35	1037.68	437.34	164.24	825.42	5559.53	682.51	1353.43	2187.18	14362.67	12175.49
1872	1922.66	1036.59	399.66	163.10	751.96	5518.31	674.46	1305.67	2168.76	13941.18	11772.41
1871	1660.47	1035.43	364.40	170.30	659.55	5463.76	663.16	1259.40	2118.93	13395.40	11276.46
1870	1380.27	1034.80	303.80	169.87	605.40	5402.94	650.37	1214.57	2054.04	12816.07	10762.03

Table 4: Comparisons - Capital Stock and Capital-Output Ratio, 1870-1913

	change capital stock (% p.a.)		**capital-output ratio, level (period start - end) and change (% p.a.)**	
	(a) total	**(b) total non-resid.[1]**	**(a)/GDP**	**(b)/adj. GDP[2]**
Austria	2.57	2.55	(1.44-2.00) 0.77	(1.41-1.83) 0.61
Hungary	4.04	4.02	(0.82-1.86) 1.92	(0.71-1.48) 1.72
Habsbg. Emp.	2.99	2.92	(1.23-1.95) 1.08	(1.18-1.70) 0.85
Germany	3.19	2.99	(3.92-4.62) 0.38	(3.17-3.49) 0.22
Germany[3]	3.11	2.87	(3.79-4.31) 0.30	(3.03-3.17) 0.11

[1] Total excluding non-agricultural residential dwellings.
[2] GDP excluding rental income from housing.
[3] Adjusted to exclude industrial inventories.

Sources*:* See text for Austrian capital stock. GDP Austria, Hungary: Schulze (2000; minor corrections for Austria). Capital stock Hungary: Katus (1970). GDP and capital stock Germany: Hoffmann (1965), with industrial value added 1913 from Burhop & Wolff (2005) and index of industrial output from Burhop (2005; amended for 1870); capital stock from Hoffmann (1965) with industrial equipment from Burhop & Wolff (2005).

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