

Collegio Carlo Alberto



Italian Industrial Production, 1861 1913: A
Statistical Reconstruction. K. The Construction
Industries

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No. 422

July 2015

Carlo Alberto Notebooks

www.carloalberto.org/research/working-papers

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ITALIAN INDUSTRIAL PRODUCTION, 1861-1913:

A STATISTICAL RECONSTRUCTION

K. THE CONSTRUCTION INDUSTRIES

2015

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**ITALIAN INDUSTRIAL PRODUCTION, 1861-1913:
A STATISTICAL RECONSTRUCTION**

K. THE CONSTRUCTION INDUSTRIES

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K. THE CONSTRUCTION INDUSTRIES

K01 Introduction

K01.01 The output data and estimates

In the 1911 *Censimento demografico* and *Censimento industriale* the construction industry is covered by *classi* 5.2 (that related to buildings) and 5.3 (the residual); quite exceptionally, however, the disaggregation differs across the two. The *Censimento industriale* separates activities, and disaggregates the two *classi* in the usual way, so that *sotto-classe* 5.24, for example, refers to the maintenance and demolition of buildings; the *Censimento demografico* instead disaggregates the sum of the two relevant *classi* by profession, so that *sotto-classe* 5.(2,3)2, for example, refers to bricklayers. The census data are transcribed in Table K.01; as and for the reasons described above (section A03.02), the industrial census covered only part of industry, and in the case of construction its coverage is very limited indeed.

The construction industry defined in the census coincides, or very nearly so, with that defined in the *ISIC* (major division 5), that is, as the erection, completion, alteration, repair, and demolition of buildings, transportation and communication systems, and other permanent structures, including the on-site assembly and installation of equipment and pre-fabricated components; the on-site preparation of construction materials is nowhere mentioned, but surely included by both the *ISIC* and the Italian census. The *Censimento industriale* excludes the sinking of shafts and wells in mines and quarries; the *ISIC*, somewhat illogically, considers that activity part of the construction industry if performed on a contract basis. In principle, the present definition follows the Italian census rather than the *ISIC* on this particular point, and presumably departs from both of them in counting the on-site preparation of chemical explosives as part of the chemical industry (above, chapter D07): in practice, neither distinction is significant, since the reclassification involves peripheral activities rather than entire industries, and the present construction estimates are too coarse to take such minor distinctions into account. The scope of the aggregate industry in the present work, the 1911 censuses, and the *ISIC* is thus substantially one and the same.

The time series evidence here imposes a disaggregation of the construction industry into three basic groups, respectively comprising public works other than railways, railways, and private buildings.

The first group covers the new construction and maintenance of (non-railway) social overhead capital, public buildings, and State properties; it is documented in the first instance by the current expenditure figures in the national and local public budgets. These figures are combined into three time series representing the aggregate expenditure, net of intergovernmental transfers, for ordinary maintenance, for the new construction and extraordinary maintenance of public buildings (and other structures with a low ratio of value added to value), and for the new construction and extraordinary maintenance of other structures. These series are then corrected to allow for private contributions, and finally scaled and deflated to obtain measures of production at 1911 prices.

Railway construction is considered separately in the second group, because it is a major item that is documented poorly by the public budgets but relatively well by specialized reports. Production is again estimated in three parts: the first covers network extensions, disaggregated by type of system, and measured directly by the growth of the relevant network; the second covers renovation and improvements, indexed by aggregate rail consumption in excess of that attributable to network extensions; and the third covers ordinary maintenance, disaggregated by type of system, and indexed by measures of network length and use.

The third group covers the construction and maintenance of private residential, industrial, and commercial buildings (including those owned by cooperatives, or by local governments, as well as by private individuals). In the prevailing dearth of direct evidence, the present production series are derived from the statistical by-products of taxation. The new construction of private buildings subject to the tax on structures is estimated, from the early 1870s, by deflating the reported or estimated increments in assessments attributable to new construction, allowing for public buildings on the one hand and temporarily exempt private buildings on the other. These figures are then extrapolated to 1861 with the aid of a small sample of urban construction-materials consumption series, allowing for public works. The maintenance of taxable private buildings is indexed by the stock of buildings to be maintained; the latter is estimated directly from reported tax assessments at a single benchmark, and extrapolated on the basis of the net change attributable to new construction and demolitions. The aggregate new construction and maintenance of private buildings are then extrapolated from these series with the aid of estimates of the population in taxable and exempt structures at the census dates (and of the intercensal movements of those populations, allowing for those induced by demolitions). This extrapolation is based in part on the agricultural population recorded at the various census dates, and the recorded decline from 1901 to 1911 is here taken at face value. We now know that it most probably reflects the shift from a winter date to a summer one (above, section A03.02); but that discovery came long after the present estimates had been frozen (and incorporated in those derived for other industries: above, *Reader's guide*, in the frontmatter to section A).

With the partial exception of railway construction, it may be noted, the present estimates of production are obtained directly as value added at constant (1911) prices: as a rule the evidence is so limited, or the industry's output so heterogeneous, that production cannot usefully be measured in or by its physical results.

A separate measure of construction movements, from the input side, is also constructed here. As noted in section B04.01 above, national production data for construction materials are extremely scanty, and essentially provide only a few benchmarks (1865, 1890, 1901); but the consumption of such materials was regularly measured by local authorities, as they were subject to consumption tax (the *dazio consumo*) in urban areas. A sample of such data, drawn from the publications and archives of a number of (typically North Italian) cities and towns, is investigated below: it provides a basis for the present estimates of private and aggregate construction in the early years, as noted, and a valuable check on them in later years; and it serves to improve the production estimates for other industries as well (see for example above, section C).

K01.02 The employment data and value added estimates

The estimates of value added in 1911 obtained below may be summarized as follows. Non-railway public works are attributed 93.7 million lire for maintenance, 38.3 million lire for the new construction of public buildings, and 195.1 million lire for other new construction; railway construction is attributed 38.6 million lire for maintenance, 45.8 million lire for network extensions, and 34.9 million lire for improvements; and private buildings are attributed 61.8 million lire for maintenance and 188.7 million lire for new construction. These sum to 194.1 million lire in maintenance (of all structures), 227.0 million lire in the new construction of (public and private) buildings, 80.7 million lire in railway extensions and improvements, and 195.1 million lire in other new construction, for a grand total of 696.9 million lire. As estimated in sections K05 and K06 below, the ratio of value added to construction value equals .60 in maintenance (of all structures), .34 in the new construction of buildings, (.51/.95), allowing for land costs, in railway extensions and improvements, and .51 in other new construction; and the

ratio of capital and salary costs to construction value equals .13. Together, these estimates point to aggregate capital and salary costs equal to some 198.1 million lire, and an aggregate wage bill equal to some 498.8 million lire.

The corresponding information from the 1911 *Censimenti* is transcribed in Table K.01. The two sets of figures are very far apart: the *Censimento demografico* counted nearly 700,000 workers, the *Censimento industriale* less than 125,000. The latter figure is clearly a partial one, excluding not only numerous artisanal repairmen, but most of the workers at construction sites as well (even though these were meant to be covered by the enabling legislation, *regio decreto 6 novembre 1910, n. 776, art. 23*): for example, only some 16,000 workers were counted in road and railroad construction and repair, while the State railways alone counted 26,000 permanent and 21,000 temporary employees in maintenance and surveillance (*Statistica F.S. 1911, p. 379*).

The average hourly wage is estimated at .317 lire in 1911 (from Table K.06, col. 7). The modal working day appears to have been of 8 hours from November through February, 9 hours in March and October, and 10 hours from April through September (*Salari edilizi 1911-12, pp. 8-44*). Employment was no doubt seasonal; the data in *U.S. 15th Census Construction, p. 33*, indicate an average employment equal to 80% of the summer peak. Assuming that employment from October through March averaged 66% of the peak from April to October, the employment-weighted average working day was some 9.337 hours long, and the average working year was some 249 days long (assuming a 300-day norm). The product of these estimates of hourly earnings, daily hours, and yearly days equals 737 lire per annum; multiplied by the 680,600 wage-earners counted by the *Censimento demografico* in categories 5.(2,3)2-8, it yields an estimate of the 1911 wage bill with full employment through the summer months equal to 501.6 million lire. Since this figure is only marginally greater than the above estimate of the actual wage bill in 1911, and construction activity was then at a strong cyclical peak, the present disaggregated estimates seem readily compatible with the aggregate census data.

K02. Public works other than railways: State expenditure

K02.01 Introduction

In the case of State expenditure, the sources include both the current *Rendiconto consuntivo* and the retrospective *Opere pubbliche*. The former is the official *ex post* budget, available for each fiscal year of the relevant period (albeit with limited geographic coverage in 1861); the latter is a massive study by the Department of Finance reviewing the State's activity relating to public works from 1862 to 1924, and recapitulating the relevant expenditure in a large number of time series. These series appear to suffer from a variety of errors and omissions, particularly in the early years; and their exact derivation is often difficult to trace. On the other hand, their comprehensive recalculation directly from the disaggregated data in the *Rendiconto consuntivo* would require a greater research effort, and more space, than can be devoted to them here. The present estimates thus incorporate the relevant series in the *Opere pubbliche* (Table K.02, cols. 1 – 3), and use the expenditure data in the *Rendiconto consuntivo* only to correct their more obvious errors and omissions (cols. 4 – 6). These expenditure figures include the inter-governmental transfers paid out by the State department of public works (since these are estimated from the income side of the local budgets, and deducted from local expenditure below), but exclude the school-construction and sundry other subsidies paid out by other State departments (since these are clearly specified in the *Opere pubbliche*, but not in the local budgets). The intergovernmental transfers received by the State are instead estimated from the income data in the *Rendiconto consuntivo*, and deducted here (cols. 7 – 9). The allowances for expenditure in areas not covered by the current State budgets (cols. 10 – 12) are typically based on the special budgets for those areas drawn up on the eve of their fiscal incorporation into the Kingdom, but generally do not allow for variation over time.

All these figures are in principle *ex post* cash budget magnitudes for the current fiscal (cols. 1 – 9) or calendar (cols. 10 – 15) years. From 1861 to 1883, the fiscal year coincided with the calendar year; through 1869, however, the receipts and payments attributed to each year include current accruals collected, and current commitments liquidated, in the succeeding nine to twelve months. A transitional one-semester budget covered the first half of 1884, and subsequent fiscal years ran from July 1 to June 30; the present State-budget figures for 1884 refer to that semester, and those for 1885-1914 refer to lagged fiscal years (e.g., “1885” covers July 1, 1884 – June 30, 1885). The final estimates (cols. 13 – 15) thus incorporate a further correction to convert fiscal years to calendar years.

K02.02 Initial estimates

The initial estimates of State expenditure in Table K.02, cols. 1 – 3 are obtained from the relatively disaggregated series in the *Opere pubbliche*. The expenditure for ordinary maintenance is approximated by the aggregate ordinary expenditure by the department of public works for roads, water-control projects, land reclamation, and harbors (pp. 976-980, rows 4 – 7). Expenditure for new buildings and the like (col. 2) is approximated by the sum of the extraordinary expenditure by the department of public works for new buildings and to transfer the capital from Torino to Firenze and thence to Roma (apparently construction rather than, say, transportation: e.g., *Rendiconto consuntivo 1875*, public works budget items 57 and 57 bis), plus half that attributable to earthquakes, eruptions, floods, and landslides (pp. 982-986, row 3 plus half of rows 5 and 6; pp. 1010-1014, row 6 plus half of row 3); the expenditure by various other departments for sundry buildings, plus half that attributable to earthquakes (pp. 1128-1134, row 4 plus half of row 3); and the expenditure by the department of communications for telephone and telegraph installations (pp. 1128-1134, row 9), by the department of education for educational facilities (pp. 1160-1166, row 1 of the education group which disaggregates pp.

1128-1134, row 5), and by the department of war for military buildings (pp. 1168-1174, row 4 of the military group which disaggregates pp. 1128-1134, row 10). Expenditure for other new construction (col. 3) is approximated by the sum of the extraordinary expenditure by the department of public works for aqueducts, roads, water-control projects, land reclamation, and harbors, plus half that attributable to earthquakes, eruptions, floods, and landslides (pp. 982-986, row 4 plus half of rows 5 and 6; pp. 1010-1014, rows 1 – 2 and 4 – 5 plus half of row 3); half the expenditure by various other departments attributable to earthquakes (pp. 1128-1134, half of row 3); and the expenditure by the department of agriculture for land reclamation (pp. 1128-1134, row 7) and by the department of war for military fortifications (pp. 1168-1174, row 3 of the military group). Exceptionally, the expenditure by various departments for sundry buildings (pp. 1128-1134, row 4) included in col. 2 is reduced by 800,000 lire in fiscal 1894, 600,000 lire in fiscal 1907, 2,000,000 lire in fiscal 1911, and 700,000 lire in fiscal 1913. The first of these adjustments corrects an error in the transcription of the expenditure for the Victor Emmanuel monument (p. 1164, row 18 of the sundry buildings group which disaggregates pp. 1128-1134, row 4; compare the *Rendiconto consuntivo 1893-94*, treasury budget item 134); the others exclude the entire recorded expenditure by the department of the navy for harbor offices and for its own premises (pp. 1165-1166, rows 2 and 12 of the sundry buildings group), which are clearly not *ex post* figures (but may be *ex ante* figures: e.g., *Rendiconto consuntivo 1910-11*, navy budget items 84 novies and 84 duodecies). The expenditure by the department of the navy for military works (pp. 1168-1174, row 1 of the military group) is also entirely left out of cols. 2 and 3; here too, the curiously rounded figures do not seem to correspond to *ex post* budget data.

The other expenditure recorded by the *Opere pubbliche* is instead excluded on substantive grounds. Railway-related expenditure (pp. 970-974, row 4; pp. 976-980, row 8; pp. 982-986, row 9; pp. 1128-1134, row 2) is excluded because railway construction is separately estimated below. The expenditure by the department of public works for general administration, the corps of engineers, and pensions (pp. 976-980, rows 1 – 3; pp. 982-986, rows 1 – 2) refers to payments for services rather than for construction; the expenditure by the department of the treasury for interest on public debt issued to finance public works (pp. 1128-1134, row 1; also pp. 1136-1142) is a cost of intertemporal finance additional to that of the corresponding construction, which is already counted (since the expenditure of the corresponding sum entered the public works budget in the normal way: e.g., *legge 23 luglio 1881*, n. 333, art. 1). The expenditure by the department of the interior for health-care projects (pp. 1128-1134, row 6; also pp. 1168-1174), by various departments for disaster relief (pp. 1128-1134, row 8; also pp. 1168-1174), and by the department of education for elementary and middle education (pp. 1160-1166, rows 2 and 3 of the education group) are all intergovernmental subsidies (and typically interest subsidies, at that: pp. 286, 377, 1160-1166), rather than direct payments for construction. The expenditure by the departments of finance or foreign affairs for buildings in other countries (pp. 1128-1134, row 11) are irrelevant in themselves; nor is the offsetting foreign public construction in Italy likely to have been significant, since foreign public buildings in Italy seem typically to have been purchased rather than built *ad hoc*. (The other series -- pp. 982-986, rows 7 – 8 and 10 – 12, pp. 1128-1134, rows 12 – 14, and pp. 1168-1174, rows 2 and 5 of the military group -- are ignored, since their first non-zero entry dates from after fiscal 1914).

K02.03 Other expenditure

In Table K.02, cols. 4 – 6 are tentative corrections of the more obvious errors and omissions of the initial estimates in cols. 1 – 3; they are obtained from a comparison of the *Opere pubbliche* and the *Rendiconto consuntivo*.

The expenditure figures in the *Opere pubbliche* appear to include the ordinary maintenance expenditure of the department of public works, but not those of other departments; the omission is a major one, since the latter were responsible for the maintenance of the structures and systems which they operated. In principle, therefore, from 1862 to 1913-14 col. 4 covers the expenditure by all departments save that of public works for the ordinary maintenance and improvement of government buildings; of State properties (the *demanio*); of the buildings and installations of the salt and tobacco monopolies, the merchant marine, and the telephone and telegraph systems; of religious buildings; of libraries, monuments, museums, and educational institutions; of health care facilities; of police buildings, prisons, and the like; and of military buildings and fortifications. Again in principle, this expenditure is all, and only, that for construction in the ordinary parts of those departments' budgets; but three exceptions are admitted in practice to maintain consistency over time. First, col. 4 excludes the ordinary expenditure for the construction and transformation of prisons by the department of the interior which continues, from 1906-07 to 1913-14, an item previously included among its extraordinary expenditure and included as such in col. 2 (e.g., *Rendiconto consuntivo*, interior budget item 158 in 1905-06, 141 in 1906-07, and 169 in 1913-14; *Opere pubbliche*, p. 1165, row 16). Second, col. 4 includes the extraordinary expenditure for the maintenance of prisons by the department of the navy which continues, in 1867, an item previously included among its ordinary expenditure (e.g., *Rendiconto consuntivo*, navy budget item 46 in 1866, 52 in 1867). Third, col. 4 includes the extraordinary expenditure for the maintenance of theaters by the department of the interior which continues, from 1863 to 1867, an item previously included among its ordinary expenditure (e.g., *Rendiconto consuntivo*, interior budget item 14 in 1862, 106 in 1863). In addition, col. 4 includes the maintenance of the premises of the department of public works; the latter expenditure is part of the costs of general administration counted by the *Opere pubbliche* (pp. 976-980, row 1) but excluded from col. 1. Again in practice, the expenditure included in col. 4 is often a crudely estimated share of a more comprehensive budget item; ambiguous inclusions and exclusions abound; and numerous small items are neglected. Moreover, the earlier budgets tend to be progressively less detailed than the later ones, and the present estimates are correspondingly rougher as one moves back in time; in particular, both the disappearance of minor relevant items and the accretion of minor irrelevant items to the surviving categories tend to be neglected, in the expectation that the residual error is a small one, while major changes are dealt with by a crude chaining.

Specifically, the present estimates for 1862-1914 are obtained as the sum of the following budget items in the *Rendiconto consuntivo* for the indicated years (and, of course, the analogous items in the neighboring years): 1913-14: finance, 6, 88-89, 94, 140, 178, and 227, plus 50% of 309 and 321, and 25% of 239, 251, and 252; justice, 6, 36, and 37; church fund, 13 and 56, plus 50% of 52; Roma charitable fund, 50% of 14; foreign affairs, 7; education, 9 and 216, plus 50% of 185, 198, 207, 211-212, 215, 218, 223, and 225, 25% of 86, 143, and 227, and 12.5% of 149-151, 158-159, 169-170, 172, and 193; interior, 9, 40, 72, 74, 118, 122, and 170, plus 50% of 73 and 135; public works, 9 and 10; communications, 16, 35, and 83, plus 50% of 5 and 25% of 63-64, 69, 115, and 116; war, 16, plus 92% of 69; navy, 5, 35, and 111, plus 25% of 67; and agriculture, 14. 1908-09: finance, 7, 77-78, 86, 131, 163, and 214, plus 50% of 311 and 322 and 25% of 225, 243, and 244; justice, 6 and 30; church fund, 15 and 35, plus 50% of 49; Roma charitable fund, 14; foreign affairs, 7; education, 9, plus 65% of 80-96, 50% of 77 and 98, 37.5% of 74-75, 25% of 108-109, 119, 126-127, and 160, and 12.5% of 39-41, 45, 47-48, 61-62, 66, 68, 103, 169-170, and 176-177; interior, 9, 38, 69, 71, 111, and 151, plus 50% of 70; public works, 9 and 10; communications, 16, 36, and 82, plus 50% of 5 and 25% of 64-65, 69 bis, 121, and 122; war, 17, plus 92% of 57; navy, 5, 31, and 72; and agriculture, 12. 1903-04: finance, 6, 59-60, 68, 108, and 177, plus 50% of 133, 259, and 269, and 25% of 203; justice, 6;

church fund, 51, plus 50% of 37; Roma charitable fund, 15; foreign affairs, 5; education, 10, plus 65% of 52-53, 50% of 47 and 55, 37.5% of 45, 25% of 59, 62, 66, 72, and 81, and 12.5% of 32-33, 39, 42, 121-122, and 125; interior, 9, 37, 64, 66, 96, and 129, plus 50% of 65; public works, 9; communications, 23 and 52, plus 37.5% of 8-9, 25% of 42, and 7.5% of 3; war, 92% of 37; navy, 21 and 64; and agriculture, 11. 1898-99: finance, 4, 49-50, 57, and 140, plus 50% of 108, 195, and 204, 25% of 160, and 4% of 90; justice, 5; church fund, 46, plus 50% of 35; Roma charitable fund, 13; foreign affairs, 4; education, 7, plus 65% of 41, 50% of 36, 37.5% of 34, 25% of 45, 49, 51, 53, 56, and 63, and 12.5% of 26-27, 30, 32, 96-97, and 99; interior, 3, 24, 50, 53, 74, and 103, plus 50% of 51; public works, 3; communications, 11 and 21, plus 37.5% of 22, 25% of 32, and 2% of 1 and 2; war, 92% of 33; navy, 14 and 53; and agriculture, 6. 1893-94: treasury, 117; finance, 6, 51-52, and 124, plus 50% of 107, 177, and 188, 25% of 145, and 4% of 80; justice, 5; church fund, 46, plus 50% of 35; Roma charitable fund, 14; foreign affairs, 4; education, 6, plus 65% of 39, 50% of 37, 37.5% of 35, 25% of 42, 45-47, 50, 52, 57, and 64, and 12.5% of 26-27, 30, 32, 98-99, and 101; interior, 3, 22, 50, 54, 72, and 101, plus 50% of 52; public works, 3; communications, 5 and 15, plus 37.5% of 16, 25% of 26, and 2% of 1 and 2; war, 92% of 34; navy, 12 and 49; and agriculture, 5. 1888-89: treasury, 40, 89, and 92; finance, 85, plus 37.5% of 67 and 72, 25% of 102, and 0.2% of 43; justice, 4; church fund, 48, plus 50% of 33; Roma charitable fund, 14; foreign affairs, 3; education, 14, plus 65% of 29 bis, 37.5% of 29, 25% of 27, 31, 33, and 35, and 12.5% of 20, 23, 38, 40, 57, and 59; interior, 17, 31, 35, 47, and 57, plus 50% of 3 and 5.5% of 25; public works, 3; communications, 69, plus 50% of 49, 37.5% of 51, and 5.5% of 45 bis; war, 92% of 31; navy, 8 and 40; and agriculture, 6. 1884: treasury, 28, 71, and 74; finance, 37.5% of 60 and 66, 25% of 93, and 0.2% of 42; justice, 4; church fund, 50% of 34; foreign affairs, 3; education, 14, plus 60% of 27, 25% of 29, 31, and 33, and 12.5% of 19, 22, 24, 26, 36, 38, 55, and 57; interior, 3, 15, 28, 41, and 50, plus 5.5% of 22; public works (and communications), 3 and 59, plus 50% of 40, 37.5% of 42, and 5.5% of 37; war, 92% of 31; navy, 7 and 34; and agriculture, 5. 1879: treasury, 74 and 78; finance, 37.5% of 61 and 0.2% of 42; justice, 5, plus 25% of 25; education, 31, plus 50% of 27, 25% of 30, and 12.5% of 17, 20, 22, 24, 26, 29, 33, 35, 45, and 47; interior, 3, 14, 24, 33, and 43, plus 5.5% of 20; public works (and communications), 50% of 34, 37.5% of 36, 25% of 2, and 5.5% of 31 and 53; war, 92% of 23; navy, 7 and 34; and agriculture, 5. 1874: finance, 81, plus 37.5% of 84 bis and 112, and 4% of 103; justice, 11, plus 25% of 14; education, 38, plus 50% of 22, 25% of 37, and 12.5% of 8, 11, 13, 15, 17, 19, 21, 24, 26, 28, 32, and 34; interior, 3, 9, 19, 23, 32, and 41, plus 5.5% of 14; public works (and communications), 50% of 28, 37.5% of 30, 25% of 2, and 5.5% of 26 and 45; war, 92% of 19; navy, 22 and 34; and agriculture, 34. 1869: finance, 107 and 135, plus 37.5% of 140, 12.5% of 151, and 4% of 131; justice, 11, plus 10% of 18; education, 50% of 22, plus 12.5% of 8, 11, 13, 15, 17, 19, 21, 24, 26, 28, 32, 34, and 38; interior, 3, 9, 19, 28, 37, 42, and 48, plus 5.5% of 15 and 57 bis; public works (and communications), 50% of 22, 37.5% of 24, 25% of 2, and 5.5% of 20 and 37; war, 92% of 20; navy, 22 and 34; and agriculture, 23. 1864: finance, 83-84, plus 25% of 104, 12.5% of 112, and 0.2% of 103; justice, 11, plus 2% of 14; education, 12.5% of 8, 11, 13-14, 18, 20, 22, 24, 27, 29, 32, 36, 38, 41, 43, 45, 55, 57, 61, and 63; interior, 45, 64, and 97, plus 50% of 51 bis, 25% of 59 bis, and 5.5% of 37 quater and 60; public works (and communications), 37.5% of 46, 25% of 2, 10% of 45, and 5.5% of 44 and 61; war, 45 and 46; navy, 27, 40, and 50; and agriculture, 10% of 40. In the event, the maintenance of military buildings and fortifications is much the largest component of col. 4 in 1862-1914, and accounts for between one third and two thirds of the estimated total. In 1861, col. 4 also covers the maintenance by the department of public works subsequently covered by col. 1. The present figure for that year is thus obtained, exceptionally, as the sum of the following budget items: finance, 96-97, plus 25% of 124 and 0.2% of 121; justice, 13, plus 2% of 18; education, 22, plus

12.5% of 8, 11, 13, 15, 17, 19, 21, 24, 26, 30, 32, 34, 36, 38, 40, 43, 46, 48, and 50; interior, 15, 27, 43, 49, 56, and 62, plus 10% of 59 and 5.5% of 35; public works (and communications), 9-19 and 25-31, plus 37.5% of 46, 25% of 2, 10% of 45, and 5.5% of 44 and 68; war, 56-59; navy, 30; and agriculture, 10% of 47.

Col. 5 complements the estimates of expenditure for new buildings and the like in col. 2. From 1862 to 1913-14, it is the sum of twelve components, obtained, and justified, as follows. The *Opere pubbliche* appears to count the expenditure of the department of the treasury for the Victor Emmanuel monument (pp. 1160-1166, row 18 of the buildings group corresponding to pp. 1128-1134, row 4), but not for other monuments. The first component of col. 5 thus covers the expenditure for minor monuments listed by the *Rendiconto consuntivo* in the extraordinary part of the treasury budget (from 1890-91 to 1896-97, and again, sporadically, from 1903-04 to 1913-14: e.g., 1893-94, items 135, 173-175, and 181 bis; 1903-04, item 168; 1913-14, items 254 and 261). In the early years, the *Opere pubbliche* figures recording the expenditure of the department of finance for sundry buildings appear to be in error. The second component of col. 5 is thus the difference between the expenditure for buildings and the like listed by the *Rendiconto consuntivo* in the extraordinary part of the finance budget (e.g., 1864, items 183, 193, 195, 200, 207, 210-211, 218-220, 227-228, 240, 242, and 244; 1869, items 58, 65 bis, 187, 214-215, 223-224, 242-243, and 245; 1874, items 166, 168-169, 169 ter, 197, 203, 208, and 216-217) and the corresponding figure in the *Opere pubbliche* (pp. 1160-1166, row 9 of the buildings group), from 1862 until 1877; curiously, the *Opere pubbliche* then often covers just one item of the relevant list (e.g., item 195 in 1864). In 1878 and the immediately succeeding years, the *Opere pubbliche* figure appears to be essentially accurate (in 1880, for example, it corresponds exactly to the sum of items 87, 94-95, and 98-102); it is here presumed to remain so in later years as well. The third component of col. 5 covers the expenditure to improve the spa at Salsomaggiore listed by the *Rendiconto consuntivo* in the extraordinary part of the finance budget in 1912-13 (item 269 bis) and 1913-14 (item 343 bis); the magnitude of this item in 1912-13 indicates that the *Opere pubbliche* did not include it either with the other buildings in the finance budget (p. 1166, row 9 of the buildings group) or with the other spas in the interior budget (p. 1174, row 1 of the health-care group). The fourth component of col. 5 covers the expenditure for churches and other buildings listed by the *Rendiconto consuntivo* in the extraordinary part of the justice budget from 1865 to 1880 (e.g., 1869, item 28; 1874, items 24-29, 34, and 39; 1879, items 26-27); no expenditure by that department is included by the *Opere pubbliche* (pp. 1160-1166, rows 3, 15, and 17 of the buildings group) until much later. In the early years, the *Opere pubbliche* appears to cover little or none of the extraordinary expenditure of the department of education for universities and the like, possibly because the captions to the *Rendiconto consuntivo* figures are then often just “University of _____,” with no indication that it was for construction work (though such an indication is usually available in the *capitoli aggiunti* recording the carry-over of those items to later budgets: e.g., item 59 in 1880 and 84 in 1881). The fifth component of col. 5 is thus the difference between a direct estimate of that expenditure and the corresponding figure in the *Opere pubbliche* (pp. 1160-1162, row 1 of the education group) from 1862 to 1880. The direct estimates are obtained as the sum of the currently funded extraordinary expenditure for universities and the like, and the entire expenditure in the *capitoli aggiunti*, listed by the *Rendiconto consuntivo* in the education budgets (e.g., 1864, items 77-80; 1869, items 43-50; 1874, items 43-46, 53-57, 59, 63-63 decies, and 64-90; 1879, items 55-66 decies and 83-134). The procedure is a crude one, which assumes that the included non-construction expenditure for universities offsets the excluded non-university expenditure for construction; and the assumption that the omissions by the *Opere pubbliche* are negligible after 1880 must also be considered tentative (in 1881, the *Opere pubbliche* figure exceeds the estimate obtained directly from the *Rendiconto consuntivo*, but by

an amount that offsets a shortfall in the jail-construction expenditure figure for the department of the interior; in 1882, the *Opere pubbliche* figure seems to be correct; and the few figures for later years that were subjected to a rough check were not obviously incorrect). The sixth component of col. 5 covers the expenditure for the construction of prisons and other buildings (but not, for the reasons noted above, for the maintenance of theaters) listed by the *Rendiconto consuntivo* in the extraordinary part of the interior budget from 1862 to 1870 (e.g., 1864, items 102-106, but not item 97, included in col. 4; 1869, items 69, 71-72, 74-75, 77, and 85). No expenditure of this type was included by the *Opere pubbliche* (pp. 1160-1161, row 16 of the buildings group) until 1871. The initial figure in the latter series appears to be correct (the sum of interior budget items 71-72 and 74-75); and a small sample of the succeeding years through 1889-90 suggests that the subsequent figures too are at least roughly correct (albeit with the above-noted discrepancy in 1881). From 1890-91 through 1905-06, the *Opere pubbliche* figure corresponds exactly to the single item in the extraordinary part of the interior budget covering prison construction and transformation (e.g., 1890-91, item 123; 1900-01, item 119; 1905-06, item 158). From 1906-07, that item was transferred to the ordinary part of the interior budget (e.g., 1906-07, item 141; 1913-14, item 169), and excluded from the *Opere pubbliche* series; in order to maintain continuity over time, it is included here (rather than in col. 4) as the seventh component of col. 5. The *Opere pubbliche* does not appear to count any expenditure for monuments by the department of the interior (pp. 1160-1166). The eighth component of col. 5 thus covers the expenditure for both minor monuments and the Victor Emmanuel monument listed by the *Rendiconto consuntivo* in the extraordinary part of the interior budget from 1884-85 to 1889-90 (e.g., 1884-85, item 59; 1889-90, items 107 and 134-137); from 1890-91, these expenditures were transferred to the treasury budget, and are counted either in the first component of col. 5 (minor monuments) or in the *Opere pubbliche* (pp. 1163-1166, row 18 of the buildings group, with the figures on p. 1163 printed one line too low). The *Opere pubbliche* also appears to exclude the expenditure of the department of the interior to transform the national archives (pp. 1160-1166) and to build or repair health-care facilities (pp. 1168-1175, row 1 of the health-care group); in both cases, however, the sums reported by the *Rendiconto consuntivo* in the extraordinary part of the interior budget appear small enough to be neglected (e.g., 1888-89, items 72-72 quater, 104, 107, and 112 bis; 1913-14, items 203 and 215). The *Opere pubbliche* does not record any extraordinary expenditure for public buildings by the department of public works before 1882 (pp. 1010-1011, row 6). The ninth component of col. 5 thus covers the expenditure for sundry buildings and monuments listed by the *Rendiconto consuntivo* in the extraordinary part of the public works budget from 1862 to 1881 (e.g., 1864, items 214, 217, and 273; 1869, items 214 and 217; 1874, items 153 quater and 156; 1879, items 138 and 299). The tenth component of col. 5 covers the expenditure to expand the telegraph net listed by the *Rendiconto consuntivo* in the extraordinary part of the public works budget in 1863 (items 178 and 253-254); this expenditure was omitted by the *Opere pubbliche* (p. 1128, row 9). The eleventh component of col. 5 covers the expenditure for military buildings listed by the *Rendiconto consuntivo* in the extraordinary part of the war budget in 1871 (item 38); this expenditure was omitted by the *Opere pubbliche* (p. 1169, row 4 of the military group). The twelfth and last component of col. 5 covers the expenditure for buildings of various kinds listed by the *Rendiconto consuntivo* in the extraordinary part of the navy budget from 1862 to 1913-14 (e.g., 1864, items 54 bis, 54 quater-57 septies, and 65-66; 1874, item 43; 1879, items 38, 40, and 47; 1884, item 45; 1888-89, items 56-57; 1893-94, item 53; 1898-99, item 66; 1908-09, items 84-85, 89-90, and 97; and 1913-14, items 123, 130, 136-37, and 140-42); for the reasons noted above, the corresponding figures in the *Opere pubbliche* were systematically omitted from col. 2. On the other hand, col. 5 excludes the extraordinary expenditure by the department of the navy to repair earthquake damage to buildings (e.g., item 113 in 1911-12), since it is

apparently counted in the *Opere pubbliche* (pp. 1128-1134, row 3), and that to maintain prisons (item 52 in 1867), since it is included instead in col. 4. In 1861, col. 5 also covers the expenditure for new buildings and the like subsequently covered by col. 2. The present figure for that year is thus obtained, exceptionally, as the sum of the following budget items: finance, 206-206 bis, 216, 219, 222, and 227; education, 60-62; interior, 82-83, 87, 89-91, 93, 98, 100 ter, and 103-104; public works (and communications), 71, 147D, 155, 163-164, 165 bis, and 180-180 bis; war, 68-69, 72-73, 77-82, 83 bis, and 98-100; and navy, 38.

Col. 6 complements the estimates of expenditure for other new construction in col. 3. From 1862 to 1913-14, it is the sum of three components. The *Opere pubbliche* (pp. 1128-1134) does not record any expenditure for canals or irrigation works by the department of the treasury or of finance, and thus presumably neglects the relevant portion of the extraordinary expenditure for canal construction and purchases reported by the administration of State canals from 1874 (*Rendiconto consuntivo*, e.g., 1875, finance budget item 155 bis; 1884-85, treasury budget items 123 bis and 152; 1894-95, treasury budget item 184; 1904-05, finance budget item 276; 1913-14, finance budget items 342 and 345). The first component of col. 6 is thus an allowance for that neglected construction expenditure; following the apparent balance between construction and cash purchases over the years (*Opere pubbliche*, pp. 253-254), these estimates equal 20% of the reported expenditure for construction and purchases from 1885-86 to 1891-92, and 100% of it in other years. The second component of col. 6 consists of two corrections to the *Opere pubbliche* series tracing the expenditure of the department of war for military fortifications (pp. 1168-1174, row 3 of the military group). The first correction is the subtraction of the ordinary expenditure for such fortifications in 1862 (war budget item 49); the latter expenditure, which is here included in col. 4, was also included, exceptionally, in the *Opere pubbliche* figure entering col. 3 (pp. 317, 1168). The second correction is the addition of the extraordinary expenditure for such fortifications in 1871 (war budget items 37 and 40); the latter expenditure was omitted by the *Opere pubbliche* (p. 1169). The third and last component of col. 6 covers the expenditure for arsenals, naval fortifications, and the like listed by the *Rendiconto consuntivo* in the extraordinary part of the navy budget from 1862 to 1913-14; for the reasons noted above, the corresponding figures in the *Opere pubbliche* were systematically omitted from col. 3. The present estimates include a number of budget items in their entirety (e.g., 1864, items 54 ter, 55, 57, and 60; 1869, items 42 and 45; 1874, items 42 and 45; 1879, items 39, 42 bis, 44, and 48; 1884, items 39-44 and 46; 1888-89, items 46-48 and 54; 1893-94, items 55-56 and 62-63; 1898-99, items 62-63; 1908-09, items 83 quater, 83 sexies-83 septies, 101-102, and 104; and 1913-14, items 144-146 and 148-149); in addition, they include all the expenditure to fortify and arm the Maddalena in 1887-88 and half of it from then on (e.g., 1888-89, item 50; 1893-94, item 58; 1898-99, item 58; 1903-04, item 75; 1908-09, item 103), and 10% of the expenditure for coastal defense from 1885-86 to 1890-91 (e.g., 1888-89, item 49; the proportion allocated to construction is estimated from the *legge 3 luglio 1884, n. 2471*). In 1861, col. 6 also covers the expenditure for other new construction subsequently covered by col. 3. The present figure for that year is thus obtained, exceptionally, as the sum of the following budget items: public works, 72-143C and 168-179; war, 70, 74, 75, 83, and 103; and navy, 42.

K2.04 Transfers and net expenditure

In Table K.02, cols. 7 – 9 are allowances for the transfers from municipal and provincial governments to the State included in the local governments' expenditure estimates below (Table K.03). These are estimated from the income side of the *Rendiconto consuntivo*; in principle, they count current contributions (*rimborsi e concorsi*, since these presumably duplicate the local governments' current expenditure) but not repayments of debt (*riscossioni di crediti, rimborsi di*

anticipazioni, etc., e.g., *Rendiconto consuntivo 1862-67*, vol. II, p. 358, items 1 and 16, 1889-90, item 92.14; these presumably correspond to items classified in the local governments' budgets as capital movements, which are excluded from the expenditure estimates in Table K.03).

Col. 7 covers transfers for maintenance, estimated from ordinary receipts; it includes three basic components. The first covers transfers from the provinces and municipalities for work on harbors; it is taken simply as reported (e.g., 1864, sub-items 39-40, 43, 92, and 95 in the specification of item 35, 1874, item 43.17, 1884, item 50.7, 1893-94, item 55.8, 1903-04, item 60.5, 1913-14, item 93). The second covers transfers for work on water-control projects. From 1885-86 to 1913-14, it is obtained as the sum of the reported transfers from local governments (e.g., 1893-94, item 55.9, 1903-04, item 60.6, 1913-14, item 94) and 75% of the relatively small amounts covering public and private contributions together (from 1890-91; e.g., 1893-94, item 55.11, 1903-04, item 60.11, 1913-14, item 92.11); from 1861 to 1884-85, it is obtained as 70% of the reported contribution received from public and private sources together (e.g., 1864, sub-items 42, 48, 89, and 93 in the specification of item 35, 1874, item 43.18, 1884, items 50.8-9; the included proportion reflects the mix of the *ex ante* figures in items 46.9-10 in 1885-86). The third covers transfers for land-reclamation work; it too is relatively small, and taken simply as reported (from 1892-93; e.g., 1893-94, item 55.12, 1903-04, item 60.8, 1913-14, item 92.6).

Col. 8 covers transfers for the construction of new buildings and the like, estimated from extraordinary receipts; it includes four basic components. The first covers transfers for the construction of telecommunications systems; it is estimated as 75% of the corresponding budget item, which includes private as well as public contributions (from 1908-09; e.g., 1913-14, items 154-155). The second covers transfers for the construction of university buildings; it is obtained as the sum of the reported transfers from local governments (from 1893-94; e.g., 1893-94, item 79.13 bis, 1907-08, items 112.11, 112.18, 112.22-23, and 118, 1912-13, items 152.18-19 and 162-163 bis) and half of those covering public and private contributions together (from 1896-97; e.g., 1907-08, items 112.12 and 112.24, 1912-13, items 152.8 and 152.20). The third covers transfers for the construction of barracks; it is taken simply as reported (from 1887-88 to 1898-99; e.g., 1887-88, item 68.13, 1898-99, item 80.16). The fourth covers a handful of minor transfers relating to the construction of jails, archives, observatories, post offices, and other buildings; it too is taken simply as reported (from 1869 to 1873, and again from 1880 to 1892-93; e.g., 1872, items 67.17 and 67.19, 1883, items 76.7, 76.10, and 76.13, 1888-89, items 76.14-15 and 76.17-18, 78, and 108).

Col. 9 covers transfers for other new construction, also estimated from extraordinary receipts; it includes six basic components. The first equals the reported transfers for road construction, which appear to have been obtained entirely from local governments (e.g., 1864, item 43, 1884, item 65, 1913-14, item 137; see also the corresponding disaggregation, e.g., 1913-14, Alleg. 32, and *legge 27 giugno 1869, n. 5147, legge 30 maggio 1875, n. 2521, and legge 23 luglio 1881, n. 333*). The second covers transfers for water-control projects (and land reclamation, where the latter is not separately counted); it is obtained as the sum of the reported transfers from local governments (from 1882; e.g., 1886-87, items 67.8, 67.11, and 67.13.A; 1893-94, item 79.8; 1900-01, items 83.8 and 83.17 bis; 1912-13, item 152.4) and 75% of the relatively small amounts covering public and private contributions together (from 1867 to 1875, and again from 1898-99; e.g., 1874, item 50, 1903-04, item 90.13, 1913-14, items 138 and 150.5). The transfers from consortia (e.g., 1900-01, items 83.9-10) are instead excluded, on the presumption that these were entirely private (*legge 20 marzo 1865, n. 2248, Alleg. F, art. 94*). The third component of col. 9 covers transfers for water distribution projects; it equals the reported transfers for the Apulian aqueduct (from 1907-08; e.g., 1913-14, item 139). The fourth

covers transfers for work on harbors; it equals the reported totals, excluding only the gift of the Duke of Galliera (e.g., 1865, item 45, 1874, item 51, 1884, item 67 but not item 94, 1893-94, items 74-75, 1903-04, items 84-87 bis and 151 bis, 1911-12, items 133-140 bis, 250, and 252), since only public contributions seem to have been contemplated by the relevant legislation (*legge 20 marzo 1865, n. 2248, Alleg. F, arts. 188 ff.*, and *legge 16 luglio 1884, n. 2518*; also *Opere pubbliche*, pp. 141-142). The fifth covers transfers for land reclamation; it equals the reported transfers from local governments (from 1884-85; e.g., 1893-94, items 79.13-14, 1903-04, items 90.10 and 90.19, 1912-13, items 152.7, 152.13, and 152.16). The transfers from consortia (e.g., 1912-13, items 152.14, 152.17, and 153) are instead excluded, on the evidence that these were overwhelmingly from private individuals (*Relazione bonifiche 1915*, p. 49). The sixth covers transfers for construction around Rome's ruins; it is taken simply as reported (from 1898-99; e.g., 1903-04, item 90.15, 1913-14, item 150.9).

K02.05 Chronological adjustments

In Table K.02, cols. 13 – 15 are the sums of cols. 1 and 4 less col. 7, cols. 2 and 5 less col. 8, and cols. 3 and 6 less col. 9, respectively, converted to a homogeneous geographic and chronological basis. Both the geographic corrections and the more complex chronological ones affect the figures for 1861-70. In 1871-83, the figures in cols. 13 – 15 are simply the appropriate combination of cols. 1 – 9, which are already on the desired basis; and the subsequent chronological correction is a simple six-month displacement of the July-through-June fiscal-year figures from mid-1884. The estimates in cols. 13 – 15 for 1884 are thus obtained as the appropriate combination of the figures in cols. 1 – 9 for 1884, plus half the corresponding figures for 1885; and the estimates in cols. 13 – 15 for 1885-1913 are obtained as half the sum of the appropriate combination of the figures in cols. 1 – 9 for the current and following years (e.g., col. 13 in 1913 equals half the sum of cols. 1 and 4, minus half the sum of col. 7, over fiscal 1913 and 1914).

The reduction of the early figures in col. 1 – 9 to a calendar year basis is necessary, even though fiscal-years nominally coincided with calendar years, because each fiscal year extended through most of all of the next calendar year for the purpose of liquidating commitments made, or collecting income accrued, during the initial twelvemonth. The *Rendiconto consuntivo 1861* indicates (pp. 65 ff., in the column heading for receipts) that fiscal 1861 thus extended through December 1862; the *Rendiconto consuntivo 1868* similarly indicates (pp. 43 ff., again in the column heading for receipts) that fiscal 1868 extended through September 1869. The other years' accounts do not contain similar indications; but the fiscal years from 1862 to 1867 probably had a nine-month extension like that of fiscal 1868 (*regio decreto 3 novembre 1861, n. 302, art. 10*), while fiscal 1869 was not brought to a close until December 1870 -- at the same time as fiscal 1870, with which year this cumbersome system inherited from the Piedmontese administration was finally abandoned (*legge 13 novembre 1859, n. 3747, art. 9; regio decreto 4 settembre 1870, n. 5852, arts. 133, 134, 688*). In practice, then, these early fiscal years are largely overlapping: the disbursements attributed to fiscal 1863, say, include part of those made in the first nine months of 1863 (i.e., those which liquidate commitments incurred within 1863, but not those which liquidate commitments incurred before 1863), all those made in the last three months of 1863, and part of those made in the first nine months of 1864 (i.e., those which liquidate commitments incurred in 1863, but not those which liquidate commitments incurred within 1864). Fiscal 1870, in turn, is a mutilated transition year: the disbursements of that fiscal year exclude those of calendar 1870 attributed to fiscal 1869 following the old norms, and also exclude, following the new norms, any disbursements from calendar 1871.

The calendar-year equivalents of the sums of cols. 1 and 4, 2 and 5, and 3 and 6 in 1861-70 are estimated as follows. Let s represent the share of each fiscal year's disbursements

attributable to the following calendar year, Y the desired calendar-year estimates, X the sum of the appropriate fiscal-year figures in cols. 1 – 6, and t the year; then,

$$Y_t = (1 - s_t)X_t + s_{t-1} X_{t-1} \quad t = 1861-70$$

setting $s_{1870} = 0$ and assuming, for simplicity, that $s_{1860} X_{1860} = s_{1861} X_{1861}$. Let a represent the share of newly authorized funds disbursed in the first twelvemonth, b the share of residual funds disbursed in each subsequent twelvemonth (assuming, for simplicity, that it is the same whether the twelvemonth is a new fiscal year or an extension period), and c the share of a twelvemonth covered by the extension period (and thus the share of b disbursed in the extension period, assuming an even flow of disbursements). Of a sum authorized in fiscal year t , a share a would be disbursed within calendar year t , and a share $bc(1 - a)$ within the extension period (in calendar $t + 1$). The residual share $(1 - bc)(1 - a)$ would be carried over to fiscal year $t + 1$; $b(1 - bc)(1 - a)$ would be disbursed within calendar $t + 1$, and $bc(1 - b)(1 - bc)(1 - a)$ within the extension period (in calendar $t + 2$). The residual $(1 - bc)^2(1 - b)(1 - a)$ would be carried over to fiscal year $t + 2$, and so on; in a steady state, $s = (1 - a)bc[1 + (1 - bc)(1 - b) + (1 - bc)^2(1 - b)^2 + \dots] = (1 - a)c/(1 + c - bc)$. Again for simplicity, the share of each fiscal year's disbursements occurring during the extension period and thus attributable to the following calendar year is here set equal to the steady-state value of s . The coefficients a and b are set equal to .59 and .67, respectively, in the case of ordinary expenditure (cols. 1 and 4), and to .46 and .52, respectively, in the case of extraordinary expenditure (cols. 2 – 3 and 5 – 6), as suggested by the public works budget figures for roads, water control, land reclamation, and harbors in 1876-79 (the first years in which disbursements are suitably disaggregated between newly authorized funds and carried-over residual funds); and c is set equal to 1.00 in 1861 and 1869, and to .75 in 1862-68. These figures yield $s = 30.8\%$ in 1861 and 1869, and 24.6% in 1862-68, for the sum of cols. 1 and 4, and $s = 36.5\%$ in 1861 and 1869, and 29.8% in 1862-68, for the sums of cols. 2 and 5 and 3 and 6.

The calendar-year equivalents of cols. 7 – 9 in 1861-70 are instead estimated by assuming that 75% of recorded receipts in fiscal 1861 and 1869, and 55% of recorded receipts in fiscal 1862-68, were actually collected in the succeeding calendar year; receipts in fiscal 1860 are assumed to have been negligible, like those in fiscal 1861. These percentages are much higher than the corresponding figures on the expenditure side, reflecting the much greater decline, in 1870, of transfer receipts than of expenditure (e.g., *Opere pubbliche*, pp. 969, 1183).

The resulting calendar-year estimates of net State expenditure within the area covered by the current *Rendiconto consuntivo* are not shown; but they are simply the figures in cols. 13 – 15, minus the allowances for geographic change in cols. 10 – 12.

K02.06 Geographic adjustments

In Table K.02, cols. 10 – 12 transcribe the allowances for the expenditure in the parts of post-1871 Italy omitted by the early national budgets. These allowances, which make up the balance of cols. 13 – 15, are obtained as the sum of separate allowances for Tuscany in 1861, the South in 1861, the Venetian provinces in 1861-68, and the Roman provinces in 1861-70.

The estimates for Tuscany in 1861 are obtained directly from the *Rendiconto Toscana 1861*. Col. 10 includes 3.1 million lire, obtained as the sum of the following budget items: finance, 110-111, plus 25% of 124 and 0.2% of 121; justice, 2% of 18; education, 22, plus 12.5% of 8, 11, 15, 21, 30, 32, 34, 36, 40, 43, 48, and 50; interior, 10% of 59, plus 5.5% of 35; and public works, 9-28, plus 25% of 2. Col. 11 includes .1 million lire, obtained as the sum of the following budget items: education, 60 and 62; interior, 50% of 80; and public works, 164. Col. 12 includes 2.2 million lire, obtained as the sum of public works budget items 116-147.

The estimates for the South in 1861 are obtained directly from the (*ex ante*) figures in that year's *Bilanci Napoletano* and *Bilanci Sicilia*. Col. 10 includes 3.6 million lire, obtained as the sum of the following budget items: *Bilanci Napoletano*: finance, 49, 62, 95, 102, 108, and 123, plus 50% of 120 and 10% of 29; church affairs, 12; education, 17 and 37, plus 50% of 4 and 25% of 60; interior, 5% of 22; public works, 4, 20, 29, 45, 51-53, 55, and 63, plus 10% of 107; and police, 50% of 29. *Bilanci Sicilia*: finance, 40, plus 5% of 10, 14, 21, 25, and 31; interior, 5% of 78-87; public works, 106, plus 10% of 104; education, 5% of 111-123; and justice, 25% of 154-155. Col. 11 includes .5 million lire, obtained as the sum of the following budget items: *Bilanci Napoletano*: finance, 115; education, 21 and 38; interior, 14; and public works, 49; *Bilanci Sicilia*: finance, 50% of 50; and education, 132 and 138-139. Col. 12 includes 8.7 million lire, all from the *Bilanci Napoletano*, public works budget items 46, 54, 57, and 64. Military and naval budgets were not included in the *Rendiconto Toscana* or the *Bilanci Napoletano* and *Bilanci Sicilia*, apparently because the relevant administrations had already been centralized (*Rendiconto consuntivo 1861*, pp. 531-538, 561-566).

The estimates for the Venetian provinces are based, in the first instance, on the *Rendiconto Veneto 1866* and *1867*. The *Rendiconto Veneto 1866* covers the expenditure of fiscal 1866 disbursed under Italian administration in the last three to six months of calendar 1866 and throughout calendar 1867. Expenditures for ordinary maintenance are estimated as the sum of the following budget items: finance, 1.0.1; interior, 7.6.0 line 12; State (public works), 7.8.9, 7.9.9-19, 7.10.7-11, and 7.10.15; church affairs and education, 8.2.10, 8.9.15, 8.12.10, and 8.15.17; police, 10.3.14; finance, 14.2.9, 14.0.9, 10.0.2, 26.3.8, 29.0.10, 34.1.4, 35.1.4, 24.0.9, and 27.3.6; commerce, 40.5.13-14; and justice, 41.4.10 and 41.3.16. These equal .75 million lire in 1866, and 2.32 million lire in 1867. Expenditures for new buildings and the like are estimated as the sum of the following budget items: finance, 1.0.29-30; church affairs and education, 8.2.18; finance, half of 14.2.0 line 17, plus (all of) 14.0.16, 10.5.19, and 25.0.18; and justice, half of 41.5.26. These equal .26 million lire in 1866, and .79 million lire in 1867. Expenditures for other new construction are estimated as the sum of the following budget items: State (public works), 7.9.20 and 7.10.16; and commerce, 40.5.15. These equal .42 million lire in 1866, and 1.00 million lire in 1867. The *Rendiconto Veneto 1867* covers the expenditure of fiscal 1867, which extended, in the Piedmontese fashion, through December 1868. Expenditures for ordinary maintenance are estimated at 3.50 million lire, from the sum of the following budget items: finance, 23, plus 2% of 33; justice, 5 and 12; education, 5% of 1-11 bis; public works, 5-11; and agriculture, 2% of 1. Expenditures for new buildings and the like are estimated at .28 million lire, from the sum of the following budget items: finance, 40; justice, 16; education, 12, 14, and 16; and agriculture, 4. Expenditures for other new construction are estimated at 1.55 million lire, from the sum of public works budget items 12-26.

The present calendar-year estimates are obtained from these figures, as follows. Maintenance expenditure in calendar 1868 is estimated, given the twelve month extension period, as 30.8% of that recorded for fiscal 1867, or 1.1 million lire; the corresponding expenditures for new buildings and for other new construction are similarly estimated as 36.5% of those recorded for the fiscal year, or .1 and .6 million lire, respectively. The expenditures for calendar 1867 are estimated as the residual figures for fiscal 1867, plus those for fiscal 1866 attributed to calendar 1867; these sums equal 4.7 million lire for maintenance, 1.0 million lire for new buildings, and 2.0 million lire for other new construction. The estimates for calendar 1866, in turn, are estimated as the sum of separate components for civilian and military expenditure. Civilian expenditure is estimated by scaling the partial figures for 1866, assumed to cover 4.5 months, up to a full year; the result equals 2.00 million lire for maintenance, .69 million lire for new buildings, and 1.12 million lire for other new construction. The *Rendiconto*

Veneto, like the Tuscan and Southern budgets, does not include military expenditure; the latter was presumably covered by the *Rendiconto consuntivo* in the Italian period, but not in the Austrian period. Austria's annual military expenditure in the Venetian provinces is here crudely estimated as 90% of the aggregate Italian average in 1861-66, excluding naval expenditure for new construction (dominated by the construction of a new naval base at La Spezia, and unlikely to have a counterpart on the Adriatic); these annual estimates of Austrian expenditure equal 3.7 million lire for maintenance, 1.1 million lire for new buildings, and 5.3 million lire for other new construction. The present estimates for 1866 are the sum of the above civilian expenditure for that year and half the estimated annual military expenditure under Austrian rule, for a total of 3.9 million lire for maintenance, 1.2 million lire for new buildings, and 3.8 million lire for other new construction. For simplicity, the corresponding estimates for 1861-65 are set equal to the sum of the civilian expenditure in 1866 and the annual military expenditure under Austrian rule, for a total of 5.8 million lire for maintenance, 1.8 million lire for new buildings, and 6.4 million lire for other new construction.

Cols. 10 – 12 further include very rough allowances for the Roman provinces, equal to 1.3 million lire for maintenance, .4 million lire for new buildings, and 1.3 million lire for other new construction annually from 1861 through 1870. These figures are obtained as one third of the civilian, plus one sixth of the military, annual expenditures attributed to the Venetian provinces in 1861-65; by way of comparison, the population of the Roman provinces was then equal to some 32% of that of the Venetian provinces (*Censimento 1871*, vol. 1, p. XIV).

These expenditure figures for the areas not covered by the State budgets are not reduced to allow for intergovernmental transfers, since the income figures in the *Bilanci Napoletano*, *Bilanci Sicilia*, *Rendiconto Toscana*, and *Rendiconto Veneto* suggest that these were non-existent or negligible.

K03. Public works other than railways: local expenditure

K03.01 Introduction

In the case of local expenditure, nationwide budget compilations for the *comuni* (municipalities) and *province* (roughly, counties) are available for most of the years from 1863 to 1899, and very few of the years from 1900 to 1913. The primary sources are normally the *Bilanci comunali* and *Bilanci provinciali*, though the *Annuario* also sometimes contains information, excerpted from unpublished data, that is not available elsewhere; all report *ex ante* budget figures only (e.g., *Bilanci comunali 1899*, p. VII), as these were the only ones regularly compiled and submitted to the national administration. The present estimates of local expenditure, presented in Table K.03, are in principle analogous to, and consistent with, the State estimates in Table K.02. In particular, the expenditure figures include the intergovernmental subsidies paid by the local governments and counted in their public works budgets, while the deducted transfers are those for public works received from the State and from local governments; the other State subsidies were excluded from State expenditure above, and other subsidies between local governments are also, in principle, excluded at the source.

The estimates of municipal expenditure are presented in cols. 1 – 9. Cols. 1 – 6 are limited to the years covered by the municipal budget data in the *Bilanci comunali*. Cols. 1 – 3 cover the expenditure in the public works budgets, excluding only overhead expenditure (in the apparent absence of significant municipal expenditure for railway construction or operation), and the expenditure in other budgets for the construction and maintenance of public offices, jails, schools, churches, hospitals, cemeteries, water and light distribution systems, municipal customs barriers, and other public-service facilities; expenditure for municipally owned commercial property, subsidized theaters, leased barracks, and the like is instead excluded, since these buildings are in principle included with private construction below (e.g., *Bilanci comunali 1899*, p. 76, item 11; *Preventivo Roma 1908*, p. 54, item 5). Here too, col. 1 corresponds in principle to ordinary expenditure, and cols. 2 and 3 to extraordinary expenditure; from 1875, however, the municipal budgets separated (ordinary and extraordinary) compulsory expenditure from (ordinary and extraordinary) discretionary expenditure, and all discretionary expenditure is here treated as if it were extraordinary. Cols. 4 – 6 cover the double-counted intergovernmental transfers received by the municipalities; these are estimated mainly from municipal receipts, with the aid of State and provincial expenditure data in the earliest and latest years. With few exceptions, the detailed estimates underlying cols. 1 – 6 are obtained initially for the late 1890s, when the budget specification in the *Bilanci comunali* is finest, and extended to other years on the assumption that the progressively broader budget categories retain their nearest observed internal distribution. The estimates of net expenditure in cols. 7 – 9 are obtained as the difference between cols. 1 – 3 and 4 – 6 when both sets of estimates are available (1861-89, 1891, 1895, 1897, 1899, 1907, 1912), and by simple interpolation or extrapolation with the aid of the corresponding national estimates in other years.

The estimates of provincial expenditure are presented in cols. 10 – 18. Cols. 10 – 15 are limited to the years covered by the provincial budget data in the *Bilanci provinciali*. Cols. 10 – 12 cover the expenditure in the public works budget, excluding overhead and railway-related items, and the expenditure in other budgets for the construction and maintenance of public offices, schools, barracks, and the like; provincially owned commercial property is instead excluded, since these buildings are in principle included with private construction below. With few exceptions, the detailed estimates of provincial expenditure underlying cols. 10 – 12 are obtained initially for 1882-1915, when the budget specification in the *Bilanci provinciali* is finest, and extended to other years on the assumption that the broader budget categories retain their nearest observed internal distribution. Where even the most detailed specification is not

adequate for present purposes, the relevant share of the budget item is estimated, if possible, by analogy to the corresponding municipal data; in what is fortunately a relatively minor fringe of cases, it is simply estimated *ad hoc*. Cols. 13 – 15 instead cover the double-counted intragovernmental transfers received by the provinces, as estimated from provincial receipts (and extrapolated, when the current income data are too aggregated to be useful, on the basis of the corresponding expenditure in cols. 10 – 12). The estimates of net expenditure in cols. 16 – 18 are obtained as the differences between cols. 10 – 12 and 13 – 15 when these are available (1866-86, 1889-91, 1899, and 1915). The estimates for 1862-65, 1887-88, 1895, 1897, 1909, and 1913 are then interpolated or extrapolated with the aid of relatively aggregated current budget data; those for 1861 simply repeat those for 1862; and those for 1892-94, 1896, 1898, 1900-08, and 1910-12 are interpolated with the aid of the corresponding national estimates.

K03.02 Municipal expenditure: initial estimates

The initial estimates of municipal expenditure in Table K.03, cols. 1 – 3 are obtained from relatively disaggregated current budget data for 1863, 1866-87, and 1891 ff.; these are extrapolated to 1861-62, 1864-65, and 1888 with the aid of relatively aggregated current budget data. In 1899, col. 1 equals the sum of budget items 54-60, plus 75% of 19, 55% of 53, 50% of 24 and 66, 40% of 73, 20% of 43, and 2% of 23 and 38; col. 2 equals the sum of budget items 86, 95-96, 105, 113-114, 131, and 144, plus 85% of 99, 50% of 107 and 145, and 5% of 138 and 172; and col. 3 equals the sum of budget items 91, 93-94, 118, and 142-143, plus 50% of 145 (*Bilanci comunali 1899*, pp. 76-83). The coefficients attached to items 19, 38, 43, 99, 138, and 172, and the exclusion of items 44-46, reflect the disaggregated evidence in the *Preventivo Roma 1908* (items 14-15, 47-49, 62-69, 147, 218-220, 223-265, 280, 288-297); that attached to item 24 reflects the disaggregated evidence in the *Rendiconto consuntivo 1899-1900*, finance budget items 201-219; those attached to items 53 and 73 reflect evidence from other years in the *Bilanci comunali (1891*, p. XXXIX, items 27-28; 1907, parte II, p. 2100, items 58-59); that attached to item 66 reflects the disaggregated evidence in the *Consuntivo Milano 1916* (items 11, 13, 16, 67, and 151); and the others are estimated by analogy or simply guessed. The present estimates for 1895 and 1897 are exactly analogous to those for 1899, being obtained with the same coefficients and the corresponding budget items, except for the substitution of 30% of item 131 in 1895 for 5% of item 134 in 1897 (138 in 1899: col. 2), and of 2% of item 87 in 1895 for item 89 in 1897 (91 in 1899: col. 3). In 1907, instead, col. 1 equals the sum of budget items 38-39, plus 86% of 59, 55% of 37, 20% of 47, 5% of 11, 4% of 13, and 3% of 22; col. 2 equals the sum of budget items 50, 60, and 66, plus 85% of 33, 20% of 44, 8% of 25, 7% of 16, 6% of 23, 5% of 53, and 4% of 35; and col. 3 equals the sum of budget items 41-42, plus 89% of 23, 80% of 44, and 1% of 16 (*Bilanci comunali 1907*, parte II, pp. 2096-2100). In 1912, in turn, col. 1 equals 88.3% of item 9, plus 40% of 11, 1.4% of 6 and 7, and 1% of 10; col. 2 equals the sum of budget items 19-20, plus 85% of 16, 78.1% of 18, 7% of 14, and 5.4% of 15, plus 20% of the discretionary expenditure for public works, 8% of that for police and health, 5% of that for education, and 4% of that for security and justice; and col. 3 equals budget item 17, plus 80.5% of 15 and 1% of 14, plus 80% of the discretionary expenditure for public works (the numbered budget items, for ordinary and extraordinary compulsory expenditure, are from the *Bilanci comunali 1912*, pp. 620-621; the discretionary-expenditure figures are instead obtained as the difference between the budget-specific aggregate expenditure figures in the *Annuario 1913*, p. 387, and the corresponding compulsory expenditure figures in the *Bilanci comunali 1912*).

In 1882-87, 1889, and 1891, col. 1 equals the sum of title I budget items 28-35 and 43, plus 27% of 15, 20% of 24 and 39, 5% of 46, and 1.5% of 21; col. 2 equals the sum of title II budget items 21 and 26-27, plus 85% of 15, 75% of 12, 50% of 23, and 6% of 14, and title V

budget items 7 and 17-18, plus 50% of 19 and 5% of 9 and 47; and col. 3 equals the sum of title II budget item 34, plus 76% of 14 and 2% of 13, and title V budget items 12-16, plus 50% of 19 (*Bilanci comunali 1891*, pp. XXXVIII-XLIII). The coefficients attached to title II, item 14 allow for the apparent shift of expenditure for the new construction of aqueducts and slaughterhouses and the like from the discretionary part of the public works budget up to 1891 (title V, items 15 and 17) to the compulsory part of the health budget in 1895 (items 89-90); the inclusion of all of title I, item 43 instead reflects the substantial stability in this item from the late 1870s, when it is entirely attributed to the maintenance of church buildings (e.g., *Bilanci comunali 1877*, p. 146, item 31), and implies a discontinuity -- tied perhaps to the disappearance of discretionary expenditure for religious purposes, and the decline in overall expenditure for such purposes -- between 1891 and 1895. Deleting only the expenditure for shooting-range construction (2% of title II, item 13, in col. 3), assumed to date from the *legge 2 luglio 1882*, n. 883, the corresponding coefficients and budget items (identified by their number in the *Bilanci comunali 1880-81*, pp. 291-293) in 1875-81 are: col. 1, title I, items 20-26 and 30, plus 27% of 8, 20% of 16, 14% of 28, 5% of 33, and 1.5% of 14; col. 2, title II, items 17 and 20-21, plus 85% of 12, 75% of 9, 8% of 19, and 6% of 11, and title IV, items 5 and 12-13, plus 50% of 14, 5% of 29, and 4% of 7; and col. 3, title II, item 29 plus 76% of 11, and title IV, items 9-11 plus 50% of 14. The corresponding figures in preceding years are relatively uncertain, because of the complex changes in classification, and the introduction of the distinction between compulsory and discretionary expenditure, between 1874 and 1875. The present estimates for 1873 and 1874 are obtained as follows: col. 1 equals items 13-15, plus 73% of 16 (assuming that the residual 27% corresponds to title I, item 19 in 1880-81), 53% of 21, 27% of 5, 20% of 22, 9% of 18, 2.5% of 4 and 7 (which apparently cover the maintenance of municipal customs perimeters), and 1% of 11; col. 2 equals item 49, plus 85% of 38, 80% of 46, 75% of 35, 50% of 37, 40% of 48, 30% of 39, 25% of 44, and 6% of 52; and col. 3 equals the sum of items 41-43 and 50, plus 75% of 44 (*Bilanci comunali 1873-74*, pp. 49, 127). The corresponding coefficients and budget items (identified by their position in the *Bilanci comunali 1871-72*, p. 109) in 1869-72 are: col. 1, lines 9-11, plus 73% of 12, 40% of 14, 1.4% of 13, 1.1% of 3, and 1% of 5; col. 2, 85% of line 25, plus 50% of 24 and 31, 45% of 21, 30% of 23, 25% of 30, 15% of 32, and 6% of 33; and col. 3, lines 27-29, plus 85% of 32 and 75% of 30. In addition to these items, in 1869 and 1870 cols. 1 – 3 include 1.2, .6, and 2.4 million lire p. a., respectively, to allow for the omission of the Roman provinces by those years' data; these allowances equal 100% (col. 1) and 80% (cols. 2 – 3) of the Roman region's expenditures in 1871, as estimated from the regional data with the same coefficients and budget items as that year's national total (*Bilanci comunali 1871-72*, p. 115; one notes the subsequent rapid rise in the Roman region's expenditures, e.g., *1873-74*, p. 173).

In 1863-68, the available evidence is rather sketchy and uneven. The sources report a functional and regional disaggregation of ordinary expenditure within the Kingdom in 1863 and 1866-68, and a regional disaggregation of ordinary and extraordinary expenditure in 1863-68 that includes the Venetian region in 1863-65 and 1867-68. The derivation of the present estimates is correspondingly complex. Their simplest component is a repetition, in the absence of further evidence, of the annual allowances for the Roman region equal to 1.2 million lire p. a. in col. 1, .6 million lire p. a. in col. 2, and 2.4 million lire p. a. in col. 3. In 1867-68, the balance of col. 1 equals 93% of item (actually column) 5, plus 12% of 7, 5% of 9, 1.4% of 6, 0.7% of 3, and 0.4% of 2; and the balance of cols. 2 and 3 equals 6.9% and 30.9%, respectively, of the aggregate extraordinary expenditure in column 12 (*Bilanci comunali 1867-68*, pp. 31, 61). In 1866 and 1863, the balance of cols. 1 – 3 equals the sum of separate figures for the Kingdom and for the Venetian region. In 1866, the figures for the Kingdom are obtained with the same coefficients and budget items as in 1867-68 (*Bilanci comunali 1866*, pp. 86-87); in 1863, the

figures for the Kingdom in col. 1 equal 93% of item (actually column) 6, plus 4% of 8 and 9, 1.4% of 7, 0.7% of 4, and 0.4% of 3 (*Bilanci comunali 1863*, p. 22), while those for cols. 2 and 3 equal 6.9% and 30.9%, respectively, of the aggregate extraordinary expenditure reported for 1863 in the *Bilanci comunali 1866*, p. 105 (in preference to that in the *Bilanci comunali 1863*, p. 19; the revised figure is the one compatible with the 1863 figure for the Kingdom and the Venetian provinces together discussed below). The expenditure in the Venetian region in 1867, estimated from the regional data with the same coefficients and budget items as that year's total in the Kingdom (*Bilanci comunali 1867-68*, p. 29), yields figures equal to 17.0% of the region's aggregate ordinary expenditure for col. 1, and (inevitably) 6.9% and 30.9%, respectively, of its aggregate extraordinary expenditure for cols. 2 and 3. The expenditure for the Venetian region in 1866 and 1863 is then estimated as 17% of the region's ordinary expenditure for col. 1, and 6.9% and 30.9%, respectively, of its extraordinary expenditure for cols. 2 and 3; these regional expenditure figures are taken from the *Bilanci comunali 1867-68*, p. 76 (for 1863 as reported, and for 1866 by linear interpolation of those reported for 1865 and 1867). Summing over the estimates for the Kingdom and the Venetian region in 1863 and 1866, one obtains figures for col. 1 (excluding the Roman region) equal to 13.4% of the corresponding aggregate ordinary expenditure in 1863 and 11.2% of it in 1866 (*Bilanci comunali 1867-68*, p. 78); the corresponding figures for cols. 2 and 3 of course remain equal to 6.9% and 30.9%, respectively, of the corresponding aggregate extraordinary expenditure. The present estimates (excluding the Roman region) for 1864 and 1865 are based on these same aggregate expenditure figures (*Bilanci comunali 1867-68*, p. 78): the balance of col. 1 is estimated as 12.6% of aggregate ordinary expenditure (excluding the Roman region) in 1864 and 11.9% of it in 1865 (interpolating the direct estimates for 1863 and 1866), while the balance of cols. 2 and 3 is again estimated as 6.9% and 30.9%, respectively, of aggregate extraordinary expenditure (excluding the Roman region). The only information for the earlier years seems to refer to local taxes and surtaxes within the Kingdom, which equaled 85.0 million lire in 1861, 118.4 million lire in 1862, and 133.6 million lire in 1863 (*Bilanci comunali 1863*, p. 25); but while aggregate income and expenditure remained very closely balanced, these figures seem to cover no more than half of aggregate income (*Bilanci comunali 1866*, pp. XI-XII). The present estimates in cols. 1 – 3 each assume that the expenditure in the Roman region, the expenditure in the Venetian region, and one quarter of the expenditure in the Kingdom remained constant from 1861 to 1863 (at 1.20, 4.53, and 4.60 million lire p. a., respectively, in col. 1, .60, .78, and 1.38 million lire p. a., respectively, in col. 2, and 2.40, 3.50, and 6.16 million lire p. a., respectively, in col. 3); three quarters of the expenditure in the Kingdom (equal, in 1863, to 13.79 million lire in col. 1, 4.13 million lire in col. 2, and 18.48 million lire in col. 3) are instead assumed to have varied in proportion to recorded receipts (compare *Bilanci comunali 1863*, p. 25, 1866, pp. 53, 105).

The present estimates for 1888 utilize the aggregate budget-specific expenditure data available in the *Bilanci comunali 1899*, p. XXXIX. First, these aggregate 1888 budget data are disaggregated into ordinary compulsory expenditure, estimated as a linear interpolation of the corresponding figures in 1887 and 1889 (*Bilanci comunali 1891*, pp. XXXVIII-XXXIX, items 51-59, combining items 52 and 59 to correspond to the apparent division of the 1888 budgets), and other (extraordinary compulsory, discretionary) expenditure, obtained as a residual. Second, the shares of maintenance in each budget's compulsory ordinary expenditure, of new buildings in each budget's residual expenditure, and of other new construction in each budget's residual expenditure are calculated, on the basis of the coefficients and budget items indicated above, in both 1887 and 1889 (for example, in 1887, title I, 1.5% of item 21 plus 20% of item 24 equal 2.2% of item 53; 2% of title II, item 13 equals 0.1% of the sum of title II, items 31 and 38 and title V, items 43 and 50). Third, these estimated budget shares in 1887 and 1889 are linearly interpolated, and the results are applied to the corresponding expenditure estimates for

1888. Col. 1 is thus obtained as the sum of 1.7%, 2.2%, 91.1%, 1.7%, and 100%, respectively, of the estimated ordinary compulsory expenditure for general administration, police and health, public works, education, and religion; col. 2, as 2.7%, 4.6%, 29.0%, 5.4%, 36.6%, 35.3%, and 5.2%, respectively, of the estimated other (extraordinary compulsory, discretionary) expenditure for general administration, police and health, security and justice, public works, education, religion, and welfare; and col. 3, as 0.1%, 33.3%, and 94.6%, respectively, of that same expenditure for general administration, police and health, and public works.

K03.03 Municipal expenditure: transfers and net expenditure

In Table K.03, cols. 4 – 6 transcribe the estimated transfers to be deducted from the initial estimates in cols. 1 – 3. These transfers are estimated from relatively disaggregated municipal income data from 1869 (cols. 5 – 6) or 1875 (col. 4) to 1899, with a contribution from provincial expenditure data in 1899 to col. 6 (to raise the estimated receipts from the provinces to the level reported in the provincial expenditure data; in the other years, the transfers from the provinces to the municipalities recorded as municipal receipts typically exceed those specified in the provincial expenditure figures, e.g., *Bilanci provinciali 1875-76*, p. 3, cat. 9, line 6, 1890-91, p. 223, item 14). The earlier figures are extrapolated in proportion to current municipal expenditure, with a contribution from State expenditure data to col. 4; and the figures for 1907 and 1912 are based on current State expenditure data and interpolated provincial expenditure data.

In 1875-99, col. 4 is obtained as the sum of the ordinary State and provincial subsidies for public works reported as municipal receipts (e.g., *Bilanci comunali 1875*, p. 110, title I, items 10-11, 1891, p. XXXIV, title I, items 17-18, 1899, p. 73, items 18-19); exceptionally, in the absence of useful current evidence, the figure for 1888 is simply set equal to those for 1887 and 1889. In 1866-74, col. 4 is estimated as 2.7% of col. 1, as in 1875, since the State subsidies in the ordinary part of the State public works budget (*Rendiconto consuntivo*, e.g., 1867, item 9, 1875, items 7-8) suggest that these, at least, were comparable to their level in 1875. In 1862-65, col. 4 is estimated as 5% of col. 1, or nearly twice the level of the succeeding years; this order of magnitude is suggested for the State subsidies by the corresponding data in the ordinary part of the State public works budgets (*Rendiconto consuntivo*, e.g., 1864, item 11), while provincial subsidies for public works were then presumably negligible (Jacini, 1867, pp. 32-33). In 1861, it is instead estimated directly from the *Rendiconto consuntivo 1861* (public works budget item 13) and *Rendiconto Toscana 1861* (public works budget item 13). In 1907, col. 4 is obtained as the sum of an estimated State subsidy of .2 million lire (from the *ex post* public works budget data in the *Rendiconto consuntivo*, averaging over 1906-07, items 34 and 36, and 1907-08, items 37 and 39), and an estimated provincial subsidy of 1.2 million lire; the latter is the weighted average of two alternative estimates, of which the first, with a weight of one, is obtained by extrapolating the subsidy recorded in the *Bilanci comunali 1899* (item 19) in proportion to Table K.03, col. 1, and the second, with a weight of two, is obtained by geometrically interpolating the subsidies recorded in the *Bilanci comunali 1899* (item 19) and the *Bilanci provinciali 1915* (p. 89, item 38). The corresponding figure for 1912 is similarly obtained as the sum of an estimated State subsidy of .3 million lire (from the *ex post* public works budget data in the *Rendiconto consuntivo 1911-12* and *1912-13*, items 38 and 40) and an estimated provincial subsidy of 1.5 million lire (the weighted average of the two alternative estimates analogous to those for 1907).

In 1869-99, col. 5 is estimated from the extraordinary State and provincial subsidies reported as municipal receipts, as follows. In 1895, 1897, and 1899, it equals 90% of the State subsidy, and 50% of the provincial subsidy, for public works other than roads (e.g., *Bilanci comunali 1899*, p. 73, items 53-54); the high proportion of the State subsidy attributed to

buildings is justified by its inclusion of the large subsidy for the city of Rome, counted above in Table K.02, col. 2 (e.g., *Bilanci comunali 1899*, p. 59, item 53; *Opere pubbliche*, pp. 1013, 1109; *Rendiconto consuntivo 1898-99*, public works budget items 71-72). In 1882-87, 1889, and 1891, col. 5 is estimated, by analogy, as 69% of the State subsidy, and 13% of the provincial subsidy, for public works (*Bilanci comunali 1891*, pp. XXXVI-XXXVII, title II, items 16-17). In 1873-81, col. 5 is estimated as 56% of the State subsidy, and 13% of the provincial subsidy, for public works; the change in the coefficient applied to the State subsidy between 1881 and 1882 reflects the increase in the subsidy to the city of Rome from .3 million lire in 1881 to 2.5 million lire in 1882 (*Bilanci comunali 1881*, p. 76, item 12, 1882, p. 76, item 16). In 1869-72, in turn, col. 5 is obtained as 42% of the State subsidy, and 8% of the provincial subsidy, for education and public works together (e.g., *Bilanci comunali 1871-72*, p. 97, items 21-22); and in 1861-68, it is simply set equal to 7.9% of col. 2, as in 1869. In 1888, col. 5 is estimated from the aggregate extraordinary State and provincial subsidies, which correspond to the sum of those for education and for public works (*Bilanci comunali 1899*, p. XXXVII, items 7-8; compare 1891, pp. XXXVI-XXXVII, items 16-17 and 19-20); interpolating between the equivalent ratios in 1887 and 1889, col. 5 is estimated as 53% of the aggregate State subsidy, plus 10% of the provincial subsidy. In 1907, col. 5 is obtained as the sum of an estimated State subsidy of 4.7 million lire, and a provincial subsidy of .2 million lire. The State subsidy is estimated as the *ex post* subsidies to the city of Rome, plus half those for reconstruction after natural disasters, in the public works budgets in the *Rendiconto consuntivo* (averaging over 1906-07, items 87-88, plus 50% of 227, 504-505, 507, 653, and 714 bis, plus 25% of 228-229 and 655, and 1907-08, items 90 and 534, plus 50% of 249, 536-537 bis, 539, 675, and 724, plus 25% of 250-251 and 677); the provincial subsidy is set equal to that for 1899 (*Bilanci comunali 1899*, p. 73, 50% of item 54), on the evidence that it did not grow between 1899 and 1915 (*Bilanci provinciali 1915*, pp. 90-93, items 87 and 123). In 1912, col. 5 is similarly obtained as the sum of a State subsidy of 2.8 million lire (from the *ex post* public works budget data in the *Rendiconto consuntivo 1911-12*, items 166.4-5, plus 50% of 320-322 and 329, and 25% of 230 quater and 326-328, and 1912-13, item 159.4, plus 50% of 320-322 and 329, and 25% of 230 bis and 324-326), and that same provincial subsidy of .2 million lire.

In 1869-99, col. 6 is also estimated from the extraordinary State and provincial subsidies reported as municipal receipts, as follows. In 1895, 1897, and 1899, it equals the reported State and provincial subsidies for roads, plus the balance of the subsidies for other public works (e.g., *Bilanci comunali 1899*, p. 73, items 50-51 plus 10% of 53 and 50% of 54); in 1899, exceptionally, it further includes 1.9 million lire from the province of Cosenza (apparently excluded from current municipal receipts, but included in the corresponding provincial expenditure: *Bilanci comunali 1899*, pp. 17 and 73, items 19, 51, and 54; *Bilanci provinciali 1899*, pp. 23 and 71, item 85). In 1873-91, it is obtained as the State and provincial subsidies for public works (e.g., *Bilanci comunali 1891*, pp. XXXVI-XXXVII, title II, items 16-17), less the shares attributed to col. 5; in 1869-72 it is estimated, by analogy, as 33% of the State subsidy, plus 52% of the provincial subsidy, for education and public works together (e.g., *Bilanci comunali 1871-72*, p. 97, items 21-22); and in 1861-68 it is simply set equal to 2.5% of col. 3, as in 1869. In 1888, col. 6 is estimated, like col. 5, from the aggregate extraordinary State and provincial subsidies, which correspond to the sum of those for education and for public works (*Bilanci comunali 1899*, p. XXXVII, items 7-8, 1891, pp. XXXVI-XXXVII, items 16-17 and 19-20); interpolating between the equivalent ratios in 1887 and 1889, col. 6 is estimated as 24% of the aggregate State subsidy, plus 66% of the aggregate provincial subsidy. In 1907, col. 6 is obtained as the sum of an estimated State subsidy of 2.2 million lire, and a provincial subsidy of 1.7 million lire. The State subsidy is estimated as the *ex post* subsidies for road construction, plus half those for reconstruction after natural disasters, in the public works

budgets in the *Rendiconto consuntivo* (averaging over 1906-07, item 210-211, plus 50% of 227, 504-505, 507, 653, and 714 bis, plus 25% of 228-229 and 655, and 1907-08, items 232-233, plus 50% of 249, 536-537 bis, 539, 675, and 724, plus 25% of 250-251 and 677). The provincial subsidy is estimated as the weighted average of two alternative estimates, of which the first, with a weight of one, is obtained by extrapolating the subsidy recorded in the *Bilanci comunali 1899* (item 51 plus half of item 54; the exceptional subsidy from the province of Cosenza is ignored) in proportion to Table K.03, col. 3, and the second, with a weight of two, is obtained by geometrically interpolating that same subsidy in 1899 and the corresponding estimate for 1915 (*Bilanci provinciali 1915*, pp. 90-93, items 85 plus 119, plus an allowance of .2 million lire for subsidies not for roads). In 1912, col. 6 is similarly obtained as the sum of a State subsidy of 4.1 million lire (from the *ex post* public works budget data in the *Rendiconto consuntivo 1911-12*, items 127-128, plus 50% of 230, 234 ter, 320-322, and 329, plus 25% of 230 quater and 326-328, and 1912-13, items 118-119, plus 50% of 227, 234 bis, 320-322, and 329, plus 25% of 230 bis and 324-326) and a provincial subsidy of 2.6 million lire (the average of the two alternative estimates analogous to those for 1907).

In 1861-89, 1891, 1895, 1897, 1899, 1907, and 1912, the estimates of net expenditure in cols. 7, 8, and 9 are obtained directly as the difference between cols. 1 and 4, 2 and 5, and 3 and 6. In the apparent absence of direct evidence of municipal income or expenditure in 1890, 1892-94, 1896, 1898, 1900-06, 1908-11, and 1913, the present estimates for those years in cols. 7 – 9 are obtained by interpolation between (and, in the case of 1913, beyond) the neighboring direct estimates. For the sake of simplicity, the present figures are an arithmetic average of those yielded by two straightforward interpolations: one, the geometric interpolation between (and beyond) the benchmarks themselves; and two, noting the often close parallelism between municipal and national expenditure, the interpolation of the benchmarks by means of the product of State expenditure and a ratio of municipal to State expenditure geometrically interpolated between those yielded by the available benchmarks. This second interpolation of municipal maintenance expenditure (col. 7) is based on State maintenance expenditure (Table K.02, col. 13); those of municipal expenditure for new buildings (col. 8) and other new construction (col. 9) are instead both based on the sum of State expenditure for those two types of new construction (Table K.02, col. 14 plus col. 15), on the presumption that the changes within the mix of such expenditure were for present purposes far less significant than the changes in its overall level.

K03.04 Provincial expenditure: initial estimates

In Table K.03, cols. 10 – 12 present the initial estimates of provincial expenditure. In 1915, the maintenance expenditure in col. 10 is estimated as the sum of budget items 35-39, 41, and 134, plus 75% of 17, 55% of 34 and 123, 3% of 29, and 2% of 47; the expenditure for new buildings and the like in col. 11, as the sum of items 79, 90, 122, and 143, plus 7% of 125-127; and the expenditure for other new construction in col. 12, as the sum of items 72, 81-85, 87, 118-119, and 121 (*Bilanci provinciali 1915*, pp. 86-95). In 1899, col. 10 is estimated as the sum of budget items 31-33, plus 75% of 16, 55% of 30, 50% of 97, 5% of 25, and 2% of 47; col. 11, as the sum of budget items 58, 64, and 79, plus 7% of 88 and 90-91, and 5% of 99; and col. 12, as the sum of budget items 55, 59-61, 63, and 104 (*Bilanci provinciali 1899*, pp. 66-71). In 1890-91, col. 10 is estimated as the sum of title I budget items 27-30, plus 55% of items 25 and 26, 40% of item 14 (assuming that it corresponds to the combination of items 10 and 16 in 1899, and that the former component grew relatively rapidly before as well as after 1899), 5% of 22, and 2% of 36, and title IV budget items 18-19, plus 50% of 24 and 5% of 20; col. 11, as the sum of title II budget items 15 and 20, plus 40% of 11 (by analogy to title I, item 14), and title V budget items 4-5, 7, 10, 18, and 21, plus 40% of 3 (also by analogy to title I, item 14); and col.

12, as the sum of title II budget item 37 and title V budget items 12-14 (*Bilanci provinciali 1890-91*, pp. 216-223). The estimates for 1882-86 and 1889 are obtained with these same coefficients and the corresponding budget items (*Bilanci provinciali 1887-89*, pp. XIII-XVI). In 1877-81, col. 10 is estimated as the sum of budget items 10-11, plus 50% of 12, 30% of 2 (for the wages of roadway maintenance personnel, subsequently included in the public works budget; compare category 4, item 2 in 1876), 3% of 3 and 9, and 0.8% of 4; col. 11, as item 21, plus 45% of 18, 30% of 17, 14% of 19, and 6% of 25; and col. 12, as items 22-23 plus an allowance, in lieu of a share of item 24 (since the variance of that item is plausibly due almost entirely to its railway component), that declines by .1 million lire p. a. from .9 million lire in 1876 to .4 million lire in 1881 (e.g., *Bilanci provinciali 1879*, p. 2). Exceptionally, since the budget specification for 1875-76 is more detailed than that for 1877-81, the coefficients utilized over the latter period reflect the distribution of 1876 as well as that of 1882. In 1875-76, col. 10 is estimated as the sum of ordinary expenditure, category 9 items 1 and 3-6, plus 55% of category 4 item 2, 40% of category 4 item 7, 5% of category 8 item 1, and 0.8% of category 5; col. 11, as the sum of extraordinary expenditure, category 8 and category 6 item 3, plus 50% of category 10 item 5, 45% of category 5, and 40% of category 4 item 7; and col. 12, as the sum of extraordinary expenditure, category 9 items 1 and 3-6 (*Bilanci provinciali 1875-76*, pp. 2-3, 38-39). For the reasons noted, the coefficients utilized over 1875-76 are based directly on the distribution of 1882. In 1873-74, col. 10 is similarly estimated as the sum of ordinary expenditure, category 8 items 1-4 and 6, plus 75% of category 8 item 5, 40% of category 3 item 6, 29% of category 3 items 1-2, 5% of category 4 item 1, and 0.8% of category 6; col. 11, as the sum of extraordinary expenditure, category 4 and category 7 item 3, plus 50% of category 9 item 6, 45% of category 6, and 40% of category 3 item 6; and col. 12, as the sum of extraordinary expenditure, category 8 items 1-4 and 6, plus an allowance of .7 million lire p. a. for the non-railway component of category 8 item 5 (*Bilanci provinciali 1873-74*, pp. 2-3, 38-39). In 1871-72, col. 10 is estimated as the sum of budget items 9-10, plus 75% of 11, 35% of 2, 5% of 3, 3% of 8, and 0.8% of 4; col. 11, as budget item 18, plus 45% of 16, 40% of 17, 20% of 15, and 15% of 22; and col. 12, as the sum of budget items 19 and 20, plus an allowance of .7 million lire p. a. for the non-railway component of item 21 (*Bilanci provinciali 1871-72*, pp. 8, 10).

In earlier years, the figures in cols. 10 – 12 are the sum of quasi-national estimates based on the geographically most comprehensive data in the *Bilanci provinciali*, and allowances for the regions omitted by the latter (the Venetian region through 1868, and the Roman region through 1870: *Bilanci provinciali 1866-68*, pp. 132-133, 1869, p. 86, 1870, pp. 8-9, 1871, pp. 8-9). The quasi-national estimates in 1866-70 are obtained exactly like the national estimates in 1871-72 (that is, with the same coefficients, the analogous budget items, and the same allowance for the non-railway component of other public works), save only the substitution in 1866-68 of 20% of item 2 for the combination, in 1869-72, of 35% of item 2 and 5% of item 3 (*Bilanci provinciali 1866-68*, p. 108, 1869, p. 86, 1870, p. 2). The allowances for the Roman region included in cols. 10 – 12 in 1866-70 are set equal to .5 million lire p. a. for maintenance, .0 million lire p. a. for new buildings and the like, and .1 million lire p. a. for other new construction; the corresponding figures for the Venetian region in 1866-68 are set equal to .7, .2, and .1 million lire p. a., respectively. These estimates for the Roman region are obtained by calculating the region's expenditure of each type in 1870 as the difference between the 1870 figures inclusive of that region in the *Bilanci provinciali 1875-76*, p. XIV and the corresponding current figures exclusive of that region in the *Bilanci provinciali 1870*, p. 2. By analogy to the quasi-national figures, maintenance expenditure is estimated from ordinary expenditure as the sum of the public works item, plus 20% of the general administration item, 3% of the security item, and 0.8% of the education item. The only recorded extraordinary expenditure was then for

public works, and it is attributed entirely to other new construction (compare the *Bilanci provinciali 1871*, p. 14). The estimates for the Venetian region are instead obtained by applying the coefficients utilized for the quasi-national estimates in 1866-68 to the corresponding *Bilanci provinciali 1866-68*, p. 178.

K03.05 Provincial expenditure: transfers and net expenditure

In Table K.03, cols. 13 – 15 transcribe the estimated transfers to be deducted from the initial estimates in cols. 10 – 12. These transfers are estimated directly as the sum of the appropriate current income items in 1873-76; they are estimated as shares of more comprehensive income items in 1882-91, 1899, and 1915; and they are extrapolated to other years in proportion to the corresponding expenditure in cols. 10 – 12. In 1873-76, the *Bilanci provinciali* separate out the ordinary and extraordinary transfers for public works received by the provinces from the State, other provinces, and municipalities (e.g., 1873-74, pp. 2 and 38, items 16 and 18). Col. 13 equals the sum of these ordinary receipts, and col. 15 the sum of the extraordinary receipts; none of these receipts is attributed to col. 14, since none of the corresponding expenditure in col. 11 is derived from public works budgets. In 1882-91, col. 13 equals the ordinary State subsidy for roads, plus an estimated 50% of other ordinary transfers (e.g., *Bilanci provinciali 1887-89*, p. XII, items 7-8); col. 15 equals 90%, by analogy to 1876, of total extraordinary subsidy receipts (*ibid.*, items 25-26); and col. 14 is again assumed negligible. In 1899 and 1915, col. 13 equals 75%, by analogy to 1891, of unspecified ordinary transfers (e.g. *Bilanci provinciali 1899*, p. 63, item 12); col. 15 equals the reported transfers for public works (*ibid.*, item 23); and col. 14 is again considered negligible. In 1877-81, in the absence of suitably disaggregated data, col. 13 is estimated as 1.7% of col. 11 (as in 1876, against 1.6% in 1882); col. 15 is estimated as 10.3% of col. 12 (as in 1876 and 1882); and col. 14 is considered negligible. In 1866-72, similarly, cols. 13 – 15 are estimated as 1.9%, 0%, and 6.3%, respectively, of cols. 10 – 12, as in 1873.

In 1866-86, 1889-91, and 1899, the estimates of net expenditure in cols. 16, 17, and 18 are obtained directly as the difference between cols. 10 and 13, 11 and 14, and 12 and 15. The corresponding figures for 1862-65 are obtained as the sum of constant allowances for the Roman and Venetian provinces (a total of 1.2 million lire p. a. in col. 16, .2 in col. 17, and .2 in col. 18, as estimated above), and year-specific estimates for the Kingdom obtained by indexing the estimated expenditure in cols. 10 – 12 for 1866, net of the amounts from the public works budgets (*Bilanci provinciali 1866-68*, p. 108, items 6-8 in col. 10 and 15-17 in col. 12), by aggregate provincial expenditure (*Bilanci provinciali 1866-68*, p. 152). The provincial public works budgets are assumed negligible in 1862-65, on the evidence that the Kingdom's legislation gave the provinces no responsibility for public works before the reforms contained in the *legge 20 marzo 1865, n. 2248* (Jacini, 1867, pp. 32-33); transfers to the provinces are assumed negligible in 1862-65 for the same reason; and the indexing procedure does not distinguish between maintenance and new construction, on the presumption that the measured growth in provincial expenditure reflected a transfer of responsibilities from other levels of government (e.g., *Bilanci comunali 1866*, p. XI). The corresponding figures for 1887-88, 1895, 1897, 1899, and 1913 are instead estimated with the aid of the aggregate provincial expenditure for public works reported for those years in the *Bilanci provinciali 1915*, pp. XXXIV-XXXV and the *Annuario 1914*, p. 425. In each of these years, that aggregate expenditure is disaggregated by assuming that ordinary expenditure varied in proportion to municipal maintenance expenditure (col. 9), and taking extraordinary expenditure as the residual; maintenance expenditure (col. 16) is then estimated as a proportion of ordinary expenditure for public works, and expenditure for new construction (cols. 17 – 18) as a proportion of extraordinary expenditure for public works. Since the public works budget overlaps very

largely with the desired estimates in cols. 16 and 18, the latter are relatively reliable; since it overlaps very little or not at all with those in col. 17, the latter are relatively weak. Ordinary expenditure for public works is thus estimated as 68.2% of col. 9 in 1887, 68.5% of it in 1888, 71.9% in 1895, 71.5% in 1897, and 71.2% in 1909 and 1913, against 68.0% in 1886 and 68.7% in 1889 (*Bilanci provinciali 1887-89*, p. XIII, item 38, p. XV, item 30), 72.6% in 1891 (*Bilanci provinciali 1891*, p. 216, item 40, p. 221, item 31), and 71.2% in 1899 (*Bilanci provinciali 1899*, p. 69, item 46, times 1.026 to allow for discretionary ordinary expenditure as in 1891); the resulting estimate for 1913, in particular, is a reasonable 86% of the corresponding figure for 1915 (*Bilanci provinciali 1915*, p. 89, item 61 times 1.026). Col. 16, in turn, is estimated as 94.9% of estimated ordinary expenditure for public works in 1887, 94.7% of it in 1888, 94.1% in 1895, 93.8% in 1897, 84.9% in 1909, and 81.7% in 1913, against 95.1% in 1886, 94.5% in 1889, 94.8% in 1891, 93.5% in 1899, and (taking the ratio of col. 10 minus col. 13 to 1.026 times compulsory ordinary expenditure) 80.1% in 1915. Quite analogously, col. 17 is estimated as 4.2% of estimated extraordinary expenditure for public works in 1887, 3.7% of it in 1888, 3.1% in 1895 and in 1897, 2.6% in 1909, and 2.5% in 1913, against 4.8% in 1886, 3.2% in 1889, 3.3% in 1891, 3.0% in 1899, and (from col. 11 minus col. 14) 2.4% in 1915. Again analogously, col. 18 is estimated as 74.3% of estimated extraordinary expenditure for public works in 1887, 74.1% of it in 1888, 64.4% in 1895, 64.1% in 1897, 71.5% in 1909, and 74.7% in 1913, against 74.6% in 1886, 73.8% in 1889, 64.9% in 1891, 63.9% in 1899, and (from col. 12 minus col. 15) 76.4% in 1915. In the apparent absence of direct evidence of provincial income or expenditure in 1861, 1892-94, 1896, 1898, 1900-08, and 1910-12, the present figures in cols. 16 – 18 are obtained by interpolation or extrapolation of neighboring values. The estimates for 1861 simply repeat those for 1862; the later ones are instead obtained as the weighted average of two straightforward interpolations. The first of these, with a weight of two, is the geometric interpolation between the available benchmarks themselves; the second, with a weight of one (to reflect the rather lower cyclical sensitivity of provincial expenditure), is the interpolation of the benchmarks by means of the product of State expenditure and a ratio of provincial to State expenditure geometrically interpolated between those yielded by the available benchmarks. As in the case of municipal expenditure above, this second interpolation of provincial maintenance expenditure (col. 16) is based on State maintenance expenditure (Table K.02, col. 13); those of provincial expenditure for new buildings (col. 17) and other new construction (col. 18) are instead both based on the sum of State expenditure for those two types of new construction (Table K.02, cols. 14 plus 15).

K04. Public works other than railways: private contributions

K04.01 Introduction

The privately financed construction and maintenance of railways and buildings are considered below; and private contributions to non-railway public works projects carried out by the State or by local governments are already counted in the public expenditure considered above. The private contributions at issue here are accordingly those relating to the construction and maintenance of structures other than railways and buildings, financed by private individuals and companies (including formally private companies in public ownership) without the intermediation of a public government. In addition, private contractors could mediate between the governments and specific construction projects, divorcing the flow of actual construction from that of public payments. While the discrepancies between these flows are normally considered small enough to be neglected, the (positive or negative) private contributions are significant when the terms of the contract involved a substantial provision of credit to the State.

It is of course in the nature of these private contributions to be poorly documented in the available sources; the present figures are very rough estimates, compiled from whatever evidence seems least indirect. The resulting time series (Table K.04, cols. 1 – 15) are about evenly divided between estimates of net private expenditure in current lire, homogeneous to the public expenditure figures obtained above, and estimates of value added at 1911 prices in privately financed construction activity, homogeneous to the railway and building construction figures obtained below. The current expenditure series refer to roads, land reclamation, water-control projects, and the Apulian aqueduct. These are typically estimated from the magnitude of the somehow related public expenditure, in the light of the relevant legislation. They include estimates of the discrepancy between actual investment and public payments in the case of land-reclamation projects and of the Apulian aqueduct; these are again based on the relevant legislation and, exceptionally, on private balance-sheet data supplied by the aqueduct's builder. The constant-price value added series refer instead to electric power-related systems (hydraulic works, power lines, and local networks), gas distribution networks, water works, and irrigation works. The electric power and gas system estimates are generally based on comprehensive output and capacity series, as even the municipally owned utilities were normally independent corporations; the water works and irrigation works series are instead based on tentative capacity series compiled for the industry's private sector, since its public component was handled directly by the State and local governments. Here too, however, the unit value added estimates tend to reflect the expenditure or cost levels specified in the public budgets or in the relevant legislation.

K04.02 Roads

Italy's legislation divided roads into national, provincial, municipal, and local; the maintenance and repair of these last was left to the individuals who used them to reach their properties, with a possible municipal contribution in the case of the more important such roads (*legge 20 marzo 1865, n. 2248, Alleg. F, arts. 9 and 51*; the law's odd silence on the new construction of such roads may reflect the presumption that settlement was already complete). The present estimates of the private expenditure to maintain local roads are presented in Table K.04, col. 1; they are obtained from the data on matching municipal contributions, and on the expenditure to maintain other roads, that underlie cols. 16 – 20.

Col. 16 transcribes the reported municipal contributions to local-road maintenance costs in 1875-87, 1889, 1891, 1895, 1897, and 1899 (e.g., *Bilanci comunali 1875-76*, p. 276, title I, item 24, 1899, p. 79, item 55), and the estimates for 1888, 1890, 1892-94, 1896, and 1898 obtained by geometric interpolation of neighboring values.

Cols. 17 – 19 present estimates of the net expenditure for the maintenance of national, municipal, and provincial roads from 1861 to 1913. The national-road estimates in col. 17 are the corresponding series in the *Opere pubbliche* (p. 976, row 4), extended to 1861 by the sum of public works budget items 9-13 in the *Rendiconto consuntivo 1861*, shifted exactly like the fiscal-year maintenance series that yielded cols. 1 and 4 in Table K.02 above, and augmented by the following allowances: for Tuscany, .8 million lire in 1861 (from the *Rendiconto Toscana 1861*, public works budget items 9-13); for the South, 1.3 million lire in 1861 (from the *Bilanci Napoletano*, public works budget item 45, and none from the public works budget of the *Bilanci Sicilia*); for the Veneto, .4 million lire in 1868 (30.8% of the sum of public works budget items 5-7 in the *Rendiconto Veneto 1867*), 1.5 million lire in 1867 (the balance of public works budget items 5-7 in fiscal 1867, plus the expenditure in State budget items 7.9.9-19 for fiscal 1866 attributed by the *Rendiconto Veneto 1866* to calendar 1867), and 1.2 million lire p. a. in 1861-66 (the expenditure in State budget items 7.9.9-19 for fiscal 1866 attributed to the Italian period of calendar 1866, scaled up from an estimated 4.5 months to 12); and for the Roman provinces, .4 million lire p. a. in 1861-70 (one third of the corresponding Venetian expenditure in 1861-65).

The municipal-road estimates in col. 18 cover municipal expenditure net of the contributions paid for local roads (col. 16) or received from other governments. In 1875-87, 1889, and 1891, these are obtained directly as the sum of the appropriate expenditure items (e.g., *Bilanci comunali 1875-76*, p. 276, title I items 21-22, 1891, p. XXXVIII, title I items 28-29) less the sum of the appropriate income items (e.g., *Bilanci comunali 1875-76*, p. 110, title I items 10-11, 1891, p. XXXIV, title I items 17-18; these correspond exactly to those entering Table K.03, col. 4). In 1895 and 1897, col. 18 is correspondingly derived as expenditure item 52 plus 55% of 51, minus income items 17 and 18 (e.g., *Bilanci comunali 1895*, pp. 73, 79). In 1899, col. 18 equals expenditure item 54 plus 55% of 53, minus income items 18 and 19; in 1907, it equals 96% of expenditure item 38 (allowing the residual 4% for contributions to the maintenance of local roads) plus 55% of 53, minus the 1.4 million lire in Table K.03, col. 4; and in 1912, it equals 75% of expenditure item 9, minus the 1.8 million lire in Table K.03, col. 4 (*Bilanci comunali 1899*, pp. 73, 79, 1907, p. 2060, 1912, p. 621). In 1873-74, col. 18 is estimated as expenditure item 13, plus 4% of 14 (allowing the residual as the counterpart of title I items 24-25 in 1875) and 28% of 16 (as the equivalent of title I item 20 in 1875), minus 2.7% of Table K.03, col. 1 (as for Table K.03, col. 4; *Bilanci comunali 1873-74*, pp. 49, 127, 1875-76, p. 276). The estimates for 1869-72 are altogether analogous to those for 1873-74, save for the addition, in 1869 and 1870, of an allowance of .6 million lire for the Roman provinces (estimated from the regional data in the *Bilanci comunali 1871-72*, p. 115, using the same coefficients and budget items as for the national total). The estimates for 1861-68 are instead obtained very simply as 65% of Table K.03, col. 1 (as in 1869), minus Table K.03, col. 4. In 1888, 1890, 1892-94, 1896, 1898, 1900-06, 1908-11, and 1913, finally, col. 18 is obtained as the product of net municipal maintenance expenditure (Table K.03, col. 7) and the share of roads in that expenditure estimated by arithmetic interpolation between (and, for 1913, beyond) the corresponding shares yielded by the available benchmarks.

The provincial-road estimates in col. 19 similarly cover provincial expenditure net of subsidies received from other governments. In 1890-91, col. 19 is estimated as the sum of expenditure title I items 27 and 28, plus 55% of 25 and 26, minus income title I item 7 (*Bilanci provinciali 1890-91*, pp. 235, 237). In 1899, it is correspondingly estimated as expenditure item 31, plus 55% of 30, minus 45% of income item 12; and a corresponding estimate for 1915 equal to 34.9 million lire is estimated as the sum of expenditure items 35 and 38-39, plus 55% of 34, minus 45% of income item 15 (*Bilanci provinciali 1899*, pp. 63, 67, 1915, pp. 83, 89). The estimates in col. 19 for 1882-86 and 1889 are exactly analogous to those for 1890-91 (*Bilanci provinciali 1887-89*, pp. XII-XIII). In 1875-76, col. 19 is estimated, equivalently, as the sum of

ordinary expenditure, category 9 items 1 and 6, plus 55% of category 4, minus ordinary income, category 4 items 2 plus 4 (*Bilanci provinciali 1875-76*, pp. 2-3, 38-39). In 1877-81, it is estimated as expenditure item 10, plus 30% of 2 (e.g., *Bilanci provinciali 1877*, p. 13), less an allowance for subsidy receipts equal to 0.4% of the preceding sum in 1880-81, 0.3% of it in 1878-79, and 0.2% in 1877 (against 0.5%, as calculated, in 1882, and 0.2% in 1876). In 1873-74, col. 19 equals the sum of ordinary expenditure, category 8 items 1-2 and 6, plus 29% of category 3 items 1-2, minus ordinary income, category 4 item 8 (*Bilanci provinciali 1873-74*, pp. 2-3, 38-39). In 1871-72, it is estimated as expenditure item 9 plus 35% of 2 (*Bilanci provinciali 1871-72*, pp. 8, 10), less an allowance for subsidy receipts equal to 0.1% of the preceding sum (as in 1873). The estimates for 1869-70 are exactly analogous to those for 1871-72, save for the addition of an allowance of .5 million lire p. a. for the Roman provinces (estimated as item 9 plus 35% of 2 in 1871, and noting the similarity of the regional public works budget in 1870 and 1871; *Bilanci provinciali 1870*, p. 2, *1871-72*, p. 9, *1875-76*, p. XV). In 1866-68, col. 5 is estimated as expenditure item 6, plus 16% of item 2 (*Bilanci provinciali 1866-68*, p. 108), less 0.1% of the preceding sum, plus .5 million lire p. a. for the Roman provinces, as above, and .6 million lire p. a. for the Venetian provinces (estimated as expenditure item 6 plus 17% of item 2, *Bilanci provinciali 1866-68*, p. 178); and in 1861-65, it simply equals the sum of the annual allowances for the Roman and Venetian provinces. In 1887-88, 1892-98, and 1900-13, finally, col. 19 is obtained as the product of net provincial maintenance expenditure (Table K.03, col. 16) and the share of roads in that expenditure estimated by arithmetic interpolation between the corresponding shares calculated for 1886 and 1889, 1891, 1899, and 1915.

The local-road estimates in col. 20 reflect the information in cols. 16 – 19. On the one hand, the language of the relevant legislation suggests that municipal contributions would cover only a relatively minor share of the maintenance costs of local roads, so that the latter were probably some 10 to 20 times the former; on the other hand, the maintenance costs of local roads were probably themselves no more than a fifth to a quarter of the maintenance costs of all other roads combined, as the relatively great length of the local roads was no doubt far more than offset by their relatively low utilization. In the event, estimates of local-road maintenance in the neighborhood of 11 million lire in the later 1880s fall close to the middle of the plausible range with respect to both col. 16 and the sum of cols. 17 – 19; they are accordingly themselves as plausible as the expectations on which they are based. Over the decades, moreover, the maintenance costs of local roads probably increased in real terms, given increasing utilization and qualitative stagnation (*Enciclopedia italiana*, vol. 32, p. 800), and *a fortiori*, given the generally rising unit costs noted below, in nominal terms; on the other hand, the declining share of agriculture in total production suggests that the utilization, and therefore the maintenance costs, of these essentially rural roads declined relative to those of the national, municipal, and provincial roads. In the event, the simple assumption that local-road maintenance expenditure declined from 25% of the corresponding total for the other roads in 1861 to 20% of that figure in 1913 yields a plausible trend rising from ca. 7 million lire p. a. in the early 1860s to 11 million p. a. by 1890, subsequently declining to 10 million lire p. a. and recovering by 1902, and then growing rapidly beyond 16 million lire p. a. by 1913. From year to year, finally, local-road maintenance expenditure probably correlated positively if imperfectly both with the expenditure on other roads (which reflected the same input prices) and, more directly, with the municipal contribution to local-road maintenance. In light of these considerations, col. 20 is estimated as follows. First, the sum of cols. 17 – 19 is multiplied by a fraction declining geometrically from .25 in 1861 to .20 in 1913; the resulting series is identified as series (a). Second, series (a) is smoothed by taking a 5-year moving average (with the first and last entries obtained as the average of the first and last two, the second and second-last as the average of the first and last

three); the resulting series is identified as series (b). Third, col. 16 is multiplied by 14.2 (the average ratio of series (a) to col. 16 in 1875-99); the resulting series is identified as series (c). In 1875-99, col. 20 equals the average of series (a), (b), and (c), with weights equal to one, one, and two. In 1861-74 and 1900-13, col. 20 equals the average of series (a) and (b), with the addition of .5 million lire in 1873, .9 million in 1874, .5 million in 1900, and .3 million in 1901 to fair over the break in the series (these corrections are equivalent to setting series (c) equal to the average of series (a) and (b) in 1872 and 1902, arithmetically interpolating series (c) over 1873-74 and 1900-1901, and calculating col. 20 in those years as in 1875-99). The corresponding estimates of neglected private expenditure for the maintenance of local roads (col. 1), finally, equal col. 20 minus col. 16 (rounded to the nearest 100,000 lire) in 1875-99, and 92.5% of col. 20 in 1861-74 and 1900-13.

K04.03 Land reclamation

From 1861 to 1882, in the absence of general norms, land reclamation projects were carried out by the State and by private interests, with or without subsidy (e.g., *Bonificazioni italiane*, p. XXIV-XXV, 227-231; *Opere pubbliche*, pp. 112-114). The *legge 25 giugno 1882*, n. 869 introduced a two-tier system. The State was made responsible for new projects of the first category, the cost of which was to be shared by the local governments and landowners. Private consortia were made responsible for new projects of the second category, and entitled to public subsidies if the consortium was compulsory; in addition, private consortia were made responsible for the maintenance of completed projects of both categories. The *legge 4 luglio 1886*, n. 3962 allowed the concession of new first-category projects to private consortia, which would receive the contribution of the State (50%) and perhaps that of the local governments (25%) as a stream of annuity payments distributed over 25 to 50 years. The *legge 18 giugno 1899*, n. 236 allowed the concession of new first-category projects without the intertemporal financing imposed by the previous legislation; it also raised the State's contribution (to 60%), and reduced that of the local governments (to 20%). The *legge 13 luglio 1911*, n. 774, finally, increased the public subsidy limits for the second-category projects undertaken by compulsory consortia on public initiative. The evidence is relatively abundant in the case of State-subsidized projects in the early decades, and first-category projects in the later ones, as these are described in some detail by the *Bonificazioni italiane* (published in 1878) and the *Relazione bonifiche* of 1903, 1907, and 1915. The *Bonificazioni italiane* also provides a very useful survey of unsubsidized private projects as of the late 1870s; but next to nothing seems to be available on the subsequent projects of the second category. The present estimates of net private expenditure for new land reclamation projects in Table K.04, col. 9 are accordingly composed of two basic elements. The first of these covers the difference between gross expenditure and the corresponding public contribution in the case of early State-subsidized, and subsequent first-category, projects managed by private individuals or consortia; the gross expenditures and State contributions (cols. 21 and 22) are estimated from project-specific evidence, while the local governments' contributions (col. 23) are mostly extrapolated from the State's. The other covers the residual net private expenditure from 1861 to 1913 (col. 24); except for some specific allowances for *ad hoc* public subsidies in the late 1880s and early 1890s, and for State-subsidized second-category projects near the end of the period at hand, it is obtained as a simple step function in real terms, scaled by the cost index obtained in section K05.05 below. The corresponding maintenance estimates in col. 2 are even simpler. Benchmark estimates of the area privately maintained in 1877 and 1914 are obtained directly from the sources; these benchmarks are then extended to 1890 and 1900 with an eye to the path of deflated private and State expenditure on reclamation projects, and geometrically

extrapolated to 1861-1913. These area figures are then multiplied by a unit maintenance cost estimate obtained for 1914, and scaled by the general maintenance cost index developed in section K05.05 below.

The estimates of gross expenditure for privately managed projects that were somehow State-subsidized (if established before mid-1882) or included in the first category (if established after mid-1882) in col. 21 are obtained by summing over project- and year-specific figures. The projects are those identified as privately managed in the *Bonificazioni italiane*, pp. 1-107, 225 and the *Relazione bonifiche 1903*, pp. 324-325, 1907, pp. 278-283, and 1915, pp. 54, 60-61, and, on occasion, in the subsequent text, pp. 139-402. The year-specific estimates are obtained, at best, by distributing the reported cost over the reported period (with a preference for the information in the text over that in the tables, where these happen to disagree); but in a significant minority of cases the costs or the time period are themselves estimated from relatively ambiguous descriptions (or even relatively uncertain expectations, in the case of the post-1877 history of the early State-subsidized projects). The Lido of Venezia project is allowed .020 million lire p. a. in 1871-72 (*Bonificazioni italiane*, pp. 3, 107; the further expenditure needed as of 1877 is neglected, since the project appears to have collapsed by about 1875). The Valli Veronesi-Ostigliesi project is allowed .170 million lire p. a. in 1861-66, .185, .225, .265, .305, .345, and .385, respectively, in the succeeding years to 1872, .400 p. a. in 1873-78, .200 in 1879, and .100 in 1880 (*Bonificazioni italiane*, pp. 3, 7, 107). The Primo circondario (or Grande bonificazione) ferrarese is allowed .325 million lire in 1873, .830 p. a. in 1874-77, .400 in 1878, 2.000 p. a. in 1906-10, and 1.630 in 1911 (*Bonificazioni italiane*, pp. 8, 11, 107, and 164-165, n. 5; *Relazione bonifiche 1915*, pp. 190-191). The Lago Fucino project is allowed an annual figure growing by .020 million lire p. a. from 1.380 million lire in 1861 to 1.600 in 1872, and then declining to 1.300, 1.000, .700, .400, and .200 in the subsequent years to 1877. The rise to 1872 corresponds roughly to that of the cost index in Table K.06, col. 12 below, so as to yield approximate constancy in real terms; and the total includes one quarter of the 14.4 million lire reported for agricultural investment after the completion of the initial reclamation (*Bonificazioni italiane*, pp. 41, 44, 107). The Ostia-Maccarese project is allowed .030 million lire p. a. in 1861-73 (*Bonificazioni italiane*, pp. 47-48, noting the inclusion of maintenance in the reported total). The Lago Agnano project is allowed .100 million lire p. a. in 1866 and 1869-71, and .250 p. a. in 1867-68 (*Bonificazioni italiane*, pp. 75-77, assuming that the private expenditure to reduce the lake from 82 to 27 ha was proportional to the reported subsequent expenditure by the State to eliminate those residual 27 ha and complete the project). The Torrente Mammella project is allowed .030 million lire p. a. in 1877-81; the Palude di S. Lorenzo project, .002 p. a. in 1869-78 (*Bonificazioni italiane*, pp. 97, 101-102, 107). The Stagno di Sanluri project is allowed .050 million lire p. a. from 1861 to 1880 (*Bonificazioni italiane*, pp. 102-104, 107, excluding part of the expenditure beyond that of the initial reclamation, and ignoring the very different account in the *Relazioni bonifiche 1915*, pp. 384-385). The Agro Bresciano project is allowed .020 million lire p. a. from 1885 to 1913 (*Relazione bonifiche 1915*, p. 139). The Roncocorrente project is allowed .085 million lire p. a. in 1905 and 1910, and .175 p. a. in 1906-09 (taking the figures reported in the *Relazione bonifiche 1915*, pp. 47, 144, and noting that the national aggregates reported on p. 54 appear to include these figures rather than the much higher acreage and cost attributed to this project on that same page). The Agro Mantovano-Reggiano project is allowed 2.800 million lire in 1901, 3.385 p. a. in 1902-06, and .400 in 1907; the Retratto-Monselice project, .050 p. a. in 1880-81 and 1899, and .250 p. a. in 1907-08; the Pratiarcati project, .025 in 1908; the Gorzon Inferiore project, .050 p. a. in 1908-09; and the Due Carrare project, .050 in 1879, .040 in 1905, .075 p. a. in 1906-07, and .070 in 1908 (*Relazione bonifiche 1915*, pp. 145, 152-156). The Gorzon Medio project is allowed .255 million lire p. a. in 1894-98, and .125 in 1899 (*Relazione bonifiche 1915*,

pp. 54, 156). The Cuoro, Anconetta, and Vampadore components of the Circondario d'Este project are allowed, respectively, .005 million lire p. a. in 1908 and 1912, and .015 p. a. in 1909-10; .020 p. a. in 1908 and 1910, and .040 in 1909; and .050 in 1904, and .100 p. a. in 1880-81 and 1905-13 (*Relazione bonifiche 1915*, pp. 54, 157-158). In the case of the Territorio Padano project, the State appears to have spent 8.5 million lire for part of the project (actually as an advance to be refunded), and the consortium a further 5.5 million for a different part; the latter sum is here distributed as .400 million lire p. a. in 1895, 1898, and 1907-11, .800 p. a. in 1896-97, .300 p. a. in 1900-01, and .250 p. a. in 1906 and 1912 (*Relazione bonifiche 1903*, pp. 102-103, 1907, p. 277, 1915, pp. 52, 158-159; *legge 4 luglio 1886*, n. 3962, art. 16). The Polesana alla destra di Canalbianco project is allowed .425 million lire p. a. in 1894-99 and 1904, and .210 p. a. in 1893, 1900, 1903, and 1905-08; the Isola d'Ariano project, 1.500 p. a. in 1902-03, .700 p. a. in 1901 and 1904, and .150 p. a. in 1911-12; and the Oca-Sagraeda project, .120 in 1912 and .250 in 1913 (*Relazione bonifiche 1915*, pp. 160, 162-164). The Settima Presa Superiore project is allowed .040 million lire in 1889, .350 in 1890, and .175 in 1891 (*Relazione bonifiche 1915*, pp. 54, 173); the Foresto Generale project, .070 in 1896, .170 p. a. in 1897-98, and .100 in 1899 (*regio decreto 23 aprile 1896*, n. 193). The Tagliamento-Lugugnana project is allowed .160 million lire p. a. in 1912-13; the Bella Madonna project, .500 in 1913; the Ongaro Superiore project, .200 in 1902, .350 p. a. in 1903-04, and .200 in 1905; and the Cavazuccherina project, .290 in 1904, and .430 p. a. in 1905-06 (*Relazione bonifiche 1915*, pp. 175-178). The Gambarare project is allowed .225 million lire p. a. in 1891-93 (*Relazione bonifiche 1915*, p. 179; *regio decreto 8 giugno 1890*, n. 6994). The Croce di Piave project is allowed .100 million lire p. a. in 1893 and 1896, and .200 p. a. in 1894-95; the Punta Gorzon project, .225 in 1908 and .450 in 1909; the S. Pietro di Cavarzere project, .100 p. a. in 1904-05; and the Bassa pianura bolognese project, 3.100 in 1913 (*Relazione bonifiche 1915*, pp. 179-182, 187-188). The Polesine S. Giorgio project is allowed .050 million lire in 1871, .100 in 1872, .150 in 1873, and so on to .650 in 1883; .700 p. a. in 1884-86; .350 in 1887; .800 p. a. in 1889-92; and .200 p. a. in 1896-97 (*Relazione bonifiche 1915*, pp. 189-190, *Bonificazioni italiane*, p. 164, n. 6, *regio decreto 3 giugno 1888*, n. 5641, and *regio decreto 10 settembre 1895*, n. 669; the early estimates are designed to sum to 1.4 million lire in 1877 and 7.0 in 1887, while the later ones distribute 3.6 million lire over the periods, and in rough proportion to the sums, suggested by the relevant legislation). The Burana project was shared between the State and a private consortium; expenditure in the part managed by the latter is here estimated to equal 2.000 million lire p. a. in 1893 and 1897, 4.020 p. a. in 1894-96, .040 in 1898, .200 p. a. in 1904 and 1908, and .400 p. a. in 1905-07 (*Relazione bonifiche 1907*, pp. 46, 278, 1915, p. 193; *legge 4 luglio 1886*, n. 3962, art. 4; *legge 30 dicembre 1892*, n. 736; *regio decreto 5 ottobre 1902*, n. 462). The Rigosa project is allowed .100 million lire in 1908, and .220 p. a. in 1909-13 (*Relazione bonifiche 1915*, pp. 54, 194-195). The Trasimeno project is allowed .285 million lire in 1896, .380 in 1897, and .095 in 1898; the Mascione-Cancelli project, .030 in 1912, and .060 in 1913; and the four small projects covered by the Agro di Sassari e Porto Torres, a total of .005 p. a. in 1902-05 and 1908-10, .025 in 1906, .030 in 1907, .050 in 1912, and .100 in 1913 (*Relazione bonifiche 1915*, pp. 225-226, p. 239 and map no. 66, and pp. 401-402). No expenditure is allowed for the Valli di Comacchio project or the Salso-Camerina-Pantano projects, since the concessions were obtained by local governments; for the Paludi Pontine project, since the consortium was concerned primarily with maintenance, and the minor other expenditure of 1886 was advanced by the State; or for the Volturmo-Vicana project, since the concession was granted only at the end of 1913 (*Relazione bonifiche 1915*, pp. 191, 233-236, 262, 359-360).

The estimated State expenditure for the privately managed projects covered by col. 21 is transcribed in col. 22. From 1870 to 1890, these figures are those reported in the *Rendiconto*

consuntivo (public works budget, e.g., 1870, item 72T, 1880, item 106, 1889-90, item 227) for the Valli Veronesi-Ostigliesi project, with those for 1884-85 ff. shifted half a year backward in the usual way. Corresponding entries for the earlier years do not appear to have been included in the public works or agriculture budgets of the *Rendiconto consuntivo*, or for that matter of the *Rendiconto Veneto*; since they are thus plausibly excluded from the State expenditure estimates in Table K.04 above, there is no need to exclude them here. Subsidies to other projects were similarly omitted; in any case, however, most of the subsidies listed in the *Bonificazioni italiane*, p. 107 were not cash payments but land grants, tax reductions, and the like. In later years, the figures in col. 22 are the similarly shifted sums of (fiscal) year- and project-specific data. From 1900-01 to 1913-14, these data are the payments reported in the *Relazione bonifiche 1915*, pp. 83-98, for North Italian projects number 3, 8-10, 13-14, 24-26, 27 (covering both the Bella Madonna and the Ongaro Superiore), 28-29, 30 (covering both the Punta Gorzon and the S. Pietro di Cavarzere), 33-35, and 38; Central Italian project number 8; South Italian project number 1; and Sardinian project 17. The data for North Italian projects number 24-25, 29, and 33, and Central Italian project number 8, are extended to the years before 1900-01 by the *Relazione bonifiche 1903*, pp. 441-442, Table 2 (respectively numbers 4, 1, 2, 7, and 8). The data for North Italian project number 12 (the Territorio Padano) are excluded, since as noted above the estimates for that concession entered in col. 21 exclude the expenditure covered by the State; the data for North Italian project number 32 (the Burana) are also excluded, since these figures cover the expenditure for the part managed by the State as well as the transfers to the consortium, and replaced by the appropriate cash-budget figures reported in the *Rendiconto consuntivo* (public works budget, e.g., 1894-95, item 312, 1900-01, item 159, 1906-07, item 251, 1913-14, item 135.7).

In the absence of more direct evidence, the contributions of the local governments to the first-category projects covered by col. 21 are estimated on the basis of those reported by the State, as follows. Allowing for the cost shares specified in the legislation current at the time the (initial) concession was awarded, the State's payments in col. 22 for North Italian projects number 9, 13, 24-25, 29, 33, and 38 and Central Italian project number 8 (as specified in the *Relazione bonifiche 1903* and *1915*), and those for the Burana project (as specified in the *Rendiconto consuntivo*), are multiplied by .50; and those for North Italian projects number 3, 8, 10, 14, 26-28, 30, and 34-35, South Italian project number 1, and Sardinian project number 17 (as specified in the *Relazione bonifiche 1915*) are multiplied by .33. These figures are summed, extended to 1914-15 on the basis of the corresponding data in the *Rendiconto consuntivo* (public works budget, items 145.1 to 145.9, times .50; items 144.23, 144.49, 144.53, 144.57, 144.62, 187.13, 234.5-7, 234.9, 234.11-12, 234.14, and 234.24, times .33), shifted half a year backward to approximate calendar-year figures, and smoothed by taking a three-year moving average. The resulting figures are presented in col. 23; they do not exceed .001 million lire p. a. until 1892. The corresponding contribution of the local governments to the early State-subsidized projects covered by col. 21 appear to have been relatively rare. The present estimates in col. 23 are based on the project-specific information in the *Bonificazioni italiane*, pp. 2 and 97; they allow .028 million lire to the Lido di Venezia project and .020 to the Torrente Mammella project, distributed in each case in proportion to the gross-expenditure estimates described above (i.e., evenly over 1871-72 and 1877-81, respectively).

The allowance for other net private expenditure in col. 24 is obtained as follows. The *Bonificazioni italiane*, p. 223 lists a total of 310 private reclamations (not subsidized by the State), covering 174,000 ha and having cost nearly 17.8 million lire. Scaling each of the three reported subtotals in proportion to the ratio of the group total acreage to the part thereof covered by the corresponding cost figure (as reported on p. 223, and ignoring the slightly different figures on pp. 145, 161, and 191), and deducting the figures for the Polesine S. Giorgio and

Grande bonificazione ferrarese projects (p. 164, nos. 5 and 6, already counted in col. 21), one obtains a revised total cost of approximately 19.4 million lire. This figure is difficult to evaluate. On the one hand, it is said to be incomplete (p. X); but since the local figures were compiled by the local bureaus of the Corps of Engineers, it should actually be relatively solid. On the other hand, it is said to cover projects from 1800 on; however, most of the recorded expenditure (and in particular that for reclamation by means of pumping machines) seems to have accrued since 1850 (e.g., p. 118, n. 27, p. 148, n. 3, p. 150, n. 10, p. 176, n. 64). In the circumstances, average expenditure in 1861-81 is here estimated at .6 million lire p. a. (net of public contributions, which are presumed negligible); in order to impose constancy in real terms, the actual allowance in col. 24 is .600 million lire times the cost index in Table K.06, col. 12, divided by .7050 (its average value over 1861-81). From 1883 to 1913, the level of expenditure for second-category projects is essentially unknown, but there is reason to believe that it was normally well below the earlier level of private expenditure (*Relazione bonifiche 1907*, pp. 94-102, *1915*, pp. 133-135). The average level of unsubsidized expenditure by voluntary consortia is here simply set at half the preceding norm, or .3 million lire p. a.; again, in order to impose constancy in real terms, the actual allowance in col. 24 is .300 million lire times the cost index in Table K.06, col. 12, divided by .8315 (its average value over 1883-1913). The corresponding figure for 1882 is estimated directly at .467 million lire, by interpolation of neighboring values. Finally, these expenditure figures are subjected to two *ad hoc* corrections. First, they are augmented by .025 million lire p. a. in 1906-11 and .465 p. a. in 1912-13 to allow for the expenditure of compulsory consortia, again assuming that public subsidies were negligible through 1913 (*Relazione bonifiche 1915*, p. 135). Second, they are reduced by .100 million lire in 1886, .200 in 1887, .300 in 1888, .290 in 1889, .148 in 1890, .108 in 1891, .232 in 1892, .189 in 1893, .057 in 1894, and .022 p. a. in 1909-10, to allow for the special State subsidies established by the *legge 23 luglio 1881, n. 333* (Tab. D, n. 15). These subsidy figures for 1889 ff. are those reported in the *Rendiconto consuntivo* (public works budget, e.g., *1888-89*, item 120, *1899-00*, item 466, *1909-10*, item 336), shifted half a year backward; those for 1886-88 are direct estimates, obtained with an eye to the subsidies' initial year specified in the enabling legislation.

The final estimates of net private expenditure in col. 9 are of course the sum of cols. 21 and 24, minus the sum of cols. 22 – 23, suitably rounded.

The evidence on private maintenance expenditure seems extremely limited. A benchmark estimate for 1914 is obtained from the *Relazione bonifiche 1915*, as follows. The State's maintenance expenditure was reported at some 2.0 million lire p. a., most of it for the already completed parts of reclamations in progress (pp. 120-121). These measured some 311,000 ha (469,000 ha reclaimed by the State, less the 158,000 ha of completed reclamations: pp. 46, 49, 53); assuming they absorbed some 75% of the total expense, unit maintenance costs work out to about 4.8 lire/ha p. a. The area maintained at private expense is here taken to include some 354,000 ha reclaimed since 1882 by first-category projects (the reported total of 769,000 ha, p. 46, less the estimated 415,000 ha maintained by the State for 2.0 million lire at 4.8 lire/ha); some 412,000 ha reclaimed through 1882 (estimated from the *Bonificazioni italiane*, pp. 222-223, as the sum of the completed part of State-subsidized projects and the total reported area of private projects, assuming, for simplicity, that the area that remained in possession of the State, the area of private projects not yet reclaimed, and the area which no longer needed maintenance after 30 years of cultivation offset the area added from 1877 to 1882, and the area of projects neglected by this survey); and some 66,000 ha reclaimed since 1882 as second-category projects (an estimated 19.2 million lire spent in 32 years, as indicated above, divided by the 289 lire/ha averaged by privately managed first-category projects: *Relazione bonifiche 1915*, p. 54). These partial estimates sum to 832,000 ha, equivalent to

some 4.0 million lire p. a. at the unit rate estimated above.

The *Bonificazioni italiane*, in turn, suggest that the privately maintained area in 1877 equaled some 291,000 ha. This figure is obtained as the total reported for private projects (p. 223, again assuming that the area of these projects not yet reclaimed offset the area of those neglected by this survey), augmented by the completed area of the following State-subsidized projects: Valli Veronesi-Ostigliesi, Prime circondario ferrarese, Stagni di Vada e Collemezzano, Piana di San Vettorino, Lago Fucino, Paludi Pontine (times .6, to allow for the public contributions), Paludi di Terratizzo, Palude di S. Lorenzo, and Stagno di Sanluri (pp. 26, 41, 52, 96, 106-107). It excludes the Lido di Venezia and the Ostia-Maccarese, since these projects appear to have been abandoned (pp. 3, 48); the Lago Agnano, which had been taken over by the State (p. 77); and the Torrente Mammella, which was just getting under way (pp. 97, 107). The data yield a corresponding expenditure equal to some 2.2 million lire, of which 1.5 for the private projects (scaling up the figures quoted on p. 223 analogously to the investment cost figures reported above), and the rest for the State-subsidized projects (from pp. 106-107, calculated exactly as the area above). The unit cost, at about 7.6 lire/ha p. a., is well above the 4.8 lire figure obtained for 1914; in view of the 42% increase in the maintenance cost index in Table K.06, col. 10 below, these two figures would not appear to be comparable. In fact, the subtotals for the three groups of private projects (p. 223) yield annual maintenance costs equal to 4.4 lire/ha for landfill projects, 2.2 lire/ha for gravity-drained projects, and 11.5 lire/ha for machine-drained projects; and this last figure at least appears inflated by the cost of operating the steam pumps, interest and depreciation charges, and similar items (e.g., pp. 172-173, n. 48, 182-183, n. 90 and n. 94). Since a weighted sum of the other maintenance costs per unit is clearly compatible with the average figure for 1914 obtained above, it would seem best to extrapolate unit maintenance costs back from 1914 directly by the cost index in Table K.06, col. 10, and to multiply it by estimates of the area privately maintained that incorporate the benchmark figures for 1877 and 1914.

In the absence of evidence on the pace of transfers of completed projects from the State to private consortia, the area privately maintained from 1861 to 1913 is here estimated, very roughly, with an eye to the pace of aggregate reclamations. Summing over the net private expenditure figures in Table K.04, col. 9 and the State expenditure figures in the *Opere pubbliche*, pp. 1010-1014, row 4, and pp. 1128-1134, row 7, one obtains average expenditure levels of about 4.0 million lire p. a. in 1861-70, 4.3 in 1871-80, 4.8 in 1881-90, 8.0 in 1891-1900, and 16.6 in 1901-13; dividing these by the simple average values of the cost index in Table K.06, col. 12 below over the corresponding years, one converts these to 1911-price estimates close to 6.0 million lire p. a. in 1861-90, 10.5 in 1891-1900, and 18.4 in 1901-13. These figures, in turn, suggest that the area privately maintained may have grown from 291,000 ha in 1877 to 387,000 in 1890, 516,000 in 1900, and 832,000 in 1914. These four estimates, in turn, are here geometrically interpolated and extrapolated (to 1861, at the growth rate that prevailed in 1877-90). The resulting year-specific area estimates are then multiplied by the unit cost estimate at 1914 prices obtained above (4.8 lire/ha), and again by the ratio of the current-year value of the maintenance cost index in Table K.06, col. 10 to its 1914 value (to obtain figures at current prices). The resulting estimates, suitably rounded, are transcribed in Table K.04, col. 2.

K04.04 Water-control projects

Italy's legislation divided water-control projects into five classes; only the third and fourth are relevant here, since projects of the first two were the responsibility of the State, and those of the fifth (until 1893 a sub-group of the fourth) were the responsibility of the relevant municipality (*legge 20 marzo 1865, n. 2248, Alleg. F, arts. 93 ff.; legge 30 marzo 1893, n. 173,*

legge 7 luglio 1902, n. 304; legge 13 luglio 1911, n. 774). Once again, the most useful evidence seems to be the related State expenditure: the new construction of third- and fourth-category projects involved an increasing State participation, and even the related maintenance, which remained entirely private, seems best approached through the State's maintenance expenditure for projects of other classes.

In the case of third-class projects, State subsidies were available from 1865 to 1893 in what seems to have been a minority of cases, and were limited in any case to 25% of the project's cost; the corresponding private expenditure is then plausibly estimated at approximately ten times the State subsidy payments. Data on the latter are available from 1876; they vary considerably from year to year, but with an average that remains close to 25,000 to 30,000 lire p. a. through fiscal 1893 (e.g., *Rendiconto consuntivo 1876*, pp. 194-195, item 13, *1889-90*, parte I, pp. 716-717, item 32). In 1893, State subsidies were extended to all third-category projects, and increased to a level that made them equal to the private contribution; subsidy payments promptly declined to nothing or nearly nothing, perhaps because bureaucratic difficulties were multiplied by the creation of a regulatory commission (*regio decreto 28 dicembre 1893, n. 721*), with fiscal 1897 and 1898 the only exceptions (130,000 and 74,000 lire, respectively: e.g., *Rendiconto consuntivo 1897-98*, parte I, pp. 744-745, item 39). In 1902, the State acquired the right to undertake third-category projects directly, even as its subsidy to those under private control was further increased (to 2.5 or 3 times the private contribution); while State expenditures then grew rapidly to circa one million lire p. a. from fiscal 1910 (e.g., *Rendiconto consuntivo 1905-06*, parte I, pp. 962-963, 1054-1055, items 209 and 604, *1913-14*, parte I, pp. 1190-1191, 1268-1269, items 132.1 and 221.1), the likely private contribution was very small (both because public expenditure was no doubt dominated by direct expenditure rather than subsidies, and because of the obvious incentive for individuals to leave such projects to the State). In summary then, and allowing for the usual lag of fiscal years behind calendar years, this evidence suggests that neglected private expenditure for the new construction of third-category projects equaled some .3 million lire p. a. from 1876 through 1893, .1 million lire p. a. in 1896 and 1897, and .0 million lire in 1894-95 and 1898 ff.

In the case of fourth-category projects, on the other hand, State subsidies were introduced in 1893; these appear to have been even less readily available than the preceding subsidies for third-category projects, and, like the latter, were limited to 25% of the project's cost. The related payments clustered in two waves, from fiscal 1894 (ca. 17,000 lire p. a. for four years) and again from fiscal 1907 (ca. 24,000 lire p. a. for four years; e.g., *Rendiconto consuntivo 1893-94*, parte I, pp. 714-715, item 38, *1903-04*, parte I, pp. 854-855, item 203, *1913-14*, parte I, pp. 1192-1194, 1270-1271, items 132.2 and 221.2). Allowing .1 million lire p. a. independently of State subsidies plus approximately 10 times the recorded subsidy payments (suitably shifted and smoothed), this evidence suggests that neglected private expenditure for the new construction of fourth-category projects equaled some .4 million lire p. a. in 1908-09, .3 million lire p. a. in 1893-96 and 1907, .2 million lire p. a. in 1897-99, 1906, and 1910, and .1 million lire p. a. in 1900-05 and 1911-13.

The estimated private expenditure for third- and fourth-category water-control projects in Table K.04, col. 10 equals the sum of the above estimates from 1893 to 1913. From 1861 to 1892, that expenditure is simply set equal to .6 million lire p. a. (.3 million lire p. a. for third-category projects, in 1861-75 as in 1876-92, and as much again for fourth-category projects, as in 1893-96), taking the implied slow decline in real terms as a rough allowance for the secular shift of projects, across classes, from private to public responsibility.

At these estimated levels, cumulative expenditure for new construction of third- and fourth-category projects from 1862 to 1913 equals some 32 million lire (23 million lire of private expenditure, as estimated, plus, say, 1 million for State subsidies and as much again

from local governments, plus another 7 million in direct State construction after 1902); the comparable figure for first- and second-category projects is close to 340 million lire, or over ten times as much (*Opere pubbliche*, pp. 1014-1015, deducting the figures for 1914-15 ff. and half that for 1913-14 from the cumulative total). State maintenance expenditures for first- and second-category projects more than doubled from the early 1860s to the early 1870s, but succeeding decadal averages remained close to 6 million lire p. a. (e.g., *Rendiconto consuntivo 1880*, pp. 406-407, items 10-11, *1913-14*, parte I, pp. 1078-1079, 1086-1089, items 42-43, 45-46, 91-92, 94-95; *Opere pubbliche*, pp. 976-980). This points to a progressive increase in State responsibilities immediately following the *legge 20 marzo 1865*, n. 2248, but to little subsequent growth of the effective stock to be maintained (presumably because the investment represented by new construction tended if anything to reduce, rather than to increase, current real maintenance costs). For want of more direct evidence, the maintenance expenditure for third- and fourth-category projects in Table K.04, col. 3 is here estimated to equal one tenth of the State's average expenditure, or .6 million lire p. a., from 1872 to 1913; in earlier years, it is estimated to have equaled 1.6 million lire p. a. in 1861-66, and then to have declined (on the assumption that formerly private responsibilities were being taken over by the State) by .1 million lire p. a. in 1867 and 1872, and .2 million lire p. a. in 1868-71, to the selected permanent level of .6 million lire p. a.

K04.05 Electric power-related systems

Electric power plants, like other industrial buildings, may be considered adequately covered by the indices of private construction considered below. The present concern is rather with the construction and maintenance of the related hydraulic works, transmission lines, and local distribution networks. These are here estimated in real terms on the basis of the capacity growth data in the *Statistica elettrica* and the power-consumption data in the *Imposte di fabbricazione* that underlie the estimates of the electric utilities' output; the weaknesses of those data are discussed in section J02.02 above, and are not reviewed here. In general, new construction is indexed by the increments in output or capacity, shifted to allow for the lag between accrual and completion; maintenance construction is instead indexed directly by the corresponding aggregate output or capacity series. Hydraulic works are related to aggregate hydroelectric capacity, including the private works of the electrochemical and electrometallurgical industries; transmission lines are related to the utilities' hydroelectric capacity, assuming that these lines ran from power stations to power-consuming centers (since a national grid does not appear to have been established until after the war: Mortara, 1934, vol. 2, pp. 166-168, 189-190), that thermal power stations were located in the centers they served, and that electrochemical or electrometallurgical plants were located by the power stations that served them; and local distribution networks are related to the utilities' aggregate output. Value added at 1911 prices is estimated from the budget data for the Milanese municipal power company. In general, these estimates are designed to cover municipally owned works as well as strictly private ones, since even the former appear to have operated as private companies with their own budgets; but minor adjustments are made to avoid duplicating the municipal expenditure for the construction and maintenance of public lighting systems. In the event, the maintenance of hydraulic works appears to have been insignificant.

Table K.04, col. 25 transcribes the present estimates of aggregate hydroelectric capacity growth. These are estimated directly, from locally disaggregated data, in 1899-1908; in other years, they are the sum of separate figures for the utilities and other industries. Through 1898, the utilities' figure is estimated as in section J02.02 above: briefly, it is derived from Table J.01 as the sum of col. 5 and half of col. 6 times .819 in 1883-95, 1.043 in 1896, 1.533 in 1897, and 1.037 in 1898; within rounding error, these equal the increments in col. 8. The other industries'

total through 1895 and increments in 1896, 1897, and 1898 are estimated as 7.99, 1.87, 4.51, and 3.36 thousand kW, respectively; these are obtained as the corresponding figures for aggregate (thermal, hydraulic, mixed, and electric) private capacity, times the share of hydraulic power (estimated as the reported hydraulic capacity plus half the reported mixed capacity) in the corresponding aggregate private capacity at the end of 1898 (57.1%; *Statistica elettrica 1898*, pp. 32-33, 49). In the absence of evidence on the time distribution of private generating plants before 1896 (since the sample data in Table J.01, cols. 4 – 6 apparently refer almost exclusively to commercial plants), the estimated total at the end of 1895 is here distributed over the preceding period on the assumption that the annual capacity increments were negligible through 1886, and then grew by .197 kW p. a. from .10 kW in 1887 to the directly estimated 1.87 kW in 1896. In 1899-1908, the figures in Table K.04, col. 25 are the sums of the reported province-specific annual increments in aggregate (private and commercial) capacity, weighted by province-specific estimates of the share of hydraulic power in those increments; the latter estimates are themselves obtained as the province-specific ratios of the reported decadal increment in hydraulic capacity, plus half that in mixed-power capacity, to the reported decadal increment in aggregate capacity (including that obtained from electric power, since the latter is included in the year-specific provincial figures as well; *Statistica elettrica 1908*, pp. 54-61, 96-109, noting that the correct figures implied by the row and column totals are 1,100.1 and 2,007.1 hydraulic kW for Belluno and Verona, respectively, on p. 54, and 1,042.0 private kW for l'Aquila in 1906 on p. 105). After 1908, the estimates in col. 25 are again obtained as the sum of separate figures for the utilities and for other industries. The utilities' figure is here obtained as the increments in Table J.01, col. 8, extended to 1914 (516.6 thousand kW) and 1915 (563.1 thousand kW) just as it had been to 1913 (on the basis ultimately of reported total consumption, which equaled 2,553 million kWh in 1914-15 and 2,860 in 1915-16; *Imposte di fabbricazione*, e.g., 1915-16, pp. 152-153). The other industries' figure is instead obtained as follows. The estimated total capacity of the utilities industries at the end of 1908 equals 335.0 thousand kW (Table J.01, cols. 7 plus 8). The corresponding figure for other industries equals 187.1 thousand kW (30.9 thousand at the end of 1898, plus 156.2 added in 1899-1908; *Statistica elettrica 1898*, pp. 32-33, 1908, pp. 34-35). Since the share of the utilities and other industries in total capacity appears to have remained relatively constant, as noted in section J02.02 above, the other industries' total (thermal and hydraulic) capacity at the end of each year is estimated as $(187.1/335.0)$ times the utilities' figure (Table J.01, cols. 7 plus 8, with col. 7 extended just like col. 8 to 169.7 thousand kW in 1914 and 180.4 in 1915). The increment in the resulting series is then distributed between hydraulic and thermal power on the assumption that the former accounted for 67.5% of each year's total, as it appears to have done, on average, over the preceding decade. In 1899-1908, indeed, the total growth of private capacity equaled 156.2 thousand kW (as noted above), while the total growth of hydraulic capacity equaled 309.6 thousand kW (*Statistica elettrica 1908*, pp. 60-61); since an estimated 204.2 thousand kW of the latter were attributable to the utilities (from Table J.01, col. 8), the residual attributable to the other industries equals 105.4 thousand kW, or 67.5% of their total decadal increment.

In Table K.04, col. 26 is the estimated index of the construction activity associated with the capacity-increment estimates in col. 25. Assuming a two-year average construction period, col. 26 is obtained by distributing the increments in col. 25 over the indicated year and the two preceding years in the proportions .25 – .50 – .25. This series is not corrected to allow for the electrification of existing hydraulic power; but the resulting error should normally be very small. One reason for this is that traditional water power appears to have been obtained primarily by exploiting relatively small natural water-falls, whereas the heavy capital costs of hydroelectric works stemmed from the dams and tunnels that created, and conducted, artificial falls (e.g., *Carta idrografica*, vol. 18, p. 326). Another reason is that the limited available evidence points

to substantial secular stability in the non-electric use of water power, so that at least over the longer term the hydroelectric works appear to represent a net addition to the water power actually used. The data on water concessions thus suggest that water power in use equaled some 249,000 hp in 1877 and 337,000 hp early in 1899 (*Annuario 1904*, pp. 270-271); since installed hydroelectric power equaled some 44,000 kW (60,000 hp) at the end of 1898 and 63,000 kW (85,000 hp) a year later (from col. 23, suitably cumulated), the increment in hydroelectric power seems roughly to correspond to that 88,000-hp net increment in water power. The *Censimento industriale*, in turn, reports 266,000 hp in use generated by hydraulic motors and not converted into electricity, for a small average increase since 1877 (500 hp p. a., which may well have been due simply to improvements in the efficiency of hydraulic motors). In the circumstances, it seems expedient to neglect the impact of changes in non-electric water power on the present hydroelectric construction series; by the same token, of course, hydraulic works for non-electric power are not here estimated separately from the associated industrial construction considered below.

The value added at 1911 prices corresponding to the hydraulic-works construction series in col. 26 is estimated from the reported value of the Milanese municipal power company's hydraulic works (without adjusting them to offset the 4.9% overestimate obtained in section J02.03 above, on the assumption that that error was introduced in the conversion of stocks to flows and 1915 prices to 1911 prices). These were completed in September 1910 (*Statistica Milano 1909*, p. 438, 1910, p. 438), and valued at 7,481,000 lire on January 1, 1911 (*Consuntivo elettrico*, p. 6); the power corresponding to that measured in cols. 25 and 26 is here taken to equal 8,832 kW (12,000 hp: *Statistica Milano 1912*, p. 487, and *Statistica elettrica 1908*, p. 3). Deflating the reported cost by the average of the 1908, 1909 and 1910 values of the appropriate construction cost index (Table K.06, col. 12) with weights equal to 3, 12, and 9 respectively, these figures suggest an average value at 1911 prices of 873 lire per kW. Allowing 5% of that for land costs and 49% of the residual for materials, as estimated in section K05.04 below, value added at 1911 prices is here estimated at 423 lire per kW; the corresponding total, in 1911, equals 35.24 million lire.

Expenditure and value added in the maintenance of hydraulic works would appear to have been negligible. The *Consuntivo elettrico* (pp. 28-29) reports actual expenses for maintenance of the hydraulic works equal to just 700 lire in 1916; multiplied by the ratio of the cumulation of col. 23 through 1913 (747,900 kW) to the power of the Milanese plant (8,832 kW), these figures suggest that maintenance expenditure over the period at hand remained under, and until 1910 or so very far under, 60,000 lire p. a. (at 1916 prices, and thus even less at 1911 prices; for the reasons noted above, moreover, these figures should not be significantly affected by the inclusion of the works producing hydraulic power not converted to electricity).

Table K.04, col. 27 is the estimated index of construction activity associated with the initial installation of power lines. For the reasons noted above, transmission capacity is related to the utilities' hydroelectric capacity. The present index is obtained, for simplicity, as the increment in Table J.01, col. 8 (extended to 1914 as indicated above), shifted half a year backward to allow for a one-year construction period (*Amministrazione Torino 1909-13*, vol. 2, p. 185). The value added at 1911 prices corresponding to this construction series is estimated from the reported value of the Milanese municipal power company's transmission line. The latter was valued at 4,632,000 lire on January 1, 1911 (*Consuntivo elettrico*, p. 6); deflating it by the average of the 1909 and 1910 values of the appropriate construction cost index (Table K.06, col. 12) with weights equal to 3 and 9, respectively, and allowing for the power of the associated plant (8,832 kW), this figure yields a 1911-price value of 533 lire per kW. Allowing 7.0% of that as value added in construction (perhaps 5% to erect the pylons and 2% to attach the lines, as suggested by the figures in the *Amministrazione Torino 1903-1908*, vol. 2, p. 274), value added

at 1911 prices is here estimated at 37 lire per kW; the corresponding total, in 1911, equals 1.84 million lire.

The maintenance of transmission lines is similarly indexed by Table J.01, col. 8, shifted half a year forward to approximate average rather than year-end capacity figures. The expenditure figures in the *Consuntivo elettrico*, pp. 28-29 and the cost index in Table K.06, col. 10 suggest that maintenance expenditure at 1911 prices was in the range of 6 to 19 thousand lire p. a. for 8,832 kW of capacity. The corresponding construction value added at 1911 prices is here estimated at 0.9 lire per kW, for a total of 0.30 million lire in 1911.

Table K.04, col. 28 is the estimated index of construction activity associated with the initial installation of local power-distribution networks. For simplicity, it is based directly on the utilities' output estimates in Table J.01, cols. 9 and 10. The latter are summed to obtain aggregate output (extended to 1,520.1 million kWh in 1914 on the basis of reported total consumption, as in section J02.02 above), and then first-differenced; allowing for the likely construction period, the increment in that aggregate between the years t and $t + 1$ is here taken as the index of construction during the year t . The value added corresponding to this construction series is estimated from the reported value of the Milanese installations, as follows. The urban distribution network was worth 5,670,000 lire, plus 1,104,000 lire for the public lighting system, on January 1, 1911; a further 1,588,000 and 229,000 lire, respectively, were added to these in 1911-13. Output equaled approximately 35.2 million kWh in 1913 (*Consuntivo elettrico*, graph following p. XXI), for a capital cost of about .264 million lire per million kWh. Deducting 10% of that to allow for public contributions to the public lighting systems (e.g., *Bilanci comunali*, 1899, p. 82, item 131, included in Table K.03, col. 2), ignoring changes in the price level (since the capital expenditure was distributed over years that straddle 1911), and setting value added at 7.0% of value (as for the transmission line), 1911-price value added is here estimated at 15,400 lire per million kWh. The corresponding total, in 1911, equals 2.45 million lire.

The maintenance of local distribution networks is similarly indexed directly by the sum of the utilities' output estimates (Table J.01, cols. 9 plus 10). The expenditure figures in the *Consuntivo elettrico*, pp. 30-33 and the cost index in Table K.06, col. 10 suggest that maintenance expenditure at 1911 prices was in the range of 30 to 40 thousand lire p. a. Output was then in the range of 54 to 60 million kWh (*Consuntivo elettrico*, graph following p. XXI). The corresponding construction value added is here estimated at about 368 lire per million kWh; allowing for some overlap with the municipal contributions already included in Table K.03, col. 1 above (e.g., *Bilanci comunali* 1899, p. 78, item 38), the privately financed value added is here reduced to 330 lire per million kWh. The corresponding total, in 1911, equals 0.33 million lire.

The 1911-price value added estimates in Table K.04, cols. 5 and 12 are obtained by summing over these separate indices of maintenance (Table J.01, col. 8, suitably shifted, and cols. 9 plus 10) and of new construction (cols. 26 – 28), multiplied by the corresponding estimates of value added per unit at 1911 prices.

K04.06 Gas-distribution networks

On the assumption that gas works, like power plants, are adequately covered by the indices of private construction considered below, the present concern is limited to the construction and maintenance of the related distribution networks. These are here estimated directly in real terms, on the simple assumption that the aggregate network grew in proportion to aggregate output. As in the case of the electric power-related systems discussed in the preceding section, the present estimates are designed to cover municipally owned works as well as strictly private ones (on the presumption that these too operated as private companies with

their own budgets), but reflect minor adjustments to avoid duplicating the municipal expenditure for the construction and maintenance of public lighting systems.

To obtain the present index of new construction in Table K.04, col. 29, the gas-output series in Table J.02, col. 13 is extended to 1860 on the one hand (24.4 million cubic meters, assuming the same growth rate in 1860-61 as in 1861-65) and to 1914 and 1915 on the other (374.6 and 353.9 million cubic meters respectively: e.g., *Rivista mineraria 1914*, p. LXII). Mid-year capacity levels are taken to equal annual output in the current year or (in 1894, 1900, and 1915, when output declined) at the previous peak, and year-end capacity levels are estimated by shifting these mid-year figures half a year backward. The estimated annual increments in completed capacity are the first differences in this shifted series; exceptionally, the estimated increment in 1909 includes a further 3.65 million cubic meters to offset the apparent destruction, in the earthquake at the end of 1908, of the gas works of Messina and Reggio Calabria (noting the consumption data for 1904 and 1906, allowing for the likely growth of consumption to 1908, and assuming that consumption equaled 85% of output: *Annuario città 1906*, p. 94, *1907-08*, p. 80, *1913-14*, pp. 187, 232, 236). Finally, these estimated increments in completed capacity are shifted half a year backward, to allow for the likely lag between construction and completion. The estimated index of new construction for year t is thus normally equal to one quarter of the difference between the sums of current (or previous peak) gas output over the years $t + 1$ and $t + 2$ on the one hand, and t and $t - 1$ on the other. Since the gas output series relies extensively on simple interpolation between benchmarks, the changes in the year-to-year output growth rates produced by that series tend to be negligible, or excessively sharp. The repeated shifting in the calculation of the present index of new construction tends to smooth out the excessive changes; the long periods of steady growth, which reflect the gaps in the information base, are of course otherwise unaffected. Maintenance, in turn, is indexed directly by the estimates of capacity at mid-year: i.e., by the gas-output series in Table J.02, col. 13, with the figures for 1894 and 1900 replaced by the higher figures for the previous year.

Value added in new construction is estimated from the likely length of the distribution network per unit of output, and the likely value added per kilometer of network. The 1911 network-length and consumption data in the *Annuario città 1913-14*, pp. 230-232 yield totals equal to 4,357 kilometers of pipes and 269.2 million cubic meters of gas (in the cities reporting both). Of these, 2,831 kilometers and 211.2 million cubic meters were accounted for by Bologna, Firenze, Genova, Milano, Napoli, Palermo, Roma, Torino, and Venezia. Allowing a further 66 kilometers of pipes and 2.2 million cubic meters for Catania (*Annuario città 1906*, p. 92, *1907-08*, p. 78, *1909-10*, p. 120, *1913-14*, p. 230), the estimated totals for Italy's large cities rise to 2,897 kilometers of pipes and 213.4 million cubic meters consumed, equivalent to some 251.1 million cubic meters produced (at the 85% consumption/production ratio noted above). Deducted from the 1911 output estimate of 345.8 million cubic meters (Table J.02, col. 13), this last figure yields an estimated 94.7 million cubic meters produced, and therefore 80.5 million cubic meters consumed, elsewhere in Italy. Since the differences between the 1911 sample totals and big-city subtotals noted above equal 1,526 kilometers of pipes and 58.0 million cubic meters of gas, the 80.5 million cubic meters consumed outside of the large cities correspond to an estimated 2,118 kilometers of pipes. Overall, then, the total network length in 1911 is here estimated at 5,015 kilometers, or 14.5 kilometers per million cubic meters produced. Economies of scale in distribution appear to be significant, as the large-city average network length per unit of output was just over half that which obtained elsewhere (11.5 v. 22.4 kilometers per million cubic meters, from the above estimates), and the large-city average was itself declining as consumption grew (from the data in the *Annuario città 1906*, pp. 92-96, *1913-14*, pp. 230-232); however, these economies may have been offset by the need to install

pipes of progressively larger diameter, and especially by the likely extension of the gas industry to progressively smaller urban centers. The simple assumption that the overall average network length per unit of output remained constant over time is thus not quite as heroic as the disaggregated data may at first suggest.

The estimated construction-industry value added in the installation of 14.5 kilometers of pipe per million cubic meters is based on a rough allowance of 2,300 lire per kilometer of pipe, equal to the 3,000 lire per kilometer estimated for water mains in section K04.07 below, less 700 lire per kilometer to allow for the lower depth to which gas mains were normally buried (Colombo, 1911, pp. 104, 398). Deducting a 10% allowance for the municipal expenditure on public lighting systems already covered by Table K.03, col. 2 above (e.g., *Bilanci comunali 1899*, p. 82, item 131), value added at 1911 prices in privately financed construction activity is here estimated at 30,000 lire per million cubic meters of gas. The aggregate 1911-price value added series in Table K.04, col. 13 accordingly equals .03 times col. 29; the resulting estimate in 1911 equals just .3 million lire.

Value added in the maintenance of gas distribution networks is again difficult to estimate. The 1911 gas output and distribution-network maintenance expenses for 18 municipal gas works reported by the *Annuario città 1913-14*, pp. 187-189 yield totals of 53,761,000 cubic meters and 612,000 lire, respectively; of these, 10,338,000 cubic meters and 374,000 lire are attributable to Bologna alone. The sample thus yields an average maintenance expenditure of 11,400 lire per million cubic meters if Bologna is included, and just 5,500 lire if Bologna is excluded. Assuming that Bologna was then replacing its gas pipes at an exceptionally rapid rate, average expenditure may be estimated at about 7,000 lire per million cubic meters. The share of construction value added in that figure is also highly uncertain, as it is quite sensitive to the balance between (frequent) repair and (infrequent) replacement; but the standard 60% figure estimated in section K05.04 below, which here implies that the pipes were dug up about every seven years, does not seem unreasonable. Deducting a further 10% to avoid duplicating the municipal expenditure already covered by Table K.03, col. 1 above (e.g., *Bilanci comunali 1899*, p. 78, item 38), value added at 1911 prices in privately financed construction activity is here estimated to equal 3,800 lire per million cubic meters of gas output. The aggregate 1911-price value added series in Table K.04, col. 6 accordingly equals .0038 times Table J.02, col. 13 (as amended in 1894 and 1900); the resulting estimate in 1911 equals 1.3 million lire.

K04.07 Water works

The costs of public water works, unlike those of public power stations or gas works, appear generally to have been included in the government budgets (e.g., *Opere pubbliche*, pp. 985-986, row 4; *Bilanci comunali 1891*, p. XXXVIII, item 34, p. XLII, item 15, 1899, p. 79, item 59, p. 81, item 94). The present estimates thus concern the discrepancy between the flow of public payments and that of actual construction, which appears to be significant in the specific case of the Apulian aqueduct, and the construction and maintenance of commercial works providing water to household and business users. Works for hydraulic power generation or agricultural irrigation are considered separately, respectively in sections K04.05 above and K04.08 below; and private wells and cisterns are counted implicitly as a component of private buildings in sections K09 and K10 below (neglecting the secular shift from wells and cisterns to internal plumbing, on the presumption that the related initial construction and maintenance costs were not too dissimilar, but including the cost of replacing one system by the other in the allowances for improvements). The construction estimates in Table K.04 are thus generally obtained by repeating the procedures that yielded the utilities output series in Table J.04 – J.06 above, but with a data base that is restricted to the commercial works. In and of themselves, these estimates are even weaker than the aggregate water-output figures obtained in chapter J04

above: the problems of extracting a time series from the available cross-section evidence remain, and they are here compounded by the uncertainty which surrounds the identity of works that were actually built or maintained at private expense. On the other hand, the restriction of these estimates to the industry's private sector means that its public sector can continue to be covered by the public budget data, thereby conserving the direct evidence of year-to-year movements which they contain, and also obviating the need to separate out an uncertain component of the relatively aggregated municipal budget data (in every case but that of new construction in 1895-99). As in chapter J04 above, separate estimates are here compiled for the Apulian aqueduct, other aqueducts, and local works. The construction and maintenance estimates for the Apulian aqueduct are current-price expenditure series, net of the State expenditure already included above (section K02.02); the corresponding estimates for the other aqueducts and for local works are instead 1911-price value added series, analogous to those calculated for the other utilities (sections K04.05 and K04.06).

Net private expenditure for the Apulian aqueduct is covered by the estimates in Table K.04, cols. 4 and 11. The new-construction expenditure estimates in col. 11 equal the estimates of actual current investment obtained above (Table J.04, col. 1), minus the State expenditure already included in Table K.02, cols. 3 and 15 (*Opere pubbliche*, pp. 985-986, row 4, shifted to convert fiscal years to calendar years). The maintenance figures in col. 4 equal the estimated mid-year capital stock at 1911 prices estimated above (Table J.04, col. 2), multiplied by the corresponding maintenance cost index estimated below (Table K.06, col. 10), and again by .0175. This last coefficient is a very rough estimate, obtained as the ratio of maintenance value added to capital stock in 1911 and at 1911 prices calculated below for the other aqueducts (.021), reduced by half to allow for the comparative newness of the Apulian works, and divided by .6 to convert value added to expenditure.

The basic estimates relating to other privately financed aqueducts are collected in Table K.04, cols. 30 – 33. All refer to the estimated output of the privately financed aqueducts that were completed in the indicated years, and measure that output in equivalent ton-kilometers per day (defined as in section J04.01 above); but they cover different samples. Group A, in col. 30, covers the aqueducts identified as privately built in the *Annuario città 1934*, pp. 476-535. These are those serving Bologna (Setta), Cagliari, Catania (Casalotto, Carcaci, and Manganelli), Ferrara (Castelfranco), Genova (Nicolay, De Ferrari-Galliera, and Genovese), Napoli, Padova, Palermo (Scillato and Corrao), Roma (Acqua Marcia), La Spezia (Compagnia Generale and Società Lunense), Torino (Val Sangone and Millefonti); Ancona, Novara, Parma, Piacenza, Reggio Emilia, Salerno (Ausino), Savona (Società anonima); Aosta (Saumont), Chieti, Imperia (Poggi), Varese; Torre Annunziata (Sarno and Vesuviano); Asti (Bonoma), Bagni S. Giuliano, Biella, Busto Arsizio, Chioggia, Monte S. Giuliano, Novi Ligure, Pescaia, Portici, Resina, San Remo (Argallo-Marsaglia), Saronno (Saronno), and Torre del Greco. In general, these aqueducts are entered in col. 30 at the date reported in the *Acque potabili 1903*, vol. 1, and with the output calculated (normally from the water-supply and aqueduct-length data in that same source) exactly as for the major aqueducts in section J04.02 above (Table J.04, col. 3). The exceptions are the following. First, the Acqua Marcia serving Roma is attributed the output specified in section J04.02 above (13,500 output units in 1870, 5,400 in 1880, 1887, and 1907, and 10,457 in 1890). Second, the privately built aqueducts serving Piacenza and San Remo are attributed only 80.6% and 95.5%, respectively, of their calculated output, to allow for the shares of their cost apparently borne by the relevant municipalities (*Acque potabili 1903*, vol. 3, pp. 218, 224). The calculated output of the Scillato aqueduct serving Palermo does not receive a similar correction, despite the contribution noted in the *Annuario città 1934*, p. 481, because the latter does not appear to have been borne by the relevant municipality (*Acque potabili 1903*, vol. 3, p. 195; *Bilanci comunali*, e.g., 1897, p. 53, item 92). Third, the Nicolay and De

Ferrari-Galliera aqueducts serving Genova are each attributed an additional 326 output units, as their share of the calculated output generated in serving San Pier d' Arena (absorbed by Genova in 1926; *Acque potabili 1903*, vol. 1, pp. 206-207); and the De Ferrari-Galliera aqueduct is attributed to 1884, as in section J04.02 above. Fourth, the privately built aqueducts that could not be identified in the *Acque potabili 1903*, vol. 1 are attributed the date reported in the *Annuario città 1934*; their output estimates are based on daily tonnages corresponding to the liters per second of normal capacity, or the annual tonnage delivered, reported by that same source (taking the average of the daily tonnages suggested by those two measures, when both are reported), and assume, for simplicity, a uniform 5-kilometer length. The figures so obtained include 104 output units in 1750 (Bagni S. Giuliano), 280 in 1883 (La Spezia-Compagnia Generale), 509 in 1885 (Palermo-Corrao), and of course all but the Acqua Marcia in the years after 1904 (Pescia in 1906, Torre Annunziata-Vesuviano and Torre del Greco in 1908, Genova-Genovese in 1912, Salerno-Ausino in 1913, Imperia-Poggi and Monte S. Giuliano in 1914, and La Spezia-Società Lunense in 1915; in this last case, the loan reportedly provided by the municipality is ignored, by analogy to the Palermo-Scillato case noted above). The peaks in col. 30, like those of its more comprehensive counterpart in Table J.05, col. 1, are attributable to the construction of four very large aqueducts: the Acqua Marcia serving Roma (as indicated above), the Serino serving Napoli (27,529 output units in 1885), the aqueduct serving Padova (5,718 output units in 1886), and the Scillato serving Palermo (14,133 output units in 1895).

The output estimates in cols. 31 – 33 cover the further aqueducts that could be at least tentatively identified as privately built. With the exception of the figures for 1884 and 1903 included in col. 31, these estimates are all obtained from the *Acque potabili 1903*. Vol. 1, as usual, supplies the dates and the data entering the output figures; vol. 3 serves instead to identify the relevant aqueducts, as these are identified as such in, or omitted from, the tabulation of municipal expenditure for water-supply installations from 1889 to 1903 (disaggregated by municipality and by source of finance, but not by year). Apart from the above-noted exceptions, which are returned to below, Group B in col. 31 covers the major aqueducts (defined as in section J04.02 above, and not already covered by cols. 11 and 30) for which the *Acque potabili 1903*, vol. 3 provides an explicit indication of construction at private expense (e.g., pp. 4-5, 222-223). These are the seven aqueducts serving Serravalle Scrivia in the district of Novi Ligure, province of Alessandria, Mondovì in the province of Cuneo, Montopoli in the district of Rieti, province of Perugia, Porto Maurizio, San Stefano al Mare in the district of San Remo, province of Porto Maurizio, Montefiascone in the district of Viterbo, province of Roma, and Verona. Each of these is normally attributed the output calculated from the *Acque potabili 1903*, vol. 1 in section J04.02 above; exceptionally, the aqueducts serving Montefiascone and Verona are attributed only 21.4% and 83.3%, respectively, of their calculated output, to allow for the shares of their cost apparently borne by the relevant municipalities (*Acque potabili 1903*, vol. 3, pp. 242, 312).

Group C in col. 32 covers the major aqueducts (defined as in section J04.02 above, and not already covered by cols. 11 and 30) which the *Acque potabili 1903*, vol. 1 identifies as built in 1889-1903 in municipalities omitted from the tabulation in vol. 3 (or included with only negligible expenditure). These are the ten aqueducts serving Stezzano in the district and province of Bergamo, Pietra-Perzia in the district of Piazza Armerina, province of Caltanissetta, Acireale in the province of Catania, Raddusa in the district of Caltagirone, province of Catania, Rossano in the province of Cosenza, San Giorgio a Cremano in the district and province of Napoli, Carini in the district and province of Palermo, Salsomaggiore in the district of Borgo San Donnino, province of Parma, Cardeto in the district and province of Reggio Calabria, and Salemi in the district of Mazzara del Vallo, province of Trapani. Each of these is here attributed the date indicated in the *Acque potabili 1903*, vol. 1, and the output calculated from that same

source in section J04.02 above. Comparing groups A, B, and C, one notes that over the period 1889-1903 group A includes fifteen aqueducts, group B four (the others dating from before the purported initial date for the expenditure covered by the *Acque potabili 1903*, vol. 3), and group C seven. Of the fifteen in group A, ten are akin to those in group B (i.e., explicitly identified as privately built by the *Acque potabili 1903*, vol. 3), and four -- those serving Catania (Casalotto), Torino (Millefonti), Parma, and Resina -- to those in group C (i.e., omitted from the tabulation in that volume), while one fits neither group (the one serving Chieti, included in the tabulation in that volume and identified only as built with borrowed funds). This evidence provides a measure of support for the presumption that the aqueducts in group C were in fact also privately financed; and it suggests that privately financed aqueducts were explicitly identified by, and omitted from, the *Acque potabili 1903*, vol. 3 in roughly equal proportions.

Group D in col. 33 covers the minor aqueducts (defined as in section J04.02 above, and not already included in col. 30) for which the *Acque potabili 1903*, vol. 3 provides an explicit indication of construction at significant private expense. Excluding as insignificant the aqueducts involving private expenditures of less than 10,000 lire, and further excluding those involving private expenditures that appear to have been contributions received and re-spent by the municipality, group D includes the aqueducts serving Civitanova del Sannio in the district of Isernia, province of Campobasso, Petilia Policastro in the district of Cotrone, province of Catanzaro, Roccamorice in the district and province of Chieti, Luino and Viggìu in the district of Varese, province of Como, Loano in the district of Albenga, province of Genova, Camogli in the district and province of Genova, Altare and Sassello in the district of Savona, province of Genova, Desio and Seregno in the district of Monza, province of Milano, Andorno Cacciorna in the district of Biella, province of Novara, Domodossola in the province of Novara, Intra in the district of Pallanza and Pallanza in the province of Novara, Ficarazzi and Sta. Flavia in the district and province of Palermo, Bobbio in the province of Pavia, Bordighera in the district of San Remo, province of Porto Maurizio, Barile in the district of Melfi, province of Potenza, Rivalta di Torino in the district and province of Torino, and Brendola in the district and province of Vicenza (the aqueduct serving Tradate in the district of Varese, province of Como is excluded because it is not dated in the *Acque potabili 1903*, vol. 1; those serving Pellezzano in the district and province of Salerno are excluded because they are altogether omitted by that source; and that serving Saronno in the district of Gallarate, province of Milano is already included in col. 30). Each of the aqueducts in group D is attributed the date indicated in the *Acque potabili 1903*, vol. 1, and the output calculated from that same source exactly as for the major aqueducts in groups A and B (i.e., assuming a 5-kilometer length when the latter is not reported, and the same per capita water quantities as in section J04.02 above when these are not exactly specified). Exceptionally, to allow for the shares of their cost apparently borne by the relevant municipalities, the aqueducts serving Petilia Policastro, Sassello, and Domodossola are attributed just 89%, 32%, and 63%, respectively, of their calculated output (itself obtained, in the case of Domodossola, as if the reported figures referred to one aqueduct rather than to two).

No attempt is made here to identify which of the over 5,000 minor aqueducts covered by vol. 1 of the *Acque potabili 1903* was omitted, like the major aqueducts in group C, from the tabulation in vol. 3. On the other hand, the water-works companies listed by the *Notizie S.p.A.* (e.g., 1912, pp. 715-723, 1920, pp. 1959-1977, 2508-2510, 3160-3161) were checked against the list of aqueducts identified as privately built from other sources. This comparison reveals the omission of the aqueduct serving Venezia, and (somewhat ambiguously) of the Voltano aqueduct serving Alessandria della Rocca and Cianciana in the district of Bivona, province of Girgenti; these are here included, exceptionally, in group B (col. 31) with the dates (1884 and 1903) and outputs (3,179 and a total of 421 equivalent ton-kilometers/day, respectively) reported in, or calculated from, the *Acque potabili 1903*, vol. 1 (pp. 210-211 and 448-449;

compare vol. 3, pp. 136-137, and the *Notizie S.p.A. 1920*, pp. 2508 and 2510). Some minor aqueducts serving the area near Bergamo also appear to have been omitted (*Notizie S.p.A. 1920*, p. 2508); but these were not identified as such in the *Acque potabili 1903*, and accordingly remain outside the present sample.

Col. 34 presents the estimated index of privately financed construction activity in the new construction of aqueducts other than the Apulian aqueduct. It is obtained from the basic estimates in cols. 30 – 33 as follows. First, the major-aqueduct output figures in cols. 30 – 32 are summed, augmented by an allowance equal to 200 output units p. a. in 1861-86 and 1905-15 and half that in 1887-88 and 1904, and then distributed over the indicated year and the two preceding years in the proportions .25 – .50 – .25 (equivalent to a two-year construction period). The allowance is for the major aqueducts not covered by cols. 30 – 32, and essentially extends the annual average value registered in cols. 31 and 32 in 1887-1904 and 1889-1903, respectively, to the earlier and later years (it does not reflect the 1884 figure in col. 31, however, as any other private aqueducts of that importance neglected by the *Annuario città 1934* would presumably also have been recorded by the *Notizie S.p.A.*). Second, the minor-aqueduct figures in col. 33 in 1889-1904 are augmented by an allowance equal to 50 output units p. a. (roughly doubling their average over those years to allow for the private minor aqueducts that were omitted from, rather than explicitly identified in, the *Acque potabili 1903*, vol. 3); in 1861-88 and 1905-14, the corresponding figures are simply set equal to 100 output units p. a. The resulting series is then shifted half a year backward (equivalent to a one-year construction period), and summed to the analogous series obtained from the previous operations. The index in col. 34 is this sum, divided by 1,000.

Col. 35, in turn, presents the estimated index of privately financed construction activity in the maintenance of aqueducts other than the Apulian aqueduct. For simplicity, it is obtained by cumulating the corresponding output estimates for completed aqueducts built at private expense, with no correction for the perhaps not infrequent transfers of completed aqueducts from private to public operation and vice-versa. In 1861-1913, therefore, the annual increments equal the sum of the figures in cols. 30 – 32, plus col. 33 in 1889-1904, plus annual allowances equal to 300 output units in 1861-86, 200 in 1887-88, 50 in 1889-1903, 150 in 1904, and again 300 in 1905-13. In order to approximate mid-year values, the present cumulation equals the total through the preceding year, plus half the increment for the current year. The appropriate initial value is of course relatively uncertain; the present figures assume an aggregate private output of 6,000 units at the end of 1860, equal to the sum of the pre-1861 figures in col. 30 and a rough allowance of just over half that for other, neglected works. The index in col. 35 is the resulting series, divided by 1,000.

The present indices of privately financed construction activity in the new construction and maintenance of local distribution networks are respectively the growth in, and mid-year value of, their estimated length. Both of these are obtained directly from the year-end length estimates in col. 41, which are themselves derived primarily from the network-length sample data in the *Annuario città* (e.g., *1906*, pp. 83-84) and the aqueduct sample data underlying cols. 30 – 33. The present figures are based on the simple assumption that the water delivered by privately built aqueducts was distributed by privately built local networks; in fact, of course, the local networks could easily be owned and operated separately from the aqueducts, or transferred between the public and private sectors (thus plausibly transferring the cost of future extensions as well as of future maintenance).

Col. 36 presents the estimates pertaining to the private distribution networks in the eleven largest cities, considered separately as in section J04.03 above. The local networks of Firenze, Messina, and Milano appear to have been altogether public, and are therefore neglected here. Those of Bologna, Napoli, Venezia, and also Catania (to a negligible approximation:

Annuario città 1934, p. 476) were fed entirely by private aqueducts, and are accordingly estimated exactly as in section J04.03 above, with a linear extrapolation to 1860. The private component of the Genova city net is tentatively estimated to have grown by one kilometer p. a. from 32 kilometers in 1860 to 55 kilometers in 1883, then by 5 kilometers p. a. to 80 kilometers in 1888, and then by 2 kilometers p. a. to 112 kilometers in 1904, and again by one kilometer p. a. in 1907-08 and 1910-13 to 118 kilometers in 1913. These estimates allow the old municipal aqueduct about half the total estimated above in 1860-83 and one third of it in 1904, with the private systems accounting for all the growth after 1883. In the case of the Palermo city net, the private component is taken to have been negligible through 1894, and then to have grown by 13 kilometers p. a. in 1895-1903, and 3 kilometers p. a. in 1904-13; it thus equals the aggregate estimated above, less the initial 9 kilometers allowed for public fountains. The private component of the Roma city net is similarly estimated as the annual total in Table J.06, col. 3, less the constant 71 kilometers attributed to the old public systems. Finally, the private component of the Torino city net is taken to coincide with the aggregate estimated above from 1861 to 1906, and assumed constant before and after that. The growth in the city's aggregate network after 1906 is thus attributed entirely to the component served by the new municipal aqueduct, without attempting to utilize the curiously footnoted figure in the *Annuario città 1909-10*, p. 115 (compare *1913-14*, p. 228).

The estimates pertaining to the other private distribution networks, included in Table K.04 as the difference between cols. 36 and 41, are derived much like their aggregate counterparts in Table J.06, cols. 8 and 9. In Table K.04, cols. 37 – 40 transcribe the estimated lengths of the other private distribution networks in 1904, grouped like the aqueduct-output estimates in cols. 30 – 33, and distributed by the year the corresponding aqueduct was built (with the date also identified as in cols. 30 – 33); the footnotes supply the further distinction (defined in section J04.03 above) between the systems that apparently did, and did not, pipe water directly into private houses. Group A, in col. 37, thus covers the 37 cities and towns served by the aqueducts covered by col. 30 (counting San Pier d'Arena separately from Genova), less the seven major cities covered by col. 36. Of the others, eight are simply attributed the 1904 network length reported in the *Annuario città 1906*, pp. 83-84. These are Cagliari, Ferrara, Padova, Ancona, Piacenza, Savona, Asti, and Biella (Reggio Emilia, Chioggia, and San Remo are not included, because they reported lower figures in subsequent issues). Seven others are attributed the later figures reported in the *Annuario città* (e.g., *1907-08*, pp. 72-73), discounted back to 1904 assuming growth equal to 7.7% from 1904 to 1906, 18.4% from 1906 to 1908, and 33.5% from 1908 to 1911 (see above, section J04.03). These are Chieti, Busto Arsizio and Chioggia (this last apparently not piping water into private houses), discounted from 1906, La Spezia, Reggio Emilia and San Pier d'Arena, discounted from 1908, and San Remo, discounted from 1911. La Spezia and San Remo are attributed only one half and one third, respectively, of the figures so obtained, to allow for the share of the public systems (*Annuario città 1934*, pp. 482-483; *Acque potabili 1903*, vol. 1, p. 330); and the figure obtained for San Pier d'Arena is evenly distributed over 1854 and 1884. Ten others are estimated from the population-served figures in the *Acque potabili 1903*, vol. 1 and an allowance of 85 cm per capita (reduced to 20 cm in the apparent absence of distribution to private houses: above, section J03.04). These are Novara, Parma (halved to allow for the share of the public system), Aosta, Varese, Torre Annunziata (at the 20 cm rate), Bagni San Giuliano (also at the 20 cm rate, and divided by six to allow for the share of public systems), Novi Ligure, Portici, Resina, and Saronno. The residual five (Salerno, Imperia, Monte S. Giuliano, Pescia, and Torre del Greco) are excluded, since their private aqueducts date from later years.

Group B, in col. 38, covers the ten cities and towns served by the aqueducts covered by col. 31, less the one major city covered by col. 36. Of these, one (Porto Maurizio) is attributed

the 1904 figure reported in the *Annuario città*; seven are estimated from the figures on the population served, including five (Serravalle Scrivia, Mondovì, Montopoli, Montefiascone, and Verona) at the 85 cm rate and two (Alessandria della Rocca and Cianciana) at the 20 cm rate; and one (San Stefano al Mare) is omitted as insignificant (under half a kilometer, at the 20 cm rate). Group C, in col. 39, similarly covers the ten towns served by the aqueducts covered by col. 32. All are estimated from the figures on the population served, two of them at the 85 cm rate (San Giorgio a Cremano and Salsomaggiore, with the figure for the latter halved to allow for the share of the public system), and eight at the 20 cm rate (Stezzano, Pietraperzia, Acireale, Raddusa, Rossano, Carini, Salemi, and also Cardeto; the figure for Acireale is halved to allow for the share of the public system, and those for Stezzano and Cardeto are omitted as insignificant). Group D, in col. 40, similarly covers the 22 towns served by the aqueducts covered by col. 33. All are estimated from the figures on the population served, thirteen of them at the 85 cm rate (Luino, Viggiù, Camogli, Altare, Sassello, Desio, Seregno, Domodossola, Intra, Pallanza, Bobbio, Bordighera, and Rivalta di Torino) and nine at the 20 cm rate (Civitanova del Sannio, Petilia Policastro, Roccamorice, Loano, Andorno Cacciorna, Ficarazzi, Sta. Flavia, Barile, and Brendola; the figures for Luino, Roccamorice, Andorno Cacciorna, and Brendola are omitted as insignificant).

The aggregate length of the privately financed distribution networks outside the eleven major cities is estimated from cols. 37 – 40 as follows. First, the network-length figures in cols. 37 – 40 are combined into annual totals, omitting the 1879 figure in col. 40, and separating the footnoted figures that refer to systems without distribution to private houses. The figures that refer to systems with distribution to private houses are then augmented by allowances for neglected works, patterned on those added to cols. 30 – 33 above, equal to a cumulative 55 kilometers through 1856, 5 kilometers p. a. in 1857-86, and 2 kilometers p. a. in 1887-88. The resulting annual figures are then redistributed, attributing 40% of each figure to the current year and 15% to each of the four succeeding years, and cumulated. The figures that refer to systems without distribution to private houses are instead augmented by allowances equal to a cumulative 20 kilometers through 1860, 2 kilometers p. a. in 1861-88, and 1 kilometer p. a. in 1889-1904; and the resulting annual figures are cumulated. These two cumulations are then summed, and discounted by 1.00444 raised to a power equal to 1904 minus the current date; the results are the present estimates of the aggregate private network lengths outside the eleven major cities from 1860 to 1904. For simplicity, the corresponding figures for 1905-13 are obtained by extrapolating the 1904 estimate in proportion to the corresponding sum of public and private networks estimated above (Table J.06, cols. 8 plus 9). In Table K.04, col. 41 is the sum of these estimates and the corresponding major-city estimates in col. 36. The annual increment in col. 41 is the present index of privately financed new construction of local distribution networks; and col. 41 itself, shifted half a year forward to approximate mid-year values, is the present index of privately financed maintenance of local distribution networks.

Cols. 14 and 7 present the estimates of value added at 1911 prices in the privately financed new construction and maintenance of water works other than the Apulian aqueduct. Each is made up of two components, corresponding to the aqueducts covered by cols. 34 – 35 on the one hand, and the local networks covered by col. 41 on the other. The construction-industry value added at 1911 prices in the aqueduct construction indexed by col. 34 is estimated at 291 lire per equivalent ton-kilometer per day (.291 million lire per index point). This figure equals the unit capital-cost figure estimated in section J04.04 above, reduced by 5% to allow for the likely incidence of land costs and by 49% of the residual to allow for that of materials (as estimated for generic public works in section K05.04 below). The construction-industry value added at 1911 prices in the distribution-network construction indexed by the annual increments in col. 41 is estimated at 3,000 lire per kilometer (.003 million lire per index

point). This figure is based, in part, on the corresponding capital-cost estimate of 23,000 lire per kilometer obtained in section J04.04 above. The breakdown of the network by the pipes' diameter in the *Statistica Milano 1913*, p. 500, and the corresponding unit weights and prices in Colombo, 1911, pp. 224, 269, suggest that the straight pipes alone weighed some 55 tons, and cost 17,000 lire or more, per kilometer. Allowing for the cost of more complex pieces, ancillary materials and equipment, and the like, aggregate materials costs may well have been close to 20,000 lire per kilometer. At the same time, digging alone cost about one lira per cubic meter, and the pipes were buried perhaps 1.5 meters down (Colombo, 1911, pp. 104, 225); allowing for the cost of actually laying the pipes, sealing the joints with rope and lead (*Enciclopedia italiana*, vol. 34, p. 456), and reconstituting the road surface, the present estimate of value added seems quite reasonable. The total 1911-price value added in new construction (excluding the Apulian aqueduct) in col. 14 is accordingly estimated as the sum of .291 times col. 34 and .003 times the increment in col. 41. The result equals .5 million lire in 1911, of which about one third in the construction of aqueducts and two thirds in that of distribution networks.

The construction-industry value added at 1911 prices in the maintenance of aqueducts (other than the Apulian aqueduct) and local networks is estimated initially as a ratio to the construction-industry value added at 1911 prices generated in the new construction of the works to be maintained. This ratio is calculated for aqueducts and local works together in a sample of towns, estimating the numerator (maintenance value added) as half the water works' maintenance and sundry expenditure in 1911 reported in the *Annuario città 1913-14*, p. 185, and the denominator (new-construction value added) as the sum of the 1911 local net reported in the *Annuario città 1913-14*, p. 229, weighted by 3,000 lire per kilometer, and the aqueduct output estimated in the usual way from the *Acque potabili 1903*, vol. 1, weighted by 291 lire per equivalent ton-kilometer per day. The ratios in the present sample are those obtained for Brescia (.045, from 23.0 thousand lire reported maintenance and sundry expenditure, 49.2 kilometers, and 371 equivalent ton-kilometers per day), Cagliari (.056, from 47.0, 30.0, and 1,139), Caltagirone (.026, from 3.1, 9.0, and 110), Chieti (.030, from 12.3, 13.0, and 574), Cosenza (.009 from 4.8, 10.0, and 848), Cuneo (.008 from 2.8, 22.0, and 349), Faenza (.002, from 1.8, 10.6, and 1,534), Firenze (.149, from 322.3, 163.2, and 2,040), Girgenti (.138, from 30.0, 10.0, and 271), Padova (.007, from 30.2, 128.2, and 5,718), Perugia (.005, from 7.4, 40.0, and 2,317), Pesaro (.073, from 5.5, 5.1, and 77), Sassari (.126, from 12.5, 11.0, and 57), Siena (.016, from 6.8, 22.0, and 520), Trapani (.014, from 31.2, 12.5, and 3,809), and Vicenza (.058, from 27.3, 59.0, and 201); other towns are omitted, as the corresponding data appear to be partial (e.g., because of the presence of private works not covered by the expenditure figures), incomplete or ambiguous (e.g., because the available data cover various aqueducts together), or out of date (because of aqueduct construction between 1904 and 1911, indicated in the *Annuario città 1934*, pp. 476 ff.). The arithmetic average of these sample ratios equals 4.8%. This figure is here taken to be a weighted sum of 10% for local networks, and 2.2% for aqueducts. The 10% figure for local networks is adapted from the 12.6% figure for gas distribution networks implied by the estimates obtained in section K04.06 above (4,200 lire of maintenance value added and 33,400 lire of new-construction value added, both per million cubic meters), allowing for the presumably lower standards of maintenance that could be accepted in water distribution. Given this figure for local networks, the 2.2% figure for aqueducts is in turn simply the ratio that keeps the average of aqueducts and local networks together at 4.8%; that is to say, the average of the ratios calculated as $(.100x + .022y)/(x + y)$, where x is the value added in the local network (3,000 lire times its length in kilometers) and y is that in the aqueduct (291 lire times its output in equivalent ton-kilometers per day), equals .048. Since 2.2% of 291 lire is approximately 64 lire, and 10% of 3,000 lire is 300 lire, the total 1911-price value added in maintenance (excluding the Apulian aqueduct) in col. 7 is estimated

as the sum of .0064 million lire per thousand equivalent ton-kilometers per day of completed aqueduct capacity at mid-year (col. 35), and .0003 million lire per kilometer of local distribution network at mid-year (col. 41, shifted half a year forward). The result equals 1.7 million lire in 1911, of which .8 million in the maintenance of aqueducts and .9 million in that of distribution networks.

K04.08 Irrigation works

Most of Italy's irrigation works were built long before 1861; but a significant proportion of these remained in private hands, and a number of major new works were also built at private expense. The present estimates of privately financed construction activity are again 1911-price value added series, analogous to those estimated for the utilities in sections K04.05 to K04.07 above. A real index of new construction (Table K.04, col. 42) is obtained by identifying the works built at private expense, calculating their equivalent size as the product of their yield (cubic meters, or tons, per second) and length (kilometers), and distributing these size figures over the works' reported or likely construction period. The calculated size figures are roughly proportional to the total volume of earth moved to cut the canals, and correspondingly, it would seem, to the canals' resource costs. This assumption of constant unit costs contrasts with that of decreasing costs (economies of scale) incorporated in the aqueduct figures estimated in section K04.07 above; but it reflects the irrigation works' much lower standards of water protection and much greater typical yields (of the order of 10 to 100 cu m/s for the main canals, against 0.1 to 1.0 cu m/s for the main aqueducts). The dominant cost item is thus plausibly the construction of the conduit's perimeter (which varies with the root of its cross-section) in the case of aqueducts, and the cutting of the conduit itself (which varies directly with its cross-section) in that of irrigation works. The resulting construction index is then multiplied through by an estimate of value added per unit at 1911 prices obtained from the reported construction costs of the Cavour canals, corrected for inflation. In the case of maintenance, an aggregate value added estimate for 1911 is instead obtained first, by scaling the reported expenditure on the Cavour canal system; it is then crudely extrapolated to other years to reflect the new construction of private works, and the nationalization of the Cavour system. Both sets of estimates, it may be noted, neglect the capillary distribution system within the fields, which is assumed to have been extended and maintained as an integral part of agricultural work. The estimates of new construction further neglect the extensions to the system of local canals; these are presumed unimportant, since even the new major canals fed pre-existing local works (e.g., *Opere pubbliche*, p. 252), and the latter seem in any case to have been relatively inexpensive.

The construction series in Table K.04, col. 42 is pieced together as follows. For Piedmont, it includes seven canals. An initial group of five canals consists of those built by the Cavour canal company (*Opere pubbliche*, pp. 250-252). The first of these is the Cavour canal itself, measuring 82 kilometers and 110 cu m/s, for a total of 9,020 output units (ton-kilometers/second); of this total, 2,255 units are attributed to 1863, 3,007 p. a. to 1864-65, and 751 to 1866 (from the construction period reported in the *Carta idrografica*, vol. 5, p. 25). The second is the 19-kilometer, 10-cu m/s Montebello canal, opened in 1868; it is here attributed 95 output units p. a. in 1867-68. The third is the 3-kilometer, 70-cu m/s Farini canal; its 210 output units are attributed entirely to 1868. The fourth is the 23.5-kilometer, 25 to 30-cu m/s Sella canal; it is here allowed 352 output units p. a. in 1871-72 (*Carta idrografica*, vol. 17, p. 119). The fifth is the 27-kilometer, 10-cu m/s Lanza-Mellana canal; it is attributed 135 output units p. a. in 1873-74. Three further canals were built at this time as part of this same system, albeit not by the Cavour canal company (*Irrigazioni in Italia*, p. 241; *Opere pubbliche*, p. 252). The first of these, the Galliate-Vigevano canal of 1868, is not included here, since it was built by a consortium of municipalities. The second and third are the 15-kilometer, 7-cu

m/s Mortara canal and 35-kilometer, 12-cu m/s Pavia canal, built by consortia in 1872-73. These are here attributed a total of 263 output units p. a. in 1872 and 1873; the *regio decreto 23 novembre 1873, n. 1702* suggests that the consortia that built them were of private individuals, and that the extension of the Pavia canal beyond the Terdoppio also dates from this period. The *Irrigazioni piemontesi* appears to date only one other canal from the period at hand: the Nuovo canale consortile of 1883 (pp. 36-37). This canal is not included here, since the consortium that presumably built it may have been one of municipalities rather than of individuals, and the work itself was relatively minor (under 5 cu m/s, from the figures given for the Bene and Cherasco canals to which it was subsidiary, pp. 30-31, and perhaps 6 kilometers, from the map, Folio 80). For Lombardy, col. 42 includes the 86.5-kilometer, 20 to 70-cu m/s Villoresi canal, identified as privately owned in the *Notizie S.p.A. 1914*, p. 1098. It is here allowed 6,054 output units, corresponding to its peak flow; of these, 1,009 p. a. are attributed to 1886 and 1889, and 2,018 p. a. to 1887-88 (*Enciclopedia italiana*, vol. 21, p. 423; *Irrigazioni in Italia*, p. 190; *Irrigazioni lombarde*, p. 32). The Marzano-Vacchelli canal, built around 1890, is excluded because it was built by a consortium of municipalities (*Enciclopedia italiana*, vol. 21, p. 423; *Irrigazioni in Italia*, p. 185); the Canale federativo built in 1888 is again excluded as minor and perhaps public (*Irrigazioni lombarde*, pp. 26-27, map, Folio 47); and the properties of the Società di Irrigazione Borromea are excluded because they could not be identified (though they too were probably minor, being valued at just .5 million lire in 1916: *Notizie S.p.A. 1920*, p. 1975). For Venetia, col. 42 includes two canals. One is the de Dottori canal, which was 9.8 kilometers long and yielded 21.5 cu m/s, of which 13.0 were used for electric power and 8.5 for irrigation (*Irrigazioni in Italia*, p. 108). To avoid duplicating the hydroelectric-works estimates derived in section K04.05 above, and assuming that the power plants were built at the same time as the canal, the latter is here allowed just 84 output units; of these, 8 p. a. are attributed to 1900 and 1905, and 17 p. a. to 1901-04 (*Irrigazioni venete*, p. 14). The other is the Alto Agro Veronese canal, with its related subsidiaries. The *Irrigazioni venete*, which attributes 20.5 cu m/s to this canal, indicates that work on it began in the early 1880s (long after the relevant individuals formed the consortium, in 1865), but was suspended and not brought to completion until 1914 (pp. 13, 48-49); but the *Carta idrografica*, vol. 25, pp. 368-369 indicates that it was already operating (in 1897), with a yield of 11.5 cu m/s (of which 10.5 for irrigation) and a length of 76.9 kilometers (apparently its final length including the secondary canals, judging from the map in the *Irrigazioni venete*, Folio 48). Allowing for the presumably lower average yield of the secondary canals, this system is here allowed 1,232 output units, attributed as follows: 103 p. a. to 1880, 1883, 1911, and 1914; and 205 p. a. in 1881-82 and 1912-13. The Ledra-Tagliamento works, built around 1880, are instead excluded because they were built by a consortium of municipalities (*Irrigazioni in Italia*, p. 113; *Irrigazioni venete*, pp. 13, 44-45). The Antonibon Portelle canal was instead probably built at private expense at much the same time; but it appears to have been negligible (*Irrigazioni venete*, pp. 46-47, map, Folio 37). For Liguria, col. 42 includes the 75.5-kilometer, 5-cu m/s Lunense canal, under construction in 1885, and apparently built by a consortium of private individuals (*Carta idrografica*, vol. 19, pp. 61-63, vol. 36, p. 136). This canal is allowed 378 output units, of which 63 p. a. are attributed to 1884 and 1887, and 126 p. a. to 1885-86. The works built by the later Società Lunense are instead ignored; these were valued at just 0.1 million lire in 1913, and delivered just 0.1 cu m/s in 1930 (*Notizie S.p.A. 1918*, p. 1408, 1930, p. 1947). No works are allowed for the rest of the peninsula or for Sardinia, despite the existence of an Aniene canal company (*Notizie S.p.A. 1918*, p. 1406; note the lack of reference to any such works in the *Irrigazioni in Italia*, pp. 393-402). For Sicily, finally, col. 42 includes relatively tentative estimates for two canal systems. The first is that of the Simeto company, founded in 1859 (*Notizie S.p.A. 1918*, p. 1409). These works, comprising two separate main canals and their subsidiaries, appear to have

been some 74 kilometers long, and distributed some 3.8 cu m/s (*Irrigazioni in Italia*, pp. 532-535, calculating the yield as the product of the reported yield per acre and irrigated acreage; contrast the *Irrigazioni siciliane*, pp. 38-39). This system is here allowed a total of 104 output units (assuming an average yield of 1.4 cu m/s); in the absence of direct chronological evidence, these are here attributed to the years following the formation of the company (17 units p. a. in 1861 and 1864, and 35 units p. a. in 1862-63). The second is the irrigation component of the Casalotto works, which also supplied Catania with water. These are allowed 40 kilometers and 0.8 cu m/s, for a total of 32 output units (*Notizie S.p.A. 1918*, p. 1404); assuming that these were built at the same time as the aqueduct, 8 units p. a. are here attributed to 1885 and 1887, and 16 units to 1886. The Castorina and Sim company canals also appear to have been private; but since these irrigated just 600 and 1,050 ha, respectively, with total yields of about 0.2 and 0.1 cu m/s, they are here considered negligible (*Irrigazioni in Italia*, pp. 534-535).

The corresponding value added at 1911 prices is here estimated from the reported expenditure for the Cavour, Farini, and Lanza-Mellana canals. These cost, respectively, 47.8 million lire for 9,020 output units, in 1863-66; 1.2 million lire for 210 output units, in 1868; and 1.8 million lire for 270 output units, in 1873-74 (*Carta idrografica*, vol. 5, p. 25; *Opere pubbliche*, p. 252). On the assumption that the overwhelming bulk of these costs were for manual earth-moving and low-grade materials (*Storia Milano*, vol. 15, p. 867), they are here converted to 1911 prices on the basis of the index of labor and low-grade materials costs in Table K.06, col. 9. The resulting cost estimates at 1911 prices equal approximately 9,700 lire, 9,700 lire, and 10,500 lire per output unit (ton-kilometers/second); the near-constancy of these figures, despite the elevenfold difference in yields between the Cavour and Lanza-Mellana canals, tends to support the present assumption of constant costs. Value added at 1911 prices is here estimated at 7,500 lire per output unit, or about 75% of the average of the value estimates obtained above. The aggregate 1911-price value added series in Table K.04, col. 15 accordingly equals .0075 times col. 42; the resulting estimate in 1911 equals .8 million lire.

The corresponding maintenance estimates in col. 8 are instead obtained first for 1911, and then extrapolated to other years. In the fiscal years around calendar 1911, annual State expenditure for canal maintenance averaged some .7 million lire for the Cavour systems, and .3 million lire for other canals (e.g., *Rendiconto consuntivo 1913-14*, finance budget items 89 and 94). The Cavour system then included some 454 kilometers of major canals, 286 kilometers of medium canals, and 754 kilometers of minor canals (*Carta idrografica*, vol. 5, 2d ed., p. 74). It helped irrigate an area of about 483,000 ha; but the Ovest-Sesia consortium covered about 52,000 ha of that total, and appears to have leased and maintained all but the largest public canals within its domain (*Irrigazioni piemontesi*, pp. 16-17, *Opere pubbliche*, pp. 253-256, and *legge 3 luglio 1853*, n. 1575, arts. 22-23 of the concession contract; the maintenance of the canals leased by the consortium does not appear to have been performed by the State at the consortium's expense, given the insignificance of reported State receipts for work done at the expense of others, e.g., *Rendiconto consuntivo 1889-90*, parte 2, pp. 118-119, *1903-04*, income item 7.2D). The Ovest-Sesia consortium is here allowed some 30 kilometers of medium canals and 80 kilometers of minor canals, out of the totals reported for the Cavour system; and the other canals within the area irrigated by the Cavour system are tentatively estimated at about 50 kilometers of medium canals, 200 kilometers of minor canals, and 6,000 kilometers of local canals (as suggested by the end map in the *Carta idrografica*, vol. 5, 2d ed., and the detailed maps in the *Irrigazioni piemontesi*). Further allowing major, medium, minor, and local canals unit weights equal to 1.00, .50, .25, and .07 (in approximate proportion to the square root of their likely average flow, here estimated at 40, 10, 2, and 0.2 cu m/s, respectively), these figures suggest that the State maintained the equivalent of about 750 kilometers of major canals in the Cavour system, out of a total within that 483,000-ha area equivalent to about 1,280 kilometers

of major canals. Since the total irrigated area within Italy's borders at that time equaled perhaps 1.4 million ha (*Irrigazioni in Italia*, p. 83), the aggregate expenditure to maintain Italy's irrigation works in 1911 may be estimated as .7 million lire, times 1,280/750, times 1.4/.483, or about 3.5 million lire.

Of that total, as noted above, about 1.0 million lire was spent by the State; and another 0.7 million seems to have been spent by the municipalities. In 1899, the latter spent some 3.3 million lire, equivalent to perhaps 4.3 million at 1911 prices, for the maintenance of irrigation and water works (*Bilanci comunali 1899*, p. 107, item 59; Table K.06, col. 10). Private water works were then about 36% of the total (Table J.04, cols. 6 and 16, K.04, cols. 33 and 39), and generated an estimated value added at 1911 prices of 1.2 million lire (Table K.04, col. 7), equivalent to an expenditure of some 2.0 million lire at 1911 prices (at the standard 60% share of value added in maintenance value estimated in section K05.04 below). Municipal expenditure for water works in 1899 was thus plausibly close to 3.6 million lire at 1911 prices (64/36 times 2.0), allowing a residual of approximately 0.7 million lire for irrigation works. Assuming substantial stability in the stock of municipal irrigation works, this same figure is here attributed to 1911, as indicated above. The privately financed maintenance of irrigation works is accordingly estimated at 1.8 million lire in 1911; construction value added is in turn estimated at 60% of that, or some 1.08 million lire.

The estimates for the other years are obtained by extrapolating this figure to allow for the construction of the private canals listed above, for the private maintenance of the Cavour system by the Cavour canal company from January 1, 1863 apparently through mid-1874, and for the transfer of other private and public canals to the Cavour system (*Opere pubbliche*, pp. 253-254; *legge 25 agosto 1862*, n. 776; *legge 16 giugno 1874*, n. 2002; *regio decreto 6 luglio 1874*, n. 2004); the presumably minor extensions to the system of local canals are instead neglected here as they are above. The present estimates allow each canal a maintenance value added equal to 90 lire per equivalent ton-kilometer per second, calculated as the product of length in kilometers and the square root of the yield in cubic meters per second; the 90-lire figure is itself obtained from the above figures for the part of the Cavour system maintained by the State (which yield an estimated value added of .42 million lire, and an estimated total of about 4,600 equivalent ton-kilometers/second). For simplicity, every canal is here treated as if it had been completed, or transferred to the Cavour system, at the end of the year in which it was actually completed or transferred. The estimated 1911-price value added in the maintenance of the canals which remained in private hands from 1861, or the year they were built, through 1913 is accordingly equal to 965,000 lire in 1861, increasing to 973,000 in 1865, 993,000 in 1884, 1,011,000 in 1888, 1,076,000 in 1890, and 1,080,000 in 1906; the terminal level is that estimated above for 1911, and the increments correspond to the completion of the works listed above with the indicated lengths and yields (Simeto in 1864, Alto Agro Veronese in 1883, Lunense and Casalotto in 1887, Villoresi in 1889, and de Dottori in 1905). The pre-existing canals transferred to the Cavour system after 1863 appear to be the Fuga canal (4 kilometers and an estimated 5 cu m/s) in 1876, the Busca, Rizzo-Biraga, and Nicorvo canals (respectively 110 kilometers and 22 cu m/s, 59 kilometers and 18 cu m/s, and 7 kilometers and an estimated 10 cu m/s) in 1885, the Gazelli canal (15 kilometers and 2 cu m/s) in 1886, and the Galliate-Vigevano canal (18 kilometers and 22 cu m/s) in 1893; all but this last appear to have been in private hands up to their transfer, and to date from before 1861 (*Irrigazioni in Italia*, p. 240; *Irrigazioni piemontesi*, pp. 20-21; *Opere pubbliche*, pp. 252-254). Allowing also for the completion of the system's new canals (Cavour in 1866, Farini and Montebello in 1868, Sella in 1872, Mortara and Pavia in 1873, and Lanza-Mellana in 1874, with the lengths and yields indicated above), the total 1911-price value added in the maintenance of the public canals of the Cavour system, excluding those leased to the Ovest-Sesia consortium, is here taken to have increased from

219,000 lire in 1861 to 296,000 in 1867, 303,000 in 1869, 315,000 in 1873, 330,000 in 1874, 338,000 in 1875, 339,000 in 1877, 410,000 in 1886, 412,000 in 1887, and 420,000 in 1894 (obtained, as before, from the terminal estimates and the estimated increments). Finally, the private canals that were transferred to the Cavour system are analogously attributed a total 1911-price maintenance value added equal to 74,000 lire in 1861, declining to 73,000 in 1877, 2,000 in 1886, and zero in 1887. The present estimates in Table K.04, col. 8 are the rounded sum of three components: the above value added estimates for the canals that remained private, from 1861 to 1913; the above value added estimates for the Cavour system from 1863 through 1873, and half the corresponding figure in 1874; and the above value added estimates for the private canals that were transferred to the Cavour system. In the event, most of the estimated changes are negligible or offsetting, and the net movement of the final series is minimal.

K05. Public works other than railways: cost indices and production estimates

K05.01 Introduction

The present aggregate estimates of 1911-price value added in the new construction and maintenance of non-railway public works are presented in Table K.05, cols. 4, 6, and 10. These figures incorporate, as their minor components, the partial estimates of privately financed production detailed above (Table K.04, cols. 5 – 8 and 12 – 15) and summarized in Table K.05, cols. 3 and 9. Their major components (corresponding in Table K.05 respectively to col. 4 minus col. 3, to col. 6, and to col. 10 minus col. 9) are the 1911-price value added series obtained from the estimates of public and private expenditure detailed above (Table K.02, cols. 13 – 15, Table K.03, cols. 7 – 9 and 16 – 18, and Table K.04, cols. 1 – 4 and 9 – 11) and summarized in Table K.05, cols. 1 – 2, 5, and 7 – 8. These current expenditure series are aggregated, deflated into real output (expenditure) series, and then scaled, in the usual way, by an estimate of 1911-price value added per unit of real output.

The present deflators are the indices of construction costs presented in Table K.06. A sample of construction-materials price series and a construction-labor wage series (col. 7) are crudely estimated and as crudely transformed into an index of high-grade materials costs on the one hand (col. 8), and of labor and low-grade materials costs on the other (col. 9). These input-specific cost indices are then combined into the desired output-specific deflators (cols. 10 – 12) on the basis of weights that reflect the structure of input costs in maintenance, building construction, and other new construction.

K05.02 An index of high-grade materials costs

The sample of construction-materials price series is presented in Table K.06, cols. 1 – 6. Some parts of that sample are based on actual quotations for standard qualities, but in a single market; others are derived from the *Movimento commerciale* and represent no more than a typical value for a relatively broad range of goods. The latter values tend to remain stable over long periods, no doubt reflecting, at least in part, an understandable reluctance to pursue minor revisions to a figure that would in any case remain only a rough average; by the same token, what changes do occur may reflect changes in the mix of traded products as well as in their average value calculated with constant weights.

The price of building stone (col. 1) is taken from the *Movimento commerciale*. From 1878 to 1887, it is the export price attributed to ordinary stone of all degrees of fabrication (from rough stone to statues); from 1888 to 1913, it is the average of the separate export prices for rough and processed ordinary building stone, with weights equal to .3 and .7, respectively (calculated to yield an estimate for 1888 equal to the reported figure for 1887); from 1914 to 1916, it is the export price of rough building stone, times 3.1 (the ratio of the present estimate to that price in 1913); and from 1861 to 1877 it is the export price of the stone and other materials not elsewhere classified, times 1.25 (to yield an estimate for 1877 equal to the reported figure for 1878).

The price of fat lime (col. 2) is pieced together from two basic sources. From 1901 to 1916, it is the Genova price reported in Cianci (1933), p. 293, and repeated in the *Sommario*, p. 189. The 1861-77 and 1888-1900 prices are the *Movimento commerciale* export price for ordinary lime (or lime and plaster together, in 1888-94; they were attributed the same unit value in 1895), times .78 (the ratio of the Genova price to the export price in 1901). Lime is grouped with plaster and cement in 1878-82, and with all materials not elsewhere classified in 1883-87; since the only change in average value between 1877 and 1888 that was not related to a redefinition of the category was the significant decline from 1880 to 1881, the present estimates simply repeat the 1877 figure in 1878-80, and the 1888 figure in 1881-87.

The price of bricks and tiles (col. 3) is similarly pieced together. From 1901 to 1916, it is the simple average of the Genova prices of bricks and tiles reported in Cianci (1933), pp. 373-374. From 1861 to 1900, it is the simple average of the *Movimento commerciale* export prices per ton for bricks and tiles (*mattoni* etc. and *tegole* etc. in 1861-77, both together in 1878-87, and *mattoni ordinari* etc. and *mattoni forati* etc. in 1888-1900), times 1.586 tons per thousand (the ratio of the Genova price to the average export price in 1901).

The price of lumber (col. 4) is pieced together from three sources. From 1901 to 1916, it is the Genova price reported in Cianci (1933), p. 380. From 1890 to 1900, it is the *Movimento commerciale* export price per ton of lumber (*legname squadrato e segato*), times .607 tons per cubic meter (the ratio of the Genova price to the export price in 1901). From 1861 to 1889, it is the Torino price per ton of soft-wood lumber reported in Felloni (1957a), p. 27, times 1.517 tons per cubic meter (the ratio of the estimated Genova price to the reported Torino price in 1890).

The price of wood fixtures (col. 5) is taken from the *Movimento commerciale*. From 1880 to 1916, it is the unweighted average of the export prices for rough and polished or painted tools and other products of ordinary wood, not elsewhere classified (*utensili e lavori non nominati* or *diversi, di legno comune: greggi, altri* and *puliti o dipinti, altri*); from 1861 to 1877, it is a similar average of the export prices for common and unspecified tools and other wood products (*utensili e lavori diversi, comuni* and *non nominati*); and in 1878 and 1879, it is interpolated on the assumption that the single reported export value for all tools and other products of ordinary wood not elsewhere classified (*utensili e lavori diversi di legno comune*) corresponds to the lower of the two figures entering the present average in 1877 and 1880.

The price of iron bars (col. 6) is pieced together from two basic sources. From 1892 to 1916, it is the Roma price of domestic iron reported in Cianci (1933), pp. 328-332 and repeated in the *Sommario*, p. 187. From 1870 to 1891, it is the unweighted average of the monthly Genova prices of domestic iron in Cianci (1933), pp. 326-328, as reported or arithmetically interpolated, times .931 (the ratio of the Roma price to the estimated Genova price in 1892). From 1861 to 1869, it is the Genova price of imported iron reported in Felloni (1957b), p. 39, times .995 (the ratio of the estimated Roma price of domestic iron to the Genova price of imported iron in 1870).

The index of construction-materials costs in col. 8 is obtained, very simply, by dividing each of the series in cols. 1 – 6 by six times its value in 1911, and then summing the six resulting figures for each year. Given the divergent paths of cols. 1 – 6, these equal weights in 1911 correspond to weights of approximately .19 each for cols. 2, 3, and 6, .15 each for cols. 4 and 5, and .12 for col. 1 in 1903; these proportions do not seem unreasonable in comparison to the figures for residential construction in Comune di Pisa (1903), p. 43, allowing for the likely lesser use of wood fixtures and greater use of metal in public construction. This index is here referred to high-grade materials only: for the reasons noted below, the low-grade materials price series missing from the present sample are more plausibly indexed by the cost of labor than by the cost of the materials covered by col. 8.

K05.03 An index of labor and low-grade materials costs

The estimates of the average construction wage are presented in Table K.06, col. 7. These too are pieced together from a variety of sources. The best information here refers to the early years: the *Salari edilizi 1862-78* (pp. 3-25) reports annual average wages for six categories of workers on building projects and three categories of workers on earth-moving projects in each of Italy's 69 provinces and 16 *compartimenti*, as well as Italy as a whole. The derivation of the disaggregated figures is not described, though they are said to have been compiled by the *Genio civile* (Corps of engineers); the figures for geographic aggregates appear to be unweighted averages over the component sub-aggregates. The category-specific national

average wage series (which mask a good deal of interlocal variation in both levels and time paths) are transcribed in Table K.07, cols. 1 – 7; the present figures for boys and women are simple averages of those reported for building and earth-moving projects. The estimated overall average wage in 1862-78 (Table K.06, col. 7) is the weighted average of these category-specific wages (Table K.07, cols. 1 – 7), with weights equal to .050 for master builders, class 2 bricklayers, and boys, .100 for women, .200 for class 1 bricklayers, and .275 for manual laborers and navvies. These rough percentages are based primarily on the evidence in Felloni (1963), pp. 1, 9 and the *Salari edilizi 1906*, pp. 110-111, with the total share of bricklayers substantially increased to reflect the presumed bias in these sources (they are dominated by road-building and earth-moving projects, while the subcontracted work they apparently exclude probably included significantly more ordinary building, in which unskilled labor is about half, rather than over three fourths, the total: *Salari edilizi 1906*, pp. 110-111); the share of women is based on the 1881 census figures for category II.V (e.g., *Annuario 1884*, p. 63).

Similarly direct, broadly-based evidence of actual construction-industry wages is not available for later years, with a single exception fortunately late enough to fix the long-term trend. Detailed figures for 1906, distributed over some 250 municipalities and 80 job classifications, were provided by the Genio civile and published in the *Salari edilizi 1906*; the subset comparable to those available for 1862-78 is used here to generate the province-specific 1906 figures in Table K.08. The figures in cols. 1 – 8 are simple unweighted averages of the average hourly wages quoted for individual municipalities in each province (*Salari edilizi 1906*, pp. 31-38, 67-70, 77-79); bricklayers' wages were either disaggregated by class or referred to "adult bricklayers" (here considered to represent class 1 and class 2 together), so that when both types are reported the class-specific figures (cols. 2 and 4) and the "adult" figure (col. 3) do not refer to the same municipalities. The figures in cols. 1 – 8 are a complete sample for these job classifications; cols. 9 – 15 report only the comparable figures for 1878 from the *Salari edilizi 1862-78* (pp. 3-14, 18-23), with the boy and woman figures again obtained as the simple average of those in building and earth-moving projects. The latter source reports no navvies' wage figures for Vicenza, or women's wage figures for Caltanissetta and Forlì, in 1878; it also appears to invert the navvies' wages for Sassari and Siena.

In Table K.09, cols. 1 and 2 summarize the information in Table K.08. Col. 1 reports the average values of the entries in Table K.08, cols. 1 – 8, excluding the figures for which there is no 1878 counterpart (Caltanissetta and Forlì in col. 8, Vicenza in col. 6); col. 2 reports the averages, over the corresponding provinces, of the entries in Table K.08, cols. 9 – 15. Col. 3 transcribes the actual national average wages in 1878 (from Table K.07); the discrepancy between cols. 2 and 3 is thus a measure of the extent to which the provinces in the sample in col. 2 are in fact a biased sample of the country as a whole. Since the disaggregated figures in Table K.08 suggest a limited stability in the pattern of interlocal wage relatives, and also a limited convergence of local wages toward the national averages, the best estimates of national average wages would appear to be a compromise between the figures in col. 1 (appropriate if interlocal wage relatives were totally unstable, or if local wages had totally converged), and the figures in col. 1 times the ratio of col. 3 to col. 2 (appropriate if interlocal wage relatives were totally stable); for the sake of simplicity, the present estimates in col. 4 are the simple average of these two alternative magnitudes. A partial exception is made in the case of bricklayers' wages, as the high figure for "adult bricklayers" in col. 1 (from 54 provinces) suggests that the figures for class 1 and class 2 bricklayers in col. 1 (from 17 provinces) are in fact relatively low (even though their wages in those same provinces were not relatively low, on average, in 1878). The higher the proportion of class 1 bricklayers in the "adult" total, the lower the implied correction to the class-specific figures; and while class 1 types may well have predominated in 1906 as in earlier years (Felloni, 1963, p. 1), it seems unlikely that the proportion of class 2 types was

altogether negligible. Assuming then that “adult bricklayers” were 80% class 1 and 20% class 2, and that class 1 wages were 1.20 times class 2 wages (as in the 17 provinces which separated those two classes), the average wage of .356 lire per hour for those two classes together is here factored into class averages, for those 54 provinces, equal to .368 lire per hour for class 1 types and to .307 lire per hour for class 2 types. Taking these figures into account, the overall sample average wages, in lire per hour, are: for class 1 bricklayers, .368 over 54 observations and .358 over 17 observations, or .366 overall, in 1906, and .301 over 54 observations and .313 over 17 observations, or .304 overall, in 1878; for class 2 bricklayers, .307 over 54 observations and .298 over 17 observations, or .305 overall, in 1906, and .245 over 54 observations and .241 over 17 observations, or .244 overall, in 1878. The final estimates of bricklayers’ wages in 1906 (col. 4) are based on these overall sample averages and the figures in col. 3, combined as for other job types following the procedure outlined above. Averaged with the weights already used for 1862-78, the 1906 job-specific figures in col. 4 yield an average construction-industry wage for 1906 equal to .259 lire per hour (Table K.06, col. 7).

These direct estimates for 1862-78 and 1906 are extrapolated to 1861-1913 as follows. First, the figure for 1906 is extrapolated to 1900-16 in proportion to a three-year moving average of the early wage series presented in Vismara (1921), p. 85 and reproduced, e.g., in Arcari (1935), p. 103 (and also, transformed into an hourly wage series on the assumption of a uniform 10-hour day, in Berra and Revelli, 1978, p. 1175). The Vismara series refers to the calculated average daily wage of workers collecting on their insurance with the Cassa Nazionale Infortuni; close to half of these workers, at least, appear to have been employed in construction or such related activities as quarrying and road transport (Vismara, 1921, pp. 83-84; *Atti assicurazione*, e.g., record of June 25, 1901, pp. 72-73, record of October 29, 1906, pp. 94-95). Second, the resulting figure for 1900 is extrapolated back to 1887 on the basis of the engineering-industry wages reported in the *Annuario 1905-07* (p. 817, top panel). These are averaged, attributing manual workers’ wages twice the weight of each of the others; chained from 1886 to 1887, to offset the omission of one data point in 1886; assumed constant from 1897 to 1901, as if the caption had simply omitted to apply the 1897 figures to the succeeding years as well, and noting in any case the small net change to 1902; and smoothed by taking a three-year moving average. Third, the resulting estimate for 1887 and the directly calculated figure for 1878 are interpolated on the basis of the average industrial wage for adult males (in the textile, paper, and chemical industries) reported in the *Annuario 1904*, p. 360, and reproduced in Geisser and Magrini (1904), p. 9. This series is again smoothed by taking a three-year moving average; and the growth of the resulting index is increased by 0.5% p. a., to force it through the figures to be interpolated. Fourth and last, the present estimate for 1862 is extrapolated to 1861 on the assumption that the latter equaled 97% of the former. This percentage is the simple average of the four corresponding figures for Firenze (99%), Genova (91%), Milano (98%), and Roma (100%), themselves calculated as the simple averages of the corresponding percentages for all the specific types of construction labor reported in Bandettini (1960), pp. 11-18, Felloni (1963), pp. 20-23, Aleati (1961), pp. 12-14, and Di Rollo (1965), pp. 27-32.

These extrapolations are clearly very rough. However, the general movement of the resulting wage series -- an average 20% increase from the late 1870s to the late 1880s, a 10% decline in the early 1890s with a slow recovery through the turn of the century, and a 35% increase in the last ten years before the World War -- is a very reasonable one. On the one hand, it is compatible with a good deal of direct, if largely inchoate, evidence: on builders’ wages in Firenze, Genova, Milano, and Torino in Aleati (1961), pp. 12-14, Bandettini (1960), pp. 11-18, Felloni (1963), pp. 20-23, Geisser and Magrini (1904), pp. 37, 126-130, and various editions of Colombo (e.g., 1911, p. 223); on quarryiers’ wages near Roma (where the building cycle was

particularly violent) in the *Annuario 1905-07*, p. 816; on agricultural day-laborers' wages (which were probably a good index of unskilled construction workers' wages) in Arcari (1936), p. 252; on rents, which presumably varied with money incomes (see below, sections K09.03 and K09.05); and broadly, at least, with the wage data in the *Salari edilizi 1906-10* and *1911-12*, returned to below. On the other hand, and no less significantly, it yields reasonable results: specifically, the deflated maintenance expenditure series implied by these wage movements grows relatively steadily, as one would want it to, with what appear to be minor steps in conjunction with the new-construction booms of the 1880s and early 1900s (Table K.05, cols. 1 plus 2, divided by Table K.06, col. 10; or Table K.05, cols. 4 minus 3, divided by .6).

The present wage series does not incorporate evidence from the *Salari edilizi 1906-10* or *1911-12*. These are concerned primarily with contractual, rather than actual, wage rates. Data on bricklayers' contractual minimum wages, in particular, are reported for a large number of (mostly northern) cities and towns from 1901 to 1912 (*Salari edilizi 1906-10*, pp. 247 ff., *1911-12*, pp. 8 ff.). An overall index of these minima was tentatively calculated as the simple average of 17 province-specific indices (all set equal to 100 in 1906) themselves obtained from a sample of 41 municipalities (Alessandria, Acqui, Casale Monferrato; Ancona, Montemarcano; Belluno; Bologna, Budrio, Castel S. Pietro; Brescia; Como, Incino Erba, Lecco, Varese; Cremona, Crema; Cuneo, Bra, Savigliano; Firenze; Milano, Gallarate, Monza, Sesto S. Giovanni; Novara, Domodossola, Intra, Pallanza, Ponderano, Romagnano, Ronco Biellese, Vercelli; Padova; Parma, Torrile; Stradella, Voghera; Roma; Torino, Chieri; Vicenza). This overall index grows from 77 in 1901 (successively by 12, 4, 1, 3, 3, 9, 4, 3, 6, 4, and 1 index points) to 127 in 1912. From 1906 to 1912, therefore, this index grows very much like the present estimates; but it grows much faster than they in 1901-06 (and especially in 1901-03). The latter result does not seem representative of actual wages, however, since it implies an implausibly slow trend growth of wages from 1878 to 1901 (3.4%, given the direct estimate in 1906, against 25% for the industrial workers covered by the index in Geisser and Magrini, 1904, p. 9) and an equally implausible stagnation of deflated maintenance expenditure over the first decade of the century (despite the significant growth in current expenditure and especially in real new construction). In any case, the link between actual and minimum wages is notoriously elastic; in the case at hand, one can well imagine that the measured pattern reflects a tendency of the early growth in minimum wages to compress, rather than to shift, the wage distribution. The *Salari edilizi 1906-10*, pp. 1-163, does contain data on actual wages (reported in small type) in a considerable number of (again mostly northern) cities and towns over the years 1906-09 (the 1910 figures refer to the beginning of the year, and almost invariably repeat those for 1909). Averaging over the implied place-specific growth rates, one obtains overall rates of 10-15% p. a., which are again implausibly high both with respect to the other wage series cited above, and with respect to the implied path of real maintenance (which would then display a very sharp reduction over these years). Once again, the source would appear biased: not implausibly, since actual wages were very rarely reported for more than a single pair of years in any one place, because these data were most likely to be included over the times and places in which they actually grew.

Table K.06, col. 9 is simply the wage series in col. 7, divided through by its value in 1911. This index is here referred to the low-grade materials missing from the sample in cols. 1 – 6 as well as to labor, on the presumption that such materials were non-traded items of little or no value beyond that of the embodied domestic labor (in quarrying, and in local transportation by road or waterway).

K05.04 The structure of construction costs

The present deflators of construction expenditure are simply weighted sums of the high-grade materials cost index and the labor and low-grade materials cost index obtained above; and 1911-price value added is taken to be a constant share of 1911-price expenditure. Since input substitutability and technical change are thus neglected here as they are throughout this study, the structure of construction costs is examined only to determine suitable relative weights for the input cost indices, and the share of value added, at 1911 prices.

The structure of costs in the construction of new buildings, which seems much the best documented, is here estimated first. A first breakdown is provided by the total and materials cost figures in Comune di Pisa (1903), pp. 39-43. These indicate, for luxury housing, a total cost of 12.85 lire/cu m and a materials cost of 8.25 lire/cu m, including .56 lire/cu m for low-grade materials (stones) and 7.69 lire/cu m for high-grade materials (lime, bricks and tiles, cut stone, lumber, wood fixtures, iron and iron work, glass, and ceramic); for middle class housing and office buildings, a total cost of 9.37 lire/cu m and a materials cost of 6.57 lire/cu m, including .58 lire/cu m for low-grade materials and 5.99 lire/cu m for high-grade materials; and for low-income housing, warehouses, and the like, a total cost of 6.66 lire/cu m and a materials cost of 4.30 lire/cu m, including .42 lire/cu m for low-grade materials and 3.88 lire/cu m for high-grade materials. Assigning these three categories of buildings weights equal to .10, .45, and .45, respectively, one obtains the following averages: total cost, 8.50 lire/cu m; low-grade materials costs, .51 lire/cu m; and high-grade materials costs, 5.21 lire/cu m. Deducting these materials costs from total cost, one obtains a residual of 2.78 lire/cu m for value added; a plausible breakdown of that figure would attribute 1.11 lire/cu m (13% of total cost, as in the example below) to capital and salary costs, and 1.67 lire/cu m to wage costs. Comparable figures for 1911 are here obtained by dividing wage and low-grade materials costs by .773 (the 1903 value of the corresponding cost index in Table K.06, col. 9) and high-grade materials costs by .878 (the analogous figure in Table K.06, col. 8), and keeping the share of capital and salary costs at 13%; the resulting figures allow 2.16 lire/cu m (21%) to wage costs, .66 lire/cu m (7%) to low-grade materials costs, 5.93 lire/cu m (59%) to high-grade materials costs, and 1.31 lire/cu m (13%) to capital and salary costs.

A second breakdown of building-construction costs is provided by the more detailed analysis, based on 1939 prices, in Corsetti (1941). The starting point is here the cost estimate for a farmhouse reported in pp. 115-117. Deleting minor or specifically farm-related items, one obtains the following cost figures: 1,322 lire for digging the foundations (item 1), and 2,252 lire for laying them in concrete (item 2); 24,016 lire for the stone walls (item 3); 10,167 lire for the roof (item 6); 2,711 lire for the concrete floor (item 8); 3,386 lire for interior and exterior plastering (item 9); 7,588 lire for planking, doors and windows (items 4 and 10); and 1,241 lire for relevant accessories (items 12b-c-d). The breakdown of these various items, in turn, is based on the unit cost figures specified in pp. 204-223; since these allow overhead a uniform 15% of all other costs, capital and salary costs are here similarly attributed a uniform 13% of the total. The distribution of the residual 87% of total costs among wages, low-grade materials, and high-grade materials is here estimated to equal 87%, 0%, and 0%, respectively, in digging the foundations (on the assumption that this was done entirely by hand); 22%, 25%, and 40%, respectively, for laying them in concrete (from case 5, p. 204); 33%, 30%, and 24%, respectively, in erecting the walls (from cases 6 and 7, p. 205); 25%, 0%, and 62%, respectively, in erecting the roof (from case 46, p. 213); 43%, 13%, and 31%, respectively, in laying the concrete floor (from cases 54 and 55, pp. 215-216); 59%, 6%, and 22% respectively, in plastering (from cases 36, 37, 40, and 41, p. 212); 25%, 0%, and 62%, respectively, in installing the planking, doors, and windows (as in erecting the roof); and 13%, 0%, and 74%, respectively, in installing the accessories (assuming wage costs equal to capital and salary costs). Applied to

the corresponding cost figures above, these percentages yield totals of 17,334 lire (33%) for wage costs, 8,323 lire (16%) for low-grade materials costs, 20,176 lire (38%) for high-grade materials costs, and 6,848 lire (13%) for capital and salary costs.

The direct shifting of these figures to their equivalents in 1911 prices is impractical, in the absence of a suitable wage series on the one hand, and in the presence of extreme discrepancies between the materials prices actually used by Corsetti and the corresponding values in the *Sommario* (which typically extrapolate the present figures in Table K.06) on the other. In general terms, however, the cost shares derived from the Comune di Pisa (1903) on the one hand and Corsetti (1941) on the other do not seem incompatible: this is most significantly so in the case of wages, whose estimated share of 33% in 1939 does not seem unreasonable next to the above estimates of 20% in 1903 and 21% in 1911, or the 30% in 1929 indicated by the *Enciclopedia italiana*, vol. 13, p. 466. The share of low-grade materials grows rather more dramatically, from 7% in 1911 to 16% in 1941; but this is plausibly attributed to the inadequate specification of the materials listed in the earlier source (for example, the 10 lire/ton quoted for lime in Comune di Pisa (1903), p. 43 -- close to half the corresponding figure in Table K.06, whereas most other prices are generally comparable -- may well include the cost of the sand used with the lime). Such considerations argue in favor of reestimating the 1911 share of low-grade materials from its 1939 share and the intervening growth in the share of wages, thus raising it to 10%, and correspondingly reducing the estimated share of high-grade materials to 56%. In summary, then, the present estimates of the structure of costs in the construction of new buildings allow 21% to wages, 10% to low-grade materials, 56% to high-grade materials, and 13% to capital and salary costs.

A rough estimate of the structure of costs in other new construction assigns 38% of costs to wages, 25% to low-grade materials, 24% to high-grade materials, and 13% to capital and salary costs. This last share is estimated directly; the others are obtained as the simple average of the estimated shares in erecting walls, pouring concrete, moving earth, and filling. Apart from the constant 13% attributed to capital and salary costs, the shares of wages, low-grade materials, and high-grade materials are estimated to equal 24%, 22%, and 41%, respectively, in erecting walls; 14%, 16%, and 57%, respectively, in pouring concrete; 87%, 0%, and 0%, respectively, in moving earth; and 26%, 61%, and 0%, respectively, in filling. The shares in filling are estimated directly, allowing wages twice the share of capital and salaries, and the residual to low-grade materials; the others are instead adapted from the above estimates for 1939 in erecting walls (33%, 30%, and 24%, respectively), pouring foundations (22%, 25%, and 40%, respectively) and digging foundations (87%, 0%, and 0%, respectively), assuming that the ratio of the wage and low-grade materials cost index to the high-grade materials cost index rose from 1.0 in 1911 to approximately 2.3 in 1939 (as is implied by the change from 1911 to 1939 in the estimated cost shares in the construction of new buildings, with wages and low-grade materials rising from 31% of the total to 49%, and high-grade materials declining from 56% of the total to 38%). The estimates so obtained are loosely confirmed by the following bits of evidence: first, the implied ratio of value added to value in 1911, in the neighborhood of 51%, is very close to that obtained for railway construction (51% of expenditure including land costs) in section K06.04 below; second, the implied ratio of wages to value in 1939, in the neighborhood of 42%, is quite reasonable next to the 44% figure for 1929 implied by the wages and output values for construction (excluding railways and new buildings) in the *Enciclopedia italiana*, vol. 13, p. 466.

The structure of costs in maintenance is here estimated directly, and very roughly. Value added is assigned 60% of value (the figure obtained for railway maintenance in section K06.05 below); with the usual 13% assigned to capital and salary costs, the share of wages is set equal to 47%. The shares of low-grade and high-grade materials costs, in turn, are estimated to

equal 12% and 28%, respectively, in rough proportion to their average respective shares in new construction.

K05.05 Cost indices and production estimates

To summarize the results of section K05.04, the shares of total construction costs at 1911 prices absorbed by capital and salary costs, wages, low-grade materials, and high-grade materials are estimated to equal 13%, 47%, 12%, and 28%, respectively, in maintenance; 13%, 21%, 10%, and 56%, respectively, in the construction of new buildings; and 13%, 38%, 25%, and 24%, respectively, in other new construction.

The expenditure deflators in Table K.06, cols. 10 – 12 are obtained as weighted sums of the input-specific indices in cols. 8 and 9, derived in sections K05.02 and K05.03. Assuming, as above, that capital and salary costs remained a constant share of the total, the relative weights attributable to the input-specific cost indices are strictly proportional to the relative shares of high-grade materials on the one hand, and wages and low-grade materials together on the other. The deflator of maintenance expenditure in col. 10 is accordingly calculated as .32 times the high-grade materials cost index in col. 8, plus .68 times the labor and low-grade materials cost index in col. 9; the deflator of expenditure for new buildings, as .64 times the high-grade materials cost index in col. 8, plus .36 times the labor and low-grade materials cost index in col. 9; and the deflator of expenditure for other new construction, as .28 times the high-grade materials cost index in col. 8, plus .72 times the labor and low-grade materials cost index in col. 9.

The estimated shares of value added at 1911 prices are simply the proportions of the value of construction at 1911 prices corresponding to the above cost-share estimates: 60% in maintenance, 34% in the construction of new buildings, and 51% in other new construction. The value of construction, in turn, is taken to coincide with that of recorded expenditure in the case of maintenance. In the construction of new buildings, land costs are assumed to have absorbed 10% of recorded expenditure (e.g., *Rendiconto consuntivo 1910-11*, public works budget item 112, *Annuario città 1915-16*, p. 140). In other new construction, land costs are assumed to have absorbed 5% of recorded expenditure (equal to the average of the 2% and 8% figures obtained for railway expenditure in section K06.04 below). The ratio of value added to recorded expenditure at 1911 prices is thus set equal to (1.00)(.60) in the case of maintenance, (.90)(.34) in the construction of new buildings, and (.95)(.51) in other new construction.

The final production estimates are the current-price expenditure series, deflated by the corresponding cost index, multiplied by the corresponding ratio of value added to recorded expenditure, and augmented by the partial estimates calculated directly as value added at 1911 prices. The estimates of 1911-price value added in maintenance, transcribed in Table K.05, col. 4, thus equal the sum of col. 3, on the one hand, and 60% of the sum of cols. 1 and 2, divided by Table K.06, col. 10, on the other. The estimates of 1911-price value added in the construction of new buildings, transcribed in Table K.05, col. 6, equal 34% of 90% of col. 5, divided by Table K.06, col. 11; and the estimates of 1911-price value added in other new construction transcribed in Table K.05, col. 10, equal the sum of col. 9, on the one hand, and 95% of 51% of the sum of cols. 7 and 8, divided by Table K.06, col. 12, on the other.

K06. Railway construction

K06.01 Introduction

Railways broadly defined include railways narrowly defined (as they will be through the rest of this chapter), machine tramways, and horse tramways. The State was heavily involved in railway construction and operation, and the available documentation is correspondingly rich. For present purposes, the most useful sources are the annual report covering all the *strade ferrate italiane* (the *Relazione S.F.I.*), which appeared almost without interruption from 1867 to 1903; the annual reports covering the operation of the main network by the Ferrovie dello Stato from mid-1905 (the *Relazione F.S.* and the more detailed *Statistica F.S.*); the annual report on the *strade ferrate* that remained *in concessione* (the *Relazione S.F.C.*), published from 1904 to 1910, and subsequently the directory of these rail lines (the *Elenco S.F.C.*) published irregularly from 1912. Machine tramways were subject to State approval, and the resulting documentation is again relatively abundant. A detailed report covering their historical development and their current operations (the *Relazione tramvie*) appeared only from 1900 to 1909; but at other times they were listed in the railways reports (the *Relazione S.F.I.* from 1878 to 1884, the *Elenco S.F.C.* in 1912 and from 1920) or in specialized publications (the *Elenco tramvie*, published irregularly in other years). Horse tramways, in contrast, were comparatively neglected. The available data seem substantially limited to the lists of the lines in operation around 1878 (in the *Relazione S.F.I.*) and in 1885 (in the *Atti tranviari*), and to a handful of later figures for major urban networks (in the *Notizie città*).

Real value added in rail and tramway construction may be indexed by deflated financial series, or by physical series. The most relevant financial data include the total cost of the lines, which can be differenced to obtain annual expenditures on capital account, and total maintenance (and surveillance) expenditures on current account (e.g., *Relazione S.F.I. 1868*, p. 153, 1877, p. 226, 1891, pp. 92, 655, 1903, pp. 139, 409; *Relazione S.F.C. 1910*, pp. 108, 347; *Relazione F.S. 1910-11*, p. 24; *Statistica F.S. 1913*, pp. 272, 275; *Relazione tramvie 1909*, p. 566; *Annuario 1904*, p. 493, 1905-1907, p. 652). The advantage of these data, in principle, is that they reflect discretionary expenditure which a physical series would miss; their disadvantages, in practice, are that they are often not available, always difficult to interpret (particularly in relation to possible overlaps between current and capital accounts), and, most of all, clearly heterogeneous over time (with manifest discontinuities, and perhaps concealed ones, that reflect changes in the underlying accounting conventions: thus the 40% decline in railway maintenance and surveillance costs from 1884 to 1886, in conjunction with the system's reorganization, and perhaps the 20% increase in these costs from 1890 to 1891, in conjunction with a change in the format of the accounts; thus also the jump in the railways' capital value from 1899 to 1900, in conjunction with the addition of formerly excluded expenditure). Physical indicators of construction include general measures such as route mileage and increments in route mileage, and, less frequently, direct measures of track mileage (including double track, sidings, etc.), material put in place, ballast improved, and the like (e.g., *Relazione S.F.I. 1880*, p. 270, 1899, pp. 64 ff., 1900, pp. 118-119; *Statistica F.S. 1906*, pp. 72-73, 1912, p. 109).

Construction is here indexed by three types of indicators: additions to the network, to represent the construction of new lines with their ordinary complement of double track, sidings, yards, and buildings; rail consumption in excess of that absorbed by the preceding activity, to represent renovation and improvements of all types (upgrading of track, construction of additional double track and sidings, construction of additional buildings, etc.); and track length and use, to represent ordinary maintenance of the right of way. Separate network-growth series, shifted to allow for likely construction periods, are estimated for major railways, minor

railways, suburban machine tramways, urban machine tramways, suburban horse tramways, and urban horse tramways; and separate maintenance series are similarly calculated for the railways and the four groups of tramways. For simplicity, however, the improvement series is referred entirely to the major railways: conversions of horse tramways to machine power are assimilated to new construction and conversions of steam tramways to electric power are ignored.

The series-specific estimates of value added in new construction (extensions and improvements) are generally based on a standard ratio of value added to value, and series-specific expenditure figures. The former is derived from data on the breakdown of railway construction costs by type of activity; the latter are derived from cumulative expenditure data, corrected for price changes with the aid of the generic cost index in Table K.06, col. 12. The corresponding estimates of value added in maintenance are instead generally derived relatively directly from current budget data.

K06.02 Network extensions: production

The railway network was measured in various ways. Total track mileage (inclusive of double track, sidings, and yards) is reported relatively rarely, and the available figures were long based on total, rather than unduplicated, route mileage (e.g., *Relazione S.F.I. 1880*, p. 270, 1885-87, vol. 3, p. 508, 1900, pp. 118-119; *Statistica F.S. 1906*, pp. 72-73); neither is it altogether clear that track mileage is in fact a better index of cumulative construction value added than route mileage, since sidings and yards in particular are much cheaper than the main line (with its expensive right of way), and the difference between the two series can in any case be picked up by the rail-consumption measure of improvements. Of the available route mileage figures, the “installed network” (*rete d'impianto*), corresponding essentially to unduplicated route mileage, seems far superior to the “operated network” (*rete d'esercizio*), which is not unduplicated and therefore sensitive to reorganization. Within the installed network, one would want to distinguish various classes of track, of significantly different unit cost; the present distinction between major-system mileage (that operated by the big companies and eventually by the State railways) and minor-system mileage (that operated by the small independent companies) is only a crude beginning, and further distinctions (between trunk and secondary lines on the major systems, between standard and narrow gauges on the minor systems) would be desirable. Curiously, even the figures on the installed network differ from source to source (e.g., *Relazione S.F.I. 1891*, p. 178, 1893, p. 180, 1899, pp. 64 ff.; *Annuario 1905-07*, p. 649); those in Table K.10, cols. 1 – 2 are obtained as follows.

The all-railway installed-network growth figures in col. 1 are obtained, from 1861 to 1903, from the line by line and year by year listing in the *Relazione S.F.I. 1899*, pp. 64 ff., extended by succeeding issues, and adding the 1-km extension missed in 1901 (*Relazione S.F.I. 1901*, p. 49, *Relazione S.F.C. 1910*, p. 44). In 1904-06, the present figures are the sums of the lines reported opened in those years in the *Statistica F.S. 1906*, pp. 8 ff. (lines no. 27-29, 39, 157) and *Relazione S.F.C. 1906*, pp. 43-44; added to the total mileage at the end of 1903 (15,723 kms; *Relazione S.F.I. 1903*, p. 84), they yield a total of 16,158 kms at the end of 1906, against 16,177 kms reported by the *Relazione S.F.C. 1906*, p. 62 (3,190 kms) and *Statistica F.S. 1906*, pp. 42, 44 (12,803 + 178 + 6 kms). The present figure for 1907 is the increment between that reported network length at the end of 1906 and the corresponding figure at the end of 1907 (16,396 kms, of which 3,111 of minor lines and 13,078 + 178 + 29 of State railways). The present figure for 1908 is that reported for minor lines alone (*Relazione S.F.C. 1910*, p. 46), which exceeds the increment in the reported year-end total (98 kms, to 16,494 kms, of which 3,404 of minor lines and 13,090 of State railways); this largely reabsorbs the discrepancy between the calculated and reported network lengths that appeared between 1903 and 1906, as the total calculated through the present increments reaches 16,497 kms. The present figure for

1909 is the difference between the latter (calculated) figure and the reported total at the end of that year (16,590 kms, of which 3,458 of minor lines and 13,132 of State railways), thus eliminating the small residual discrepancy; and that for 1910 is the increment in the reported year-end-totals, which then reach 16,763 kms (3,575 of minor lines and 13,164 + 24 kms of State railways). In 1911-17, finally, the present figures are obtained as the sum of separate estimates for major and minor railways. The major-railway component equals the increment in the State railways' reported main network (excluding, that is to say, the separately reported figures for the narrow-gauge Sicilian State railways: e.g., *Statistica F.S. 1916*, pp. 56, 59), minus the net transfer from the private lines to the State railways (-23 kms in 1911, 149 kms in 1912, -62 kms in 1913, 23 kms in 1915, and -9 kms in 1916: e.g., *Relazione F. S. 1913-14*, p. 27). The minor-railway component is instead equal to the figures in col. 2, obtained as indicated below.

The minor-line installed-network growth figures in col. 2 are obtained as the sum of a private-railway component and a State-railway component. From 1861 to 1910, the private-railway component is obtained directly from the line by line and year by year listing in the *Relazione S.F.C. 1910*, pp. 37 ff. (which yields annual figures unaffected by mere transfers between operating groups). From 1911 to 1917, this component is obtained by summing over the lines reported opened in those years in the *Elenco S.F.C. 1922* pp. 8 ff., 35 ff. (which covers the private lines subsequently operated by the State railways), and 38 ff., excluding of course those in areas that were not then part of the Kingdom; where a line is reported to have opened over a span of years, its total length is here distributed over that span, with an eye to the evidence available in earlier sources. In 1911, the present estimate equals 213 kms (pp. 8 ff., lines 25, 27, 30-31, 44, 53, 64, and 104, plus part of 102; pp. 35 ff., line 13; pp. 38 ff., lines 9-10 and 29); in 1912, 175 kms (pp. 8 ff., line 83 plus parts of 91-93 and 102; pp. 35 ff., lines 4-5; pp. 38 ff., lines 8, 17, and 19-20); in 1913, 192 kms (pp. 8 ff., lines 74 and 95, plus parts of 91-93, 96, and 102; pp. 35 ff., lines 6-7; pp. 38 ff., line 18); in 1914, 84 kms (pp. 8 ff., lines 13, 33, 63, and 67, plus parts of 91-93 and 96); in 1915, 439 kms (pp. 8 ff., lines 78, 80, 94, 109, 114, and 121-122, plus parts of 1, 91-93, and 117); in 1916, 332 kms (pp. 8 ff., lines 23, 49, 54, 68-69, 85-86, and 110, plus parts of 1 and 117); and in 1917, 51 kms (pp. 8 ff., lines 75 and 112-113, plus parts of 117). These figures allow line 1, pp. 8 ff., 5.784 kms p. a. in 1915-16; lines 91-93, pp. 8 ff., 45.172 kms in 1912 and 34.830 kms p. a. in 1913-15 (*Elenco S.F.C. 1912*, pp. 12-13, lines 67 and 87); line 96, pp. 8 ff., 19.085 kms p. a. in 1913-14; line 102, pp. 8 ff., 8.091 kms p. a. in 1911-12 and 2.523 kms in 1913 (*Relazione S.F.C. 1910*, p. 47, line 60, *Elenco S.F.C. 1912*, p. 10, line 18); and line 117, pp. 8 ff., 12.143 kms p. a. in 1915-17. The State-railway component, in turn, equals the increment in the narrow-gauge Sicilian railways' reported network (24 kms in 1910, 35 kms in 1911, 18 kms in 1912, 66 kms in 1914, 50 kms in 1915, 9 kms in 1916, and 20 kms in 1917: e.g., *Statistica F.S. 1916*, p. 59).

The machine tramway network seems to have been measured only by route mileage. From 1900 to 1909, the *Relazione tramvie* reported operated and installed network lengths for the current year, and installed network lengths in all preceding years; these retrospective series were repeatedly revised, and accordingly exist in a variety of versions. After 1909, the *Elenco S.F.C. 1912* and *Elenco tramvie 1914* and *1916* report only operated-network lengths; but installed-network figures, suitably dated, are again available in the *Elenco S.F.C. 1920* and (with more detail) *1922*. The present machine-tramway network growth figures in cols. 3 and 4 refer to the installed network, and distinguish urban from suburban lines; the here less significant distinction between steam and electric power is instead ignored. From 1861 to 1907, the present figures are normally obtained from the *Relazione tramvie 1907*, which is here preferred to the somewhat less informative issues for 1908 and 1909. The chronological evidence is drawn from the line by line and year by year listing in pp. 131-151; the

suburban-urban distinction is instead taken from the list of built-up areas served by the individual lines in pp. 56-127. In general, a line is considered suburban if it is said to serve more than one built-up area; however, the Palermo lines that served “the city and its suburbs” (lines 181-189) are considered urban, while the lines serving the suburb of Roma, the hilltop town of Rocca di Papa, and Mantova’s Porto Catena (lines 219, 223-224, and 323) are considered suburban (*Elenco S.F.C. 1912*, pp. 58, 60, 70). In the event, the suburban lines include all those operated by steam power, plus the electric lines numbered 32, 34-35, 38-43, 54, 56, 61, 106-109, 139-141, 149-152, 155-160, 171, 173-178, 180, 190, 219-225, 227, 238, 291, 295, 297-300, 308-312, and 320; the urban lines are of course the residual electric lines. Exceptionally, the first 9 kms of suburban line 238 (Torino-Moncalieri-Poirino) and the first 4 kms of suburban line 237 (Torino-Gassino-Brusasco) are here attributed to 1878 and 1880, respectively, rather than to 1875 and 1877 (i.e., to the years when steam power was introduced, rather than to the years of first operation with horse traction: *Relazione tramvie 1909*, p. 375); and the suburban-line figures for 1883 are augmented by an allowance of 18 kms for the three unnumbered lines that were abandoned in 1889 (4 kms), abandoned in 1900 (4 kms), and transformed into a railway in 1906 (10 kms). The present figures for 1908 and 1909 are estimated from the *Relazione tramvie 1909*, pp. 367-370. The suburban lines are taken to be those numbered 132, 75, 110, 118-126, 177, 98, 159, 113, 164, and 190 in 1908, and 82, 76, 103, 209, 207, 181, 48, 170, 143, 114, and 79 in 1909; the urban lines are again the residuals from the reported annual totals. The corresponding figures for 1910-15 are instead obtained by summing over the lines reported opened in those years in the *Elenco S.F.C. 1922*, pp. 46 ff., 86 ff., excluding of course those areas that were not then part of the Kingdom, and handling lines with multiple dates as in the case of the minor railways discussed above. The suburban-line estimates in col. 3 include the following lines from pp. 46 ff.: in 1910, lines 27, 62-63, 95, 129, 131, 152-154, part of 55 (an estimated 3.938 kms; compare *Relazione tramvie 1909*, p. 256, n. 89), and the unnumbered spur sub 209; in 1911, lines 28, 30, 60, 66, 72, 109-110, 132 (with the corresponding spur), 195, 219-221, and half of 181; in 1912, lines 46, 51, 64, 123, 142, 200, 202, 206, and half of 181; in 1913, lines 89 (with the corresponding spur), 114, 184, half of 47, part of 115 (an estimated 12.822 kms: compare *Elenco tramvie 1914*, p. 147, n. 2), and the abandoned line included between numbers 115 and 116; in 1914, lines 56-57, 65, 67, 165-166, half of 47, part of 10 (an estimated 18.128 kms: compare *Relazione tramvie 1909*, p. 232, n. 15, *Elenco tramvie 1914*, pp. 10-11, n. 15, p. 143, n. 8), and part of 115 (the residual 2.077.kms); and in 1915, lines 13, 117, 185, 190, 194, and 218, but no part of 84 (compare *Elenco tramvie 1914*, p. 42, n. 141). In addition these figures include the following lines from pp. 86 ff. (since they are suburban by the criteria applied through 1909): in 1910, Anzio-Nettuno (41); in 1911, Napoli-Terre di Agnano (sub 43); in 1912, Ferrara-Pontelagoscuro (sub 27); in 1913, Cagliari-Poetto (sub 51); and in 1914, Valenza-stazione (2) and Verona-Avesa (sub 22). The urban-line estimates in col. 4 instead include the following lines from pp. 86 ff.: in 1910, lines 5.5, 6.4, 17, 23.1, 27.1-4, 30, 31.3, 34.2, 45.1, 46, and the first two of the three abandoned lines included between numbers 43 and 44; in 1911, lines 3.8, 5.2, 11.30, 11.32, 23.2, 26.6, 26.13, 40.23, 40.25, and 45.2; in 1912, lines 3.9, 5.6, 15.4, 26.14, 29.1-3, 36, 40.7, 40.13, and 49B.1-4; in 1913, lines 1, 3.10-11, 4.11, 8.5, 12, 26.7, 26.11, 43.18, and 43.20-22; in 1914, lines 3.7, 10.2, 11.35, 15.3, 26.10, 26.15, 40.4, 40.18, and 49A.9; and in 1915, lines 3.12-13, 7.7, 40.21, 43.13, 50, and 51.1-2.

Horse tramways seem to have appeared in Italy in 1872 on urban lines, and very shortly thereafter on suburban lines (Bianchi, 1883, p. 10; *Relazione S.F.I. 1878*, pp. 232-233). As noted above, relatively comprehensive network-length data seem to be available only for 1878 and 1885. In general, however, horse traction would appear to have remained in use on urban lines, and on suburban lines that were similarly sensitive to frequency and pollution, until the

adoption of electric power from the late 1890s on (e.g., Bianchi, 1883, p. 143, and below). On typical suburban lines, instead, horse traction was quickly superseded by steam power: so quickly, in fact, that only four lines suitable for steam power, but granted in 1872-76, appear to have been built initially for horse traction alone (the parts of the Torino-Poirino and Torino-Brusasco lines noted above, included in col. 3 from 1878 and 1880, respectively; the Milano-Saronno line, included in col. 3 from 1879; and part of the Firenze-Peretola-Poggio a Caiano line, apparently included in col. 3 from 1880: *Relazione S.F.I. 1878*, p. 232, 1879, pp. 236, 238, Bianchi, 1883, p. 176, *Relazione tramvie 1907*, pp. 8, 63, 131-132, 1909, pp. 375 ff.). The total length of horse tramway lines ever laid down is of course unknown; but a rough indication of the appropriate order of magnitude can be obtained from the line-specific data on electric tramways. In the case of urban lines, electric tramways often appear in clusters; and these clusters plausibly correspond to the conversion of existing horse-tramway lines, since investment in an untested, divisible market would be unlikely to display such an initial lump. In the case of suburban lines, most of which were administratively independent, this sort of evidence is typically not available; but one can at least attempt to guess the proportion of the machine-powered lines introduced with electric traction which represented converted horse lines rather than totally new lines (in new markets, or in old markets in terrain too difficult for horses or steam power). The present estimates of suburban and urban network extensions in cols. 5 and 6 are thus designed to begin in 1874 and 1872 respectively; to move relatively smoothly through paths that reflect the impact of technical progress (cols. 5 and 6), the distribution of the early concessions (col. 5: *Relazione S.F.I. 1878*, pp. 232-233), and the general crisis of the mid-1890s (col. 6); to end around the turn of the century; and to yield cumulative lengths compatible with the early benchmarks, and with the final totals, suggested by the available evidence. The first benchmarks, here referred to the end of 1878, are obtained from the *Relazione S.F.I. 1878*, pp. 232-233 (repeated 1879, pp. 236-238), integrated by the *Relazione tramvie 1907*, p. 131, 1909, p. 375. These suggest a cumulative construction equal to 71 kms of suburban lines (40 kms for Genova-Rivarolo, Firenze-Peretola-Poggio a Caiano, Milano-Monza, and Napoli-Torre del Greco, plus 9 kms for Torino-Poirino, 18 kms for Milano-Saronno, and 4 kms for Torino-Brusasco, here taken to have been converted to steam in 1878, 1879, and 1880, respectively) and 67 kms of urban lines (including Palermo-Rocca, which is line 188 in the *Relazione tramvie 1907*, and deducting the 4 kms of the Torino-Brusasco line included with the urban tramways, *Relazione S.F.I. 1878*, p. 234, *Relazione tramvie 1907*, p. 131). The second benchmarks, here referred to the end of 1885, are obtained from the *Atti tranviari*, vol. 2, pp. 158 ff., 204 ff., 406 ff., integrated by the *Relazione S.F.I. 1878*, pp. 232-233 and the *Notizie città 1891*, p. XXXVI. These suggest current networks in use equal to 74 kms of suburban lines (18 from Firenze, 17 from Genova, 7 from Livorno, 23 from Milano, and 9 from Napoli; these are taken to represent a 40-km gross increase from 1878, allowing for the conversion to steam of the 6-km section of the Firenze-Peretola-Poggio a Caiano line in 1880 and of the other lines as noted above) and 200 kms of urban lines (say 3 in Ancona, 10 in Bologna, 5 in Brescia, 6 in Firenze, 9 in Genova, 6 in Livorno, 38 in Milano, 4 in Modena, 30 in Napoli, 27 in Palermo, 2 in Rimini, 10 in Roma, 1 in Talamone, 44 in Torino, 1 in Venezia, and 4 in Verona). The overall cumulation of col. 5, in turn, is set equal to 182 kms. Of the electric lines listed by the *Relazione tramvie 1907* and identified above as suburban, lines 34-35, 43, 152, 155, 160, and 238 are former steam lines (e.g., *Elenco tramvie 1891*, lines 34, 39-40, 74-75, 78, 103); lines 38, 40-42, 54, 171, 173-177, 190, 227, 291, 295, and 297-299 (henceforth: group A), with a total length of 111 kms, appear to have been closely tied to urban systems, and to have been built or electrified with these; and lines 32, 39, 56, 61, 106-109, 139-141, 149-151, 156-159, 178, 180, 219-225, 300, 308-312, and 320 (henceforth: group B), with a total length of 285 kms, are independent lines, or lines tied to urban systems but built or

electrified apart from these (e.g., *Elenco S.F.C. 1922*, pp. 86 ff.). The present estimate includes, as converted horse lines, 65% of group A (72 kms), 15% of group B (43 kms), an allowance of 30 kms for conversions after 1907 (21% of the total, as suggested by the urban clusters noted below), and of course the 37 kms of lines converted to steam in 1878-80. The overall cumulation of col. 6, finally, is set equal to 430 kms. Summing over the electric urban lines that appeared in clusters, one obtains a total of 380 kms (6 kms in Alessandria, in 1913; 76 kms in Torino, in 1898-1900; 11 kms in Brescia, in 1907-08; 11 kms in Como, in 1907; 49 kms in Milano, in 1896-97; 8 kms in Padova, in 1907; 10 kms in Verona, in 1908-09; 10 kms in Bologna, in 1904; 7 kms in Ferrara, in 1910; 8 kms in Modena, in 1912; 11 kms in Parma, in 1910; 11 kms in Firenze in 1898-99, followed by other 15 kms in 1907-09; 12 kms in Livorno, in 1897; 6 kms in Ancona, in 1909; 2 kms in Terni, in 1901; 38 kms in Napoli in 1899-1902, followed by another 30 kms in 1902-04; 12 kms in Catania, in 1905; and 30 kms in Palermo in 1899-1901, followed by another 17 kms in 1912; *Elenco S.F.C. 1922*, pp. 86 ff.). The present estimate of converted horse lines includes all of these, and allows a further 50 kms for neglected urban lines electrified on a piecemeal basis (essentially those in the other cities listed in the above estimates for 1885, including notably Roma, where the process lasted from 1895 to 1904 (Formigari and Muscolino, 1979, pp. 118, 127), and Genova; no other lines are allowed for the above cities that electrified an initial cluster, to offset the inclusion in these clusters of replacements for horse omnibus lines, and totally new lines, as well as converted horse tramway lines).

The conversions of suburban and urban horse tramways to machine power are also estimated here for later use. The suburban-line figures in col. 7 correspond initially (1878-80) to the conversions to steam power identified above, and subsequently (1890-1913) to electrifications. From 1890 to 1907, these figures distribute the 115 kms of conversions estimated above (as 65% of group A plus 15% of group B) on the basis of the line-specific dates and lengths reported in the *Relazione tramvie 1907*, pp. 2-127; for simplicity, the present figures are obtained by attributing 65% of each line in group A and 15% of each line in group B to the indicated year (or to the first year of the indicated period), and eliminating the annual totals under 2 kms (for 1890 and 1905) to absorb the rounding error. In subsequent years, the figures in col. 7 distribute the residual 30 kms of horse lines estimated above, assuming that conversions declined smoothly through 1913 to a zero residual network by the end of that year. The urban-line figures in col. 8 all correspond to electrifications. As noted above, some 79% of the 380 kms of clustered urban lines appeared through 1907. Adding a similar share of the further 50 kms allowed above, one obtains an aggregate estimate of conversions through 1907 equal to some 340 kms, or about 92% of the 369 kms covered over the same period by col. 4. Since the conversions in col. 8 are obviously bounded by the machine-network extensions in col. 4, the present estimates in col. 8 from the origin through 1907 are obtained directly as 92% of col. 4 (with the 1907 figure rounded down, to absorb the cumulative rounding error), without making further use of the machine-line opening dates noted above. In subsequent years, the figures in col. 8 distribute the residual 90 kms of horse lines estimated above; assuming once again that the entire network was converted by the end of 1913, the present figures equal those suggested by the clustered machine-line opening dates noted above, augmented by one or two km p. a.

The present indices of construction for network extensions in cols. 9 – 14 are derived from the figures in cols. 1 – 6, allowing for plausible lags between accrual and completion. Each is measured, in principle, by distributing the completed new mileage over its period of production (and therefore in completed-kilometer equivalents rather than in actual kilometers). In the case of major railways, completed network extensions are obtained as the difference between cols. 1 and 2; col. 9 is then obtained by distributing that difference over the current year

and the preceding four years, with 23% attributed to the current year, 30% to the first preceding year, 23% to the second, 16% to the third, and 8% to the fourth. These percentages are loosely based on the evidence that railway lines built directly for the State normally took some two to five years to build, with the more important lines (which were the more likely to go through obstacles rather than around them) taking the longer time (*Relazione S.F.I. 1885-87*, vol. 1, e.g., pp. 41-45, 90-94, 153-161). Specifically, they assume that four- and five-year construction periods each applied 30% of the time, and two- and three-year periods each 20% of the time; that construction was evenly distributed over the relevant period; and that completion occurred, on average, at the three-fourths mark of the current year (rather than at the half mark, to allow for the complementary construction that took place after a line was nominally completed: e.g., *Relazione S.F.I. 1885-87*, vol. 1, p. 112), with the small amount (25% of 20% of 30%) thus implicitly attributed to the fifth preceding year being absorbed in the rounding of the other years' shares. In the case of minor railways, in turn, col. 10 is obtained by distributing col. 2 over the current year and preceding two years, with 35% attributed to the current year, 50% to the first preceding year, and 15% to the second; these percentages are based on a two-year construction period, and an average completion date some seven months into the current year.

In the case of tramways, finally, cols. 11 – 14 are obtained by distributing cols. 3 – 6 over the current and preceding year, with 75% attributed to the current year, and 25% to the preceding year; these percentages are based on a half-year construction period (as suggested by Ogliari and Sapi, 1961, vol. 11, pp. 148, 206, 212, 219, 276-277), and a mid-year-average completion date. The decline in horse tramways is thus ignored, so that their conversion to machine power is assimilated to new construction; but the error resulting from this not inconsiderable simplification would appear to be slight. On the one hand, the conversion to machine traction, with its much heavier rolling stock, involved reconstructing the track with much heavier rails (*Atti tranviari*, vol. 2, pp. 130-133, and *Relazione tramvie 1909*, pp. 226 ff.; Bianchi, 1883, p. 177; *Statistica elettrica 1898*, p. XXII); and since such tramways were built overwhelmingly on public roads, reconstruction was unlikely to cost much less than new construction. The reconstruction could admittedly lag behind the introduction of machine power (Formigari and Muscolino, 1979, p. 376); but a simultaneous upgrading of the fixed plant and the rolling stock would appear to be the norm (logically, one would want to avoid idling the equipment that has been newly purchased; empirically, the staggering over many months of even the clustered urban electrifications noted above suggests that the conversion required more work, and caused more disruption, than can be attributed to the mere installation of an overhead line). On the other hand, errors in the estimates of new construction tend in any case to generate offsetting errors in the estimates of improvements: the latter are indexed by rail consumption in excess of that attributed to new construction, and the value added estimates applied below to a ton of rails consumed for improvements straddle, relatively closely, those implicitly applied to a ton of rails consumed for tramway construction. The maximum possible cumulative overstatement of aggregate construction implied by the estimates below, calculated on the extreme (and empirically untenable) assumption that machine power could replace horses without any reconstruction of the track, is thus just –1.1 million lire (182 kms of suburban lines, times the difference between 29,000 and 48 times 349 lire/km, or 2.2 million lire: plus 430 kms of urban lines, times the difference between 51,000 and 168 times 349 lire/km, or –3.3 million lire).

K06.03 Renovations and improvements: production

The rail consumption figures underlying the present index of renovations and improvements are presented in cols. 15 and 16. The apparent total consumption in col. 15 is simply the sum of recorded output and *commercio speciale* net imports (Table E.02, col. 9, and

E.03, col. 6, extended to 1915 with the aid of the current *Rivista mineraria* and *Movimento commerciale*); the estimated consumption for network extensions in col. 16 is instead obtained from the network-extension figures in cols. 1 – 6 (on the assumption that the installation of the rails virtually coincided with a segment's nominal completion) and estimated average tonnages per kilometer specific to each major type of system but constant over time. For major railways (the difference between cols. 1 and 2), rail consumption is estimated to average 80 tons per kilometer; this figure allows 1.25 kms of track per km of line (from the earliest major-network total-track and installed-network figures, *Relazione S.F.I. 1880*, pp. 262, 264-270) and rails averaging 32 kg/m. While 36 kg/m rails were standard, lighter rails were also widely used, especially in the early trunk lines and later secondary ones (i.e., disproportionately, in newly laid track), while heavier rails appear limited to exceptionally steep sections of main line (Giordano, 1864, p. 94; Maroni, 1961, pp. 30-31; *Atti ferroviari 1881*, part 2, vol. 1, pp. 309 ff.; *Relazione S.F.I. 1891*, pp. 148 ff., 1900, pp. 84 ff.). For minor railways (col. 2) rail consumption is estimated to average 56 tons per kilometer; this figure allows 1.07 kms of track per km of line (from the difference between the total and major-network figures in the *Relazione S.F.I. 1880*, pp. 262, 264-270), and rails averaging about 26 kg/m (*Relazione S.F.I. 1891*, pp. 206 ff., 1900, pp. 108 ff.).

Tramway figures are highly variable as a function both of the type of power, as noted above, and of location: while light T (Vignole) rails are the norm on exclusive rights of way, on common rights of way these T rails must be accompanied by a counter-rail, or replaced by the far heavier Phoenix rails (e.g., Fadda, 1902, ch. 2, pp. 33-34, ch. 5, pp. 18-25). Exclusive rights of way were typical of suburban lines, but exceptional for urban ones (e.g., *Enciclopedia italiana*, vol. 34, p. 162); and the proportion of double tracking was also no doubt far greater on urban lines. Very tentatively, then, the machine tramways are allowed rails averaging 20 kg/m on suburban lines and 42 kg/m on urban ones (*Relazione tramvie 1909*, pp. 226-315), while horse tramways are allowed rails averaging 16 kg/m on suburban lines and 25 kg/m on urban lines (*Atti tranviari, Sunto*, pp. 130-133, allowing counter-rails for 100% of the urban lines and 20% of the suburban lines); and the ratio of track to line is set at 1.2 for suburban machine lines, 1.5 for suburban horse lines (given their relatively higher frequencies, as noted above, and lower speeds), and 2.0 for urban lines. Col. 3 is thus allowed 48 tons per kilometer; col. 4, 168 tons per kilometer; col. 5, 48 tons per kilometer; and col. 6, 100 tons per kilometer.

A comparison of cols. 15 and 16 reveals that the recorded total falls well short of estimated consumption for network extensions in the 1860s; discounting neglected domestic output (since there is authoritative evidence that there was none: e.g., *Atti ferroviari 1881*, parte 2, vol. 1, pp. 407-408), these two sets of figures seem best reconciled by appealing on the one hand to very spare construction (with perhaps as little as 55 tons of rails per kilometer), and on the other to neglected imports, including both the 9,000 tons of rails recorded in the 1866-67 *commercio generale* but missing from the *commercio speciale* (see above, section E02.03) and the rail imports to the Venetian and Roman provinces before their incorporation into the Kingdom (perhaps 15% of actual total?). Be that as it may, the differences between cols. 15 and 16 point to virtually no renovations and improvements in the 1860s and mid-1890s, minor amounts in the 1870s and 1898-1905, and large amounts in the 1880s and (especially) 1906-13: all of which agrees well with what is known of Italy's railway history. The rail-consumption series in col. 17, which serves here as the index of construction for renovations and improvements, is accordingly set equal to zero through 1872. In subsequent years, it is obtained as a three-year moving average (to smooth out likely inventory movements) of the difference between col. 15 on the one hand and col. 16 shifted back one year (to let rail installation lag behind both rail availability and accrued construction) on the other.

K06.04 Network extensions and improvements: value added

The 1911-price estimates of value added in railway-network extensions, in tramway-network extensions, and in renovations and improvements are transcribed respectively in cols. 18, 19, and 20 (and, summed, in col. 21). These series are weighted sums of the production series in cols. 9 – 10, 11 – 14, and 17, respectively; the weights are series-specific estimates of 1911-price value added per unit, typically obtained as the product of a standard ratio of value added to value and a series-specific estimate of 1911-price value per unit. The standard ratio of value added to value (which is here applied to all construction other than the electrification of tramway lines) is obtained from data on the distribution of the cost of new rail lines among categories of expenditure, combined with category-specific ratios of value added to value estimated by analogy to those developed in section K05.04 above. The series-specific estimates of value per unit at 1911 prices are instead obtained from data on the cumulative cost of the railway and machine tramway systems, and on the total expenditure for improvements by the State railways. These reported value figures are converted to 1911-price averages on the basis of the estimated profile of actual construction (cols. 9 – 12 and 17) and the generic public-works construction cost index in Table K.06, col. 12, and extended, by analogy, to the horse tramways; for simplicity, construction for improvements is assumed to have been absorbed entirely by the major rail lines.

The ratio of value added to value, here applied to the extension and improvement of all types of railways and (non-electric) tramways, is estimated at 51%. This figure is based on the breakdown of costs in the construction of the Calabro-Sicule in 1870-88 on the one hand, and in that of extensions to the State railways in 1905-14 on the other. In the former case (*Relazione S.F.I. 1885-87*, vol. 1, p. 9), total costs were distributed as follows: land (row 1), 2.1%; earth moving (row 2), 13.3%; bridges and abutments (row 3), 34.3%; tunnels (row 4), 25.6%; stations and guard houses (row 5), 3.9%; completion of the permanent way (*armamento*, row 6), 9.6%; and materials and sundry construction (row 7), 11.3%. Allowing category-specific ratios of value added to value equal to zero for land costs, 100% for earth moving, 34% for bridges, abutments, stations, and guard houses (as in section K05.04 above), 70% for tunnels, 50% for *armamento* (as in the replacement costs in the *Relazione S.F.I. 1903*, p. 408), and 20% for materials and sundry construction, one obtains a weighted average of 51.3%. In the latter case (*Relazione F.S. 1913-14*, pp. 292-293), the calculation is complicated by the separate entry for design, supervision, and general administrative expenses (sum of cols. 17 – 19). Defining the relevant total to include only half that entry, one obtains the following distribution of total costs: land (col. 8), 8.0%; earth moving (col. 9), 9.5%; bridges and abutments (col. 10), 20.7%; tunnels (col. 11), 31.1%; buildings (col. 12), 5.1%; installation of the track (*posa di armamento*, col. 13), 2.2%; direct construction (i.e., work not contracted out, col. 14), 4.1%; materials supplied (col. 15), 1.1%; materials from stocks and sundry works (col. 16), 12.0%; and supervision (half of cols. 17 – 19), 6.2%. Allowing category-specific ratios of value added to value again equal to zero for land costs, 100% for earth-moving, 34% for bridges, abutments, and buildings, and 70% for tunnels, and equal to 100% for the installation of the track and for supervision, 50% for direct construction, 5% for materials from stocks and sundry works, and zero for materials supplied, one obtains a weighted average of 51.1%. The standard ratio selected here thus agrees relatively well with both sets of cost-distribution figures, despite the at times significant differences between them.

The series-specific value figures, in turn, are obtained as follows. A direct measure of improvement expenditure is provided by the *Relazione F.S. 1912-13*, p. 29, which indicates that 470 million lire were spent on improvements from “1904-05” to “1912-13” (apparently from mid-1905 to mid-1913: this initial date is that at which the State railways began operating, and this terminal date is that of the current valuation to which the discussion refers). Since the

upgrading of tramway tracks is here assumed to coincide with the introduction of machine power and assimilated to new construction, the (residual) improvements traced by col. 17 can reasonably be assumed significant only in the case of the major railways. The 470 million lire spent by the State railways are accordingly distributed over the entire 710,500 tons of rails here attributed to improvement-consumption over that period (col. 17, summing over half of 1905, 1906-12, and half of 1913). The corresponding average value of the construction cost index in Table K.06, col. 12 (calculated as the sum of its annual values, weighted by the rail consumption attributed to each year, and divided by the above total tonnage) is .9655; this suggests that the reported expenditure for improvements equaled some 486.8 million lire at 1911 prices, or about 685 lire per ton covered by col. 17. The corresponding estimate of 1911-price value added per unit is 51% of that, or 349 lire per ton.

The value of the major railways is estimated initially from the cost figures -- apparently simple cumulations of undepreciated expenditure on fixed plant and equipment -- for the end of 1903 quoted in the *Relazione S.F.I. 1903*, pp. 122-139 (these figures are preferred to those later quoted for the State railways, e.g., *Relazione F.S. 1910-11*, p. 24, since the base of the latter seems to have been redefined when the railways were nationalized). An initial figure of 4,739.1 million lire for 12,804 kms of line is obtained from the 4,685.1 million lire and 12,466 kms reported for the Rete Mediterranea, Rete Adriatica, and Rete Sicula (p. 134) by deducting an allowance of 5.2 million lire and 24 kms for the Brescia-Iseo line subsequently transferred out of the State railways and thus excluded from col. 9 (taking the length specified in the *Relazione F.S. 1907-08*, p. 15, and the per-kilometer cost of the Parma-Brescia-Iseo line, *Relazione S.F.I. 1903*, p. 129), and conversely adding the cost and length figures reported for the then independent lines that were subsequently absorbed by the State railways (e.g., *Statistica F.S. 1910*, pp. 14 ff., lines 80-83, D162, 187-188, and 199-200) and are therefore included in col. 9: 12.8 million lire and 133 kms for the Venete (*Relazione S.F.I. 1903*, p. 136: the value figure is the price paid by the State when it repurchased the line, but the resulting per-kilometer figure seems close to the actual cost of similar lines), 2.7 million lire and 27 kms for the Padova-Montebelluna line (p. 136, and apparently analogous to the Venete figures), 1.1 million lire and 8 kms for the local Telesse and Cerignola lines (p. 137), .2 million lire and 5 kms for the Ofantino-Margherita di Savoia line (p. 137), and 42.4 million lire and 189 kms for the Palermo-Marsala-Trapani line (p. 137). The expenditure for improvements included in that initial estimate of 4,739.1 million lire is itself estimated at 498.3 million lire, obtained as the sum of the annual rail-consumption figures in col. 17 weighted by the corresponding value of the construction cost index in Table K.06, col. 12, times 685 lire per ton (the expenditure at 1911 prices estimated above), from the origin through 1903. The cumulative initial construction cost of the major lines extant as of the end of 1903, net of improvements, is accordingly estimated to equal 4,240.8 million lire for 12,804 kms. For simplicity, the deflator of this aggregate expenditure is calculated by summing the annual values of the construction cost index in Table K.06, col. 12 weighted by the corresponding figures in Table K.10, col. 9 (which sum to 10,276 kms), adding the residual 2,528 kms (which include those built before 1861, the small cumulative discrepancy between accruals and completions, and the rounding error) weighted by the value of the cost index in 1861 (which does not seem too grossly incorrect, to judge from the pre-1861 time paths of the underlying series cited in sections K05.02 and K05.03 above), and dividing by 12,804 kms. The resulting figure is .7129, which yields an estimated aggregate 1911-price construction cost net of improvements equal to some 5,948.7 million lire, or approximately 465,000 lire per kilometer; the corresponding estimate of 1911-price value added per unit is 51% of that, or 237,000 lire per kilometer in col. 9.

The cumulative initial construction cost of the minor railway lines extant at the end of 1910 is reported in the *Relazione S.F.C. 1910*, p. 108, as 512.1 million lire for 3,546 kms out of

3,575. The excluded lines are the State-owned Brescia-Iseo (24 kms) and the Cremona-Croce S. Spirito (5 kms, completed in 1906, p. 46); allowing 5.2 million lire for the former (as estimated above) and .8 million lire for the latter (from the per-kilometer cost of the Cremona-Croce S. Spirito-Borgo S. Donnino line, p. 104), one obtains a total cost of 518.1 million lire for 3,575 kms. The deflator of this aggregate is calculated by summing the annual values of the construction cost index in Table K.06, col. 12 weighted by the corresponding figures in Table K.10, col. 10 (reduced to 101 kms in 1908, 87 in 1909, and 41 in 1910, to exclude the narrow-gauge Sicilian State railways and the lines completed after 1910), adding a residual 27 kms (which include the lines built before 1861 and the rounding error) weighted by the value of the cost index in 1861 (as above), and dividing by 3,575 kms. The resulting figure is .7972, which yields an estimated aggregate 1911-price construction cost equal to some 649.9 million lire, or approximately 182,000 lire per kilometer; the corresponding estimate of 1911-price value added per unit is 51% of that, or 93,000 lire per kilometer in col. 10.

The cumulative initial construction cost of the machine tramways extant at the end of 1909 is reported in the *Relazione tramvie 1909*, pp. 498 ff.; however, not all the cost figures are disaggregated by line (nor are the construction costs at issue here always reported separately from rolling stock costs; a number of lines, including the major Genoese group, are accordingly neglected by the present calculations). As a preliminary step, the aggregate construction cost figures for the major Florentine and Neapolitan groups (respectively lines 166-178 and 194-202) are here distributed over their urban and suburban components. Taking the lengths of the urban components as reported on pp. 292 and 304, and assuming that the per-kilometer costs of urban lines were twice those of suburban lines (a ratio rather under the prevailing average, as will be seen below, to reflect the fact that these suburban lines were also electrified), one obtains costs per kilometer of suburban line equal to 70,000 lire on the Florentine system, and 210,000 lire on the Neapolitan system; the corresponding urban-line costs yield totals of 3.6 million lire for 25.6 kms for the Florentine system, and 11.3 million lire for 26.9 kms on the Neapolitan system. In the case of suburban tramways, an initial set of estimates equal 38,000 lire per kilometer for steam lines, and 77,000 lire per kilometer for electrified lines (identified as such on pp. 226 ff., and counting lines reporting both steam and electric power among the electrified lines). The former figure is the simple average of the per-kilometer figures in col. 136 reported for lines 8-48, 50-57, 70, 73-75, 83-85, 91, 93-98, 100, 102-107, 116, 129-135, 137-149, 152-157, 161-162, 184, 208, and 214 (correcting those reported for lines 52-53 and 147 by a factor of 10); the latter figure is the simple average of the equivalent figures reported for lines 1-2, 4-6, 59-62, 76-79, 82, 86-90, 108, 110-114, 128, 159-160, 164, 180-181, 186-193, 203-206, and 209-210, and the above estimates for lines 166-178 and 194-202 (respectively 70,000 and 210,000 lire). The estimate for electrified lines is then reduced by 4,000 lire, to offset the original construction costs of horse tramway lines that were later rebuilt as electric lines (on the assumption that these were included in the cumulative cost figures for 10% of the electrified lines, or roughly half the proportion implied by the estimates in col. 5 and the current data for 1909, and allowing suburban horse lines a historical cost of about 40,000 lire per km). Combining the resulting figure with the steam-line estimate with weights equal to .25 and .75, respectively (i.e., in approximate proportion to the share of electrified and steam lines in the suburban total: *Relazione tramvie 1909*, pp. 226-314 and col. 4), one obtains an overall estimate for the suburban lines equal to 47,000 lire per kilometer. The deflator of the figure is calculated by summing the annual values of the construction cost index in Table K.06, col. 12 weighted by the corresponding figures in Table K.10, col. 11 (with the figure for 1909 reduced to 64 kms, to exclude the lines completed in 1910), and dividing by the sum of the latter (3,707 kilometers). The resulting figure is .7881, which yields an estimated 1911-price construction cost of 60,000 lire per kilometer. In the case of urban tramways, an initial overall estimate of 134,000 lire per

kilometer is obtained by summing over the total construction costs (col. 135: 38.2 million lire) and installed network lengths (col. 18: 342.7 kms) reported for lines 3A-B, 58, 71-72, 80-81, 92, 109, 115, 117, 127, 136, 150-151, 163, 165, 182-183, 185, and 211-213, and adding the above estimates for the urban components of lines 166-178 and 194-202 (a total of 14.9 million lire and 52.5 kms). This initial estimate is then reduced by 36,000 lire, to offset the original construction costs of horse tramway lines that were later rebuilt as electric lines (on the assumption that these were included in the cumulative cost figures for 45% of the urban lines, and allowing urban horse lines a historical cost of about 80,000 lire per km). The deflator of the resulting figure, calculated as for the suburban tramways above (on the basis of col. 12, reduced to 19 kms in 1909, instead of col. 11), equals .8097, for an estimated 1911-price construction cost of 121,000 lire per km. Both these estimates of 1911-price construction costs are in fact gross of the cost of power stations and distribution systems serving the electric tramways (*Relazione tramvie 1909*, p. 497). Assuming that electrification costs equaled 20 to 25% of the electric tramways' total construction costs (as implied by the figures, apparently for an additional kilometer of single track, in Oppizzi, 1913, pp. 898-899, 1004), that the share of value added in electrification costs equaled 10% (rather than the here standard 51%, to allow for the relatively high materials costs of electrical equipment), and that 25% of the suburban lines and 100% of the urban lines were electrified, the ratio of value added to value is here reduced to 49% for the suburban lines, and 42% for the urban lines. The corresponding estimates of 1911-price value added are thus 29,000 lire per kilometer for suburban lines (col. 11), and 51,000 lire per kilometer of urban lines (col. 12). Allowing for the ratio of track to line estimated above (respectively 1.2 and 2.0), these figures are equivalent to 24,200 and 25,500 lire, respectively, per km of track; since the suburban lines incorporated both the cheapest and the most expensive track (respectively, that on exclusive sections of public roads, and that entirely off public roads: e.g., Oppizzi, 1913, p. 899, and *Relazione tramvie 1909*, p. 314), the rough similarity of these figures does not seem unreasonable.

These 1911-price value added estimates of 29,000 and 51,000 lire per kilometer are here applied directly to the horse tramway lines in cols. 13 and 14, respectively. On suburban lines, horse-tramway tracks were generally lighter and simpler than those of machine lines (e.g., Fadda, 1902, ch. 2, p. 68). Assuming they cost 20% less than machine lines per km of track, but had a 25% higher ratio of track to line (as estimated above), one obtains the same value added figure per kilometer of line on horse tramways as on machine tramways. On urban lines, horse-tramway tracks were generally lighter than those of machine lines; they were also simpler in some ways, like the suburban tracks, but more complex in others (notably through the use of counter-rails, before the general adoption of Phoenix rails). Assuming that these opposing influences offset each other, and that the ratio of track to line was the same for urban horse and machine tramways (as estimated above), one again obtains the same value added figure per km of line on horse tramways as on machine tramways.

K06.05 Maintenance

The 1911-price estimates of value added in the maintenance of railway and tramway lines are transcribed in Table K.10, cols. 22 and 23 (and, summed, in col. 24). The railway-line figures in col. 22 are obtained by extrapolating direct estimates for 1910-11 on the basis of a crude index that reflects track use and, secondarily, track length. Total track use is indexed by a weighted sum of the vehicle- and axle-kilometer series in Table F.39 (cols. 1, 3, and 4, in not-quite-final versions that produce an underestimate, in Table K.10, col. 22, of .1 million lire in 1892, 1898, 1906, and 1909); rising vehicle weights are ignored, on the presumption that they were offset by increasing rail weights. Allowing very roughly both for relative gross weights and for the stresses caused by reciprocating engines, locomotive-kilometers, passenger-car axle-

kilometers, and freight car-kilometers are here attributed weights of 1.00, 0.10, and 0.15, respectively. Total track length is instead indexed directly by the average length of the installed network. The latter is estimated by cumulating Table K.10, col. 1 through the preceding year, allowing an initial length of 2,127 kms at the end of 1860 (*Relazione S.F.I. 1899*, p. 64), and adding half the length completed in the current year. These indices are divided through by their value in 1911, and summed with weights equal to .9 (track use) and .1 (track length), respectively; the resulting series is the present index of real maintenance.

Value added in State-railway maintenance in 1911 is estimated from that year's *Statistica F.S.* as follows. The reported total labor cost for the maintenance and surveillance of the permanent way (54.3 million lire: p. 381) is reduced by the expenditure for renovations and improvements (4.2 million lire: p. 377), by the expenditure for surveillance personnel (13.9 million lire: p. 372), and by half the expenditure for the maintenance-and-surveillance office staff (an allowance of 5.4 million lire: p. 372), for a net labor cost of 30.8 million lire; of that, 5.4 million are attributed to salaries, and the residual 25.4 to wages. Recorded maintenance expenditure, in turn, is estimated at 51.7 million lire, obtained as the recorded total for maintenance and surveillance together (71.3 million lire, excluding the complementary expenditure which is here attributed to renovations and improvements: p. 373), less surveillance personnel costs (13.9 million lire: p. 372) and half of the total (personnel and other) office costs (an allowance of 5.7 million lire: p. 372). On the presumption that recorded maintenance expenditure excludes the (opportunity) cost of capital, materials costs are estimated as the difference between recorded expenditure and labor cost, or 20.9 million lire. Capital and salary costs together are assumed to equal 13% of total value, as in section K05.04 above; estimated as 13/87 times wages and materials costs, they equal 6.9 million lire, of which 5.4 million are attributed to salaries, as above, and the residual 1.5 million to neglected capital costs. The present estimate of value added equals the sum of wages, salaries, and neglected capital costs, or 32.3 million lire; the corresponding estimate of total maintenance costs equals the sum of value added and materials costs, or 53.2 million lire.

For the private railways, in turn, a 1910 figure is obtained from that year's *Relazione S.F.C.* The latter reports 3.8 million lire in labor costs for the maintenance and surveillance of the permanent way (p. 379), of which 1.6 million lire for surveillance personnel (p. 347) and .2 million lire for office personnel (p. 343), and an aggregate maintenance and surveillance expenditure of 5.9 million lire (p. 347). These figures suggest a maintenance wage bill of 2.0 million lire, materials costs of 2.1 million lire, and approximately .6 million lire in maintenance-related salaries and neglected capital costs; value added and total maintenance costs in 1910 are accordingly estimated at 2.6 and 4.7 million lire, respectively. From 1910 to 1911, the index of track length for the privately operated railways increased 5.0% (from the 3,458 kms reported at the end of 1909, and increments of 117 kms in 1910 and 236 kms, including the transfer from the State railways, in 1911: above, section K06.02), and the corresponding index of track use (estimated for simplicity directly from Table F.40, cols. 7 – 8, allowing 2.1 axles per passenger car) increased 5.3%, for an estimated increase in real maintenance of again, rounding, 5.3%. Allowing for the simultaneous 0.9% increase in the general maintenance-cost index (Table K.06, col. 10), private-railway maintenance costs and value added in 1911 are estimated at 5.0 and 2.8 million lire, respectively. Summing over the State-railway and private-railway figures, one obtains an aggregate estimate of value added equal to 35.1 million lire, or 60% of the estimated maintenance cost of 58.2 million lire.

The time series generated by the present extrapolation of this value added estimate is of course a very weak indicator of short-term movements; but it seems to perform relatively well over the longer term. Since the early maintenance-and-surveillance expenditure figures tend to include expenditure on improvements (*Annuario 1904*, p. 493), the appropriate trend is best

judged from the lowest among these: e.g., those for 1868 (12.6 million lire: *Relazione S.F.I. 1868*, p. 153), 1872 (14.4 million lire: *Annuario 1904*, p. 493), and 1886 (26.6 million lire: *Annuario 1904*, p. 493). The present 1911-price maintenance value added figures of 5.2 million lire in 1868, 7.6 in 1872, and 15.3 in 1886 are respectively 28%, 40%, and 47% of the comparable maintenance-and-surveillance figures (respectively 18.3, 19.2, and 32.3 million lire) obtained by deflating those years' reported figures by the maintenance cost index in Table K.06, col. 10. In 1872 and 1886, in particular, these ratios are close to the 44-45% implied by the 1911 State railway and 1910 private railway figures cited above (respectively 32.3 to 71.3 million lire, and 2.6 to 5.9 million lire). Since track use grew markedly faster than track length, these early ratios vary directly with the relative weight of track length in the real maintenance index; but by the same token these ratios are unlikely to have declined significantly over time, since surveillance costs were if anything more sensitive than maintenance costs to track length. The rough constancy obtained here thus provides some empirical justification for the relatively low weight attributed to track length in the present index of real maintenance.

The tramway-line figures in col. 23 are built up from separate estimates for the four types of systems distinguished above. In the case of machine tramways, separate indices of suburban and urban track length are obtained by cumulating the network-length figures in cols. 3 and 4, excluding, as above, half the length added in the current year; the only further correction is the deduction of the suburban lines abandoned or transformed in 1889, 1900, and 1906 (respectively 4 kms, 4 kms, and 10 kms, as estimated in section K06.02 above) from the middle of those years, and of those destroyed by the earthquake of 1908 (75 kms: *Relazione tramvie 1909*, p. XXVIII) from the end of that year. In the case of horse tramways, separate indices of suburban and urban track length are instead obtained by cumulating the difference between cols. 5 and 7 on the one hand and the difference between cols. 6 and 8 on the other, again excluding, as above, half the length added or deducted in the current year. In the apparent absence of figures on track use, 1911-price value added in the maintenance of each of these four systems is here extrapolated on the basis of these indices of track length, assuming that maintenance costs per km increased by 1.5% p. a. (the trend average suggested by the above estimates for the railways: 37.9 million lire for 17,481.5 kms in 1913, and 2.3 million lire for 2,311.0 kms in 1861).

Benchmark estimates of 1911-price value added in the maintenance of machine tramways are derived from the maintenance-and-surveillance cost data for 1909 reported in the *Relazione tramvie 1909*, pp. 498 ff. In the case of the suburban tramways, an initial sample estimate of maintenance and surveillance costs equal to 1,192 lire per kilometer of line at year end is obtained by summing over the figures in cols. 18 and 153 for lines 1-2, 4-6, 8, 10, 12-14, 16-23, 25-28, 30-34, 36-38, 40-48, 50-57, 63-70, 74-79, 83-90, 93-97, 99, 102, 104-107, 116, 129-135, 138-143, 145-149, 152-155, 159-162, 180-181, 184, 189, 191-193, 203-206, 208, and 214 (i.e., the suburban lines with over 100,000 lire in total operating costs). In the case of urban lines, the corresponding figure is 3,018 lire per kilometer (lines 3B-C, 58, 71-72, 81, 92, 117, 127, 136, 150-151, 158, 163, 183, and 211-213); the mixed groups (lines 109-110, 166-178, 194-202) yield a suitably intermediate figure (2,402 lire per kilometer) which can therefore be ignored. These initial estimates of 1909-price maintenance and surveillance costs, equal to 1,192 and 3,018 lire per kilometer of line at year end, are here transformed as follows. First, they are multiplied by 3,607/3,564.5 and 430/417.5 (from col. 3, with the deductions noted above, and col. 4), respectively, to convert them to lire per km of line at mid-year; second, they are increased by 3.7% (from the maintenance cost index in Table K.06, col. 10), to convert them to 1911 prices; and third, they are reduced by 50% and 45%, respectively (on the presumption that the ratio of maintenance to surveillance costs was higher on the suburban lines than on the railways, and higher still on the urban lines), to convert them to estimates of value added in

maintenance. The resulting benchmark estimates of 1911-price value added in maintenance in 1909 equal 625 lire per km (2.23 million lire in all) for suburban machine tramways, and 1,773 lire per km (.74 million lire in all) for urban machine tramways.

Analogous estimates of 1911-price value added in the maintenance of horse tramways are tentatively derived from the operating cost figures, presumably for 1885, included in the *Atti tranviari*, vol. 2, pp. 196-205. These suggest that maintenance costs per km of line were roughly three times as high on horse tramways as on steam tramways (i.e., perhaps twice as high, allowing for relative ratios of track to line; the reason, it would seem, is that the relatively light track laid for horse tramways was susceptible to damage from other road traffic: Fadda, 1902, ch. 4, p. 101). Assuming that horse tramways were then approximately 27% suburban and 73% urban (from cols. 5 – 8), and assuming further that costs per km of urban line were some 2.6 times those per km of suburban line (as for the machine tramways, from the mid-year estimates obtained above), this overall three-to-one ratio to the steam tramways is here decomposed into approximately 1.38 for the suburban horse tramways, and 3.60 for the urban horse tramways. For simplicity, these ratios are here applied directly to the 1911-price estimates of value added in suburban machine-tramway maintenance derived above; the 1911-price value added figures so obtained equal, for example, 863 lire per km of suburban horse tramway line, and 2,250 lire per km of urban horse tramway line, in 1909.

K07. Private buildings: direct measures of construction

K07.01 Introduction

Construction figures relating to private buildings are very limited, and of poor quality. Such measures are typically derived from the building permits (*licenze di costruzione*) or occupancy permits (*licenze di abitabilità*) required by municipal regulations. Building permits tend to lead and overstate actual constructions, occupancy permits to lag behind and understate it; neither measure reflects maintenance. The unit of measurement is more often the room, or even the building (which can be anything from a small single-family dwelling to a large complex of apartments or offices), than actual volume; and the published evidence covers only a few years and municipalities. The data in the *Notizie città* thus cover only nine cities, typically only through the 1880s; those in the *Annuario città* cover dozens of cities, but only in four years early in this century; and those in the readily available local publications yield time series, again restricted mostly to the present century, for only eight major cities. Unpublished data also appear to be very scarce: copies of the permits often survive, but their tabulation seems to have been performed only for publication.

Information on the housing stock was included in the censuses. Nominally complete data are provided for 1861, 1871, and 1881, but the intercensal increments may well reflect variations in coverage rather than actual growth. Estimates of the stock at the census dates can also be extrapolated from the data for 1881, the partial figures for 1901 and 1911, and the earlier population data; combined with estimates of the demolition rate, these figures yield estimates of average construction over the intercensal periods.

K07.02 The Notizie città

The *Notizie città 1888* and *1891* provide some evidence of construction in Italy's major cities through the 1880s.

The data in Table K.11 are from the *Notizie città 1891*, pp. 179 (Bologna), 193 (Catania), 149 (Firenze), 131 (Genova), 86 (Milano), 118 (Palermo), 11 and 41 (Roma), 102 (Torino), and 164 (Venezia); these repeat and extend those in the *Notizie città 1888*. The table headings in the source are succinct, and the text provides no further elucidation (with three exceptions: the Roma figures are said to refer to occupancy permits, the Palermo figures are said to include public buildings, and the Venezia figures are said to refer to houses inspected, presumably by the health authorities). The mix of references to production ("houses built") and permits ("permits to renovate") is odd, since the production figures are also, presumably, obtained from permits; the underlying distinction is perhaps that between permits granted *ex post* (on the basis of the completed work) and permits granted *ex ante* (on the basis of plans).

Table K.12 provides a set of summary measures based on the data in Table K.11. The number of equivalent houses built is normally calculated as the reported number of houses built, plus one fifth the number of houses raised or added on to, plus one tenth the number of houses renovated or demolished, plus one twentieth the number of façades redone; for simplicity, no distinction is drawn between ostensible production and permits, nor is any allowance made for the types of activity neglected in particular cities' reports. The series for Bologna (col. 1) allows 100 permits to renovate p. a. in 1873-81, and 2 houses demolished p. a. in 1873-82; the series for Milano (col. 5) refers to the entire city (Table K.11, cols. 17 – 19); the series for Palermo (col. 6) omits 1890, since the territory to which the data refer seems to have been expanded in that year (*Notizie città 1891*, p. 118); the series for Roma (col. 7) omits 1870, since the partial data reported for that year may include permits granted earlier in the year; and the series for Venezia (col. 9) is half the reported number of houses built or restored. The subtotal series (col. 10) is in principle the sum of the figures in cols. 1 – 6 and 8 – 9 (i.e., the total excluding Roma,

which as the capital city must be considered *sui generis*); to offset the appearance and disappearance of some component series, the sum of the available figures is multiplied by 2.15 in 1881, 1.15 in 1888 and 1889, 1.34 in 1890, and 1.40 in 1891, these coefficients being of course the ratio (or the product of the ratios) of the relevant partial sums (e.g., the ratio of the sum of cols. 1 – 6 and 8 – 9 to the sum of cols. 1, 4, 5 and 8 in 1882). The total in col. 11, in turn, is the sum of the subtotal (col. 10) and the Roma series excluded from the latter (col. 7). This series suggests trendless fluctuations in the 1880s; but this evidence is of limited significance. The heterogeneity of the basic unit (the “house”) makes for a weak index even of new construction in those nine large cities; and in any case it cannot be considered representative beyond the narrow limits of the sample (new construction only, nine cities only).

K07.03 The Annuario città

The *Annuario città* 1906, pp. 46-47, 1907-1908, pp. 38-39, 1909-1910, pp. 213-214, and 1911-1912, pp. 42-115 contain construction data for a broad (and growing) sample of municipalities, but for only a few years near the end of the relevant period (respectively 1904, 1906, 1908, and 1909). Table K.13 is excerpted from those sources: it omits less homogeneous measures of output (houses, dwelling units, numbers of permits), and the municipalities which reported their production of rooms in only one of these four years. The identification of the 1909 data with residential rooms only is tentative: the Italian headings are simply *alloggi nuovi* (new dwelling units) and *locali ottenuti* (rooms obtained), and only the French translation of the latter (*pièces de ces logements*: rooms of these dwellings) points to the present interpretation; since *licenze di abitabilità* (occupancy permits) is systematically mistranslated as *licences de construction* (building permits), it is very weak evidence indeed. The missing observations in Table K.13 may correspond to the absence of production as well as to the absence of information: the different symbols in the source (a dash or a dot) may be intended to convey this distinction, but their use does not appear to be free of occasional confusion.

Summing over the municipalities reporting residential construction in both 1904 and 1906, one obtains totals of 14,839 residential rooms in 1904 (allowing Milano the same ratio of residential to non-residential construction as in 1906) and 27,462 residential rooms in 1906, for an increase of 86% in two years. Firenze, Milano, and Roma by themselves account for 10,015 of those rooms in 1904 and 21,995 of them in 1906, for a two-year growth of 120% in these three cities, and just 13% in the other sixteen in this sample. A similar calculation for 1906 and 1908 yields totals of 31,286 residential rooms in 1906 and 32,296 in 1908, for an increase of 3% in two years. Firenze, Milano, and Roma accounted for 21,118 rooms in 1908, for a two-year growth of minus 4% in these three cities, and plus 20% in the other twenty-two in this sample. A similar calculation for 1908 and 1909 yields totals of 42,167 residential rooms in 1908 and 54,807 in 1909, for an increase of 30%. Firenze, Milano, Roma, and Torino accounted for 28,907 of those rooms in 1908 and 36,771 of them in 1909, for an increase of 27% in these four cities and 36% in the other twenty-four in this sample. A similar calculation for 1904 and 1909 (omitting Bologna, since the 1904 figure may well refer to non-residential rooms, as in 1906) yields totals of 23,404 residential rooms in 1904 (with the number in Milano estimated as above) and 51,326 in 1909, for an increase of 119% in five years. Firenze, Genova, Milano, Napoli, and Roma account for 18,295 of those rooms in 1904 and 37,411 in 1909, for an increase of 105% in these five cities and 172% in the other twenty-seven in this sample.

The addition of non-residential rooms would alter these results somewhat, the increase in Milano from 1906 to 1908 being particularly conspicuous; and the comparisons to 1909 would of course yield sharply lower growth rates if the 1909 figures were taken to include non-residential rooms as well as residential ones. In general, these data suggest sustained growth in construction (other than maintenance) in the years from 1904 to 1909, in the largest

cities and perhaps the middle-sized ones as well; but the vast mass of Italy's municipalities (of which there were then over 8,000: *Censimento demografico*, vol. 7, p. 11) escapes the sample altogether.

K07.04 The local sources of construction figures

A handful of local publications provide statistics on construction.

The data in Table K.14 are from the *Consuntivo Bologna*, e.g., 1894, p. 13, 1906, pp. 26, 32, 1913, pp. XXXI, LXIX; no data appear to be available in earlier years. The board of health data in cols. 1 – 6 refer to plans submitted and occupancy permits granted; the planning commission data in cols. 7 – 10 variously refer to petitions received (1907, 1910-13) or to permits granted (1906, 1908-09). The disaggregated planning-commission figures (e.g. *Consuntivo Bologna 1909*, p. XXVIII) suggest that the discrepancies between col. 4 and col. 7 (in 1906, 1908-09) are only partly attributable to the inclusion of non-residential construction in col. 1 but not in col. 4; a significant residual points to widespread negligence in notifying the health authorities. Data on minor petitions or permits (for alterations to façades, construction of porches, placing of signs, etc.) are also reported.

The data in Table K.15 are from the *Statistica Brescia*. Cols. 1 – 3 transcribe the data on construction activity in the report on public works (1908, p. 196, 1913, p. 213); cols. 4 – 8 are from the reports of the health authorities (e.g., 1908, p. 193, 1913, p. 188), who warn, in 1908, p. 193, that many industrial buildings were not reported to them. The discrepancy between col. 3 and cols. 7 – 8 is not explained.

The data in Table K.16 are from the *Annuario Ferrara* (e.g., 1909, p. 117, 1913, p. 163). The rooms (col. 4) appear to be those in the corresponding dwellings (col. 3), which are in turn those in the new buildings and additions (cols. 1 – 2); the non-residential buildings in the rural municipality appear to be agricultural rather than industrial.

The data in Table K.17 for 1870-73 are from the *Atti Firenze* (1874, p. 798); those for 1903-13 are from the *Annuario Firenze* (e.g., 1906, pp. 313-314, 1909, p. 352, 1913, pp. 295-296). From 1907, the headings of the tables whence cols. 1 – 5 are drawn refer to “dwellings” (*abitazioni*) rather than to “buildings” (*costruzioni*); but the change may be only semantic, as there is evidence of imprecision in the terminology (e.g., *Annuario Firenze 1906*, p. 314, 1913, p. 296). The figures in cols. 4 – 5 are at times obtained as the sum of separate data for the closed and open municipalities. In 1903-06, col. 7 is estimated from the reported distribution of dwellings by the number of their rooms, assuming an average of 15 (against 16.73 in 1907 and 14.42 in 1908) for those with 11 or more rooms; in 1903 and 1904, the quoted number of dwellings (col. 6) may include non-residential premises (cols. 8 – 11, from 1904 only: *Annuario Firenze 1906*, pp. 313-314). The dwelling units are clearly the apartments within the new buildings and additions; the non-residential “premises” (*locali*) are presented as an analogous unit, that may thus include a number of rooms within a building. The definition of “service premises” (*locali ad uso di servizio*) in this context is not clear.

The Milano data in Table K.18 are from the *Statistica Milano* (e.g., 1901, p. 300, 1906, p. 24, 1908, pp. 21-23, 1913, pp. 18-20). Col. 1 is the first difference in the reported built-up area at the end of each year (excluding, in 1904, the 194,000 square meters added by the extension of the municipal perimeter); the early figures, to 1889, may be largely the result of interpolation. Col. 2 refers instead to the ground area of new buildings erected during the year, and exceeds col. 1 by the area of current demolitions, which are also reported (the difference between the area built up and the area cleared always equals the increment in the built-up area, save only a 10,000 square meter error in 1908). Cols. 3 and 4 transcribe the question marks, as well as the figures, in the sources; one notes the question mark for 1891 in col. 3, indicating either ignorance or disbelief of the corresponding figure in the *Notizie città 1891* (Table K.11,

col. 17). The occupancy permits in col. 5 are only the totals of a table that disaggregates (from 1905, in the 1909 edition) by area, type of building (residential, business), and origin (new construction, renovation). The dwelling room figures for 1907 and 1911 in cols. 6 and 7 are those reported in the 1908 and 1913 editions, respectively, rather than those originally reported in the current editions; but the original figures for 1907 underlie the total for that year in col. 8 (*Statistica Milano 1906*, p. 391, *1907*, p. 406, *1908*, pp. 22-23, *1911*, p. 18, *1913*, p. 23). The contrast between the rapid growth in the number of rooms (cols. 6 – 8) and trendless fluctuations in the number of buildings (col. 3) is striking; it suggests that the latter is a very poor indicator of actual construction.

The Roma data in Table K.19 are from the *Annuario Roma 1913*, pp. 13-19. The figures in cols. 3 and 4 are said to include only the rooms destined to be “inhabited”: presumably, as in the census, these include kitchens but exclude passageways, storage areas, and the like (*Censimento demografico*, vol. 7, p. 190). Col. 3 sums over dwellings of various types (*villini, palazzine, case*); col. 4 includes farms, hotels, churches, schools, offices, workshops, stables, barracks, etc. Schools and barracks, presumably constructed with public funds, never account for more than a few hundred rooms; “public offices” were occasionally more significant (764 rooms in 1906, 1,451 in 1907, and 369 in 1908), but in the absence of a separate category for “private offices” these may include both private and public construction. In 1904, the disaggregated figures sum to 1,348 rooms, only 857 of them residential, while the reported total (in that and other tables) is 3,148 rooms; the present estimate in col. 3, which keeps the ratio of residential to total rooms close to that of other years, assumes that the number of *case d’abitazione civile*, printed as 253 (against 988 to 10,553 in other years) was actually 2,053. In 1901-08, the rooms in additions to existing buildings are not disaggregated by type; the present estimates in col. 3 assume that these rooms (typically under 3% of the total, with a peak of 5% in 1908) were distributed across types in proportion to those in new buildings. Cols. 5 and 6 report occupancy permits; the source notes that the room figures are less than half of the corresponding (current or lagged) construction permits. Some further data on “rooms built” in Roma are reported in the *Rivista mineraria 1904*, p. 373; but these figures (543 in 1900, 1,741 in 1901, 1,791 in 1902, 2,088 in 1903, and 4,148 in 1904) would appear to be a variant of the *ex ante* permit series in col. 4. Col. 7 reports the permitted occupancy of the rooms receiving occupancy permits; the source indicates that these figures are based on the rooms’ actual volume. Comparing cols. 6 and 7, one notes that the year-specific average volume per new room varied over a range equal to 20% of the overall (five-year) average; a similar comparison of cols. 5 and 7 indicates a comparable range of variation in the average volume per building built or raised in excess of 50%.

The data for Torino are here divided into two sets. The early figures, in Table K.20, are transcribed from Costanzia (1978), p. 25; their ultimate source is the municipal health office. Cols. 1 and 2 were based on occupancy permits; col. 3 is an estimate (by the health office) of capital employed, apparently obtained as the product of the number of rooms (col. 2) and a rough unit cost figure estimated directly (col. 4; the odd figures in 1867 and 1869 suggest a weighted sum of partial estimates). The surprising variability in this cost per room probably reflects changes in the quality mix, as Costanzia tends to believe (p. 26): the analogous unit rental figures -- 20% of col. 4 in 1861-64 and 10% in 1865-79 -- reinforce that suggestion to the extent that they have any independent significance, since price movements would affect current and capitalized values to the same extent only in full long-run equilibrium; and the cost figures per cubic meter in the Comune di Pisa (1903), pp. 39-41 are twice as high for luxury as for popular housing (which translates into an even larger ratio in costs per room, since average room sizes presumably varied over a similar range). Such extreme swings in the composition of output are surprising, but not incredible in this specific case: with the transfer of the capital to

Firenze in 1864, one would expect the population loss, and consequent housing glut, to be concentrated in the middle- and upper-income groups; it is quite likely that in the subsequent few years the only new construction would be designed for the laboring poor (with the partial and short-lived exception of projects too far along, in 1864, to be more profitably abandoned than completed). What is particularly significant, in the present context, is that even the number of rooms is an imperfect index of construction; the number of buildings is a very poor one, as the year-specific average value varies over a broad range (from 10.9 to 59.6 million lire per building, against an overall average of 26.8 million lire).

The data in Table K.21 are from the *Annuario Torino*. Cols. 1 – 4 are from the 1907-08 issue, p. 6; one notes the lack of correspondence to the 1891 data in the *Notizie città 1891* (Table K.11, cols. 26 – 27). Cols. 5 – 7 are from the *Annuario Torino 1907-08*, p. 147, *1909-10*, p. 198, *1910-11*, p. 187, *1911-12*, p. 285, *1912-13*, p. 315, and *1913-14*, p. 332; col. 6 is the sum of separate figures for minor works, notifications of construction outside the city, and sewer permits (roughly in the proportions two thirds – one sixth – one sixth), while the “dwelling permits” (*permessi di abitazione*) in col. 7 are presumably what were elsewhere called occupancy permits (*licenze di abitabilità*). The discrepancies between the construction-permit data in cols. 4 and 5 are not explained; most curiously, both sets of figures appear in the 1907-08 issue (the third variant, in the footnote, is from the 1906-07 issue, p. 250, summing over new buildings, and additions). Col. 8 refers to the rooms covered by the permits in col. 7; it is transcribed from the *Annuario Torino 1909-10*, p. 198, *1910-11*, p. 277, *1911-12*, p. 285, *1912-13*, p. 315, and *1913-14*, p. 332.

The Venezia data in Table K.22 are from the *Rendiconto Venezia 1903-13*, p. 37; one notes that residential construction was normally about 90% of the total, but with major exceptions (especially 1906, when residential and other construction were almost equal; the latter may or may not include a significant public component). The table in the source refers simply to “construction movements”; the data probably tabulate (*ex ante*) construction permits, since (*ex post*) occupancy permits would not cover demolitions.

A comparison of the local source data in Tables K.14 – K.19 and K.21 – K.22 to the corresponding *Annuario città* figures in Table K.13 is instructive. The *Consuntivo Bologna* overlaps the *Annuario città* in 1908 and 1909 only; where the latter reports a declining number of rooms, the former reports an increasing number of buildings built, raised, or renovated. The *Statistica Brescia* and the *Annuario città* both report the number of rooms built in Brescia in 1908 and 1909: the two sets of figures are grossly similar in their magnitudes, and very similar in their movements. The *Annuario Ferrara* and the *Annuario città* overlap in 1909 only, and report the same number of rooms built in Ferrara in that year. The *Annuario Firenze* and the *Annuario città* report the same number of rooms built in Firenze in 1908 and 1909; in 1904 and 1906, the residential-rooms-built figures in the *Annuario città* are close to the present estimates derived from the *Annuario Firenze*, and similarly compatible with the latter source. The *Annuario città* figures for residential rooms built in Milano correspond to the *Statistica Milano* figures for primary residential rooms in 1908 and 1909; in 1906, the two sources’ figures are compatible if the *Annuario città* figures for residential rooms is taken to cover secondary as well as primary residential rooms; and in 1904, the *Annuario città* total is barely 37% of that in the *Statistica Milano*. There is no correspondence between the Roma figures in the *Annuario città* and either the *ex ante* or *ex post* data in the *Annuario Roma 1913*: both the magnitudes and their movements are significantly different. The Torino figures in the *Annuario città*, available for 1908 and 1909 only, correspond exactly to those in the *Annuario Torino*. Finally, the Venezia figures in the *Annuario città* show a steady growth from 1906 to 1908 to 1909; the *Rendiconto Venezia 1903-13* shows a growth in residential construction from 1906 to 1908 but a decline to 1909, while aggregate construction declines throughout.

Table K.23 provides a set of summary measures based on the data in Tables K.14 – K.19 and K.21 – K.22. The number of new or renovated rooms completed is taken as the indicator of new construction; no attempt is made to weight new and renovated rooms in proportion to unit value added, or to resolve the many contradictions between these local sources and the *Annuario città*. The series for Bologna (col. 1) allows 12 rooms per new building and 3 rooms per renovated building receiving an occupancy permit from the board of health (Table K.14, cols. 4 – 5; the missing observations for 1902 to 1904 are linearly interpolated). The series for Brescia (col. 2) is the sum of the reported new and renovated rooms and industrial premises (Table K.15, cols. 4 – 6) in 1908-13; the estimates for 1901-07 are 10 times the reported major construction permits plus two times the reported minor construction permits for 1900-06 (Table K.15, cols. 1 – 2), shifted forward one year to allow for the lag between *ex ante* and *ex post* verification. These coefficients are selected to produce a smooth extrapolation of the data: they yield an estimate for 1908 that is within 1% of the reported total. The series for Ferrara (col. 3) refers to the entire municipality. The number of rooms obtained within the city is taken as reported from 1909 to 1911; in 1912 and 1913, it is estimated on the basis of 14.5 rooms per new building and 3 rooms per building raised (keeping these in the usual 5-to-1 proportions, and choosing the levels suggested by the data for 1909). The number of rooms obtained in the rest of the municipality is estimated on the basis of half those rates for both residential and non-residential construction, to allow for lower average sizes in rural areas; the missing observations for 1909 are assumed equal to those recorded in 1910. The series for Firenze (col. 4) is obtained as the sum of the reported or estimated number of residential rooms (Table K.17, col. 7) and three times the total number of non-residential premises (Table K.17, cols. 8 – 11; the missing observations in 1903 are assumed equal to those recorded in 1904). The series for Milano (col. 5) simply transcribes that for primary residential rooms (Table K.18, col. 6). The series for Roma (col. 6) is estimated in two parts. In 1909-13, the number of *standard* rooms completed is estimated by dividing permitted occupancy by the overall average ratio of permitted occupancy to rooms completed (Table K.19, cols. 6 and 7); the 1909 estimate so obtained is then extrapolated back to 1903 on the basis of the corresponding *ex ante* permits (Table K.19, col. 4), shifted forward two years (as suggested by the two-year lag between the *ex ante* cycle in 1907-09 and the *ex post* cycle in 1909-11). The series for Torino (col. 7) simply transcribes that for rooms granted permits (Table K.21, col. 8). The series for Venezia (col. 8) is the total reported volume (Table K.22, col. 3), divided by an estimated 50 cubic meters per room. The subtotal series (col. 9) refers to Bologna, Brescia, Ferrara, Firenze, Roma, and Venezia, i.e., all the cities in the sample other than Italy's twin industrial capitals; it is obtained as the sum of the figures in cols. 1 – 4, 6, and 8 in 1909-13, and the sum of cols. 1 – 2, 4, 6, and 8, times 1.1068 (to offset the loss of col. 3) in 1903-08. The total series (col. 10) is the sum of the subtotal and the Milano and Torino figures (cols. 5, 7, and 9).

The general impression, as from the *Annuario città*, is one of rapid growth over this final decade of the period at hand. Most of the increase from 1905 to 1906, in the total as well as the subtotal, is due to growth in Venezia, itself largely due to an exceptional burst of non-residential construction in 1906; the 1912 peak in the total is due entirely to Milano and Torino, in the face of an overall decline from 1911 to 1912, and partial recovery to 1913, in the other cities in the sample. Once again, the sample's limited scope and internal heterogeneity make it difficult to extrapolate beyond its limits with any confidence in the results.

K07.05 The Censimento

Information on the housing stock may be found in the *Censimento*. The *Censimento 1861* (parte I, pp. 26-30; vol. 1, p. XXXII) and *1871* (vol. 1, pp. VI-X) counted houses; the

Censimento 1881 (Relazione generale, pp. XXIII-XXX, 94-99; vol. 1, parte 2, pp. 155-242) counted houses, apartments, and rooms; the *Censimento 1901* (vol. 5, pp. XXX-XXXII, 72-77) counted dwelling units (*abitazioni*) in the 92 major cities, and the *Censimento demografico* (vol. 7, pp. 44-51, 228*-329*) counted apartments (*locali*) and rooms (*vani*) in the 282 major municipalities.

The only comprehensive measures in homogeneous units thus refer to houses in 1861, 1871, and 1881. The reported totals are 3,693,172 in 1861, 5,114,526 (4,508,910 excluding the Venetian and Roman provinces) in 1871, and 5,344,688 in 1881. The implications of these figures are that net new construction averaged some 81,600 units p. a. over the first decade within the 1861 area, or perhaps 92,600 units p. a. within the 1871 area (assuming the annual flow in the two areas was in proportion to the stock counted in 1871), against only 23,000 units p. a. over the second decade. This ostensible collapse of residential construction seems to have left no trace in the literary sources (or, for that matter, in the time series purportedly obtained by distributing the intercensal increments in the housing stock: *Reddito nazionale*, pp. 100-102, 187, 266; Vitali, 1969a, pp. 498-503). It is most plausibly attributed to variations in census error: the housing data were considered manifestly defective in both 1871 and 1881 (and again in 1901, to the point that publication was withheld), and a specific tendency to overcount may have been reduced, between 1871 and 1881, by the introduction of permanent municipal registers (*Censimento 1871*, vol. 1, pp. VI, VIII, 1881, *Relazione generale*, pp. XXIV, 10, 1901, vol. 5, pp. XXX-XXXI, and *regio decreto 4 aprile 1873, n. 1363*, art. 5; see also the end of this section, below). Some tentative estimates of intercensal construction are here obtained as follows. Table K.24 summarizes the detailed evidence from the 1881, 1901, and 1911 censuses. The figures in group *A* are from the *Censimento 1881*, vol. 1, part 2; those in line 1 are obtained by summing over the figures for each municipality that was a provincial capital (pp. 155-168), while those in line 2 are the reported national totals (p. 242). The accompanying *Relazione generale* indicates that these figures refer only to the 4,469,500 houses that were wholly or partly inhabited, and exclude the 875,188 houses -- most of them apparently dispersed cottages used only during the months of agricultural activity -- that were entirely uninhabited at the year-end census date (pp. XXVI, 94); that the inhabited rooms include kitchens but exclude shops, storage space, and the like (p. XXVI); and that the recorded number of persons present equals the national total (28,460,000 persons) minus 71,000 persons living on boats or in caves and the like (pp. VII, XXIV, 95, 100-101). The few figures in group *B* are from the *Censimento 1901*, vol. 5, pp. 76-77. They cover the 92 cities and towns with more than 20,000 inhabitants, or 16.4% of the aggregate population (32,475,000: p. VII). The figures in group *C* are from the *Censimento demografico*, vol. 7; they refer to the 263 municipalities, of the 282 that were provincial capitals or included over 15,000 persons, that provided the requisite information (pp. 44, 276*). The figures in cols. 1 – 4 and 6 – 9 are from p. 45 and p. 50, respectively; the number of apartments are taken as reported, while the number of rooms are calculated from the reported frequency distributions on the assumption that units with more than five rooms averaged seven rooms. The empty apartments (which here include those used as office suites) cover those in all inhabitable houses (pp. 44, 209, 213); the rooms seem to be defined as in 1881 (p. 190). The population figures in cols. 5 and 10 are obtained by summing over the disaggregated data in Table XIII* (pp. 228*-276* and pp. 284*-332*, respectively), excluding the 19 municipalities noted on p. 44; they equal 23.0% and 8.8%, respectively, of the national total (34,671,000: p. 14).

The initial observation prompted by the data for 1881 is that the number of inhabited rooms per person was relatively high in the urban parts of the major municipalities, but much the same in the exurban areas of the major municipalities and in the entire Kingdom outside the major municipalities. In line 1, the ratio of col. 3 to col. 5 equals .756 inhabited rooms per

person, and the ratio of col. 8 to col. 10 equals .586 inhabited rooms per person; taking the differences between line 2 and line 1, the ratio of col. 3 plus col. 8 (14,039,000 rooms) to col. 5 plus col. 10 (23,898,000 persons) equals .587 inhabited rooms per person. This suggests that the sample in group C, cols 6 – 10 (which covers 8.8% of the total population, to 3.9% in the sample in group A, line 1, cols. 6 – 10) can be considered representative of housing densities in the entire area not covered by cols. 1 – 5 of group C. The estimated total number of inhabited rooms in 1911 is accordingly 21,711,000, obtained as the sum of the 5,616,000 rooms for 7,981,000 persons in cols. 1 – 5, and an estimated 16,095,000 rooms for the residual 26,603,000 persons (assuming that 0.25% of the total population were on boats or in caves and the like, as in 1881, and allowing .605 rooms per residual person, from the ratio of col. 8 to col. 10).

Estimates of empty and total rooms in 1881 and 1911, in turn, are obtained through a plausible distribution of the approximately 875,200 empty houses counted in 1881. On the basis of the census comments noted above, two thirds of these, or 583,500 empty houses, are here assumed to be cottages averaging 1.0 apartments and 1.2 rooms each; the other 291,700 are assumed to be houses averaging 1.25 apartments each (against 1.54 for the inhabited houses, from the number of these cited above and the data in row 2, cols. 1 – 2 and 6 – 7), and thus containing 364,600 empty apartments in all. These are here allocated between principal urban places and residual areas in proportion to the empty apartments counted in row 2, cols. 2 and 7; 222,700 of them are accordingly attributed to the principal urban places (raising the number of empty apartments to 673,300), and 141,900 to the residual areas (raising the number of empty apartments to 1,012,500, including the cottages above). The corresponding figures for the provincial capitals are obtained from these figures in proportion to the ratios of line 1 to line 2 in cols. 2 and 7. Another 21,700 empty apartments are thus added to the 43,900 in line 1, col. 2 (for a total of 65,600); and 40,900 empty cottages and 9,900 other empty apartments are added to the 20,100 in line 1, col. 7 (for a total of 70,900). These estimates yield ratios of empty to inhabited apartments equal to .08 and .18 in the principal urban places of the provincial capitals and of the entire Kingdom, respectively, and .32 and .44 in the residual areas of the provincial capitals and of the entire Kingdom, respectively. The first of these pairs of ratios, in particular, reasonably straddles the analogous figures for the urban samples for later years (.12 in 1901 and 1911, from cols. 1 and 2). The figures for the residual areas are instead much higher than the single available other observation (.19 in 1911, from cols. 6 and 7); but this discrepancy can be variously attributed to the shift of the census date from late December in 1881 to mid-June in 1911 (assuming a continuation of the seasonal movements of agricultural workers noted above), to the growth of dispersed settlements (*Censimento 1901*, vol. 5, p. XXVIII, *Censimento demografico*, vol. 7, p. 17, to the extent that the recorded growth is not simply a reflection of those seasonal movements), to the relative decline of the agricultural population (*Censimento 1901*, vol. 5, p. LXXIX, *Censimento demografico*, vol. 7, pp. 138-139), and to the destruction caused by the 1908 earthquake (to the extent that it had not been made good: see below). The numbers of empty rooms are here estimated on the basis of the following estimates of the average number of rooms per empty apartment: 2.508 and 2.054, respectively, for all the 65,600 and 673,300 empty apartments attributed to the principal urban places of the provincial capitals and of the entire Kingdom (i.e., in both cases, 75.8% of the corresponding figure for inhabited apartments obtained from cols. 1 and 3, as in 1911); 2.334 and 2.383, respectively, for the 30,000 and 429,000 empty apartments not in cottages attributed to the residual areas of the provincial capitals and of the entire Kingdom (i.e., in both cases, 80% of the corresponding figure for inhabited apartments obtained from cols. 6 and 8, against 84.1% in 1911, to allow for the inclusion of seasonally occupied cottages among the inhabited apartments recorded in 1911); and 1.2, as assumed above, for the 40,900 and 583,500 empty apartments in cottages attributed to those same residual areas. These figures yield estimates of the number of empty

rooms equal to 165,000 and 119,000 in the principal urban places and in the residual areas, respectively, of the provincial capitals, and to 1,383,000 and 1,722,000 in the principal urban places and in the residual areas, respectively, of the entire Kingdom. Together with the inhabited-room data in cols. 3 and 8, these figures yield an estimate of 20,351,000 total inhabitable rooms in 1881. Together with the population data in cols. 5 and 10, these figures yield estimates of empty rooms per person equal to .108 in the residual areas of the provincial capitals, and .118 in the entire Kingdom excluding the provincial capitals. Allowing for the ratio between these two figures (1.093), the total number of empty rooms in 1911 is estimated as 788,000 (in cols. 4 and 9) plus 2,493,000 (1.093 times the ratio of col. 9 to col. 10, times .9975 to allow for people on boats or in caves, times the 23,640,000 persons not covered by group C); added to the above estimates of the total number of inhabited rooms, these yield an estimate of 24,992,000 total inhabitable rooms in 1911.

To recapitulate, the evidence suggests a housing stock equal to 17,246,000 inhabited and 20,351,000 total rooms in 1881, with a total population of 28,461,000 persons, and to 21,711,000 inhabited and 24,992,000 total rooms in 1911, with a total population of 34,671,000 persons. These imply a growth of the inhabited rooms per capita from .606 in 1881 to .626 in 1911, and of the total rooms per capita from .715 in 1881 to .721 in 1911 (Table K.25, cols. 1 – 4). As noted above, the corresponding decline in the number of empty rooms per capita from .109 in 1881 to .095 in 1911 seems traceable to the change in the census date from winter to summer, to the growth of dispersed settlement, to the relative decline of the agricultural population, and to the 1908 earthquake.

An estimate of the total rooms in 1901 is extrapolated from the data in Table K.24 as follows. Since the total numbers of persons per inhabited and empty apartment (from cols. 1, 2, and 5) are virtually identical to the corresponding figures for 1911, the total number of rooms in the urban places covered by the statistics in group *B* are here estimated as .765 per person (from group *C*, cols. 3 – 5), or 4,070,000 in all. The residual number of rooms is estimated on the basis of a per capita figure extrapolated from this estimate for the 92 major urban places, which covered, as noted above, 16.4% of the total population. In 1911, the total number of rooms per capita is estimated as .765 for the 23.0% of the population in the major urban places, and .707 for the residual 77.0% (from the above totals, less the figures in cols. 3 – 5). Assuming that the .765 of the top 23.0% is a weighted sum of the unknown figure for the top 16.4% and .707 for the other 6.6% (as for the residual 77.0%), the top 16.4% is here attributed .788 total rooms per capita, or 1.115 times the .707 attributed to the residual 83.6%. In 1881, the total number of rooms per capita attributable to the 16.4% of the population in the major urban places is estimated as the weighted sum of the .805 attributed to the top 11.9% in the principal urban places of the provincial capitals (from the above estimate of 165,000 empty rooms and the figures in line 1, rows 3 and 5), and .705 attributed to the other 4.5% (and to the entire bottom 88.1%, from the above totals less the above figures for the top 11.9%); the resulting figure is .778 total rooms per capita, or 1.104 times the .705 attributed to the residual 83.6%. Geometrically interpolating 1.104 in 1881 (here attributed to the beginning of 1882) and 1.115 in 1911, one obtains a figure of 1.111 in early 1901; divided into the above estimate of .765 rooms per person, this figure yields a ratio of .689 rooms per capita for the residual 27,155,000 persons, or 18,710,000 rooms in all. The estimated aggregate number of rooms in 1901 is accordingly 22,780,000, for 32,475,000 persons, or .701 per capita (Table K.25, cols. 1 – 4).

Some inevitably even more tentative estimates for the earlier decades are here constructed on the assumption that the stock of rooms per person grew exponentially from end-1861 through end-1871 and end-1881 to mid-1911 (dismissing the lower figure obtained for 1901 as a reflection of the “agrarian crisis” of the 1880s, and the general crisis of the 1890s). Given an aggregate year-end population of 26,801,000 in 1871 and 25,017,000 in 1861

(*Censimento 1871*, vol. 1, p. XIV), and estimates of year-end rooms per person equal to .713 in 1871 and .711 in 1861, the year-end stock of rooms is here estimated at 19,109,000 in 1871, and 17,787,000 in 1861 (Table K.25, cols. 1 – 4).

Given then the census-date housing stock estimates summarized by Table K.25, col. 3, average annual residential construction depends on the length of those periods (here taken as 10, 10, 19.11, and 10.33 years, respectively) and on the intervening demolitions. The tentative figures in Table K.25, cols. 8 – 10 are obtained, for simplicity, from the formula

$$(1) (I/n) = (K_t(1 - d)^{-n/2} - K_{t-n}(1 - d)^{n/2})/n$$

itself derived from

$$(2) (I/n) = ((K_t - K_{t-n}(1 - d)^n)(K_t(1 - d)^{-n} - K_{t-n}))^{1/2}/n$$

where I is total intercensal construction (in rooms), K is the housing stock (in rooms), d is the proportion of the stock demolished each year, n is the intercensal period (in years), and t is the date of the later census: i.e., as the geometric average of two estimates which attribute all intercensal construction respectively to the end, and to the beginning, of the intercensal period (thus approximating the figure obtained by assuming a steady rate throughout that period).

If d is taken as the normal demolition rate, which tends to remain constant over time, the estimates in the bottom row of cols. 8 – 10 are usefully corrected to allow for the great earthquake which hit the Messina area at the end of 1908. Judging from the *Censimento 1881, Relazione generale*, pp. 31, 91, 95, 99, the city of Messina then held some 78,400 people in 65,300 rooms (at 1.2 persons per room) and 16,700 apartments (at 3.9 rooms per apartment), with another 11,400 rooms (at an estimated 3.0 rooms per apartment) in 3,800 empty apartments (at the regional average of .23 empty apartments per occupied apartment) in partly occupied buildings, and perhaps another 3,100 rooms in empty buildings (at an estimated .04 per capita, against a regional average of .095 estimated from the reported number of empty houses and an allowance of 1.2 rooms per empty house). The total number of rooms is equivalent to 1.02 per capita; estimating the city's population at the end of 1908 as 98,900 people (geometrically extrapolated from 78,400 at the end of 1881 and 92,400 some 19.11 years later: *Censimento 1901*, vol. 5, p. 63), the stock of rooms at the time of the earthquake is here estimated at approximately 100,000. Repeating these calculations for the rest of the municipality, one obtains 48,100 people in 1881, in 17,800 rooms (at 2.7 persons per room) and 11,900 apartments (at 1.5 rooms per apartment); another 6,500 empty apartments (at .55 times the number occupied) with 7,800 rooms (at an estimated 1.2 rooms per apartment); and another 5,300 empty rooms in empty houses (at an estimated .11 such rooms per capita). The total number of rooms is equivalent to .64 per capita; estimating the area's population at the end of 1908 as 61,800 people (from the municipal totals of 126,500 people in 1881 and 149,800 in 1901, and the above figures for the city), the stock of rooms at the time of the earthquake is here estimated at approximately 40,000. Some 60,000 people died in the destruction of some 90% of these 140,000 rooms, and another 20,000 died in other municipalities (*Enciclopedia italiana*, vol. 23, pp. 1, 8); the total number of destroyed rooms is correspondingly estimated at 168,000, or about 16,000 p. a. over the intercensal period. In 1911, it may be noted, the *Censimento demografico*, vol. 7, pp. 252*-253*, 308*-309* suggests a total of about 60,000 rooms in the municipality of Messina; of these, some 14,000 may be considered to have survived the earthquake (10% of the total at the time, as estimated) and 46,000 to have been rebuilt. The latter figure equals some 37% of those estimated destroyed, suggesting a net loss (including other areas) equal to 63% of 168,000, or approximately 106,000 rooms (.003 per person counted

by the 1911 census).

Assuming then that d remained constant, average building lives of about a century (Vitali, 1969a, p. 514) imply that average annual construction grew by just 2% from 1862-71 to 1872-81, by another 7% to 1882-1900, and by another 37% to 1901-11 allowing for earthquake losses (from Table K.25, col. 10). Average building lives of about two centuries, as estimated in section K09.06 below, imply instead that average annual construction declined by 1% from 1862-71 to 1872-81, and then grew by 5% to 1882-1900 and by another 49% to 1901-11 allowing for earthquake losses (from Table K.25, col. 9). The slow growth attributed to the early decades is the inevitable result of the decelerating growth in population and the assumed slow growth in the number of rooms per capita (cols. 6 – 7). The acceleration around the turn of the century is more interesting, since it incorporates some empirical evidence of the variation in the number of rooms per capita; but here too the results depend critically on the assumed constancy of the demolition rate (for example, allowing for earthquake losses, a decline in d from .010 in 1882-1900 to .008 in 1901-11 would yield a deceleration to a 22% increment in construction from 1882-1900 to 1901-1911; an increase in d to .012 in 1901-11 would instead yield a magnified acceleration to a 50% increment in construction from 1882-1900 to 1901-1911).

The early estimates in Table K.25 also provide some perspective on the above-noted decline in the increment in the total recorded number of houses between 1862-71 on the one hand and 1872-81 on the other. Comparing those numbers of houses and the present numbers of rooms, one obtains averages of about 4.2 rooms per house (allowing for the Venetian and Roman provinces) in 1861, 3.7 in 1871, and 3.8 in 1881. Assuming that the actual rooms per house remained constant or nearly so, the 1871 census appears quite closely comparable to that for 1881: the effect of the 1873 decree introducing permanent housing registers seems minimal, and the major source of spurious variations appears to be not overcounting in 1871 (by comparison to 1881), but undercounting in 1861.

K08. Urban construction: an index of materials consumption

K08.01 Introduction

Given the apparent paucity of evidence bearing directly on the construction of private buildings (above, section K07.01), the latter is usefully approached through measures that include both private and public construction, and from which the public component can somehow be extracted. This section is concerned with one such measure, based on the consumption of construction materials within a sample of urban areas; another such measure, based on the tax on buildings and other structures, is considered in section K09 below. With the limited exceptions noted in section B03.01 above, the consumption of construction materials cannot be estimated, at the national level, for want of production statistics; but direct evidence of consumption at the local level was generated by the local consumption tax (*dazio consumo*) to which these materials were subject. This tax was typically levied on goods brought through the municipal customs barriers into the *comune chiuso*, on the basis of rates and classifications specific to each municipality (and subject to periodic revision); from 1898 (*legge 14 luglio 1898, n. 302*, arts. 8 and 16), it could be based on the completed volume of new construction (including major reconstruction of existing buildings) and extended, on this basis, to the city beyond the customs perimeter; from 1902 (*legge 23 gennaio 1902, n. 102*, art. 9), the latter tax could be applied to the entire municipality beyond the customs perimeter (the *comune aperto*), excluding however both farmhouses and industrial works.

The data collected here include both physical series for major materials and aggregate tax-yield series. The sample physical series normally include binders (plaster, lime, cement, etc.), bricks and tiles, timber and lumber, and, less frequently, freestone or rubble; the yield series are normally a tax-weighted sum of these and other construction materials, and often include a substantial yield from relatively small tonnages of furniture and metal. The actual sample varies across cities, reflecting both differences in the sources and a certain amount of learning over a single pass through a few dozen local archives.

The individual series are typically heterogeneous over time. The physical series could be affected by changes in classification, and the yield series would reflect changes in unit rates as well; more awkwardly, the consumption of materials in the *comune chiuso* would be a varyingly biased sample of that in the city as a whole if the city's growing fringe passed out beyond the customs perimeter, and again if that perimeter were expanded to adapt to past (or expected) urban growth. The latter problem is in fact pervasive and severe: since the city walls were the most convenient customs barrier, since the incentive to keep the city's growing fringe within the customs perimeter was reduced by the preponderance, in the tax base, of non-durables consumed at roughly constant per-capita rates, and since the expansion of the customs perimeter would be resisted by those who stood to lose the tax advantages of the *comune aperto*, there was no general tendency for the customs perimeters to expand ahead of the city proper. From this perspective, the most homogeneous series are those for cities that did not break out of their walls until after the First World War; but by the same token these were precisely the cities where relatively little new construction was taking place.

The calculation of city-specific indices of materials consumption is made difficult by the significant variability of the input proportions over time. The present indices are the binder-consumption series as a first choice, and deflated tax receipts as a second choice (by themselves, or to extrapolate binder-consumption figures). Computational simplicity aside, the neglect of changes in the ratio of binders to bricks and tiles, or to lumber, may be justified by the following considerations: from year to year, such changes may well reflect changes in the inventories of materials other than binders (whereas binders are stored, on site, only with great difficulty); over longer periods, such changes plausibly reflect substitution between bricks and

stones or rubble (which was typically not taxed, and could in any case be obtained within the customs perimeter from ongoing demolitions), substitution between lumber and metal, and changes in the volume of lumber consumed for purposes other than construction (e.g., Arciprete, 1941, pp. 180-203; Corsetti, 1941, pp. 206-211). There is no obvious correlation, in the sample data, between consumption levels and proportions, so that the latter do not appear to be a useful index of the ratio of maintenance to new construction; nor is there any other relationship between input proportions and construction value added per unit of binder consumption sufficiently obvious to be specified, as it would here have to be, *a priori*.

The calculation of an overall index from the city-specific series is also beset by problems. Mechanically, the individual series are of varying length, variously interrupted by gaps in the data base, and occasionally broken by a major expansion of the customs perimeter. Substantively, the sample is limited to large and medium-sized cities, most of them from northern Italy and the rest from west-central Italy; it contains a very wide spectrum of individual time paths; and it covers perhaps a tenth of the total it is to represent. The latter ratio is gauged from a comparison of the total consumption in the present sample to the benchmarks provided by the Corpo delle miniere: in 1890, the present sample covers the consumption of some 130,000 tons of binders, against a production close to 1.6 million tons (Table C.04), and of about 160 million bricks and tiles, against a production in excess of 1.0 billion (Table C.04 and section C02.03); with brick construction apparently more common in northern than central or southern Italy, the latter comparison is probably biased in the sample's favor. Moreover, half to two thirds of the totals in the sample (over 70,000 tons of binders and 110 million bricks and tiles) were consumed by Roma and Milano alone: excluding these, the sample's coverage drops to some 4 to 5% of domestic production and consumption.

With the available sample thus simultaneously small, unrepresentative, and internally heterogeneous, the choice of weights is a critical one. The present aggregate series is calculated by applying, to an arbitrary base year, a chain of year-to-year growth rates obtained as the geometric average of those yielded by the series in the sample. Mechanically, the implicit attribution of equal weights to every city in the sample in every year frees the time path of the aggregate from the choice of base year; it accordingly avoids the conceptual and computational difficulties of computing a standard weighted sum of partial indices when these are numerous, of unequal length, and frequently non-overlapping (as when the expansion of a customs perimeter redefines the unit of observation; with the present technique, the year of spurious growth is simply dropped from the sample). Substantively, this equiponderation removes much of the sample's bias in favor of large cities (when measured by their relative share of total consumption), though it obviously does nothing to remove the sample's geographic bias. On the negative side, this scheme has the disadvantage that it fails to attribute, to the more rapidly growing cities, the increasing weight they acquired in actual fact; at the limit, if every city grew at a constant rate (which varied across cities), the present measure would yield an aggregate growing at a constant rate, and entirely miss the acceleration of the aggregate's actual growth rate. In the present context, however, this seems to be the sort of index-number problem one can live with: the cyclical variation in growth rates, which is relatively unaffected, here matters more than the curvature of the long-run trend (which is in any case largely indeterminate, in the absence of an unequivocal standard of real value); and these minor defects seem a small price to pay for the attendant computational simplicity.

A final word on the present data base may be in order. The materials-consumption series in Tables K.26 – K.50 are the result of the relatively successful attempts at data gathering; but municipal budget information was published, in the necessary detail, only in exceptional cases, and only about half the visits to local archives proved fruitful. The municipal records of Ancona and Civitavecchia were destroyed in the last war; those of l'Aquila, Bergamo, Lucca,

Pistoia, Sampierdarena, Siena, and Viareggio were inaccessible or in disorder (in 1979-80, when this part of the work was carried out); and no data, or mere traces, were found in Arezzo, Ascoli Piceno, Cesena, Fano, Livorno, Mantova, Parma, Pesaro, Pisa, Reggio Emilia, Rieti, Rimini, and Viterbo. Venezia is something of a special case: yield data for 1873-86, at least, may be found in the *Rendiconto Venezia*, but local conditions were so favorable to smuggling that the effects of changes in administrative pressure can easily dominate the resulting time series (e.g., *Rendiconto Venezia 1881-82*, pp. 165-166). The present sample could easily be expanded by examining other municipal archives (particularly in the South, since the present investigation was cut off in central Italy by the combination of lengthening distances and decreasing success ratios); one should also note the annual reports of the provincial Chambers of Commerce (whose potential usefulness in this connection was discovered only near the end of the present investigation), and of course the likelihood that local historians would succeed where the present visitor has failed.

K8.02 Alessandria

The data in Table K.26 are from the *Archivio Alessandria* (box 534, containing scattered monthly summaries, annual summaries, and multi-year synopses).

The sample quantity figures in cols. 1 – 3 cover, respectively, binders (lime and plaster, plus minor quantities of pozzolana, cement, and asphalt), ordinary bricks, and lumber (*legname da opera*, divided into soft and hard wood through the early years). The data for 1861-67 are from a synopsis for those years; those for 1873, from a report for that year (replacing the reported lime and plaster quantity, which seems to err by an order of magnitude, by the ratio of the corresponding yield to the unit rate); those for 1885-86, from a report for 1886; and those for 1888-89, from a report for 1889. The figures for 1877-78 are obtained from a report for 1878 covering the first ten months of the year; the present quantity estimates are obtained by dividing the reported yields by the corresponding unit rates, and then dividing these ten-month figures by .86 (estimated from the aggregate yield data for 1872 and 1873, when the monthly summaries indicate that the first ten months accounted for .843 and .876, respectively, of the year's total).

The yield figures in col. 4 are from annual reports for 1862, 1868, 1869, 1871, 1873, 1878 (ten-month data, scaled as those in cols. 1 – 3), 1889, 1898, 1903, 1905, 1911, and 1913; the 1903 report indicates the yield in 1903 and its increase from 1902 (whence the present estimate for that year), adding however that the increase was due to a reduction in the deduction for presumptive re-exports of iron products. The total yield includes that on iron (throughout) and furniture (apparently through 1903, since furniture first appears as a separate category in 1905, with a yield of 19,086 lire). Tax rates (documented also in box 533) appear to have increased considerably between 1862 and 1868, and mildly from 1870 to 1871 and again between 1873 and 1877; they then remained constant through 1889, and little altered, it would seem, from then on (with the exception noted above in 1903) through 1905. The 1910-13 taxes were based on completed volume rather than actual imports, and the unit rate was not reported. The customs perimeter, on the other hand, appears to have remained unchanged throughout this period, coinciding with the line of fortifications and the river (box 534); in 1901, it contained some 34,400 people, against 36,000 (30,800 in 1882) in the city as a whole (*Censimento 1901*, vol. 5, pp. 63, 69).

The binder-consumption series in col. 1 is here extrapolated on the basis of the aggregate yield in col. 4 and the 1889 ratio of col. 1 to col. 4. The estimates for 1897-98 and 1902 are straightforward calculations in this manner; the estimate for 1903 repeats that for 1902; and that for 1905 is that for 1903, scaled by the ratio of the 1905 figure in col. 4, augmented by the yield on furniture (see above), to the 1903 figure in col. 4. No attempt is made to estimate binder consumption in 1910-13, however, since the tax base was then differently defined, and

the unit rates are not known.

K08.03 Bologna

The data in Table K.27 are from the *Archivio Bologna* and the *Dazio Bologna*. The sample quantity figures in cols. 1 – 5 cover binders (lime and cement plus plaster; the latter outweighs the former in the nineteenth century but not in the twentieth), bricks and tiles (separately counted, with the former much the larger of the two, from 1870 to 1891), lumber (including timber, normally about one tenth to one fifth of the total), and freestone (including both rough and cut stone, other than marble; these were separately counted, with rough stone normally some five times as large as cut stone, through 1891). The *Dazio Bologna* (e.g., 1902, pp. 16-17) is the source of the figures for 1873 ff., the *Archivio Bologna* the source of those for 1865-69 (box for 1869) and 1870 (box for 1870); quantity figures for the other years do not appear to have survived. All the present figures for those years are direct (rounded) transcriptions of sums of those in the sources, with one exception: the data for 1868 cover only the first ten months of the year, and the present full-year estimates are those data divided by .88 (by analogy to Ferrara in 1883: see below).

The total yield figures in col. 6 are from the *Dazio Bologna* (e.g., 1874, unnumbered appendix, 1890, appendix H, 1906, pp. 36-37); they include the yield on metal, terra cotta, marble, glass, and reeds (but not furniture). Tariff rates remained essentially stable from 1871 on, save for an average reduction of about 10% between 1891 and 1892, and a 40% reduction (due to the suppression of taxes on wood and iron) on Aug. 1, 1901; the tax levied on construction in the open municipality from 1911 was separately tabulated (*Consuntivo Bologna 1910*, p. XVI; *Dazio Bologna*, e.g., 1913, pp. 44-45). Col. 6 is here used to interpolate col. 1 between 1870 and 1873, allowing just over 97 tons of binders (against 100 tons in 1873 and 94 tons in 1874) per thousand lire of total tax.

All the series in Table K.27 are broken in 1901, as the customs perimeter was significantly expanded in that year to incorporate the parts of the city that had grown into the open municipality; the population within the customs perimeter was thereby increased from about 100,000 (equivalent to the city's population in 1882) to about 125,000 (essentially equivalent to the current population of the city as a whole: *Censimento 1901*, vol. 5, pp. XXIX, 63, *Dazio Bologna 1902*, p. 40).

K08.04 Brescia

The data in Table K.28 are from the *Archivio Brescia* and the *Statistica Brescia*. The sample quantity figures in cols. 1 – 6 cover, respectively, binders (lime and plaster plus pozzolana, asphalt, and cement, long taxed at different rates), bricks and tiles, lumber (including timber, normally about one tenth to one fifth of the total), freestone (including both rough and cut stone, with the former approximately twice the latter when they are separately counted), and rubble (*pietre da muro*). The yield figures in cols. 7 – 9 represent, respectively, the yield of the tax collected within the closed municipality on the basis of completed volume (it was levied from Sept. 1, 1908, in lieu of the customs tax on lumber, and exempted both public-interest construction and ordinary maintenance: *Statistica Brescia 1910*, p. 183), the total yield of the closed-municipality tax on materials (including the tax collected on the basis of completed volume and taxes on minor materials, but excluding taxes on furniture), and the yield of the materials tax in the open municipality (levied entirely on the basis of completed volume, exempting industrial workshops and farm buildings as well as public-interest construction and maintenance, at a rate designed to correspond to the average total materials-tax burden in the closed municipality: *Statistica Brescia 1908*, p. 66, 1910, p. 183). The *Statistica Brescia* (e.g., 1910, pp. 174-180) is the direct source of the present figures for 1907-13 (save only the 1907-08 figures in col. 6, discussed below); the earlier data are instead obtained, often indirectly, from

the *Archivio Brescia* (boxes 4/2A-2B, 5/8A-8F, and another marked “miscellanea, 1881-1906”); the archive has not been reordered, and other relevant data may have survived in other boxes).

In the early years, disaggregated quantity data are directly available only for 1865 (also the last four months of 1864, here judged to be too small a sample to be useful), 1871-74, 1880, and 1884; annual yield data, subaggregated by major groups of goods, are also available for 1878-85 (the 1884 quantity data, ostensibly attributable to 1885, are here dated by their exact correspondence to the 1884 yield data in the latter series; for most groups of goods, in any case, the differences between 1884 and 1885 yields were very small). The 1878-79, 1881-83, and 1885 quantity estimates in col. 1 (binders) are thus the reported yields times .2646 tons/lira (the group average in 1880 and 1884); those in col. 2 (bricks and tiles), reported yields times 400 units/lira (the inverse of the tax rate on the single category of goods); those in col. 4 (lumber), the reported yields times .1042 tons/lira (against a group average of .1047 in 1880 and 1.036 in 1884); and those in col. 5 (freestone), the reported yields times .5077 tons/lira (against a group average of .5021 in 1880 and .5132 in 1884). The 1865 figure in col. 5 is also an estimate, obtained as the reported quantity (1,412 tons, taxed from March 19) times 1.10. The pre-1909 tonnage figures in col. 6 are all estimates, as the data refer to yields and (variable) cartloads. In 1865, 1871-74, 1880, and 1884, standard cartloads are estimated as the sum of the reported two-animal cartloads and one-animal cartloads with weights of two and one, respectively (and a 10% increase in the 1865 quantities, taxed from March 19, to approximate full-year totals); in 1878-79, 1881-83, 1885, 1907, and 1908 (January-August; 8,442 tons were taxed as such in September-December), standard cartloads are estimated as the reported yield divided by .40 lire per cartload (the rate on one-animal loads, two-animal loads paying twice that, until 1895, when a single rate of .50 lire per cartload come to be applied). The further transformation, on the basis of one ton per standard cartload, is extremely tentative: the conversion in 1908 of the tax rate from .50 lire per cartload (of any size) to .30 lire per ton, at a time when most rates were unchanged, would suggest a standard cartload of about 1.3 tons; but one ton is the upper limit of the range for one-horse carts specified by Arciprete (1941, p. 53).

The early aggregate yield data (col. 7), in turn, are obtained by aggregating over the reported yield for each good (or group of goods) in 1865, 1871-74, and 1878-85. The 1894 figure is reported as such; and those for 1895-1906 are built up from monthly reports of aggregate yields (in the current month, and the same month of the previous year). The monthly figures are normally obtained from the current set of reports, with the following year's set used only as and when the former is incomplete; the notable exceptions are 1895-96 and 1900. The present 1900 figure, built up from the 1901 reports, is well in excess of that obtainable from the 1900 reports (32.8 v. 28.9 thousand lire). The present 1896 figure is similarly built up from the 1897 reports; the 1896 reports begin with the month of May, and the 8-month subtotal in the current reports is again well below the comparable figures in the subsequent retrospect (15.0 v. 20.2 thousand lire). The only evidence for 1895 (15.3 thousand lire from May to December) is from the partial set of 1896 reports; the present figure is estimated as the ratio of the 1895 subtotal to the 1896 subtotal from the 1896 reports, times the 1896 total from the 1897 reports. No use is made here of the aggregate yield figures for 1896-1900 in the *Rendiconto Brescia* (1897, p. 12, 1898, p. 12, 1900, p. 17); these differ from those in the *Archivio Brescia*, mainly but not exclusively, it seems, by the inclusion of furniture.

The estimates of binder consumption in col. 1 in 1894-1906 are indexed by the aggregate tax-yields in col. 8. One notes the decrease in the ratio of these two figures from .064 tons per lira in 1885 (.061 in 1881-85) to .054 in 1907 (the last full year before the 1908 tax revision), and recalls the discontinuities in the reported yield figures in 1896 and 1900, which plausibly signal heterogeneity in the aggregate yield series (perhaps a change in classification among major categories, e.g., to include metal products among construction materials; unit rates

on the goods in Table K.28 were relatively stable from 1884 to 1908, save for the change in the tax on bricks and tiles from 2.5 lire per thousand to 1.5 lire per ton -- perhaps a near doubling of the effective rate -- between 1895 and 1896). Assuming, then, that the change in the ratio of col. 1 to col. 8 between 1885 and 1907 is best concentrated in 1894-95 (since the 1895 figure, as calculated, is scaled to be homogeneous to those for 1896-99) and 1899-1900, rather than distributed over the entire period, the estimates in col. 1 are tentatively obtained as the figures in col. 8 times .064 in 1894, .059 in 1895-99, and .054 in 1900-06.

All the series in Table K.28 are broken in 1908, as the customs perimeter was expanded on Sept. 1 to incorporate the parts of the city that had grown into the open municipality. The number of inhabitants within the customs perimeter was thereby increased by about 20%: it stood at 44,200 people in 1901, against 48,100 (43,400 in 1882) in the city as a whole, and 55,600 in 1911, including 8,700 in the area between the old perimeter and the new (*Censimento 1901*, vol. 5, pp. 63, 69; *Statistica Brescia 1908*, p. 65, 1911, p. 109).

K08.05 Carrara

The data in Table K.29 are from the *Archivio Carrara* (boxes 308, 316, 326, 336, 344, 356, 364, 372, 387). No relevant data are available through 1885, as Carrara was then an open municipality with no tax on construction materials (e.g., boxes 161, 191, 298); quantity data for 1888 seem to cover only the first six months of the year (box 325); and no relevant data seem to be available for 1894 and 1896 ff. (save for the first four months of 1897 and 1898), as the only other surviving accounts appear to be those aggregating over all consumption taxes and disaggregating by the month or day (e.g., boxes 378, 395, 409, 428, 473).

The sample quantity data in cols. 1 – 3 cover, respectively, binders (lime, plaster, pozzolana, asphalt), bricks and flat tiles (*mattoni, mezzane, mattoncioni*), and lumber (including timber, normally about one fifth to one third of the total); the yield data (col. 4) seem unaffected by changes in tax rates (or in the customs perimeter), but do include taxes on minor materials and metal products which account for a share of the total tax rising from 20% in 1886 to 30% in 1895. Binder consumption in 1888 (col. 1) is estimated on the basis of the aggregate yield (col. 4), geometrically interpolating the ratio between these two magnitudes in 1887 and 1889.

K08.06 Ferrara

The data in Table K.30 are from the *Archivio Ferrara* and the *Annuario Ferrara*. The *Annuario Ferrara* (1909, pp. 139, 144, 1913, pp. 214-215, 219) reports disaggregated quantities and yields for 1906-13; the *Archivio Ferrara* (19th-century boxes 24-31, 39-41, 43-44, 46-47) reports disaggregated quantities and yields for 1862 (and averages for 1861-63), 1865-68, 1870-75, 1880-82, and 1887-88, aggregate yields for 1883 and 1896-99, and partial (January to September or October) yields for 1883-84, 1886-87, 1889-90, 1895-96, and 1899-1900 (information on other years, if available at all, seems too fragmentary to be useful).

The sample quantity data in cols. 1 – 5 cover, respectively, binders (of all types, save the no doubt negligible exclusion of cement and asphalt in the earliest years), bricks and tiles, lumber, and timber (here counted separately because of the extreme changes in their relative proportions). The yield data in cols. 6 – 7 refer to the total yields of the closed-municipality tax on materials (including taxes on minor materials and metals, but not furniture) on the one hand, and the open-municipality taxes on materials (levied at .50 lire per cubic meter, or half that for structures without internal divisions: *Archivio Ferrara*, 20th-century box 3). All the data are obtained directly from the sources, summing across tax categories as necessary, with the following exceptions. The 1861 and 1863 figures in cols. 1 and 4 are one half of the difference between thrice the reported averages for 1861-63 (2,669 and 1,136 tons, respectively) and the data for 1862 (2,878 and 1,304 tons respectively). All the figures for 1867-68, 1870, and 1873

are the sums of the corresponding monthly data. In col. 6, the aggregate yields for 1884 and 1889-90 are the reported January-October figures divided by .8773 (the January-October/full year ratio in 1883); that for 1886 is the reported January-September figure divided by .7964 (the January-September/full year ratio in 1887); that for 1895 is the reported January-September 22 figure divided by .7511 (the January-September 22/full year ratio in 1896); and that for 1900 is the reported January-September figure divided by .7893 (the January-September/full year ratio in 1899).

The figures in col. 1 between 1882 and 1886, and again between 1888 and 1906, are indexed by the aggregate tax yields in col. 6, as follows. From the early 1870s through 1908, tax rates appear essentially (and, for the goods in Table K.30, absolutely) unchanged; the variation in the ratio of col. 1 to col. 6 thus appears due to changes in the relative quantities of imported construction materials. That ratio ranges from .052 tons per lira in 1882 to .069 tons per lira in 1907: all the other values lie between .056 and .066 tons per lira, with an unweighted average of about .058. Since the year to year variations appear to be essentially random, the 1883-84, 1886, 1889-90, and 1895-1900 estimates in col. 1 are all obtained as the product of col. 6 and this simple average coefficient; the basic pattern of stasis through the turn of the century (with a dip in 1890), if not the smaller-scale movements, should be true to fact.

The customs perimeter appears to have coincided with the line of fortifications throughout this period; in 1901, about 32,400 people lived within it, against 35,800 (28,800 in 1882) in the city as a whole (*Censimento 1901*, vol. 5, pp. 63, 69).

K08.07 Firenze

The data in Table K.31 are from the *Relazione Firenze*, *Annuario Firenze*, and *Archivio Firenze*. The *Relazione Firenze* (e.g., 1868-69, p. 47, 1869-70, pp. 65-67, 1884, p. 303, 1891-94, Alleg. 115) contains annual quantity data for 1867-75, 1879-88, and 1891-1900, and annual yield data for 1865-88 and 1890-1900; the *Annuario Firenze* (e.g., 1906, p. 262, 1910, pp. 271-272) contains annual quantity and yield data for 1902-13; and the *Archivio Firenze* (1890, file n. 10923) contains annual quantity and yield data for 1889-90. Quantity data for 1865-66 (the first full years after the tax on construction materials was introduced on Sept. 1, 1864) and 1876-78, and both quantity and yield data for 1901, appear to have been lost; the re-ordering of the archive in progress when it was visited yields a slim hope that they may have since been recovered.

The sample quantity data in cols. 1 – 6 typically sum over a varying set of tax categories. Col. 1 covers binders of all types: lime, cement, pozzolana, asphalt, tar, and black. Cols. 2 – 3 cover bricks and small tiles (*mattoni*, *quadroni*, *tegolini*), including those made within the customs perimeter, separately counted in 1908-10 (but taxed long since: e.g., *Atti Firenze 1895-96*, p. 143). Cols. 4 – 5 cover timber and lumber (*legname greggio* to 1884, *legname da costruzione* from 1895), apparently excluding boards (only) in 1895-97 (*Atti Firenze 1895-96*, p. 145, 1897-98, p. 775; *Tariffa Firenze 1866*, p. 12); the 1875 shift from volume units to weight units may be more apparent than real, as in the early years lumber could be weighed and converted into volume units at a standard rate (.45 tons per cubic meter: *Tariffa Firenze 1866*, p. 12). Col. 6 covers the rubble taxed by the cartload (*barrocciata*, equivalent to 1/2 or 1 cubic meter when drawn by 1 or 2 horses respectively: *Quaderno Firenze*, p. 4); it excludes very large stones, taxed by the cubic meter, and normally imported in negligible quantities. All the present quantity figures for 1879-81 are calculated from the published three-year averages for 1879-81 ff. and annual data for 1882 ff.; figures for 1881 similar but not identical to the present estimate may be found in the *Archivio Firenze* (1882, file n. 12606). The yield data in col. 7 cover the total yield of the closed-municipality tax on materials; they include taxes on minor materials but not (from 1867) taxes on wood and metal products, and include the tax on

materials produced within the customs perimeter (separately counted from 1902; it rises from 1-3,000 lire in 1902-05 to 6-16,000 lire in 1906-11 and 41-55,000 lire in 1912-13, and corresponds exactly, in 1908-10, to the tax on the reported quantities of bricks produced within the customs perimeter). Col. 8, finally, covers the open-municipality tax on materials, levied at the rate of .30 lire per cubic meter (*Atti Firenze 1899-1900*, vol. 1, p. 318); its disappearance in 1911-12 is curious, as there is evidence that it was not, in fact, suppressed (*Atti Firenze 1911*, vol. 2, p. 461).

The 1865-66 and 1876-78 estimates of binder consumption (col. 1) are obtained through the aggregate yield data (col. 7), as follows. The 1865-66 yield data are homogeneous, in principle, to the sum of the yields of the taxes on construction materials and wood and metal products in 1867 (a total of 248,900 lire); they reflect what appears to be a slight increase in the average tariff in mid-1866 (*Atti Firenze 1865-66*, p. 491; also *gen.-sett. 1864*, pp. 225 ff., and *Tariffa Firenze 1866*, pp. 10-12). The 1865-66 estimates in col. 1 are accordingly those years' figures in col. 7, multiplied by the 1867 ratio of binder consumption (col. 1) to total taxes on construction materials, wood, and metals (note *e*), and further multiplied by 1.10 in 1865 and 1.05 in 1866 as a rough offset to tariff changes. Between 1875 and 1880, on the other hand, tariff rates appear to have remained constant (given the lack of related material in the *Atti Firenze*); the 1876-78 estimates in col. 1 are accordingly those years' figures in col. 7, multiplied by a uniform .130 tons per lira (against .131 in 1873-74, .128 in 1875, and .132 in 1879).

All the series in Table K.31 are affected by repeated changes in the customs perimeter. The latter was expanded in 1869, 1870, and 1875, reduced between 1877 and 1878, adjusted (to adapt to new rail lines) in 1883, 1886, 1895, and 1896, again expanded, in a major way, in September 1911, and again adjusted early in 1912 (*Relazione Firenze 1868-69*, pp. 42-43, 1870, p. 45, 1874-75, p. 313, 1879-80-81, p. 415, 1882-83, p. 419, 1886, p. 270, 1895, p. 97, 1896, p. 101, 1899, p. 117; *Annuario Firenze 1903*, p. 222, 1913, p. 223; *Atti Firenze 1883*, p. 105, 1899-1900, vol. 2, p. 2020, 1912, vol. 1, p. 102). These changes are more than usually difficult to evaluate, since the relevant data are incomplete and at times, it seems, in error; but they may well have been relatively unimportant before 1911. In particular, the early cycle in the tax yield, which might be due to changes in the area subject to tax, is definitely attributed to changes in actual construction (*Relazione Firenze 1868-69*, p. 48, 1879-80-81, p. 447; also 1882-83, p. 470, attributing the recent increase to a combination of speculative building and public works); in those years, then, the present uncorrected series may be considered distorted, but not unacceptably so. The break in September 1911, on the other hand, is clearly a major one: the customs perimeter roughly doubled in length, probably absorbing the entire city that had grown up beyond the preceding limit (the *Censimento 1901*, vol. 5, pp. 63, 69 attributes Firenze a population of 147,000 within the current perimeter, and 158,500 in the city as a whole; the *Censimento demografico*, vol. 1, p. 221, taken just a few months before the Firenze customs perimeter was expanded, attributes the city 150,100 people within the customs perimeter and 57,500 people beyond it).

K08.08 Forlì

The consumption-tax records in the *Archivio Forlì* are typically complete, save for a few years here and there, from 1861 to the abolition of the customs perimeter in mid-1904; but city-wide annual figures are reported only rarely, and must otherwise be compiled from disaggregated data. The information in Table K.32 obtained directly from the *Archivio Forlì* is thus limited to a sample of the most accessible figures; in particular, further research would yield, directly, physical consumption statistics which are here either estimated or altogether missing.

The sample quantity series in cols. 1 – 3 cover, respectively, binders (lime and plaster, but not cement, at least when it was separately counted), bricks (but not tiles), and lumber (but not timber). In 1861-63, 1866-67, and 1877, they are calculated from monthly figures for each of the four city gates (boxes for 1861-63, 1867, and 1877); the missing figures for imports of lime and lumber through Porta Schiavonia in December 1866 are assumed equal to 14 and 4 tons, respectively, as in December 1867). The other years' figures are obtained directly from annual summaries for 1870 (box for 1871), 1871-75 (box for 1875), 1876 (current box), 1878 (current box), 1879-83 (box for 1883), and 1886 (current box); exceptionally, the 1875 figures are the reported annual totals (which actually refer to yields and not to quantities) divided by the unit tax rates, and the 1886 figures sum over the categories applicable before and after the changes in the tax schedule that seem to have taken place early in the year (the lime and brick figures in particular are relatively rough, as the new categories do not appear to correspond exactly to the old ones). The aggregate yield data in col. 4, in turn, cover the tax on these and (after the first few years) a dozen other items, including metals (but not, apparently, furniture) of minor significance. They transcribe annual figures only in 1888 and 1889; the others are obtained by summing over monthly city-wide summaries (all these reports include a comparison to the previous year; the sets actually used here are those for 1883, 1884, 1886, 1889, 1890, 1891, 1892, 1894, 1896, 1897, 1899, 1901, 1903, and 1904).

Estimates of binder consumption (col. 1) in 1884-85 and 1888-1903 are here obtained through the aggregate yield figures (col. 4); to repeat, many and perhaps all of these estimates could be replaced by a direct sum of the relatively disaggregated data in the *Archivio Forlì*. Between 1882 and 1904, the tax schedule appears to have been revised only twice: early in 1886; and between 1892 and 1893. The present estimates in col. 1 for 1884 and 1885 are accordingly those years' figures in col. 4, multiplied by the ratio of col. 1 to col. 4 in 1882 and 1883 together (.104 tons per lira). In 1886, tax rates were increased by perhaps 20% on average (the rate on ordinary bricks doubled; those on most minor items increased by perhaps a third to a half; those on lime, plaster, and lumber, which yielded about half the total tax, were unchanged; and that on rubble, gravel, etc. was reduced by a half). The present estimates in col. 1 for 1887-92 are accordingly those years' figures in col. 4, times .104 tons per lira (as in 1883-85), divided by 1.20; the 1886 ratio of col. 1 to col. 4, equivalent to the 1883-85 figure divided by 1.12, can be reconciled (within ordinary year-to-year variation) to the estimated 20% increase on the grounds that the change took place during the year, and inventory movements would tend to stretch the effective duration of the lower tax. From 1892 to 1893, on the other hand, a number of tax rates were reduced; using 1886 weights (the latest year for which annual quantities are reported in the sources), that reduction (on lumber, bricks, and ferrous metal) appears equivalent to an average of close to 20%, in effect roughly annulling the average increase in 1886. The present estimates in col. 1 for 1893-1903 are accordingly those years' figures in col. 4, times .104 tons per lira, as in 1883-85; one notes that inventory movements probably exaggerate the dip in 1892 and rise in 1893. No estimate is here obtained for 1904, as that year's partial figure, also affected by inventory movements, seems too weak a basis for extrapolation.

The series in Table K.32 appear to be homogeneous with respect to the area to which they refer, as the customs perimeter and (despite occasional re-naming) the four gates appear to have remained unchanged throughout this period; by 1901, however, the perimeter enclosed only some 15,500 people, compared to 19,200 (16,000 in 1882) in the city as a whole (*Censimento 1901*, vol. 5, pp. 65, 69).

K08.09 Genova

The data in Table K.33 are from the *Resoconto Genova* (e.g., 1878-80, p. 642, 1908, pp. 873, 876). The binder figures in col. 1 cover lime, cement, and plaster; from 1902, lime was

separately counted. The brick figures in col. 2 are the sum of separate data for various categories of bricks. The timber and lumber figures in cols. 3 and 4 sum over various categories of *legname da costruzione*; in 1880-83, when these were six in number, only the second through the fifth are here assumed to have been measured by board length rather than weight (*Resoconto Genova 1878-80*, pp. 638-641, 1881-82, pp. CDLXXXVIII, D, 1884, p. CCCLXXXIV). The stone figures in col. 5 are the sum of separate data for various kinds of stone, marble, slate, and their products. Slate tiles, counted separately and measured by the hundred through 1901, are here attributed a unit weight of one kilogram (compare *Resoconto Genova 1901*, p. DCXXXII, 1902, p. DCXXVI); the resulting allowance varies between 250 and 600 tons. Col. 6 covers sand and gravel; and col. 7 covers the yield on these and a handful of other materials (wood and metal products, but not furniture and paper, and paint; metal products accounted for nearly 600,000 lire in revenue, on imports of nearly 15,000 tons, in 1908).

The estimates of binder consumption (col. 1) in 1863-79 are obtained through the yield data in col. 7. An index of construction-materials tax levels is obtained from the 1880 quantities and the 1863-80 tax rates in the *Resoconto Genova 1878-80*, pp. 638-641, 1881-82, pp. CDLXXXVII-CDLXXXVIII; allowing 3 kg per brick, 6.7 kg per board meter of sixth-category lumber, and one twelfth of the year's consumption for each month, that index equals .512 in 1863, .496 in 1864, .465 in 1865-66, .475 in 1867-68, .603 in 1869-70, .725 in 1871, .749 in 1872-75, .959 in 1876-77, .978 in 1878, .993 in 1879, and 1.000 in 1880. The estimates in col. 1 in 1863-79 are the figures in col. 7 divided by that index and multiplied by the ratio of col. 1 to col. 7 in 1880.

The customs perimeter appears to have been expanded only once, but significantly, on June 26, 1892 (*Resoconto Genova 1892*, pp. 23-24). In 1901, it enclosed 214,832 people, against 159,200 (138,100 in 1882) in the city and 234,700 in the municipality as a whole (*Censimento 1901*, vol. 5, pp. 63, 69).

K08.10 Grosseto

The data in Table K.34 are from the *Archivio Grosseto*, boxes 312 (1890-1901), 357 (1871-87), 359 (1903), and 388 (1888-89). Earlier material seems to have been lost; later material may survive, in disorder, in the municipal archives.

The present figures represent a broad sample of the major taxed items. Col. 1 covers binders (lime, and small amounts of plaster and pozzolana, but not the even smaller quantities of cement); col. 2 covers small and large bricks, and flat tiles (*mattoni semplici* or *piccoli*, *mattoni doppi* or *grossi*, and *mezzane*); col. 3 covers timber and lumber (*legname da lavoro* or *da costruzione*); and col. 4 covers both rough and cut freestone (*pietre abbozzate e lavorate*). These figures are transcribed directly from current annual summaries, with the following exceptions: all those in cols. 1 and 2, and those in col. 4 in 1871-75, aggregate over tax categories; all those for 1868 and 1903 aggregate over monthly data; all those for 1898 are obtained from the 1899 report, dividing the reported yields by the corresponding unit rates; and the taxed quantities of plaster in 1891, lime in 1896, and both small and large bricks in 1899 are estimated as 100 times the reported amount (which obviously errs by that factor, given the reported yields and unit rates).

The customs perimeter does not appear to have been relocated over this period. In 1901, it contained 4,500 people, to 5,300 (4,000 in 1882) in the city as a whole (*Censimento 1901*, vol. 5, pp. 68-69).

K08.11 Mantova

The data in K.35 are from the *Relazione Mantova* (e.g., 1895, p. 43). The present figures cover a sample of the principal materials: col. 1 covers binders (lime, plaster, cement);

col. 2, bricks and tiles; and col. 3, lumber (including minor quantities of timber).

The customs perimeter does not appear to have been altered over these years. In 1901, it enclosed 30,100 people, against 29,100 (28,000 in 1882) in the city proper (*Censimento 1901*, vol. 5, pp. 64, 69).

K08.12 Massa

The aggregate yield data in Table K.36, col. 2 are from the *Archivio Massa* (boxes 1012, 1084, 1141, 1234, 1264); quantity data seem limited to a few months' figures for 1868, 1870, and 1886 (boxes 979, 998, 1126). Tax rates are available for 1870, 1886, and 1893 (boxes 998, 1126, 1196); a crude index of the average tax rate (the sum of the rates per ton on lime, bricks, and lumber with weights 1 – 3 – 1, in rough analogy to the input proportions in neighboring Carrara) declines from 108 in 1870 to 100 in 1886 and 85 in 1893.

The estimated consumption of binders in col. 1 is obtained from the aggregate yield figures in col. 2, as follows. First, the latter are tentatively deflated: the 1870-71 figures are divided by 1.08, the 1880 figure by 1.04 (since the date of the change in tax rates between 1870 and 1886 is unknown), the 1886-87 figures by 1.00, and the 1893-96 and 1898 figures by .85. Second, the deflated figures are multiplied by .035 tons per lira; the latter is a rough estimate that reflects both the average ratio of binder consumption to total yield in Carrara, and the relative tax rates in Carrara and Massa (in 1886, they were about twice as high in Massa as in Carrara, using the weights cited above). While the resulting series is obviously very rough, it should be a fair representation of medium-term movements.

Information on the customs perimeter is not available, but it is unlikely to have changed (significantly) over this period: in 1901, there were still only 8,600 people within the customs perimeter, against 13,500 (12,000 in 1882) in the city as a whole (*Censimento 1901*, vol. 5, pp. 66, 69).

K08.13 Milano

The data in Table K.37 for 1881-1913 are from the *Statistica Milano* (e.g., 1884, p. 282). Earlier data in col. 1 are from Zaninelli (1974), p. 135; in col. 6, from the *Relazione Milano* (1879, p. 13, 1880, p. 21).

The present quantity series cover a broad sample of major construction materials. Col. 1 covers lime and plaster (and, presumably, other binders as well), plus minor quantities of the corresponding kiln materials. Col. 2 covers large and small bricks and tiles (*mattoni, pianelle, e tegole*), including those produced within the customs perimeter. In 1890-93, they were reported by the cartload, but at the same rate per unit that had previously applied to 100 bricks; since a cart-load was surely at least twice that, and the absolute figures remain in much the same proportion to other construction materials as the earlier and later ones, one suspects that this "cartload" label is spurious. The actual unit of measurement (variously labeled "each", "hundreds", "thousands") is often ambiguous in other years as well; but that ambiguity is easily resolved by examining the corresponding tax yield. Col. 3 covers lumber, and minor quantities of timber; and col. 4 covers both rough and cut freestone, with rough stone predominating. Col. 5 reports the yield of the (closed-municipality) tax on completed volume; it was presumably introduced, like the similar tax in Brescia, as a substitute for the discontinued tax on lumber. Col. 6 reports the aggregate yield, inclusive of taxes on minor items (but not metal or furniture), and of course of the tax based on completed volume; these figures are transcribed directly from the sources, except in 1881-85, when the present figures are the sums of the disaggregated (goods-specific) yields.

The estimate of binder consumption in 1868 is obtained by scaling the figure for 1869 in proportion to the growth of consumption net of the corresponding kiln materials. In 1873-75,

binder consumption is estimated from the total yield figures in col. 6. From 1872 to 1876, the ratio of col. 1 to col. 6 changed significantly (from .0418 to .0512 tons per lira), despite the apparent absence of change in the tax schedule (*Statistica Milano 1905*, Alleg. D); the present interpolation of col. 1 is accordingly based on year-specific ratios of col. 1 to col. 6 that themselves geometrically interpolate those for 1872 and 1876.

The customs perimeter appears to have been widened three times during this period (*Statistica Milano*, e.g., 1884, p. 13, 1888, pp. 4, 97, 1889, pp. 13, 105, 1890, pp. 15, 127, 1898, p. 20, 1908, pp. 17-18, 1914, p. 16). The first expansion, in 1889, added some 10% to the enclosed area, apparently without noticeable affect on the corresponding population; the second expansion, on Sept. 1, 1898, moved the customs perimeter from the walls around the old center to the limits of the built-up area, trebling the enclosed area and nearly doubling the corresponding population, from 263,500 to 454,400, that of the open municipality declining from 207,100 to 26,900); and the third expansion, on Dec. 30, 1908, replaced the current irregular perimeter by a more conveniently convex one, increasing the enclosed area by 50% with only a marginal increase in the corresponding population (from 531,300 to 559,100, that of the open municipality declining from 35,200 to 18,600). According to the *Censimento 1901* (vol. 5, pp. 63, 70) the customs perimeter then enclosed some 462,700 people, or just a few less than the city as a whole (464,000, against 295,500 in 1882). For present purposes, the second and third of these perimeter changes mark a break in the relevant series; the first may be considered the source of only minor distortion.

K08.14 Novara

The data in Table K.38 for 1865-76 and 1878-79 are from the *Archivio Novara* (boxes 277-278); those for 1877 and 1884-1913 are from the *Atti Novara* (e.g., 1878, p. 212, 1884, pp. LIV-LV, 1894, p. 235, 1906, pp. 642-643, 1914, pp. 276-277). All are transcribed directly from annual reports, save the quantity figures for 1865-69 (obtained by summing over monthly data) and the yield figures for 1884-91 (obtained by summing over goods-specific yields). Data for other years do not appear to have survived, with a limited exception in 1864 (the *Archivio Novara*, box 277, contains a report covering the last four months of the year, from the beginning of direct collection by the city).

The sample quantity data in cols. 1 – 3 cover, respectively, binders (lime, plaster, cement, and asphalt), taxed from January 1867; bricks and tiles; and timber and lumber, taxed until April 1912. The total closed-municipality yield in col. 4 covers the taxes on these items plus (to April 1912) wood and metal products only; consumption of the latter, in particular, was relatively stable from year to year. Col. 5 covers the corresponding tax on completed volume levied in the open municipality from January 1906 (*Atti Novara 1907*, p. 473; the low figure for that year no doubt reflects the lag between accrual and collection). The rate was set initially at .20 lire per cubic meter for ordinary buildings (excluding those exempt by law), and .30 lire per cubic meter for luxury housing; it was raised to the latter figure for all taxable buildings in April 1912.

Here, as elsewhere, the binder-consumption series is considered the primary index of construction; but the variations in input proportions (and thus among possible indices) are here unusually severe. By the same token, the extrapolation of the binder-consumption series (col. 1) to 1865-66 on the basis of the brick or lumber figures (cols. 2 – 3) is necessarily very tentative. The present extrapolation is based on the ratio of col. 1 to the sum of cols. 2 and 3, with weights 2 and 1 (in their present units), respectively; since col. 1 moves much like col. 2, and not at all like col. 3, in 1867-69, while the opposite is the case in 1869-74, the present weighting scheme seems as good, or as poor, as any.

All the materials-consumption series reflect the expansion of the customs perimeter on

Feb. 1, 1886, and April 12, 1912 (apparently the only such changes, judging from the indices to the *Atti Novara*). The later expansion was a major one, incorporating the urban area that had grown up in the open municipality in a relatively short period of rapid growth. It changed the year-end population balance between the closed and open municipalities from 18,300 to 36,300 in 1911 to 33,600 to 19,400 in 1912 (*Atti Novara 1914*, p. 305; also map, *1911*, p. 569); by way of comparison, the customs perimeter enclosed 17,600 people in 1901, against 29,600 (15,200 in 1882) in the city as a whole (*Censimento 1901*, vol. 5, pp. 64, 70). The earlier expansion was much more narrowly circumscribed, to a salient, south of the old line, encompassing the area where public institutions (the asylum, the theater, the military barracks) were built or building. The construction proceeding in that salient is said to have accounted for 7,700 lire, or about 43%, of the total yield in 1886 (*Atti Novara 1887*, p. 141) -- thus indicating, among other things, that public works were not exempt from the local consumption tax, and that a few major public buildings could compare to all other local construction combined. Since, in the present case, the area allotted to those public buildings was presumably one relatively free of prior construction, it seems possible to refer the pre-1886 figures to the post-1886 area, correcting only the very last entries before the date of the change. This is done in col. 1, where the data for 1884 and 1885 are increased by 300 tons and 600 tons, respectively, to allow for public construction in the area soon to be incorporated (against an estimate of about 900 tons of binders consumed in that same area, obtained as the reported total times 43%, i.e., that area's proportion of the total yield).

K08.15 Padova

The data in Table K.39 for 1869-1901 are from the *Rendiconto Padova (1871*, pp. 52-53, *1873*, pp. 114-115, *1880*, pp. 68-69, *1883-84*, p. 45, *1889-90*, pp. 92-93, *1895*, Alleg. 2, pp. 14-15, *1898*, Alleg. 5, pp. 14-15, *1901*, Alleg. 5, pp. 16-17); those for 1902-13 are from the *Consuntivo Padova (1904*, p. 88, *1907*, Alleg. 4, *1912*, p. 100, *1913*, p. 272). Earlier, unpublished information does not appear to have survived in the rather poorly ordered *Archivio Padova*.

The present quantity data cover the principal items subject to tax: binders (lime, plaster, and cement); bricks and tiles (variously disaggregated, by size, in 1869-75 and 1904-13); and lumber and timber (taxed until 1903, and separately counted, with the former accounting for some three quarters of the total, in 1869-80). Minor quantities of wood products, wallpaper, floor tiles (excluded from col. 4), marble, and other freestone were also subject to tax.

All the present figures are obtained directly from the sources, with one exception: in the absence of more direct data, all the present figures for 1885 are five times the reported average for 1881-85, less the sum of the reported figures for 1881-84.

The customs perimeter appears to have remained stable throughout this period; in the absence of more direct information, one notes that there is no break in the average balance of wine consumption between the closed municipality on the one hand and the open municipality on the other. In 1901, the customs perimeter enclosed 49,000 people, against 51,500 (37,700 in 1882) in the city as a whole (*Censimento 1901*, vol. 5, pp. 63, 70).

K08.16 Pavia

The data in Table K.40 are from the *Archivio Pavia* and the *Rendiconto Pavia*. The data for 1865 are from the *Archivio Pavia*, box 3.3.3.A (in the Archivio di Stato); the units, not reported, are assumed to be the same as those for 1871-72. Binders (col. 1) here include lime and plaster; bricks and tiles (col. 2) are separated into large and small; and the lumber and stone categories (cols. 4 – 5) appear to be comprehensive. The data for 1871-72 are from the *Archivio Pavia*, box 1.III.3.B (in the Archivio comunale); binders now include cement, bricks and tiles are no longer disaggregated, the lumber data remain comprehensive, and the present stone

figures sum over the data for rough and worked stone other than worked fine marble. The yield data (col. 6) for 1886-1900 are from the *Rendiconto Pavia 1895*, pp. 54-55, *1900*, pp. 14-15; they include the yield of taxes on metal and furniture. The quantity data for 1889-90 are from the *Archivio Pavia*, box 1.III.3.A (in the Archivio comunale); the binders figures are those for category 75, the bricks and tiles figures are the sum of those for categories 73 (new) and 74 (used), the lumber figures are the sum of those for categories 77 (new lumber) and 78 (timber and used lumber), and the stone figures are the sum of those for categories 69 (rough stone and gypsum) and 70 (worked stone and rough marble). The quantity data for 1895-1900 are from the *Rendiconto Pavia 1896 to 1900* (e.g., *1896*, prosp. 6 bis, *1897*, prosp. H); the data cover the same goods as in 1889-90, with the categories renumbered as follows: binders, 73 in 1895 and 84 in 1896-1900; bricks and tiles, 72 in 1895 and 82-83 in 1896-1900; lumber, 75-76 in 1895 and 85-86 (plus green logs, in a separate, unnumbered category) in 1896-1900; and stone, 68-69 in 1895 and 76, 77, and 80 in 1896-1900. The yield data (col. 6) for 1906-07 are from the *Rendiconto Pavia 1907* (between pp. 132 and 133); the accompanying quantity data were not transcribed. The quantity and yield data for 1908-13 are from the *Rendiconto Pavia 1909, 1911, 1912, and 1913*; the relevant category numbers are then 85 (binders), 80 and 83-84 (bricks and tiles), 86-87 (lumber), and 75-76 and 79 (stone).

The binder-consumption estimates (col. 1) for 1886-88, 1891-94, and 1906-1907 are obtained by extrapolation based on the yield data in col. 6. The 1886-88 and 1906-1907 estimates are based on the ratio of col. 1 to col. 6 in 1889 and 1908, respectively. From 1890 to 1895, the ratio of col. 1 to col. 6 changes significantly (from .0334 to .0281 tons per lira), despite the apparent absence of change in the tax schedule; the present interpolation of col. 1 is accordingly based on year-specific ratios of col. 1 to col. 6 that themselves geometrically interpolate those for 1890 and 1895.

The customs perimeter does not appear to have changed over this period. In 1901, it enclosed 26,000 people, against 29,900 (29,800 in 1882) in the city as a whole (*Censimento 1901*, vol. 5, pp. 64, 70).

K08.17 Perugia

The data in Table K.41 are limited to quantity figures for 1906 (from that year's *Annuario Perugia*, pp. 177-178) and yield figures for 1906-13 from the *Resoconto Perugia (1907, p. 36, 1909, p. 36, 1911, p. 76, 1914, p. 78)*. Earlier figures do not seem to have survived, in the *Archivio Perugia* or elsewhere, as the tax was farmed through 1905 (*Resoconto Perugia 1906*, p. 173).

Taxed binders include lime, cement, and plaster; lumber (*legname da costruzione*) includes timber; and stone (*pietre e marmo grezzo*) includes uncut marble and probably both freestone and rubble. Data for 1907-13 may survive in later editions of the *Annuario Perugia*; the present binder-consumption figures for those years are estimates, obtained as follows. First, the tax on bricks and stone (col. 6) in 1906-09 is estimated as those years' tax on bricks (col. 5) times 1.09 (the ratio of col. 5 to col. 6 in 1910); second, col. 6, thus extended, is summed to the tax on lumber and wood products (col. 7); and third, the resulting sum is divided by the ratio of that sum to col. 1 in 1906.

The tax perimeter seems to have remained unchanged over these years; in 1901, it enclosed 20,100 people, to 20,600 (17,400 in 1882) for the city as a whole (*Censimento 1901*, vol. 5, pp. 65, 70).

K8.18 Piacenza

The data in Table K.42 are from the *Archivio Piacenza*. The quantity data in cols. 1 – 4 cover, respectively, binders (lime and plaster, plus minor quantities of cement, pozzolana, and

asphalt); bricks and tiles (disaggregated, essentially, into small pieces and large pieces, with the latter relatively minor); lumber (including minor quantities of timber); and freestone (both rough and cut, with the latter relatively minor). The aggregate yield data in col. 5 include taxes on the above items, and on metal; furniture was counted elsewhere.

The data for 1873-93, reporting only the total yield (col. 5), are transcribed from a single summary manuscript table (*Archivio Piacenza*, box for 1891-97). The data for 1867-72 are obtained, aggregating as necessary over tax categories, from printed folio tables (boxes for 1868-71 and 1872-74). The present figures for 1866 are the sums of the data in manuscript reports for January-June and August-October (supplementary boxes for 1867-69, and box for 1866), scaled up by 1.25 to approximate full-year magnitudes. The data for 1865 are from a manuscript annual summary, confirmed by partial figures for January-October (supplementary boxes for 1844-71 and 1867-69; boxes for 1865 and 1866). The data for 1863 are from a manuscript annual report dated February 19, 1864, and signed by the municipal inspectors (supplementary box for 1858-82); these are here preferred to the alternative set in another, unsigned, undated report (*ibid.*). The data for 1861-62, finally, are from a manuscript triennial report (*ibid.*). No other quantity data appear to have survived, save only some figures covering the first three months of 1864 (box for 1865; this sample was judged too limited, and subject to weather, to warrant annual estimates for that year).

The estimates of binder consumption (col. 1) in 1873-93 are obtained through the yield data (col. 5), as follows. First, aggregate yields are deflated. Using 1872 weights (the latest available quantity data) and the periodic evidence of tariff rates (*Archivio Piacenza*, boxes for 1872-74, 1875-77, and 1898, and supplementary box for 1844-71; *Delibere Piacenza 1875 and 1884*), one notes that the average tariff of 1872 was raised some 24% in March 1875, 13% in May (?) 1876, and 18% between 1884 and 1885. Deflated tax yields are accordingly estimated as col. 5 divided by 1.00 in 1873-74, 1.20 in 1875 and 1.35 in 1876 (allowing for rate changes within the year), 1.40 in 1877-84, and 1.65 in 1885-93. Second, binder consumption is estimated by multiplying deflated yields by the ratio of col. 1 to col. 5 in 1872 (.086 tons per lira). Since that ratio, and indeed the proportions of the various quantities, all display significant variation in earlier years, the present index of construction is inevitably crude; but even if the variation in the index never exceeds the latter's margin of error, the basic picture of essential stability from the late 1860s through the early 1890s should be empirically valid.

There is no evidence in the sources of change in the customs perimeter, which in 1886 still coincided with the line of fortifications (*Archivio Piacenza*, box for 1886). In 1901, the customs perimeter enclosed 35,500 people, against 36,000 (35,000 in 1882) in the city as a whole (*Censimento 1901*, vol. 5, pp. 63, 70).

K08.19 Prato

The data in Table K.43 are from the *Archivio Prato* (annual boxes first on receipts in general, then on the consumption tax in particular) for 1876 ff.; earlier data do not appear to have survived.

The present quantity figures in cols. 1 – 5 represent a broad sample of the items subject to tax. Col. 1 covers binders (lime, plaster, and cement, separately counted in 1912-13). Col. 2 covers bricks; the figure for 1884, in the face of an apparent order-of-magnitude error in the source, is estimated as the yield divided by the unit rate. Col. 3 covers, ostensibly, timber (*legname greggio*); lumber and wood products (*legname abbozzato e lavorato*) were separately counted, and, by weight, no more than some 5% of the present category in 1876-82, 10% in 1883-1900, 15% in 1901-05, and 20% in 1906-13. Cols. 4 and 5 cover freestone and rubble (*pietrame grezzo, abbozzato, e lavorato; pietre e sassi; and materiale da murare*). The relation between the weight-based and volume-based categories is unclear; neither is there an

explanation of the surprisingly low figures for 1881-82 (which are consistent with the reported yields and unit rates).

The customs perimeter seems to have remained stable throughout this period (in so far as one can judge from the time path of wine consumption). In 1901, it enclosed 14,400 people, against 17,400 (15,500 in 1882) in the city as a whole (*Censimento 1901*, vol. 5, pp. 65, 69).

K08.20 Ravenna

The data in Table K.44 are from the *Archivio Ravenna*. Col. 1 covers binders (lime and plaster); col. 2, bricks, tiles, and stones (but not freestone, separately taxed by weight); and col. 3, lumber (*legnami segati*). Metals and minor items (but not furniture) were also taxed as construction materials.

Most of the present figures are transcribed directly from annual reports in the boxes for 1864 (data for 1862-63, filed apart from the current reports), 1869 (data for 1865-67, filed among the papers of the commission to revise the consumption tax rates; the latter also include some apparently preliminary figures for 1868), 1871 (data for 1868-69, again misfiled, in box 29), 1874 (data for 1872), 1875 (data for 1873), 1876 (data for 1874-75), and 1878 (data for 1876-77). The present figures for 1871 sum those for the year's first semester, third trimester, and fourth trimester (the first and third in the box for 1872, the second in the box for 1871). Data for 1870 and 1878 appear to cover the first eleven months only (in monthly reports on the one hand, and three trimestral plus two monthly reports on the other, both in the current year's box; the December 1870 report, which should have been filed in the box for 1871, could not be found); the present estimates are the sums of those eleven month data, times 1.064 (allowing December 6% of the year's total; the reports for December 1871, 1876, and 1877, each in the following year's box, suggest that December imports were 5 to 7% of the year's total in the case of binders and lumber, and 4 to 8% in the case of bricks).

Other data could not be found. Curiously, the classification of municipal records adopted in 1879 omits finance altogether; later tax records may survive, but when visited that material was in disorder, under the roof of the farmers' market.

The customs perimeter does not appear to have been altered over these years. In 1901, what was probably still the old perimeter enclosed some 12,000 people, against 19,500 (18,600 in 1882) in the city as a whole (*Censimento 1901*, vol. 5, pp. 65, 70).

K08.21 Roma

Consumption-tax data appeared in the *Consuntivo Roma* (e.g., 1875, pp. 86-89) and, more accessibly, in the *Annuario Roma 1885* (pp. 384-385: data from April 1, 1871, when such taxes were presumably first levied, through 1885), the *Notizie città 1888* (p. 51: summary data for 1881-88) and 1891 (pp. 44-45: data for 1885-91), the *Relazione Roma* (e.g., 1900, pp. 18-23: data for 1886-89, 1891-95, 1898-1900, 1907-10, and 1912-13 in the surviving issues), and the *Rivista mineraria 1884 to 1906* (e.g., 1906, p. 389: summary data for 1881-1906, in the Roma district reports). One notes the presence of discrepancies, albeit normally negligible ones, between the various available sources for the 1870s and 1880s.

The figures in Table K.45, covering a broad sample of the principal taxed items, are from the *Annuario Roma 1885* (1871-84), *Notizie città 1891* (1885-91), *Relazione Roma* (1892-95, 1898-1900, 1907-10, and 1912-13) and *Rivista mineraria* (1896-97, 1901-1906); the April-December 1871 data are here uniformly scaled up by 25% to approximate annual totals (the ratio suggested by the monthly data of binder and rubble consumption in the *Relazione Roma 1887*, pp. 74-75). Col. 1 covers binders (lime, plaster, and cement, variously disaggregated in the sources); the 1871-72 data, reported in cartloads and animal packs, are here converted at the rates of .70 tons per cartload and .14 tons per pack (Arciprete, 1941, p. 53).

Col. 2 covers all bricks and tiles (disaggregated into half a dozen categories); the 1871 cartload figure is here converted on the basis of .70 tons per cartload and 3 kgs per brick, or 233 bricks per cartload. Col. 3 covers lumber, including comparable quantities of timber; the present series is fragmentary, as the relevant data do not appear in the *Annuario Roma 1885* or the *Rivista mineraria*. In the case of both bricks and tiles and lumber, the *Notizie città 1891* and *Relazione Roma* are wont to mislabel the units of measurement; but these are readily established from the corresponding yield and tax rate, or by chaining to unambiguous data. Col. 4 covers freestone other than marble (surely including cut stone, despite the label *in blocchi grezzi*); through 1885, it may include slab and carved stone, equivalent to another 25% or so in later years. The *Rivista mineraria 1891*, p. 284, notes the extensive consumption of taxed freestone for public works; this confirms the lack of exemptions to the consumption tax levied as goods passed through the customs perimeter. Col. 5, finally, covers rubble, variously labeled *rottami*, *pietre...*, *pozzolana*, *tufo...*, and the like.

The customs perimeter coincided initially with the Aurelian walls, enclosing an area which the city of 1870 did not begin to fill. It appears to have been widened only twice, on April 16, 1886 and April 2, 1888, and then to a very limited extent; both times, the expansion incorporated parts of the new residential area of Prati di Castello (*Resoconto Roma ottobre 1886 – dicembre 1887*, p. 43, *gennaio 1888 – ottobre 1889*, p. 57; also *Popolazione Roma*, p. 18 and maps). The annual increments from 1885 to 1889 are thus biased upwards; but since construction in the Prati area was negligible through, say, the 1870s, and then followed the violent cycle of construction elsewhere in the city (e.g., *Resoconto Roma gennaio 1888 – ottobre 1889*, p. 73-75), the present series may be considered essentially correct and homogeneous (*stricte*, it underestimates growth in, say, 1881-85, and overestimates growth or underestimates decline in 1885-89). In 1901, the (expanded) customs perimeter enclosed 422,000 people, against 425,000 (273,000 in 1882) in the city as a whole; subsequent growth came largely by expansion into the suburban open municipality (*Popolazione Roma*, p. 60).

K08.22 Savona

The data in Table K.46, covering the period 1861-88, are from the *Archivio Savona*. All are transcribed from annual or biennial reports (in boxes 89-4, 241-242, 245-249, 257, 260-262), except those for 1879 (cols. 1 – 3) and 1888, calculated from sets of thrice-monthly reports (in boxes 243, 245). Later data appear to have been lost.

The present quantity series (cols. 1 – 3) cover lime, bricks, and square tiles (*quadrelle* or *quadretti*), respectively; they represent a small sample (categories 96, 97, and 99 to 1874, 81, 82, and 84 in 1875-83, and 85, 86, and 88 in 1884-88) of the ca. two dozen categories of the Savona tax on construction materials. The total yield series (col. 4) reflects the movements of all of these items (as well as a general rate increase, averaging perhaps 10%, in 1867), including a large number of narrowly specified wood products (significant proportions of which may have been absorbed by the local ship and boat yards).

The customs perimeter does not appear to have been altered during this period; but the argument is *e silentio*. In 1901, the (new?) customs perimeter enclosed some 38,600 people, against 29,400 (19,100 in 1882) in the city as a whole (*Censimento 1901*, vol. 5, pp. 64, 69).

K08.23 Siena

The *Dazio Siena*, pp. 12-13, contains 1865-86 figures for taxed marble, lime, and *terre cotte* (presumably including bricks and tiles) on the one hand, and lumber (*legname da lavoro*, presumably including timber) on the other; these are transcribed in Table K.47, cols. 2 – 3. Other data may survive in the municipal archive, which when visited was in disorder and inaccessible.

Col. 1 is a rough estimate of binder consumption, calculated as one quarter of the figures in col. 2.

The customs perimeter seems to have remained stable through these years, presumably coinciding with the city's rather wide circle of walls; in any event, the lack of contrary evidence in the *Dazio Siena* here seems compelling. In 1901, it enclosed 25,600 people, against 26,600 (23,400 in 1882) in the city as a whole (*Censimento 1901*, vol. 5, pp. 64, 70).

K08.24 Torino

Some early brick-and-tile consumption data for Torino (35.3, 64.7, 102.0, and 152.2 thousand tons p. a. from 1861 to 1864) are available in Costanzia (1978), p. 29; the tax was suppressed in July 1865, no doubt to lighten the crisis induced by the removal of the capital to Firenze.

The tax on construction materials was reinstated on May 22, 1898 (*Statistica Torino 1899*, pp. 292, 312); the resulting data are summarized in Table K.48. The figures for 1898-1901 are from the *Statistica Torino* (e.g., 1899, pp. 312-313); those for 1902-13 are from the *Annuario Torino* (e.g., 1903-04, pp. 308-319). All refer to magnitudes net of reexports. Col. 1 covers binders: lime, plaster, and cement, including cement products (*cemento lavorato*, *piastrelle di cemento*, *piastrelle uso marsigliese*). Col. 2 covers bricks. Col. 3 covers lumber (including timber), separately counted only from 1908; curiously, the 1908 tonnage for lumber and firewood together in the *Annuario Torino 1908-09*, p. 66, is the rate-weighted sum of the separate tonnages in the following edition (1909-10, p. 73). Cols. 4 and 5 cover freestone and rubble, respectively; the latter was taxed from January 1, 1901. Col. 6 covers the total yield on materials brought through the customs perimeter, excluding lumber and including minor items and metals (which dominate the series from 1910). Col. 7 covers the volume-based tax levied in both the closed and the open municipalities from Feb. 10, 1910 (*Annuario Torino 1911-12*, p. 16). All the present figures are direct transcriptions or sums of data in the sources, with one exception: in 1906-10, about 3% of the present brick-consumption figures (col. 2) is obtained by converting the data for "unusually large bricks of the first category," reported by weight, at the rate of 3 kgs per brick. No attempt is made to obtain estimates of binder consumption for 1910-13, as the present series appear to be weak indices of actual construction movements within the customs perimeter. One notes, in this connection, the thorough revision of the tax system in 1910, the significant widening of the customs perimeter on Sept. 2, 1912 (raising the enclosed area from 1,700 ha to 6,000 ha, *Annuario Torino 1911-12*, p. 5, 1912-13, p. 5; the perimeter had enclosed 277,100 people in 1901, to 282,800, against 230,200 in 1882, in the city as a whole, *Censimento 1901*, vol. 5, pp. 63, 70), and the apparent tax-exemption of materials imported for the buildings of the 1911 fair (since 5,000 tons of lumber imported for that purpose, but not subsequently re-exported, were taxed in 1913: *Annuario Torino 1913-14*, p. 34).

K08.25 Treviso

The data in Table K.49 are from the *Archivio Treviso*, *Dazio Treviso*, and *Resoconto Treviso*. The sample quantity data in cols. 1 – 3 cover, respectively, binders (lime, plaster, and cement, including small quantities of slaked lime), ordinary bricks and tiles, and lumber (including minor quantities of timber). All three series are obtained from a manuscript table in the *Archivio Treviso* (box 2571) for 1872, and from the *Resoconto Treviso*, e.g., 1883, p. 89, for 1881-85, 1891-99 (two averages only), and 1905-10 (*Archivio Treviso*, boxes 2127, 2143, 2146, 2148, 2151, 2153, 2628, 2631, 2648, and 2657). Col. 4 covers the yield on these and other construction materials, including metals but not furniture. The data for 1869-78 are from the *Resoconto Treviso 1881*, pp. 85-88 (*Archivio Treviso*, box 2621); the series in the source

continues to 1881, but appears to include the yield on furniture in 1880-81 (see the time path of the yield in the residual group, and the 1879-81 figures in other sources). The data for 1879-80 and 1887-90 are from the *Archivio Treviso* (boxes 2596 and 2639, respectively); those for 1881-85 and 1891-99, from the *Resoconto Treviso* (same sources as the quantity data); and those for 1905-13, from the *Dazio Treviso*. Col. 5, reporting the yield of the open-municipality tax levied from August 1, 1909, is also from the *Dazio Treviso*.

Binder consumption (col. 1) in 1869-71, 1873-80, and 1887-90 is estimated from the aggregate yield figures (col. 4) for those years, multiplied by .040 tons per lira in 1869-71 and 1873-80 (against .041 in 1872 and .039 in 1881), .050 tons per lira in 1887-90 (against .051 in 1885 and .045 in 1891-95), and .054 tons per lira in 1911-13 (as in 1910). One notes that the average tax rate appears to have remained relatively constant: in 1870-71, the increase in taxes on wood was offset by the cut in taxes on metal; in 1880-81, the change in the tax base for bricks and tiles seems to have kept the rate unchanged (allowing 2.4 kg per small piece and 3.6 kg per large one); in 1890-91, the increased taxes on timber amounted to an extra 2% of the aggregate yield, and the cut in taxes on metal in 1895-96, and on lumber between 1900 and 1907, were of a similar magnitude (see the tax rate schedules in the *Archivio Treviso*, boxes 2127, 2146, 2552, 2576, 2596, 2618, and 2639).

The customs perimeter appears to have remained constant, coinciding with the city walls, throughout this period; but the argument is once again *e silentio*. In 1901, the customs perimeter enclosed 16,900 people, against 18,200 (18,300 in 1882) in the city as a whole (*Censimento 1901*, vol. 5, pp. 65, 70).

K08.26 Verona

The data in Table K.50 are limited to quantity and yield figures for 1877 and yield figures for 1878 from the *Resoconto Verona 1877*, Alleg. A and B, 1878, Alleg. E, and yield figures for 1871-74 and 1881-85 from the *Archivio Verona*, boxes 194 (XVI/28) and 223 (VII/2).

Taxed binders include lime, cement, and plaster; taxed lumber includes timber; and taxed rubble includes tufa and other stone. Binder consumption (col. 1) in years other than 1877 is estimated from the total yield (col. 5), as follows. The Verona tariff for 1871-75 is available in the *Archivio Treviso*, box 2571. At those rates, the 1877 quantities yield a total of 38,000 lire; the present estimates for 1871-74 are accordingly the current yield, divided by 38.0, times binder consumption in 1877. The tariff is assumed to have remained unchanged between 1877 and 1878; the 1878 estimate of binder consumption is accordingly the 1877 quantity times the ratio of the yields in 1878 and 1877. The Verona tariff implemented on January 1, 1881 is available in the *Archivio Verona*, box 193 (XVI/31), 194 (XVI/28), or 195 (XVI/30). At those rates, the 1877 quantities yield a total of 51,100 lire; the present estimates for 1881-85 are accordingly the current yield, divided by 51.1, times binder consumption in 1877.

The customs perimeter is presumed to have remained constant; in 1901, it enclosed 61,600 people, against 62,600 (60,800 in 1882) in the city as a whole (*Censimento 1901*, vol. 5, pp. 63, 70).

K08.27 Vicenza

The data in Table K.51 are limited to quantity data for 1908-13, from the *Consuntivo Vicenza* (e.g., 1909, p. XXV, 1914, p. XXIV), and yield data for 1901, 1905-06, and 1908-13 from the *Consuntivo Vicenza* (1906, Alleg. C) and *Resoconto Vicenza* (1911-14, p. 30); no further information was obtained from earlier issues of these series, the *Atti Vicenza*, and a one-in-five sample of the annual consumption-tax records (1861-93) in the *Archivio Vicenza*.

Taxed binders include lime, cement, and plaster. The total yield includes that on

construction materials and on sundry items; in 1908-13, the materials included here, taxed at 4.0, 1.5, and 10.0 lire per ton, respectively, accounted for 44 to 53% of that total. The reported total yield is obviously a poor index of binder consumption; in 1908-13, the ratio of col. 1 to col. 4 varies from .0232 to .0325 tons per lira. On the other hand, the great increase in the yield from 1901 to 1908 surely reflects real growth, and the distortions from goods other than binders or construction materials, or from tariff changes, should not be overwhelming. Binder consumption in 1901 and 1905-06 is accordingly estimated as the 1908 amount, times the ratio of the current yield to the 1908 yield.

The customs perimeter presumably remained constant or nearly so, since its expansion was proposed in May 1913 and approved in June 1914 (*Resoconto Vicenza 1911-14*, pp. 5, 31). In 1901, the customs perimeter enclosed 24,300 people, against 30,000 (27,700 in 1882) in the city as a whole (*Censimento 1901*. vol. 5, pp. 64, 70).

K08.28 Urban construction: an aggregate index

Table K.52 summarizes the information on binder consumption in the 26 cities covered by Tables K.26 – K.51. For the reasons indicated in section K05.01 above, binder consumption is here considered the best index of construction, and the annual growth rate is considered the most convenient summary statistic. Cols. 1 – 26 are identically conceived: the entry for any year is the ratio of the current to the previous year's binder consumption figure (i.e., one plus the growth rate), calculated from the relevant time series (col. 1 in each of Tables K.26 – K.51). The consumption figures refer to the closed municipalities only; no use is made of the occasional open-municipality yield data (based on completed volumes, and referring partly or largely to rural construction). Interpolated ratios, identified as such, are the annual average ratio linking successive consumption figures. Such interpolations through gaps in the component series tend to improve the aggregate estimate of growth across the gaps, while masking the shorter-term movements within them (as a constant estimate is added to the varying sum of the observed year-to-year growth rates); the benefit was here taken to exceed the cost for interpolations of less than a decade.

Exceptionally, the growth rates in col. 24 (Treviso) from 1891 to 1905 are estimated through the following steps. The 1891-99 rates are estimated directly: starting from reported consumption in 1890, they describe a simple U-shaped consumption curve with a constant decline to 1892-93 and then a constant growth to 1899, and with the 1891-95 and 1896-99 averages very close to the reported ones (Table K.49, col. 1). The 1900-05 growth rates, in turn, yield an otherwise normal interpolation of the estimated 1899 consumption level (the figure implied by the 1890 level and estimated 1891-99 growth rates) and the reported 1905 consumption level.

No ratio is calculated if the change in consumption reflects a significant alteration of the customs perimeter, but minor changes in the perimeter are ignored; the significant changes (which obscure two years' growth figures, unless they took place at the very beginning or end of a calendar year) are those identified as considerable, significant, or great in the notes to Tables K.27, K.28, K.31, K.33, K.37, and K.38.

Reading across the year-specific figures in cols. 1 – 25, one immediately notes the extreme range of variation in the city-specific growth rates, and the corresponding sensitivity of any aggregate index to the chosen weighting scheme. For the sake of simplicity, all cities are here weighted equally: the extreme differences in actual consumption levels are ignored, on the grounds that the smaller cities are likely to represent a far larger number of omitted observations than the large ones; and while the largest cities may well represent little beyond themselves, the weight they receive in the present scheme (one twentieth or so each depending on the number of observations in each year) is no more than roughly twice their actual share of total consumption

(in 1901, for example, Milano, Roma, and Torino consumed some 43,500, 37,300, and 45,600 tons of binders, respectively, against a total of about 1.8 million tons: see above, Table C.04). What is significant, however, is the cyclical movement of the entire distribution of growth rates (cols. 27 – 30), and of their geometric average (col. 31), which point to sustained growth in the 1880s and early 1900s and to depression in the 1890s.

Col. 32, finally, is an index of urban construction obtained by setting 1911 = 100 and extrapolating on the basis of the average year-to-year ratios in col. 31. The correlation of this index with other measures of public and private construction is considered below.

K09. The construction of taxed structures

K09.01 Introduction

As noted in section K08.01 above, the construction of private buildings is usefully approached through measures that include both private and public construction, and from which the public component can somehow be extracted. One such measure, based on the consumption of construction materials within a sample of urban areas, is considered in section K08 above; another such measure, based on the tax on buildings and other structures, is considered here.

The tax on buildings and other structures was established in 1865, and began to generate useful data about a decade later. This tax applied to public as well as to private buildings and other structures; however, these “other structures” seem to have been interpreted in a rather narrow sense, which excluded most of those here considered public works. Various categories of buildings -- including, notably, the rural buildings that were covered by the tax on the land which they served -- were instead statutorily exempt. The evidence of private construction provided by the tax on structures is thus indirect and limited, and much like that obtained from the consumption of construction materials. Next to the latter, it appears specifically as a weaker indicator of construction movements, since changes in assessments followed actual construction with an uncertain lag, and could reflect a variety of influences other than new construction; but it covers a broader sample of actual private construction, and contaminates it with a smaller proportion of public works. Unfortunately, it tends to share the other measure’s urban bias, so neither casts much light on rural construction.

The present attempt to trace the new construction of private buildings through the statistical by-product of this tax on structures begins with a series representing the assessed rental value of new structures added to the tax rolls. This series is then shifted to represent the assessed rental value of the current construction of taxed structures, reduced to exclude public works, deflated by an *ad hoc* rent index to approximate a volume series, scaled by an estimate of 1911-price construction value added per unit volume, and corrected to include various categories of temporarily exempt structures. A corresponding maintenance series is obtained by extrapolating a benchmark estimate of the stock to be maintained on the basis of these estimates of new construction and a standard allowance for demolitions. Both series cover only taxable private structures, and thus exclude permanently exempt rural buildings.

K09.02 The tax on structures: principal features

The tax on buildings and other permanent structures was separated from the tax on other real property by the *legge 26 gennaio 1865, n. 2136*. Within a few years, it had acquired what would prove to be its permanent essential features (*regio decreto 28 agosto 1870, n. 5832; regio decreto 24 agosto 1877, n. 4024*; Parravicini, 1958, pp. 220-221, 233-239). First, the tax was levied on the structure’s rental value (which could exceed its actual current income), net of a standard deduction for costs equal to one third of the rental value for workshops, and one quarter of it for other structures. Second, the rental values were determined by the taxpayers and the tax authorities through negotiation or adversary proceedings; once determined, these values could be increased or decreased only if they changed by at least one third (on a continuing basis), or in the context of a general reassessment (of which only three were to occur, in 1871-73, 1878-79, and 1890-93: e.g., *Imposte dirette 1871*, p. 118, *1877*, p. 245, *1889-90*, p. 14; Parravicini, 1958, pp. 236-239). Third, the tax was levied on all permanent structures, but with a number of general and special exemptions. The general exemptions include a temporary two-year exemption for all new structures, raised to three years for workshops by the *legge 11 luglio 1889, n. 6214*), and a permanent exemption for churches, cemeteries, State-owned fortifications, and rural buildings owned by the same person as the land which they served (and

therefore subject to the land tax). The special exemptions were granted by laws designed to favor the redevelopment of particular cities, the economic development of particular areas, the construction of low-income housing, and reconstruction after natural disasters. The most common special exemptions were simply extensions, usually to five or ten years, of the general temporary exemption for new structures; but particular classes of structures could also be declared permanently exempt, and the taxes due from disaster areas could be postponed or remitted outright (e.g., *Imposte dirette 1907-08*, pp. 45-46). Moreover, as will be seen below, these statutory limitations to the tax base were apparently accompanied by a relatively general exclusion of social overhead capital. The basis for this is not clear, as there seems to be no simple reconciliation of the relevant legislative language, court decisions, economic logic, and statistical evidence; but the numbers argue fairly strongly that the taxes paid on State properties, railways, and canals covered little more than their buildings. Fourth, tax obligations were based on the actual or imputed rental incomes inscribed in the published tax rolls. These rolls were of two kinds: principal and supplementary. The principal roll for the year was published in January, and was based on the situation as of the previous October 15 (later pushed back to August 31); it included all definitive assessments, and preliminary assessments for most incomes that were still in question (*regio decreto 24 agosto 1877, n. 4024*, art. 50; *Imposte dirette*, e.g., 1903-04, p. 29). The supplementary rolls were published at intervals over the year (with the last on November 1 until 1897: *Imposte dirette 1898*, p. 22); they included preliminary assessments for the other incomes in question, accrued differences between preliminary and definitive assessments, assessments omitted from the principal rolls through clerical error, and all new assessments, including those for incomes that had avoided tax in the previous years (*regio decreto 24 agosto 1877, n. 4024*, arts. 52-53, 58-66; the statutory limit for claims of back taxes was set at two years, except for those which accrued over the period of controversy).

The data generated by the tax on structures reflect its legislative basis. The tax yield data thus tend to distinguish between the taxes on State properties and those on other properties; between those on principal-roll incomes, and those on supplementary-roll incomes; and between those on current-year incomes (in the principal and supplementary rolls), and those on past-years incomes (in the supplementary rolls). Currently taxable incomes were also reported. These data may refer to principal-roll incomes only, to principal- and supplementary-roll incomes for the current year only, or to principal- and supplementary-roll incomes for the current and past years together. Principal-roll incomes were in fact increasingly emphasized, as the best indicator of the permanent tax base, and a systematic disaggregation of their year-to-year movements is available from the late 1880s. Other useful data, including specifically information on incomes gross of the statutory allowance and on the number of taxed buildings and rooms, were published on rare occasions. Most data (but not, unfortunately, the systematic disaggregations of changes in principal-roll incomes) were disaggregated geographically by province; in 1873 and from 1878, they are further disaggregated to separate out the municipalities that contained the provincial capitals.

K09.03 The tax on structures: principal tax-based time series

The more useful time series generated by the tax on structures are presented in Table K.53, cols. 1 – 19.

Cols. 1 – 5 refer to aggregate assessments. The principal-roll assessments in col. 1 are those published early in the indicated years. The present figures for 1874-84 are transcribed from the *Annuario finanze* (e.g., 1874, p. 1060, 1884, p. 182); those for 1885-89, from the *Imposte dirette 1893-94*, p. 11; and those for 1890-1916, from the *Imposte dirette 1914-25*, p. 132 (also *Relazione finanze 1916-17*, p. 82). Two alternative figures are available for 1909:

one equal to 581.054 million lire, published in the current aggregate time series and subsequently revised to that reproduced here; and one equal to 579.779 million lire, appearing in the current and subsequent reports as the sum of the provincial figures for that year (e.g., *Imposte dirette 1908-09*, pp. 40, 43, 165, *1910-11*, p. 47, *1913-14*, p. 161).

The supplementary-roll assessments, published over the indicated years, included taxable incomes of the current year (col. 2) and of past years (col. 3 minus col. 2; these are incomes accrued in past years but omitted from those years' assessments). With rare exceptions, the present supplementary-roll figures are obtained indirectly. In 1874-88 and 1891, the current-year assessments in col. 2 are obtained as the difference between col. 4 (aggregate current-year assessments) and col. 1 (principal-roll assessments). In 1889 and 1890, supplementary-roll income figures are reported directly; they are here attributed to col. 2, since much higher figures for total supplementary-roll incomes are implied by the taxes levied on that income (*Imposte dirette 1889-90*, pp. 14, 56-57, *1890-91*, pp. 13, 56-57). In 1894-1913, col. 2 is estimated as the reported tax on current-year supplementary-roll income, divided by the tax rate (.1625; e.g., *Imposte dirette 1895-96*, p. 15, *1910-11*, p. 42). This series is broken between 1897 and 1898, as the suppression of the November series of supplementary rolls significantly reduced the potential supplementary-roll tax base (*Imposte dirette 1898-99*, p. 22; also, e.g., *1891-92*, pp. 54-55); in addition, the local peaks in 1879 and 1891 appear to reflect the temporary growth of disputed incomes in the early phase of a general reassessment. In 1894 and 1898 ff., it may be noted, the total reported taxes on supplementary-roll incomes are typically very close to the product of the tax rate and total assessments (col. 3, noting that the 1906 figures in cols. 3 and 4 seem affected by earthquake-related tax exemptions: *Imposte dirette 1913-14*, p. 48); the corresponding partial figures in col. 2 in 1894 ff. should therefore be relatively solid.

The total supplementary-roll assessments in col. 3 are obtained as the difference between the total assessments in col. 5 and the principal-roll assessments in col. 1 in 1876-77 and in 1898-1917; in 1894, the figure in col. 3 is taken as reported (*Imposte dirette 1893-94*, pp. 12-13); and in 1895-97, the figures in col. 3 are estimated as the sum of the reported taxes on current and past-year supplementary roll income, divided by the tax rate (*Imposte dirette 1896-97*, p. 18, *1897-98*, p. 24; a similar procedure applied to the figures for 1894 and 1898 reproduces the difference between cols. 5 and 1). As in the case of col. 2, the figures for 1898 ff. are not homogeneous to those of the preceding years. The ratio of col. 2 to col. 3 is particularly low in 1894-95, because a long-standing legal controversy over the eligibility for a special 10-year exemption of buildings outside Roma's municipal customs perimeter was then resolved in the tax authorities' favor, thus creating an unusual bulge of taxable past-year incomes (*Imposte dirette 1894-95*, p. 16, *1895-96*, p. 15, *1896-97*, pp. 18-19). That same ratio exceeds unity in 1906 because the figure in col. 4 is then reduced, as noted above, by earthquake-related tax remission; the alternative estimate of col. 3 obtained as total supplementary-roll taxes divided by the tax rate equals 13.402 million lire (*Imposte dirette 1906-07*, p. 32). With the exceptions noted below, the aggregate current-year assessments in col. 4 and the aggregate assessments in col. 5 are transcribed from the current *Imposte dirette* (e.g., *1890-91*, p. 121, *1913-14*, p. 147). In general, an unqualified aggregate includes the income of past years, and aggregates restricted to the current year are so labeled; in case of doubt, the corresponding taxes levied on current and past-year incomes (divided by .1625) serve to indicate the presumable scope of the reported aggregate assessments (e.g., *Imposte dirette 1874*, pp. 63, 92, *1880*, p. 514, *1900-01*, pp. 32, 117). In 1876-77, exceptionally, the aggregate current-year assessments in col. 4 are obtained by dividing the corresponding taxes by the tax rate (e.g., *Imposte dirette 1877*, p. 545); since a similar calculation in 1875 and 1878-82 yields figures very close to the reported assessments in col. 4, these estimates appear to be the best

basis on which to calculate the current-year supplementary figures in col. 2. The alternative is to use the figures in col. 3, themselves derived from the aggregate assessments in col. 5, deducting an estimate of past-year assessments obtained as the reported tax on past-year incomes divided by the tax rate (e.g., *Imposte dirette 1877*, p. 536); the resulting figures in col. 2 would equal 2.395 in 1876 and 4.299 in 1877, or the present estimates plus the (negative) discrepancy between actual aggregate assessments (col. 5) and the aggregate tax divided by the tax rate. In 1874, it may be noted, the disaggregation of the taxes into those on current and past years is clearly in error: it implies aggregate current-year assessments well below the reported figure (and even below the principal-roll figure in col. 1), and past-year assessments in excess of aggregate supplementary-roll assessments (*Imposte dirette 1874*, pp. 41, 92). In 1883, also, the tax figures imply aggregate current-year assessments (392.603 million lire) perceptibly below the figure in col. 4 (*Imposte dirette 1883*, pp. 268-279).

Cols. 6 – 9, in turn, transcribe some series relating to changes in aggregate principal-roll assessments. In 1889-1914, the figures in cols. 6 – 9 are taken (directly, or as the difference between two reported figures) from the *Imposte dirette 1889-90*, p. 13, *1890-91*, p. 12, and *1913-14*, pp. 50-51; they refer to changes from the previous year's assessments to the current year's assessments (and therefore, given the process by which the principal rolls were drawn up, to changes in incomes from the end of August or mid-October of the second preceding year to the same date of the immediately preceding year: e.g., *Imposte dirette 1903-04*, p. 29). The figures in col. 2 for 1908 and 1911, and in col. 9 for 1906 and 1912, are corrected for clerical errors (*Imposte dirette 1905-06*, p. 35, *1907-08*, p. 47, *1910-11*, p. 45, *1913-14*, p. 48). The figures in col. 9 for 1891-96 exclude the increments due to the general revision of 1890 (ca. 80 million lire added to the rolls, most of them within the first two years: compare the first differences in col. 1). Those for 1909 and 1910 correspond to the first differences in col. 1; but they differ from the sums of the disaggregated figures, which equal 1.427 and 11.247 million lire, respectively (and thus correspond to the 581.054 million lire assessment figure for 1909: *Imposte dirette 1908-09*, p. 40, *1909-10*, p. 38). The differences between col. 9 on the one hand and col. 6 plus col. 7 minus col. 8 on the other are due to a variety of usually minor influences (increases due to the discovery of structures that had avoided tax, to transfers between taxable and non-taxable categories, to clerical errors and other causes; one notes the here irrelevant error in the corresponding figures for 1913, *Imposte dirette 1912-13*, p. 48, *1913-14*, pp. 50-51). In 1875-88 and 1915-17, col. 9 is simply the difference between the current year's and previous year's figures in col. 1. The high figures in 1879 and 1880 reflect the general revision of 1878 (*Imposte dirette 1879*, p. 5); the decline from 1915 to 1916 is said to reflect a decline not in new construction but in administrative efficiency as tax personnel were called to the colors (*Relazione finanze 1916-17*, p. 81). For present purposes, of course, the most immediately useful series is that in col. 6; but its representativeness as a (uniformly lagged) index of actual construction is questionable on a number of points.

An initial question concerns the impact of the above-noted resolution of the legal controversy over the status of buildings outside Roma's municipal customs perimeter. About 3 million lire of taxable income p. a., and eight years' taxes on it, were at stake; and the language of the *Imposte dirette 1894-95*, p. 16 suggests that these taxes were about evenly divided between still unclaimed taxes (that were therefore to be added to the past-year supplementary rolls) and taxes collected on a preliminary basis (that would otherwise have had to be refunded). The bulge in past-year supplementary-roll incomes in 1894 and 1895 points to significant additions of formerly untaxed buildings to the principal rolls in 1895 and 1896; but in those years the detailed specification of changes in principal-roll assessments reported in the *Imposte dirette 1913-14*, pp. 50-51 lists only small increments due to the addition of structures that had avoided tax, to transfers from non-taxable to taxable categories, and to unspecified causes. The

increases in assessments due to the addition of these long exempt structures thus appear to have been included among those due to new construction, so that between them the figures in col. 6 for 1895 and 1896 should overstate the growth due to current (i.e., normally lagged) construction by one to two million lire.

A second question concerning col. 6 refers to the sharply off-trend figure for 1910, which in fact appears to be spurious. The aggregate evidence to this effect is provided by the current-year supplementary-roll assessment figures in col. 2, which are typically dominated by new construction and reassessments (e.g., *Imposte dirette 1889-90*, p. 14), and thus tend to move as the sum of cols. 6 – 7 one year later. Col. 2 contains no hint of the peak in 1909 that would have accompanied a genuine peak in col. 6 in 1910. The disaggregated evidence confirms this view. The 1909 assessments in col. 1 exclude those for the provinces of Messina and Reggio Calabria (equal to 6.916 million lire in 1908), since these were not published, thus remitting the tax, in the wake of the earthquake of December 1908; the 1910 assessments included all provinces, but those for the earthquake-affected provinces were naturally much reduced from their pre-earthquake levels (*Imposte dirette 1913-14*, pp. 48, 152-161). In accounting for the changes in assessments, the 1909 figures should have shown this decline as due to a transfer to exempt categories (or to special causes); the 1910 figures would correspondingly have shown an increase of the same amount due to the opposite transfer (or again to special causes) as the temporary exemption came to an end, and a demolition figure inclusive of earthquake losses. In fact, the figures in the *Imposte dirette 1913-14*, pp. 50-51 show that the earthquake-related decline in 1909 was attributed to demolitions (col. 8; these demolitions could not have been anything else, the interpretation in the *Imposte dirette 1908-09*, p. 40 to the contrary, since no other category can include the effect of the suspension). The actual reductions of principal-roll assessments in 1910 due to earthquake-related demolitions were apparently counted as such (col. 8), thus producing an apparent total reduction due to demolitions which double-counts the earthquake damage (as is evident from the affected provinces' 1908 assessments); and the temporary exemptions counted as demolitions in 1909 were apparently offset in 1910 by a corresponding increase in the opposite category, namely, new construction (col. 6). Deducting the 1908 assessments of the provinces of Messina and Reggio Calabria (noted above) from the 1910 figure in col. 6, one obtains a revised figure for that year of 10.106 million lire. The latter is quite close to those reported for 1909 and 1911; and it yields the relatively steady growth in new construction and reassessments together (cols. 6 – 7) suggested by the path of supplementary-roll assessments (col. 2).

More general questions concern the relative sensitivity of the assessment figures in col. 6 to influences other than actual construction: specifically, to variations in rents per standard unit over time, and across space. Within the data generated by the tax on structures, some evidence of rent movements is provided by the general and partial revisions of the assessed income levels. The general revision of 1878 yielded an increase of 16% over the existing levels, established some seven years earlier (*Imposte dirette 1878*, pp. 314-315); and the 80 million lire added to the aggregate assessments by the general revision of 1891 ff. equal some 19% of the previous levels, established some 12 years earlier (*Imposte dirette 1913-14*, p. 50). Interestingly, the relative increases in the municipalities containing the provincial capitals and in the provinces' residual areas do not suggest that rents in the larger towns were growing systematically faster than the average (*Revisione fabbricati*, pp. 94-95, 106-107; *Imposte dirette 1890-91*, pp. 114-115, 118-119). The influence of the partial revisions, which required permanent income changes of at least one third, are apparent from col. 7. These point to a decline in rents through the 1890s, and a rise in the 1900s (though part of the later rent increases, at least, was due to improvements, mainly for sanitary facilities: *Imposte dirette 1912-13*, p. 51; *Relazione finanze 1913-14*, p. 60). Since changes of up to one third would not

result in reassessment, however, the actual gross changes recorded by the *Imposte dirette 1913-14*, p. 50 (about 10 million lire deducted in 1895-1901, and 33 million added in 1906-14) provide only near-useless lagged lower bounds to the actual average changes. Evidence of rent movements from other sources seems equally scarce (Geisser and Magrini, 1904, p. 41). The *Annuario città (1906*, pp. 48-49, *1907-08*, pp. 41-42, *1909-10*, pp. 215-216) provides rent figures for various types of housing in a large number of cities, but only for 1904(?), 1906(?), and 1908; the 42 cities included in both the first and the last of these surveys yield rent changes (in the case of 3-room low-income apartments, taking the mid-points of the quoted ranges as the relevant averages) varying from -27% to +150%, with an unweighted average of +29%. The *Notizie città 1891* (p. 179) provides rental values for a standard unit in Bologna's city center and outskirts from 1873 to 1890; these rise in steps from 80 and 45 lire, respectively, in 1873-75 to 115 and 70 lire, respectively, in 1887-88, and then decline to 100 and 60 lire, respectively, in 1889-90. The *Inchiesta abitazioni* (pp. 92 ff.) includes numerous rent series for lower-grade public employees' housing in Roma from 1880 to 1907; these series, obtained as simple averages over a number of observations that grows from 9 to 2,729, suggest a decline of the order of 10% from the late 1880s to the mid-1890s, recovery by 1904, and a further 10% increase to 1907. The *Archivio B.I.* (file 718, pp. 223-224) records the rent income for a specific building in downtown Roma; it rose in a rough S-curve from 77,259 lire in 1903-04 to 81,823 lire in 1906-07, 93,506 lire in 1908-09, and 106,426 lire in 1912-13. In general, therefore, the evidence suggests sustained rent inflation, except for a decline in the 1890s: a movement not coincidentally similar, in its broad features, to that of the wage series constructed in section K05.03 above.

Interlocal differences in (assessed) rents per standard unit imply that the figures in col. 6 are biased towards construction in high-rent areas. Comparable data on rents per standard unit are not available; but geographically disaggregated data on average assessments per room or per capita are available for 1873 and 1891 (*Imposte dirette 1873*, pp. 72-79, *1890-91*, pp. 120-123). In 1873, the average assessment per room equaled 20 lire nationwide; it equaled 47 lire in the municipalities containing the provincial capitals (which accounted for 23% of the rooms and 53% of the assessed income), and 12 lire elsewhere. The local averages for the provincial-capital municipalities vary over a considerable range, with a modal group between 20 and 40 lire per room (43 cases), a low tail (14 cases under 20 lire per room), and a more extended high tail (5 cases between 40 and 60 lire per room, 4 between 60 and 80, 2 between 80 and 100, and one over 100). The local averages for the provinces excluding the provincial-capital municipalities are generally lower and less variable, with a large modal group between 5 and 15 (56 cases), a negligible low tail (one case), and a small upper tail (9 cases between 15 and 20, 2 between 20 and 30, and one above 30). Very roughly, then, these figures point to average rents per unit near 80 lire in the handful of municipalities containing the leading cities (Firenze, Genova, Milano, Napoli, Roma, and Torino; the other member of the over-60-lire-per-room group is the relatively insignificant Foggia), near 30 lire in the other provincial-capital municipalities, and near 10 in the residual area. Per capita rent assessments are less useful, since these are heavily influenced by the relative share of exempt (rural) construction; but these are the only ones that are available for 1891. In 1873, average assessments per capita equaled 73 lire in the six leading-city municipalities, 27 lire in the other provincial-capital municipalities, and 6 lire per capita in the residual area. In 1891, the comparable figures equal 87, 32, and 9 lire per capita, respectively; scaled group by group in proportion to the per room/per capita ratios that prevailed in 1873, these yield estimates equal to 95, 36, and 15 lire per room, respectively. Averaged together, these per-room assessment figures for 1873 and 1891 yield figures proportional to 7, 2.6, and 1. Part of these differentials are probably due to real differences in the volume, and cost per unit volume, of the average

room in these three groups, given the urban bias of the middle and upper classes. Their larger part is surely a reflection of relative congestion and site rents; but the average relatives for the existing structures would be fully reflected in the additions to that stock only if these additions displayed the same topographic distribution as the existing stock. Some urban construction, replacing demolished structures, did indeed take place in high-rent areas; but most new construction surely took place on the outskirts of the built-up areas, where site rents were significantly lower than the municipal mean. In the circumstances, a standard unit of new construction in the six leading-city municipalities, in the other provincial-capital municipalities, and in the residual area can be presumed to enter the assessment figures in col. 6 with weights that were significantly different, albeit much less so than the averages suggested by the disaggregated data for 1873 and 1891.

There is thus good reason to disaggregate col. 6 into (at least) the three groups corresponding to the six leading-city municipalities, the other provincial-capital municipalities, and the residual, and to reaggregate these partial figures with weights more suitable to the purpose at hand. Unfortunately, however, the annual principal-roll changes in cols. 6 – 9 are geographically disaggregated only in 1889-90 and 1907-14, and then only to separate out the components attributable to the provincial-capital municipalities (e.g., *Imposte dirette 1889-90*, p. 14, *1910-11*, p. 45). The figures for the latter are transcribed here in cols. 10 – 13. The reported net increment in 1913 (col. 13), added to the reported assessments for 1912, yields a figure .278 million lire above the assessments for 1913 reported in the *Imposte dirette 1912-13*, p. 48, and .007 million lire above the revised assessments for 1913 reported in the *Imposte dirette 1913-14*, p. 46. The current-year supplementary-roll figures for 1889 and 1890 are also disaggregated to separate out the provincial-capital municipalities (e.g., *Imposte dirette 1890-91*, p. 13). In 1889, these municipalities accounted for 4.868 million lire, of which 4.348 million due to new construction, out of a total of 7.164 million lire (col. 2), of which 5.979 due to new construction; in 1890, they accounted for 3.370 million lire, of which 3.140 million due to new construction, out of a total of 4.863 million lire (col. 2), of which 4.216 due to new construction.

Beyond these, the most useful disaggregated data appear to be those underlying the partial aggregates transcribed here in cols. 14 – 19. The figures in cols. 14 – 16 refer to the principal-roll assessments in the six leading municipalities listed above, to the other provincial-capital municipalities, and to the residual. The underlying data are the principal-roll assessments by province, and by provincial-capital municipality, for 1890 ff. reported in the *Imposte dirette 1913-14*, pp. 152-171 (rounded to the nearest 1,000 lire), with the apparent typographical errors checked against earlier issues (e.g., Genova in 1900: *Imposte dirette 1900-01*, p. 149; note also the arithmetic error in the aggregate for 1896, *Imposte dirette 1913-14*, p. 160). The figures in col. 14 are obtained by summing over their six components; those in col. 15, as the reported provincial-capital total minus col. 14; and those in col. 16, as the reported total minus the reported provincial-capital total. The sums of cols. 14 – 15 correspond exactly to the provincial-capital assessments reported with the data underlying cols. 10 – 13, with two exceptions: in 1910, the present figures sum to 333.096 million lire, against 332.913 million reported in the current issues; and in 1913, the present figures sum to 365.086 million lire, against 364.558 or 364.829 reported in the current issues (e.g., *Imposte dirette 1913-14*, p. 46). The sums of cols. 14 – 16 correspond exactly to their counterparts in col. 1, with one exception: in 1909, as noted above, the present figures sum to 579.779 million lire, or less than either of the alternative figures for that year given elsewhere in these same sources.

The figures in cols. 17 – 19 refer to the sum of the principal-roll and current-year supplementary-roll assessments in those same three groups. The underlying data are the aggregate current-year assessments by province, and by provincial-capital municipality, reported

in most years from 1878 to 1890 (e.g., *Imposte dirette 1883*, pp. 84-95, *1890-91*, pp. 108-119). Their derivation is essentially analogous to that of cols. 14 – 16, but somewhat more complex. A number of the provincial-capital series display discontinuities which do not seem due to typographical errors; since these are not mirrored in the corresponding provincial series, they appear to reflect redefinitions, within the provinces, of the division between the provincial-capital municipality and the residual. The present figures in cols. 17 – 19 are corrected to eliminate these spurious changes, normally by using the provincial series to estimate growth within the provincial-capital municipality over the break in the time series for the latter. The figures in col. 17 are thus the sums of the data for Firenze, Genova, Milano, Napoli, Roma, and Torino, with the following corrections (in millions of lire): Genova, +1.028 in 1882 and +1.310 in 1884; and Napoli, –2.413 in 1884. The figures in col. 18 are obtained by subtracting col. 17 from a provincial-capital total that is similarly corrected to remove at least the more important discontinuities in the provincial-capital series. This corrected provincial-capital total is the reported figure (plus 10 million lire in 1880, to offset a clerical error verified by the corresponding tax yield) with the just-noted corrections to col. 17, plus the following further corrections (again in millions of lire): Bari, –.416 in 1885, –.429 in 1886, and –.445 in 1887; Brescia, +.275 in 1878 and +.300 p. a. in 1879-81; Cremona, +.177 in 1884; Perugia, –.107 in 1879 and –.108 in 1883; and Rovigo, –.099 in 1879. The figures for 1889 in cols. 17 and 18 are obtained, in the absence of the disaggregated data available in neighboring years, from the current-year taxes attributed to the provincial-capital municipalities (*Imposte dirette 1890-91*, p. 12). These imply an aggregate assessment of 231.968 million lire, which is here distributed between cols. 17 and 18 by arithmetically interpolating their respective shares in their sum. The figures in col. 19 are instead the national totals in col. 4 (in 1889, col. 1 plus col. 2), minus the sum of cols. 17 and 18.

K09.04 Aggregate taxed new construction: current assessed values

The data in Table K.53, cols. 1 – 19 are used initially to estimate the increases in assessments due to new construction in high-, medium-, and low-rent areas (cols. 20 – 22). These figures are then reaggregated with weights designed to offset these interlocal differences (col. 23), and shifted to yield estimates of the current-price assessed rental value of the accrued new construction of taxed structures (col. 24).

The increases in principal-roll assessments due to new construction in the leading six municipalities (Firenze, Genova, Milano, Napoli, Roma, and Torino), in the other provincial-capital municipalities, and in the residual area (cols. 20 – 22) are designed to disaggregate the aggregate data in col. 6 into the three main groups identified above. They are obtained as follows. In 1907-09 and 1911-14, the figures in col. 22 are obtained directly as the difference between cols. 6 and 10; the corresponding figures in cols. 20 – 21 are instead obtained by disaggregating col. 10. The figures in col. 20 are obtained first, normally on the assumption that the leading six municipalities accounted for 75% of the demolitions and rent adjustments attributed to the entire group of provincial-capital municipalities (by way of comparison, the figures in cols. 14 – 16 imply that the leading six municipalities accounted for 71% of the increments in the provincial-capital municipalities' principal-roll assessments over the years 1907-08 and 1911-14, when these data are not affected by the 1908 earthquake); the estimates in col. 21 are then calculated as col. 10 minus col. 20. In 1907-09, the first differences in cols. 14 – 15 sum exactly to col. 13. In 1907-08, col. 20 is estimated directly as the increment in col. 14 plus 75% of col. 12 minus 75% of col. 11. In 1909, col. 20 is estimated in the same way, except that the reported demolitions in col. 12 are first reduced by the 1908 principal-roll assessments for the municipalities of Messina and Reggio Calabria (a total of 3.594 million lire, without counterpart in the 1909 totals: *Imposte dirette 1913-14*, pp. 165, 169). In 1911 and

1913-14, the first differences in cols. 14 – 15 differ from their ostensible counterparts in col. 13. Col. 20 is then estimated as the increment in col. 14, scaled by the ratio of col. 13 to the sum of the increments in cols. 14 – 15, plus 75% of col. 12 minus 75% of col. 11. In 1912, the first differences in cols. 14 – 15 again sum exactly to col. 13; but an estimate of col. 20 analogous to those of 1907-08 leads to a figure of 6.064 million lire, which is close enough to the total in col. 10 to imply a sharply below-trend figure in col. 21. Given the otherwise relatively regular growth in col. 21 (as in col. 22), it would seem plausible to assume that the bulge in col. 11 (increases due to rent changes) was accompanied by a bulge in the share of that item attributable to the leading six municipalities. The present figure in col. 20 is accordingly obtained as the increment in col. 14 plus 75% of col. 12 minus 90% of col. 11. In 1910, as noted above, the new-construction figures appear severely distorted by an improper accounting of the earthquake-related suspension of the 1909 tax rolls in the affected provinces. The distribution of the related distortions is not clear, and an application of the above procedures with adjustments based on the 1908 assessments in the provinces and municipalities of Messina and Reggio Calabria yields an implausible geographic distribution of the 10.106 million lire total estimated above. In the face of this uncertainty, the present figures in cols. 20 – 22 are obtained by distributing that estimated total in proportion to shares obtained by linear interpolation of those prevailing in 1909 and 1911.

In 1889 and 1890, the figures in col. 22 are again obtained directly as the difference between cols. 6 and 10. In the absence of a suitable disaggregation of the provincial-capital principal-roll increments in col. 13 analogous to that provided for later years by the data in cols. 14 – 15, col. 10 is here disaggregated on the basis of the increments in the corresponding aggregate current-year (principal- plus supplementary-roll) assessments in cols. 17 – 18. Since the aggregate current-year assessments (cols. 4, 17 – 19) are generally quite close to the principal-roll assessments of the following year (cols. 1, 13 – 16), except of course in the periods affected by a general reassessment, the increments in aggregate current-year assessments from $t - 1$ to t approximate both the current-year supplementary-roll assessments in year t , and the net increment in principal-roll assessments from t to $t + 1$. Since current-year supplementary-roll assessments are dominated by new construction (at least until reassessments for rent increases become significant: *Imposte dirette 1889-90*, p. 14, *1890-91*, p. 13; also compare col. 2 and cols. 6 – 7 shifted one year backward), the interpretation of the increments in cols 17 – 18 as approximations to the contemporary current-year supplementary-roll figures (and therefore to the next years' principal-roll increments due to new construction) suggests distributing the figures in col. 10 between cols. 20 and 21 in proportion to the previous years' increments in cols. 17 and 18. With these increments equal to 2.743 and .797 million lire, respectively, in 1888, and 3.639 and 1.013 million lire, respectively, in 1889, the implied disaggregation of col. 10 yields figures of 3.450 and 1.002 million lire in cols. 20 and 21, respectively, in 1889, and 5.043 and 1.404 million lire in cols. 20 and 21, respectively, in 1890. Somewhat different estimates are obtained if the increments in cols. 17 – 18 are interpreted instead as approximations to the next years' net increments in principal-roll assessments. The latter interpretation leads one to disaggregate col. 13 in proportion to the previous years' increments in cols. 17 – 18, to obtain col. 20 as the appropriate share of col. 13 plus (as in 1907 ff.) 75% of col. 12 minus 75% of col. 11, and thence to obtain col. 21 as col. 10 minus col. 20. This procedure yields figures of 3.356 and 1.096 million lire in cols. 20 and 21, respectively, in 1889, and 4.966 and 1.481 million lire in cols. 20 and 21, respectively, in 1890. One notes, however, that the ratio of col. 12 to col. 8 was unusually high in 1889-90 (84%, to 66% in 1907-08 and 1911-14), and that 78% of col. 8 in 1889 is attributed to reconstruction in five of the six leading municipalities (*Imposte dirette 1888-89*, p. 19). If the share of col. 12 attributed to the six leading municipalities is raised to 90%, the estimates of this second group are revised

to 3.643 and .809 million lire, respectively, in 1889, and 5.126 and 1.321 million lire, respectively, in 1890. The present figures in cols. 20 and 21 are the arithmetic averages of the first and last of these estimates.

In 1891-96, the derivation of the desired estimates is complicated by two factors. The major one is the general revision of 1890, which resulted in additions to principal-roll assessments equal to 55.422 million lire in 1891, 18.420 in 1892, 4.095 in 1893, 2.351 in 1894, .014 in 1895, and $-.056$ in 1896 (*Imposte dirette 1913-14*; p. 50; compare cols. 1 and 9); the minor one is the resolution of the legal controversy over the status of buildings outside Roma's municipal customs perimeter, which appears to have added one to two million lire to the new-construction figures in col. 6 for 1895 and 1896 (above, section K09.03). The estimates for 1891 in cols. 20 – 22 make use of the reported assessments for 1891 corrected to exclude the structures not subject to tax in 1890 (*Imposte dirette 1890-91*, pp. 107-119). These figures yield principal-roll subaggregates equal to 167.749, 96.343, and 217.043 million lire for the leading six municipalities, the other provincial-capital municipalities, and the residual, respectively (compare cols. 14 – 16), and total current-year principal- and supplementary-roll subaggregates equal to 174.252, 99.430, and 224.927 million lire, respectively (compare cols. 17 – 19). The principal-roll components of these figures total 481.135 million lire, or 56.312 million lire above the actual assessments for 1890, and 5.488 million lire (net of rounding error) below the actual assessments for 1891 (*Imposte dirette 1890-91*, pp. 114-115, *1913-14*, p. 160; compare col. 1). A comparison of these differences to the functional disaggregation of the 1891 increment in principal-roll assessments (*Imposte dirette 1913-14*, pp. 50-51; compare cols. 6 – 9) indicates that the synthetic 1891 figures are (almost exactly) equal to the previous year's assessments plus the increments due to the general revision, to newly discovered structures, and to transfers between taxable and non-taxable categories (respectively, 55.422, .400, and .490 million lire), and thus to the actual assessments for 1891 minus the decrement for demolitions as well as the increment for new construction (respectively, .490 and 5.978 million lire). The differences between the actual and synthetic 1891 principal-roll figures for the leading six municipalities, the other provincial-capital municipalities, and the residual (cols. 14 – 16, and as cited above) equal 2.952 (net of rounding error), .693, and 1.843 million lire, respectively; the present figures in cols. 20 – 22 are these differences, augmented by disaggregated estimates of the effect of demolitions equal to .305, .102, and .083 million lire, respectively. These estimates allow the residual municipalities in col. 22 17% of the (.490 million lire) total demolitions, against 16% in 1889-90 and 34% in 1907-08 plus 1911-14 (cols. 8 and 12); the leading six municipalities in col. 20 are attributed 75% of the other demolitions (the 83% allowed the provincial-capital municipalities), and the other provincial-capital municipalities in col. 21 are attributed the other 25% (of 83%).

Deducting the above-noted differences between the actual and synthetic principal-roll figures for 1891 from the corresponding differences between the actual and synthetic total current-year figures for 1891 (cols. 17 – 19, and as above), one obtains figures for the leading six municipalities, the other provincial-capital municipalities, and the residual municipalities equal to 1.884, .277, and 1.188 million lire, respectively. These are in principle the difference between the actual and synthetic supplementary-roll figures for 1891; presuming that the latter are analogous to the synthetic principal-roll figures discussed above, the differences obtained here should equal, or at least be dominated by, the contribution of new construction. The present estimates for 1892 in cols. 20 – 22 are the total for that year in col. 6, distributed in proportion to these estimates of supplementary-roll new-construction assessments in 1891.

In 1893-1906, the present estimates in cols. 20 – 22 are obtained by distributing the totals in col. 6 on the basis of the principal-roll increments in cols. 14 – 16, *ad hoc* assumptions about the distribution of the changes in cols. 7 and 8, and, in 1893-96, *ad hoc* corrections for the

effects of the general revision of 1890 and the resolution of the Roman tax controversy. In 1897-1906, when the latter corrections are unnecessary, col. 20 equals the increment in col. 14, minus .68 times col. 7, plus .75 times x times col. 8, where x declines by .01 p. a. from .81 in 1893 to .68 in 1906; col. 21 equals the increment in col. 15, minus .23 times col. 7, plus .25 times x times col. 8; and col. 22 equals col. 6 minus cols. 20 and 21. These coefficients are based on the evidence that in 1907-08 and 1911-14 the provincial-capital municipalities accounted for 91% of the changes in assessments due to rent adjustments and 66% of those due to demolitions (cols. 7 – 8, 11 – 12), and that their assessment changes due to new construction can be approximated reasonably closely as the increments in cols. 14 and 15, minus .91 times col. 7, plus .66 times col. 8; on the evidence, noted above, that their share of demolitions equaled 84% in 1889-90; on the evidence that the rent declines in the mid-1890s, like the later increases, were concentrated in the provincial capitals (*Imposte dirette 1913-14*, pp. 152-171, noting in particular the declining principal-roll assessments for the municipality of Roma); and on the assumption, as above, that the leading six municipalities account for 75% of the rent-change and demolition adjustments attributed to all provincial-capital municipalities together.

In 1893-96, the present estimates are obtained by first calculating the figures analogous to those for 1897-1906 (exactly as those for cols. 20 and 21, and with the addition of the aggregate increment due to the revision of 1890, specified above, to col. 6 before calculating col. 22), and then adjusting these first-round results to offset the effects of the general revision of 1890 and of the resolution of the Roman tax controversy. In 1891, it may be noted, the differences between the synthetic principal-roll figures for 1891 and the actual principal-roll figures for 1890 equal 18.172, 13.324, and 24.816 million lire for the leading six municipalities, the other provincial-capital municipalities, and the residual (above and cols. 13 – 15). These figures include some .890 million lire for the effect of newly discovered structures and transfers between categories; assuming that these applied to the leading six municipalities, the other provincial-capital municipalities, and the residual in the proportions .10 – .10 – .80 (noting the split between provincial-capital municipalities and the residual in 1889 and 1890: *Imposte dirette 1889-90*, pp. 13-14. *1890-91*. p. 12), one obtains 18.083, 13.235, and 24.104 million lire, respectively, as the distribution of the general-revision effect alone. In 1892, in turn, estimates calculated in exact analogy to the first-round figures for 1893-96 equal 9.130, 3.090, and 11.002 million lire, respectively; deducting the figures in cols. 20 – 22, one obtains 6.429, 2.693, and 9.298 million lire, respectively, as the distribution of the general-revision effect alone. These two sets of estimates indicate that the distribution of the annual changes due to the general reassessment was not particularly stable; the proportions that obtained in 1891 (respectively 32.6%, 23.9%, and 43.5%) and 1892 (respectively 34.9%, 14.6%, and 50.5%) are therefore no more than a rough guide to those that may have obtained in later years.

In 1893, the first-round estimates (covering new construction and the reassessment) for cols. 20 – 22 equal 3.743, 1.391, and 3.074 million lire, respectively. The present estimates in cols. 20 – 22 are derived from these, on the assumption that the aggregate change due to the general reassessment (4.095 million lire) was distributed between the three groups at hand in the same proportions as those for the two previous years combined (approximately 33.2%, 21.6%, and 45.2%, respectively). In 1894, 1895, and 1896, the first-round estimates for cols. 20 – 22 equal, respectively, 6.993, 1.124, and 1.788 million lire (of which 2.351 in all due to the reassessment); 3.996, 1.327, and 1.535 million lire (of which just .014 in all due to the reassessment); and 2.975, .908, and 1.403 million lire (reduced by .056 in all by the reassessment). The increments in the principal-roll assessments for the municipality of Roma from 1891 to 1898 equal, respectively, 8.930, 2.727, 1.376, 1.875, .253, –.706, –.868, and –1.551 million lire (*Imposte dirette 1913-14*, p. 166). The sharply off-trend figure for 1894, in

the face of a continuing decline in construction over the relevant preceding years (Table K.45), suggests that an unusually high proportion of the year's reassessments were concentrated in the leading six municipalities. The present estimates allow 1.800 million lire of the total reassessment to these municipalities, and distribute the residual .551 million lire between the other provincial-capital municipalities and the residual in proportion to their relative shares of their combined reassessments in 1891-92. In 1895 and 1896, the small reassessments are again distributed among the three groups in the proportions .332 – .286 – .452. The resulting figures in cols. 21 – 22 are the direct result of this small correction; those in col. 20 are further corrected to remove the belated addition of formerly exempt structures outside the Roman municipal customs perimeter. As noted above, the requisite correction appears to have been between one and two million lire. On the one hand, the aggregate supplementary-roll figures for 1894 and 1895 in cols. 2 and 3 point toward the upper end of that range. The current-year figures (col. 2) sum to 9.6 million lire, which include a share s of the 3.0 million lire of current assessed income in question, and a residual R ; the aggregate figures (col. 3) sum to 29 million lire, which include the 9.6 million in col. 2, the residual R once again (assuming that past-year supplementary-roll incomes were normally about equal to current-year incomes, as suggested by cols. 2 and 3), and presumably the same share s of a share s' of 24 million lire (8 years' income, where s' is the share of that income that would normally have been taxable by 1894). With $s' = 1.0, 0.8, 0.7,$ and $0.6, s = .47, .60, .71,$ and $.86$. Since the law granting the special 10-year exemption dated from 1883 and the Roman building boom collapsed in 1887, s' is plausibly between 0.6 and 0.8, implying belated assessments close to, or even above, 2.0 million lire. On the other hand, the above-cited changes in the principal-roll assessments for the municipality of Roma in 1895 and 1896 point to rather smaller increases from these long-exempt structures: no more than perhaps 1.0 million lire in 1895, and perhaps .3 million in 1896. The present estimates in col. 20 are obtained by deducting these likely maxima from the first-round figures, corrected for the general reassessment as described above.

The figures in cols. 20 – 22 for 1875-88 are obtained as follows. First, the aggregate increase in principal-roll assessments due to new construction (col. 6) is extrapolated in proportion to the current-year supplementary-roll assessments (col. 2, replacing the reassessment-inflated figure for 1879 by a linear interpolation of neighboring values), shifted forward one year. The ratio between these two series is assumed to remain equal to its value in 1889 (6.631/4.897). The subsequent path of that ratio (in 1890-91 and 1895-98) points to a declining trend, which however bears no clear relation to the composition of the gross increases in aggregate principal-roll assessments (e.g., *Imposte dirette 1913-14*, pp. 50-51). The language of the sources points instead to a rising trend, with significant cyclical variation. The increases in assessments due to cadastral improvements (i.e., the discovery of buildings that unduly avoided the tax) are said to have accounted for most of the aggregate increase in 1874-77, relatively little of it in 1879-81, and rather more, once again, in 1882-88 (*Imposte dirette 1876*, pp. 144, 163, 1877, p. 249, 1879, p. 6, 1880, p. 450, 1881, p. 131, 1882, p. 645, 1884-85, p. 9, 1888-89, p. 16). However, the significance of these evaluations is clouded by an apparent confusion between gross and net increases (e. g., *Imposte dirette 1887-88*, p. 15), and the stress on the fruits of administrative pressure may reflect the bureaucracy's tendency to put itself in favorable light. In the event, the best evidence of systematic variations in the relative share of new construction and cadastral improvements in the current supplementary-roll assessments would appear to be the relative share of current- and past-year incomes in aggregate supplementary-roll assessments (since an old structure newly discovered by the tax authorities would be assessed for the current year and the two previous years as well). The ratio of past-year to aggregate supplementary-roll assessments, calculated from the corresponding taxes, does not display systematic variation. In 1874, as noted above, it exceeds its logical limit of

one; in 1875 and 1878, it equals approximately .45; in 1876 and 1877, it equals .32 and .37, respectively (from cols. 2 and 3), or approximately .50 (from the alternative estimates noted above); in 1879, with the inflation of current-year supplementary-roll assessments due to the general reassessment, it drops to .27; in 1881, when the language of the reports suggests that it should be relatively low, it equals .52; in 1882-87, it remains between .36 and .41; and in 1888 (which corresponds to the principal-roll increments in 1889) it equals .39 (*Imposte directe*, e.g., 1878, pp. 331, 402-403, 1886-87, pp. 40-41, 78-79). Overall, therefore, the evidence is weak and mixed; but it tends to support the present simple assumption of a trendless ratio of col. 6 to col. 2, suitably shifted.

Second, this extrapolation of col. 6 is disaggregated into cols. 20 – 22. In 1881-88, the aggregate estimates are disaggregated in proportion to the increments in cols. 17 – 19, also shifted forward one year. Disaggregated estimates for 1880 equal to 1.448, .575, and 1.945 million lire, respectively, could also be obtained in this fashion; but the distribution implied by these figures is quite different from that which obtained in the immediately succeeding years, and the difference may well be the spurious result of the current general reassessment (the effects of which dominate the large increments from 1878 to 1879 in cols. 17 – 19). Before 1878, the sources do not include municipal figures analogous to those in cols. 17 – 19; and even the provincial assessment series are discontinuous, as these variously include, or exclude, past-year assessments (cols. 4 – 5). The most nearly continuous disaggregated series are those for current-year taxes (on principal- and supplementary-roll incomes together). These figures indicate that the provinces including the six leading municipalities accounted for 60.6% of the increment in the tax yield from 1875 to 1876, 54.1% of that from 1876 to 1877, 60.0% of that from 1877 to 1878, 42.9% of that from 1878 to 1879 (which is affected by the general reassessment), 73.6% of that from 1879 to 1880, and 77.4% of that from 1880 to 1881 (*Imposte directe*, e.g., 1875, pp. 376-378, 1880, pp. 509-515). The 83.6% ratio similarly obtained for the increment from 1874 to 1875 is not considered significant, in view of the above-noted deficiencies of the tax figures for 1874. Both the aggregate current-year taxes and those attributed to the six leading provinces declined from 1873 to 1874 (*Imposte directe 1873*, pp. 162-165, 1874, pp. 98-101); the ratio of these decrements also is not here considered significant. By way of comparison, the leading six municipalities accounted for 63.0% of the aggregate increment in current-year assessments from 1879 to 1880, and 68.3% of that from 1880 to 1881 (cols. 4 and 17). In 1877-79, the present figures in col. 20 for year t are obtained as 87% of the share of the leading six provinces in the increment in current-year taxes from year $t - 2$ to $t - 1$, times the estimated extrapolation of col. 6. Cols. 21 and 22 are instead obtained as 24.1% and 75.9%, respectively (in proportion to their relative shares over 1881-83), of the residual. The figures in cols. 20 – 22 for 1875-76 disaggregate the extrapolation of col. 6 in proportion to the shares obtaining in 1877; those for 1880 disaggregate the extrapolation of col. 6 in proportion to the arithmetic average of the shares obtaining in 1879 and 1881.

In 1875-1914, col. 23 is the sum of cols. 20 – 22 with weights equal to 0.40, 0.80, and 1.00, respectively. These weights are designed, in principle, to remove the effect of differential site rents on the value attributed a standard unit of new construction in the three territorial groups at hand. For the reasons noted in the preceding section, the appropriate weights are specified by the available evidence (on average, not marginal, values) only within very broad limits; the present estimates, though not unreasonable, are correspondingly weak. The extrapolation of col. 23 forward to 1918 is based directly on the aggregate supplementary-roll figures in col. 3, shifted one year forward, and replacing the figure for 1915 by a repetition of that for 1914 (since the apparent decline in the assessments due to new construction from 1915 to 1916 is said to be spurious; see the discussion of col. 9 above). While the figures in col. 3 are hardly an ideal proxy, they are at least influenced by new construction altogether less indirectly

than the increments in aggregate principal-roll assessments transcribed in col. 9. The actual path of the ratio between col. 23 and col. 3 (suitably shifted) depends primarily on the changes in assessments due to rent increases (col. 7). The latter grew very rapidly from 1907 to 1914; but there is no clear reason to assume that after 1914 reassessments would have grown significantly faster, or less fast, than new construction. The present extrapolation on the basis of equiproportionate growth is thus not only simple but prudent. On the other hand, no attempt is made here to extrapolate col. 23 beyond 1875, on the basis of assessment figures for the years before 1874, since these were distorted by the general reassessment of 1871-73, and also by the extension of the tax to the Roman provinces (e.g., *Imposte dirette 1873*, p. 64, 1876, p. 144, *Annuario finanze 1873*, pp. 1158-1161).

Col. 24 presents the estimated construction of taxed structures, measured by their assessed rental value at current prices. It is obtained by shifting col. 23 to allow for the lag between actual construction and the increment in the tax base, and then adjusting the resulting series for various specific distortions. That lag is difficult to measure empirically, as the geographically disaggregated series reflect the general reassessment of 1890 and therefore mask the clearly identified cyclical turning points of the late 1880s (e.g., 1887 in Roma). As noted above, the figures in col. 6, and therefore col. 23, for the year t actually refer to changes in the tax base from September 1 of $t - 2$ to August 31 of $t - 1$ (and, earlier, from mid-October to mid-October of those same years, with the shift coming at some unidentified date between 1877 and 1895: *regio decreto 24 agosto 1877*, n. 4024, art. 50; *Imposte dirette 1896-97*, p. 19). Allowing for the two-year exemption of new structures, a further administrative lag of zero to three months, and a construction period of about 20 months, the new construction measured by col. 23 in year t is here distributed over the years $t - 5$, $t - 4$, and $t - 3$ in the proportions .30, .55, and .15, respectively. The figures so obtained are adjusted as follows. First, the 1.3 million lire of disputed assessments on structures outside the Roma customs perimeter deducted from col. 20 in 1895-96 are distributed over the years 1882-93, allowing .05 million lire p. a. in 1882 and 1891-93, .10 in 1883 and 1888-90, .15 in 1884 and 1887, and .20 in 1885-86. This pattern mimics that suggested by the Roman construction series in Table K.11, col. 7, assuming that 50 equivalent houses were completed annually in 1892 ff., and distributing the houses completed in the year t over t , $t - 1$, and $t - 2$ in the proportions .35, .55, and .10, respectively (corresponding to a construction period of about 20 months). Second, the figure for 1891 is divided by .9 to allow for the impact of the extension of the temporary exemption applicable to workshops from two years to three years, effective January 1, 1891 (*legge 11 luglio 1889*, n. 6214, arts. 8 and 14). For what such weak evidence may be worth, the indication that the local surtax on workshops yielded 3.2 or 3.3 million lire out of a total local surtax of 35.2 million lire suggests that workshops represented about 10% of the aggregate taxable gross rents (A. P. Camera, XVIth legislature, 3d session, debates of July 4 and 5, 1889; *Imposte dirette 1888-89*, p. 97). A similar adjustment would be in order for the year in which the reference date for the principal rolls was pushed back from mid-October to the end of August; as noted above, however, the date of that shift is not clear. Third, the figures for 1903-13 are adjusted to allow for the improvements which underlie, in part, the rent increases in col. 7 (and which in part escape it, since rent increases of less than one third did not give rise to reassessment). Since the sources indicate only that such improvements were significant (*Imposte dirette 1912-13*, p. 51, *Relazione finanze 1913-14*, p. 60), any adjustment is inevitably tentative. Assuming that about half the increases in col. 7 were due to improvements, that the sharp growth in those increases reflects the threshold effect of the one third lower limit on assessment increases, and that administrative and accrual-completion lags equaled two years or so, the figures for 1899-1913 obtained by shifting col. 23 are here multiplied by a factor that grows linearly from 1.02 in 1899 to 1.20 in 1908-13.

K09.05 Taxable private new construction: 1911-price value added

The estimates of the current-price assessed rental value of all taxed construction (col. 24) are converted into estimates of the 1911-price value added in taxable private new construction (col. 29) in four steps. First, the current assessed value of public taxed construction is deducted from the corresponding aggregate. Second, the resulting estimates of the current assessed rental value of private taxed construction are deflated by a 1911-base rent index. Third, the resulting estimates of the 1911-price assessed rental value of private taxed construction are scaled by the 1911-price ratio of construction value added to assessed rental value. Fourth, the resulting estimates of 1911-price value added in private taxed construction are augmented by corresponding figures for the construction of private structures that were taxable but temporarily tax-exempt.

The estimates of the current assessed value of public taxed construction are obtained by identifying the public structures that were subject to tax, and then estimating the assessment per unit of expenditure or value added in the corresponding time series. As noted above, the language of the relevant legislation was extremely broad: it specified that the tax applied not just to buildings but to all permanent structures, and it limited the permanent exemptions to churches, cemeteries, State-owned fortifications, and rural buildings owned by the same person as the land which they served (e.g., *regio decreto 28 agosto 1870, n. 5832, arts. 1 – 5*). However, the weight of the literary and quantitative evidence is that social overhead capital was generally excluded, so that the tax in fact covered few if any structures other than buildings. For example, the fact that toll-free bridges, roads, and other real State property in free public use were specifically exempted from the original tax on real property and the subsequent tax on land, but not from the tax on structures, suggests that these were not considered structures at all; nor is there any evidence in the parliamentary debates that the separation of the tax on structures from that on other realty was designed to extend the tax to formerly exempt social overhead capital (*legge 14 luglio 1864, n. 1831, art. 10; legge 28 maggio 1867, n. 3718, art. 3; legge 1 marzo 1886, n. 3682, art. 17; A. P. Camera, VIIIth legislature, 2d session, debates of December 5 and 10, 1864*). The explicit subjection of toll bridges to the tax on structures at the favored rate applied to workshops similarly suggests that toll-free bridges were exempt, since they can hardly have been taxed on their potential income at the more onerous rate applied to structures other than workshops (e.g., *regio decreto 24 agosto 1877, n. 4024, art. 3*). In a similar vein, the later legislative exemption of the buildings of hydroelectric power systems is referred to in the literature as an exemption of hydroelectric systems in general, suggesting that the buildings were in fact the only element of those systems subject to the tax (*decreto-legge 2 ottobre 1919, n. 1995, art. 4; Imposte dirette 1914-25, p. 133*). This suggestion is reinforced by the failure of the legislation favoring artificial lakes to exempt dams from the tax on structures, since it would almost certainly have done so had they been subject to it (*decreto-legge luogotenenziale 12 febbraio 1919, n. 242; compare decreto-legge luogotenenziale 28 marzo 1919, n. 454, art. 3*). Moreover, and perhaps most significantly, the relevant legislation at times refers to the taxable permanent structures simply as buildings (*edifici*: e.g., *regio decreto 25 maggio 1865, n. 2319, art. 8; legge 11 agosto 1870, n. 5784, Alleg. F, art. 4*). The quantitative evidence confirms the exemption of social-overhead structures other than buildings. The tax on structures paid on State properties (e.g., 2.1 million lire in 1907-08, equivalent to assessments of 13 million lire and gross rents of 17 million; *Imposte dirette 1907-08, p. 10*) thus corresponds closely to the largely imputed rent earned by State-owned buildings, and clearly excludes any tax on the potential yield of other State property (*Rendiconto consuntivo 1906-07, parte 2, pp. XXXVI, XC, CXXVII-CXXVIII*). The taxes and surtaxes on land and structures paid by the municipalities also clearly exclude any tax on the potential yield of non-income-yielding

municipal public works other than buildings (for example, they paid 9.0 million lire in 1899, when the local surtaxes more than doubled the State taxes on realty, against actual and imputed rent incomes of 9.7 million lire from land and 10.4 million lire from buildings, and real assets of 547 million lire in properties with actual rents, 174 million lire in properties with imputed rents, and 172 million in properties with no yield; *Bilanci comunali 1899*, pp. XX, XXIII, XLIX, 100-101, 104-105). The tax on structures paid by the railways similarly suggests that only their buildings were subject to it (for example, they paid .162 million lire in 1885, equivalent to assessments of about 1.0 million lire, at a time when their lines had cost some 1,935 million lire and buildings represented perhaps 5% of that total: *Imposte dirette 1885-86*, pp. 38-39, *Relazione S.F.I. 1884*, p. 423, and above, section K06.04). In the same vein, the taxes and surtaxes on land and structures paid by the Cavour canal system clearly indicate that the canals themselves were not subject to the tax on structures (for example, it paid .278 million lire in 1913-14, when its capital value equaled 86 million lire; *Rendiconto consuntivo 1913-14*, part 2, pp. 588, 592). There is admittedly some literary evidence that appears contrary to the present interpretation. On the one hand, the *Relazioni finanziarie 1871*, p. XXIII, indicates that public buildings in general were exempt; but this can hardly have been the case, in view of the specific exemption of State-owned fortifications and of the tax payments on public properties noted above. On the other hand, the *legge 26 giugno 1902*, n. 245, art. 13, which exempted the Apulian aqueduct, and the *legge 25 giugno 1911*, n. 586, art. 12, which exempted public aqueducts, spoke generally of their assets and structures. However, the relevant structures were in any case those that would otherwise be subject to tax, so that the language of these laws need not mean that those structures included works other than buildings; nor is it likely that dams, bridges, and tunnels of aqueducts would be taxed if, as it seems, those of hydroelectric systems and railways were not. The treatment of gas works is also somewhat ambiguous, albeit for different reasons. The mains attached to the generating plant appear to have been taxed, by virtue of the rule that equipment permanently affixed to a building was considered part of the building; the urban distribution networks may also have been taxed, though the record of judicial decisions on this point seems inconsistent, and those favorable to the tax authorities may concern only cases where the entire network was in fact leased out (e.g., *Imposte dirette 1891-92*, p. 22, *1892-93*, p. 27; *Revisione fabbricati*, pp. 6-7, 70-85). In any case, as noted in section K04.06 above, the construction activity embodied by these networks was relatively insignificant.

The aggregate time series for public works estimated in chapters K02 – K06 above refer to non-railway public buildings, other non-railway public works, and railways. On the basis of the preceding considerations, the taxed structures covered by col. 24 are here taken to include non-railway public buildings (to a negligible approximation: these include churches and perhaps other minor exempt structures, but not cemeteries or fortifications) and a small share of railways (corresponding to their buildings), but no other non-railway public works (again to a negligible approximation). The railways' contribution to the current assessed values in col. 24 is estimated, very simply, as the 1911-price value added in aggregate new railway construction (Table K.10, col. 21), divided by the ratio of value added to value (.51, to obtain 1911-price expenditure), multiplied by the cost index for new public works other than buildings (Table K.06, col. 12, to obtain current price expenditure), multiplied by an estimate of the ratio of current-price assessments to aggregate current-price expenditure. This last coefficient is estimated to equal approximately .00052, from the tax and aggregate cost figures for the mid-1880s cited in the preceding paragraph (which incidentally imply that the annual rents imputed to railway buildings were just 1% or so of their cost, if that cost was indeed some 5% of the total for the system); the railway component to be deducted from col. 24 thus simplifies down to 0.1% of the product of Table K.10, col. 21 and Table K.06, col. 12. The contribution

of non-railway public buildings to the current assessed values in col. 24 is instead obtained directly as the product of estimated aggregate expenditure for such buildings (Table K.05, col. 5) and an estimated ratio of assessed rental value to capital cost. The municipal rent incomes and real asset values for 1899 cited in the preceding paragraph indicate that the land and buildings earning a (real or imputed) rent yielded an average 2.8% of the assets' value; plausibly, however, the yield on buildings was higher (and that on land lower) than that overall average. In the case of State properties that earned (real or imputed) rent, the sources report both an economic value obtained by capitalizing their income and a book value that presumably reflects their historical cost (e.g., *Rendiconto consuntivo 1911-12*, parte 2, pp. CLXXXI, 42-43; *Relazione demanio 1911-12*, p. 138). The properties used directly by the State were imputed an average rent equal to just 2.2% of their book value in 1873, 2.1% of it in 1884-85, and 3.2% of it in 1909-10; excluding the assets used by the Department of War (which probably included firing ranges and the like), however, these ratios rise to 3.6 to 3.8% (*Relazione demanio 1873*, pp. 86-107, 1884-85, p. 188, 1909-10, p. 188). This residual probably covers little beyond office buildings; and the imputed yield of these was probably higher than that of more specialized public buildings (schools, etc.), which would earn proportionately less if offered for rent (e.g., *regio decreto 28 agosto 1870*, n. 5832, art. 18). On balance, therefore, the gross rental value of public buildings was probably close to 3.5% of their cost. Allowing for the statutory 25% deduction, the assessed rental values of non-railway public buildings included in col. 24 are here assumed to equal 2.6% of the expenditure figures in Table K.05, col. 5. In Table K.53, therefore, col. 25 (the current assessed value of private taxed construction) is estimated as col. 24 minus the sum of .001 times Table K.10, col. 21 times Table K.06, col. 12, and .026 times Table K.05, col. 5.

The estimated current assessed values of taxed private construction (col. 25) are then deflated by a 1911-base rent index; the resulting 1911-price assessed values of taxed private construction are not shown, but equal col. 29 minus Table K.54, col. 16, divided by 8.6. The desired deflator is here approached through both the revenue side and the cost side. The evidence of rent (revenue) movements has been described in section K09.03 above. Using the evidence from the general reassessments (16% inflation from 1871 to 1878, and 19% inflation from 1878 to 1890), the *Inchiesta abitazioni* (say a 5% deflation from 1887 to 1890, another 5% deflation to 1895, and then 11% inflation to 1904), the *Annuario città* (29% inflation from 1904 to 1908), and the *Archivio B.I.* (say 15% inflation from 1908 to 1913), and smoothing over the more significant changes in the growth rate, average revenue per unit is here assumed to grow by 2.1% p. a. in 1872-78 and by 2.5% p. a. in 1879-87, to decline by 1.7% p. a. in 1888-90 and by 1.0% p. a. in 1891-95, and then to grow again by 1.0% p. a. in 1896-1903, 2.5% in 1904, 5.0% in 1905, 7.0% p. a. in 1906-08, 5.0% in 1909, and 3.0% p. a. in 1910-13. This revenue index is transcribed in col. 26. It traces, in principle, the average level of rents (which, as noted above, does not appear to have increased faster in the provincial capitals than in the residual area, at least to about 1890); it would accordingly appear to trace the rental value of new construction to the extent that the latter was distributed relatively uniformly over the urban landscape, and also to the extent that stock equilibria corresponded to flow disequilibria (i.e., that realized rentals on new structures generated economic profits or losses in their construction). The cost-side index is transcribed instead in col. 27. It is obtained as a weighted sum of two indices, which refer respectively to current costs and to annualized capital costs. The index of current costs, which is attributed a weight of .25, is simply the maintenance-cost index in Table K.06, col. 10. The index of capital costs, which is attributed a weight of .75, is instead obtained as the building-construction cost index in Table K.06, col. 11, times the sum of an interest rate and a depreciation rate, divided by the complement of the effective tax rate, and scaled to set 1911 = 1.000. The interest rate is that earned on the loans of the savings banks

(*casse di risparmio*), as reported in Biscaini Cotula and Ciocca (1979), pp. 122-124, extrapolated back from 1876 to 1872 in proportion to the consol rate reported in Bianchi (1979), p. 150. The depreciation rate is instead assumed constant and equal to 1.5% p. a. (A. P. Camera, VIIIth legislature, 2d session, debate of December 5, 1864). The complement of the effective tax rate, in turn, converts capital costs net of the tax on rents into capital costs gross of the tax on rents; it needs to be considered explicitly, despite the constancy of the State tax rate (.1625 of assessed rents net of the standard 25% or 33% deduction), because of the variation in the local surtaxes. Col. 28 transcribes the average tax rate on the net assessed rents of each year from 1872 to 1913 (excluding 1889 and 1895, when the requisite data do not appear to be available); it is not shifted over time, on the assumption that the current tax rate corresponds to the expected rate influencing entrepreneurial decisions. It is calculated as the ratio of aggregate taxes (including those on past-year incomes) and surtaxes (excluding collection fees, reported only in later years) to aggregate assessed rentals (including past-year assessments); aggregate assessed rentals are taken as reported (col. 5), or estimated as aggregate State taxes (including those on past-year incomes) divided by .1625 (e.g., *Imposte dirette 1872*, pp. 40-41, 1877, pp. 320-321, 1882, pp. 40-41, 1887-88, p. 129, 1893-94, p. 14, 1894-95, p. 15, 1896-97, pp. 24-27, 1903-04, pp. 30, 37, 39, 1913-14, pp. 36, 147). In general, the average rate in col. 28 displays a rising trend; but it declines in 1879 and 1891, in conjunction with the general reassessments, apparently because local surtaxes were not allowed to share in the increases in the tax base due to reassessments (*legge 23 marzo 1888, n. 5308, art. 1*). These declines are therefore spurious, for present purposes, in the sense that they do not reflect a decrease in the rate actually applicable to new structures. From 1872 to 1905, therefore, the effective rate on new structures is estimated as the figure in col. 28 (completed by linear interpolation), times (31.6/30.1) in 1879-90 and ((31.6/30.1)(32.3/31.2)) in 1891-1905. In 1906-13, significant partial reassessments would similarly lead to an underestimate of the effective tax rate. These totaled some 25 million lire (*Imposte dirette 1913-14*, p. 50), and accordingly suggest an average tax rate of about 40.0% in 1913 (calculated by deducting 25 million lire from col. 5). In 1906-13, therefore, the figures in col. 28 are multiplied by a ratio that increases linearly from 1.000 in 1905 to 1.038 in 1913, and then again by the correction factor applied in 1891-1905. The cost-site index in col. 27, which ignores site rents, would appear to trace the rental value of new construction to the extent that the latter occurred at the extensive margin (where after-tax site rents were negligible), and also to the extent that stock equilibria were also flow equilibria (i.e., that realized rentals on new structures corresponded to anticipated levels and therefore did not generate economic profits or losses). On the presumption that a minor but conspicuous share of new construction represented reconstruction in inner cities (where site rents were significant), and that flow disequilibria could also be sustained and significant, the 1911-price assessed value of private taxed construction (not shown) is obtained by deflating the current-price assessed value series in col. 25 by the geometric average of the indices in cols. 26 and 27.

The 1911-price value added in private taxed construction (not shown as such, but equal to col. 29 minus Table K.54, col. 16) is estimated by scalar multiplication of these 1911-price assessed values. This scalar equals the ratio of construction value added to assessed value; it is here approached as the product of the ratio of construction value added to value (estimated equal to .34, excluding land costs, in section K05.04 above) on the one hand and the ratio of construction value to assessed rental value on the other. The latter ratio is approached through scattered evidence. On the eve of the World War, the agents of the Bank of Italy estimated the value of buildings by deducting taxes and expenses from gross rentals, and capitalizing the resulting net rent as if it were a perpetuity at an interest rate of 4 or 5% (using the lower rate for buildings in good condition and location; *Archivio B.I.*, e.g., file 717, pp. 26-27, 51, 57-58, 75, file 718, pp. 191-248, file 719, pp. 17, 25, 36). Their figures suggest capital values, for

buildings in good condition, equal to 16 or 17 times gross rents. The *Annuario città 1915-16*, p. 140, reports the capital cost and rental value for municipal housing in Brescia, Verona, and Vicenza: these figures yield a ratio of capital costs to gross rents equal to 22 including land costs, and 20 excluding land costs. The *Relazione F.S. 1912-13*, p. 192, reports the capital cost and rental value of railway workers' housing; these figures suggest that the former was 18 times the latter. The *Relazione case 1914*, pp. 26-95, yields 36 ratios of unit selling prices to unit rental values (excluding the probably erroneous entries with selling prices under 500 lire, or with a ratio of selling price to rental value below 10 or over 50); the average of these is approximately 21. Since the buildings covered by these last three sources were temporarily exempt from the tax (and surtax) on structures, and this exemption may have been at least partly passed on in the form of relatively low rents, these higher ratios of capital to rental values actually point to a norm, for taxable structures, close to that indicated by the *Archivio B.I.* Allowing for land costs, therefore, construction costs may be estimated at some 15 times gross rents. Actual gross rents, in turn, may have averaged perhaps 1.25 times the gross rents reported to the tax authorities: about one fifth of this discrepancy may be attributed to structures that were not reported at all (and were discovered by the authorities only in subsequent years; *Imposte dirette 1913-14*, p. 50), and the residual seems a reasonable allowance for the understatements that would result from the fact that taxable rents were essentially set by negotiation between the taxpayer and the authorities. Finally, the gross rents reported to the tax authorities may have averaged 1.35 times the assessed rents, which excluded 25% of reported rents in the case of residential structures and 33% in that of workshops. In summary, therefore, the 1911-price capital value (construction cost), net of land cost, of new structures is estimated at 25.3 times their deflated assessed rental value; construction value added is estimated at .34 times construction cost, or 8.6 times deflated assessed rental value. The 1911-price value added in the construction of taxed private structures is thus estimated as 8.6 times col. 25 deflated by the geometric average of cols. 26 and 27.

Col. 29 presents the estimated 1911-price value added in the construction of taxable private structures; it equals these estimates for taxed private structures, plus an allowance for taxable but temporarily exempt private structures (Table K.54, col. 16). As noted above, construction of particular buildings or in particular locations was often favored by a special extension of the two- or three-year exemption granted all new structures (e.g., *Imposte dirette 1904-05*, pp. 30-31; above section K09.02). Most of the beneficiaries of these temporary exemptions appear relatively unimportant; but three groups of structures which received ten- to fifteen-year exemptions after the turn of the century, and are therefore omitted altogether by the estimates in Table K.53, seem too significant to be neglected. These groups cover low-income housing built by eligible sponsors (*legge 31 marzo 1903*, n. 254, and *legge 14 luglio 1907*, n. 555); other housing in the city of Roma (*legge 8 luglio 1904*, n. 320); and reconstruction after the great earthquake at the end of 1908 (*legge 12 gennaio 1909*, n. 12). The corresponding estimates are presented in Table K.54.

The best evidence on low-income housing appears to be that in the *Relazione F.S.* and the *Relazione case 1914*. Col. 1 transcribes the current expenditure to build railway workers' housing, as reported for each fiscal year in the *Relazione F.S. 1910-11*, p. 169, *1911-12*, p. 160, and *1913-14*, p. 161 (with the figure for 1912-13 obtained as a residual from the other year-specific figures and the cumulative total reported for mid-1914). These figures are then shifted half a year backwards, to obtain calendar-year estimates of current expenditure, and deflated by the cost index in Table K.06, col. 11 to obtain the 1911-price figures in col. 2. Cols. 3 – 10 are a tabulation of the data in the *Relazione case 1914*, pp. 26-95; the present figures omit municipal housing (covered elsewhere by the source), railway workers' housing (in the source on pp. 94-95, but here covered by the superior information from the *Relazione F.S.*), and

three cooperatives dating from the mid-1880s. Cooperatives and the like are here distinguished from corporations and the like, to reflect the very different average sizes of their projects. Cols. 3 and 7 summarize the total numbers of active sponsors (i.e., all those not identified in the source as not yet active or in liquidation), and cols. 4 and 8 the numbers of these reporting completed rooms. Cols. 5 and 9 summarize the total numbers of rooms reported (including shops, which accounted for approximately 1.5% of the total), and cols. 6 and 10 report estimates of the numbers of tax-exempt rooms. These figures are estimates, since the source disaggregates apartments, but not rooms, by tax status; the present figures assume that the average number of rooms per apartment, in each project, was the same for taxed and exempt apartments. The chronological dimension of these figures drawn directly from the *Relazione case 1914* refers to the year in which the sponsoring organization was incorporated, since these dates are the only ones provided in the source (the clearly erroneous “1946” cited for 72 non-exempt rooms on p. 60 is here taken to be a misprint for 1906). Col. 11 is an estimate of the total number of exempt rooms produced, again arranged by the year in which the sponsoring organization was incorporated; it is the sum of the estimates of exempt reported rooms in cols. 6 and 10, plus estimates of exempt rooms not reported obtained as the number of active sponsors not reporting (col. 3 less col. 4, and col. 7 less col. 8) times the average size of their projects (125.8 and 1,218.4 exempt rooms per sponsor, from the totals of cols. 4 and 6 on the one hand and cols. 8 and 10 on the other). The estimated production of rooms by calendar year in col. 12, in turn, is obtained as follows. One simple assumption is that construction proceeded at an even rate from the year following that in which the sponsor was incorporated through 1915 (rather than 1914, since the references to events in 1915, e.g., p. 95, and to buildings completed by sponsors incorporated in 1914, both suggest that the report actually refers to the situation near the end of 1915); another, that construction took place at an even rate, but over no more than five years (i.e., five years, or less if needed to remain within the end of 1915, again from the year following that in which the sponsor was incorporated). On the first assumption, for example, the 1,455 rooms built by sponsors incorporated in 1901 (col. 11) would be distributed, at 103.9 p. a., over 1902-15; on the second assumption, these same rooms would be distributed, at 291.0 p. a., over 1902-1906 (the 14,797 rooms built by sponsors incorporated in 1912 would instead be evenly distributed over 1913, 1914, and 1915 on either assumption). The time paths of construction corresponding to both assumptions are calculated here; the present estimates in col. 12 are the sum of the two resulting series with weights of .3 for that based on the first assumption and .7 for that based on the second. In addition to the information summarized in col. 11, the *Relazione case 1914*, pp. 96-101, reports the completed construction of low-income housing built by municipal corporations and, directly, by the municipalities, but with no indication of the corresponding chronology. Out of 27 municipal corporations, 24 reported 3,529 rooms (including shops), all of them exempt; allowing for the three that did not report, the likely total is 3,970 exempt rooms. A further 4,627 rooms (including shops) were built directly by the municipalities; of these, all were exempt save for 156 (estimated, as above, from the proportion of non-exempt apartments in the individual project). Since another 156 exempt rooms (estimated on the same basis) were produced by the cooperatives dating from the mid-1880s and excluded from cols. 3 – 10, the total number of neglected exempt rooms is here estimated at 8,597 (about 7.8% of the total in col. 11).

The estimates of construction value added in low-income housing in col. 13 are obtained as the sum of separate figures for railway workers’ housing and all other exempt low-income housing. The estimate of value added in railway workers’ housing is simply the 1911-price value series in col. 2 times .34 (the ratio of value added to value obtained above) times .9 (to allow for land costs). The estimate of value added in other exempt low-income housing is obtained as the partial room figures in col. 12, times 1.078 to allow for neglected rooms (on the

simple assumption that the latter moved in step with the larger group for which a basic chronology is available), times a coefficient of 460 lire per room itself obtained as .34 times .9 (as above) times a 1911-price unit value estimated at 1,500 lire. The latter figure is suggested by the municipal housing costs in Brescia, Verona, and Vicenza (equal to 1,526 lire, 1,453 lire, and 1,458 lire per room, respectively: *Annuario città 1915-16*, p. 140) and the average sales values of the rooms listed in the *Relazione case 1914*, pp. 26-95 (1,588 lire per room over a sample of 60 that omits unit sales values reported at less than 500 lire); the corresponding cost figure for railway workers' housing (1,934 lire per room: *Relazione F.S. 1912-13*, p. 192) seems rather above the norm.

The estimates of construction value added in col. 14 refer to the exempt housing in the city of Roma not included in col. 13. These buildings numbered 131, 165, and 180 at the end of 1914, 1915, and 1916, respectively (*Relazione case 1914*, p. 128; *Relazione finanze 1915-16*, p. 72, 1916-17, p. 83). This continued increase suggests that the chronological limitations imposed by the original legislation (*legge 8 luglio 1904*, n. 320, art. 6) were subsequently removed (e.g., *legge 11 luglio 1907*, n. 502, art. 7), and that the 131 buildings extant at the end of 1914 may be taken to have been built from mid-1904 to the end of 1914. The present estimates convert these 131 buildings into 5,502 rooms, at the average ratio that prevailed in the new buildings in Roma from 1901 to 1908 (*Annuario Roma 1913*, p. 15), and thence into an aggregate 1911-price construction value added of 3.367 million lire, allowing the usual ratio of value added to value (.34) and a value per room, net of land costs, equal to 1,800 lire. The figures in col. 14 are obtained by distributing this aggregate in proportion to the figures for 1903 (halved) to 1913 in Table K.19, col. 4, shifted one year forward.

The estimates of construction value added in col. 15 refer to the exempt reconstruction in the provinces devastated by the great earthquake at the end of 1908. The assessments for the provinces of Messina and Reggio Calabria declined from 6.916 million lire in 1908 to 2.016 million lire in 1910, for a net decline of 4.9 million lire (*Imposte dirette 1913-14*, pp. 154-159). Assuming that the (1911-price) rental value of new structures was one-third higher than the (current-price) rental value of the existing ones demolished by the earthquake, and that construction value added equaled 8.6 times the assessed rental value (as above, noting that average rents per room in the province of Messina appear to have been close to the national average outside the provincial capitals: *Imposte dirette 1873*, pp. 75, 79), the aggregate value added in the reconstruction after the earthquake appears close to 56.2 million lire. The total number of rooms destroyed by the earthquake is estimated in section K07.05 above at 168,000; if 10 to 20% of these were exempt, these estimates imply a value added per room of about 370 to 420 lire, or a not unreasonable 80 to 90% of the 460 lire estimated above for low-income housing. Again as estimated in section K07.05 above, reconstruction in the not quite 2.5 years to the census date appears to have made good about 37% of the losses due to the earthquake. Assuming therefore that 15% of those losses were made good in each year, tax-exempt earthquake-related construction value added at 1911 prices is here estimated at 8.43 million lire p. a. in 1909-13.

Col. 16 transcribes the estimates of aggregate value added in the construction of temporarily exempt structures; they are the sum of the partial figures in cols. 13 – 15. The estimates of aggregate value added in the construction of taxable private structures are reported in Table K.53, col. 29; they equal 8.6 times col. 25 deflated by the geometric average of cols. 26 and 27, plus Table K.54, col. 16.

K09.06 The maintenance of private taxable structures: 1911-price value added

The estimates of 1911-price value added in the maintenance of taxable private structures are presented in Table K.53, col. 31. These figures assume that maintenance varied in strict

proportion to the stock figures in col. 30, which are themselves obtained by extrapolating a benchmark estimate on the basis of the new-construction estimates in col. 29 and a constant demolition rate.

The benchmark stock figure is estimated for 1890. The current assessments for 1890 for the six leading-city municipalities, the other provincial-capital municipalities, and the residual are reported in cols. 14 – 16. These figures are then corrected to incorporate the results of the general revision of that year. Summing over the annual figures estimated in section K09.04 above, these corrections equal 27.657, 16.980 and 35.608 million lire, respectively, and thus yield estimates of 1890 assessments at 1890 prices equal to 177.234 million lire in the six leading-city municipalities, 99.999 million lire in the other provincial-capital municipalities, and 227.835 million lire in the residual area. Dividing these by (95/15), (36/15), and (15/15), respectively, in order to eliminate site rents (according to the 1891 relative rents per room estimated in section K09.03 above) and summing the results, one obtains an overall assessment figure of 297.486 million lire. The overall assessment of private structures is obtained from this figure by deducting estimates of public-structure assessments. The assessments on State structures are estimated as the reported tax (1,391,632 lire: *Imposte dirette 1890-91*, p. 55) divided by .1625, or 8.564 million lire. The assessments on municipal structures are estimated as 75% of the geometric average of the rent incomes reported for 1889 and 1891 (6.670 and 6.919 million lire, respectively: *Bilanci comunali 1891*, pp. XXXIV-XXXV), or 5.095 million lire. The assessments on provincial structures are estimated as the ratio of the reported tax on land and structures together (.406 million lire: *Bilanci provinciali 1891*, pp. 216-217) to the comparable municipal figure (8.599 million lire, estimated as the geometric average of the figures reported for 1889 and 1891; *Bilanci comunali 1891*, pp. XXXVIII-XXXIX), times the above estimate for municipal structures, or .241 million lire: this is close to 75% of half of the reported gross rent income on provincial land and structures together (.632 million lire: *Bilanci provinciali 1891*, pp. 214-215). The assessment of private structures is thus estimated at 283.586 million lire at 1890 prices; deflated by the rent index in col. 27, which excludes site rents, it equals 333.239 million lire at 1911 prices. Assuming that embodied construction value added equals 8.6 times the assessed rental value, as estimated in section K09.05 above, the 1890 stock of taxable private structures is here estimated at 2,865.9 million lire of embodied construction value added at 1911 prices. This taxable stock in 1890 is here identified with the maintainable stock in that year, since new structures entered the tax base (and, presumably, the maintainable stock) a few years after their completion, while demolished structures were removed from it relatively promptly.

This benchmark figure is extrapolated to other years by letting the stock to be maintained increase by the new construction recorded in col. 29, and decrease by demolitions. Again on the assumption that new structures did not require maintenance until some time after their completion (which itself lagged behind the accrual recorded by col. 29), the gross increase in the stock to be maintained from t to $t + 1$ is taken to equal new construction in $t - 3$ (e.g., the new construction figure for 1887 is added to the stock figure for 1890 to obtain that for 1891). Demolitions are instead assumed to equal a constant 0.5% share of the current stock. This is twice the 0.25% suggested by the typical figures in the *Imposte dirette 1913-14*, pp. 50-51, on the presumption that the older structures slated for demolition earned rents per effective unit (and per maintenance lira) equal to perhaps half the current average. Exceptionally, to allow for the earthquake at the end of 1908, the stock to be maintained in 1909 is reduced by a further 52.7 million lire; this figure is calculated as the decrease in assessments of 4.9 million lire estimated in section K09.05 above, times 8.6, times 1.25 to allow for the difference between actual and 1911-price assessments. In summary, therefore, the 1911-price construction value added embodied in the stock to be maintained in year t is calculated as the rounded figure for $t -$

I times .995, plus col. 29 for $t - 4$, minus 52.7 when $t = 1909$. Before 1890, the stock to be maintained in year t is calculated equivalently by dividing .995 into the rounded figure for $t + 1$ minus col. 29 for $t - 3$. These figures are transcribed in col. 30. In 1911, it may be noted, the present estimate divided by 8.6 equals 405.6 million lire; the sum of cols. 14 – 16, divided by (95/15), (36/15), and (15/15), respectively, equals 346.8 million lire. The latter figure includes assessments on public buildings equal to perhaps 12.9 million lire for State buildings (75% of gross rents equal to some 17.2 million lire: *Rendiconto consuntivo 1910-11*, parte 2, p. CLXVIII, 1911-12, parte 2, p. CLXXXI), 13.5 million lire for municipal buildings (75% of gross rents estimated equal to 18.0 million lire on the assumption that buildings accounted for some 75% of the increase in rents from 20.1 million lire, of which 10.4 for buildings, in 1899 to 30.2 million lire in 1912: *Bilanci comunali 1899*, pp. 72-73, 1912, pp. 620-621), and 1.6 million lire for provincial buildings (75% of gross rents estimated equal to 2.1 million lire, against 2.5 in 1915: *Bilanci provinciali 1915*, pp. 82-83). On the other hand, it excludes the assessments on the temporarily exempt structures covered by Table K.54 (perhaps 0.8 million lire, estimated as the cumulation of col. 16 through 1907, divided by 8.6), and the assessments on the houses owned by landless peasants in Southern Italy, exempted by the *legge 15 luglio 1906*, n. 383 and the *legge 9 luglio 1908*, n. 434 (perhaps 5.8 million lire, noting the 8.8 million lire in assessments transferred to exempt categories in 1907-12, against a normal rate of some 0.5 million lire p. a.; *Imposte dirette 1913-14*, pp. 50-51). The present estimate of 405.6 million lire is thus to be compared to a current figure of about 325.4 million lire; since the latter reflects assessments fixed in past years and the former reflects assessments at 1911 prices, their ratio (1.25) is not unreasonable. A significantly higher ratio would be implausible, however, since rent increases in excess of one third gave rise to reassessment; the current assessments in 1911 thus effectively constrain the present 1911-price estimate for that year to something near its present level. The 1911-price estimate for 1890 is similarly constrained: even though higher figures in 1890 could be reconciled with the desired level in 1911 by increasing the annual allowance for demolition, the strong presumption that the total and per-capita stock displayed positive growth from 1890 to 1911 rules out any major increase in the initial benchmark (as would be obtained, for example, by applying a rent index that grows more rapidly than the one used here).

The 1911-price value added in maintenance (col. 31) from 1875 to 1913 is calculated as .012 times the stock to be maintained (col. 30, which is similarly measured by 1911-price value added). This coefficient is estimated as the ratio of value added to value in maintenance divided by the ratio of value added to value in the construction of buildings (respectively .60 and .34, as estimated in section K05 above), times the ratio of annual maintenance expenses to construction cost, tentatively estimated at .0067. The figures for the municipal low-income housing in Brescia, Verona, and Vicenza yield a ratio of annual maintenance costs to construction costs equal to .0028 (*Annuario città 1915-16*, p. 140); the figures for railway workers' housing yield a ratio of annual maintenance costs to land and construction costs equal to .0028 in 1913-14 (*Relazione F.S. 1913-14*, pp. 161, 164). Both these ratios may underestimate typical levels, however, as these buildings were relatively new. The *Archivio B.I.* instead yields ratios of annual maintenance costs to land and building values equal to .0036 to .0062, with the higher figures reached for buildings in poor condition (file 717, pp. 51, 75, file 718, pp. 224, 246); since the value of the land was comparable to that of the building, these figures are roughly half the ratio of annual maintenance costs to construction value alone. The average ratio selected here is a compromise estimate. It yields figures which seem generally plausible next to those for new construction (compare Table K.05, cols. 4, 6, and 10), and which also imply a reasonable ratio of municipal to private expenditure in 1899 (see below, section K10.03).

K10. Private buildings: construction estimates

K10.01 Introduction

The aggregate new construction and maintenance of private buildings are estimated by extrapolating the figures for taxable private structures estimated in section K09 above. The latter are first extrapolated over time, to extend the series for taxable private structures from 1872 or 1875 to 1861; and these completed series are then extrapolated from the taxable sector to the exempt sector. The extrapolation over time is based on a series of regressions relating taxable private new construction to urban construction (represented by the index derived in chapter K08 above) and various measures of public works (represented by the series derived in chapters K02 – K06 above). While the regression results are quite sensitive to the exact specification of the equation, and to the sample period over which it is fitted, the extrapolations which they yield are generally in agreement on the sequence of events. The present estimates of taxable private new construction in 1861-71 are an average of a variety of these extrapolations, obtained from different equations fitted over samples covering both the entire (42-year) sample and shorter initial periods within it (respectively, 11, 16, 21, 26, 31, and 37 years), adjusted to eliminate the error in 1872. The maintenance of taxable private structures in 1864-74 is estimated by extending the estimates obtained in section K09.06 above on the basis of the new construction figures for 1861-71; the corresponding figures for 1861-63 are instead obtained by simple linear extrapolation.

The extrapolation from the taxable sector to the exempt sector is obtained by estimating the population in taxable and exempt structures at the various census dates, calculating the number to be accommodated in each sector (allowing both for net additions and for those displaced by demolitions) over each intercensal period, and then assuming that the ratio of exempt to taxable construction in each intercensal period was proportionate to these numbers. The resulting four estimates of exempt construction in each intercensal period are then transformed into three alternative annual series, respectively a smooth extrapolation, a smooth extrapolation corrected to reflect the deviations of taxable new construction from its own smooth interpolator, and a smooth extrapolation corrected to reflect the deviations of taxable new construction from the values predicted by the regressions noted above. The present estimates of exempt new construction are an average of these three alternatives. The maintenance of exempt structures is estimated, like that of taxable structures, by defining an initial benchmark of the stock to be maintained (calculated from the corresponding estimate for taxable structures, assuming the relative stocks were proportionate to the population in exempt and taxable structures at that date), and then extrapolating it to 1864-1913 on the basis of the estimates of new construction and a constant allowance for demolitions. The maintenance estimates for 1864-1913 are a constant proportion of the estimated stock to be maintained; those for 1861-63 are instead obtained, once again, by simple linear extrapolation.

The aggregate estimates of the new construction and maintenance of private buildings are then obtained directly as the sum of the corresponding figures for taxable structures on the one hand and exempt structures on the other. The resulting figures seem generally compatible with the direct evidence of private construction reviewed in chapter K07 above.

K10.02 Taxable private structures: extrapolation to 1861

The new construction of taxable private structures in 1861-71 is estimated by extrapolating the figures for 1872 ff. in Table K.53, col. 29 with the aid of a set of regression coefficients; the maintenance of those structures in 1861-74 is estimated by extrapolating the figures for 1875 ff. in Table K.53, col. 31 with the aid of the corresponding estimates of new construction.

Table K.55 summarizes a series of ordinary least squares regressions relating taxable private new construction (Table K.53, col. 29) to a series of variables over a varying number of years from 1872 on. The basic model posits that taxable private new construction equals some multiple of the index of urban construction (Table K.52, col. 32, calculated on the basis of binder consumption) minus some multiple of new construction for public works (interpreted as an index of urban public works), plus or minus a residual trend (interpreted as covering maintenance and other trend-dominated variables). Model A is this basic model, with new construction for public works defined as the 1911-price value added in the new construction of public buildings and other publicly financed public works (i.e., Table K.05, col. 6, plus col. 7 suitably scaled and deflated). The regression results are generally satisfactory. The coefficient of urban construction is positive and significant, as expected, in all seven equations (i.e., over the sample periods ranging from 11 to 42 years). The coefficient of public works is also negative and significant, as expected, over the sample years of intermediate length. It is closer than usual to zero in equation A42, since over 1908-13 the dependent variable and the public works variable both grow faster than the index of urban construction; and it is insignificantly negative, or even positive, in equations A16 and A11, which span years in which the public works variable displays only minor variations around its trend. The constant and the trend coefficient are instead of opposite sign, and their magnitudes are such that they are mutually offsetting to a relatively small residual.

Models B – H are variations on model A, extended to include variables representing the maintenance of public works (model B), railway construction (models C, E, H), or privately financed public works (models F – H), or to distinguish public buildings from other publicly financed public works (models D – E, G – H). In general, the coefficients appear sensitive to the specification of the model (not surprisingly, in view of the strong intercorrelation of the independent variables), and also of the sample period (at times displaying curious regularities, as in col. 6, model D). Again in general, however, these regression equations yield extrapolations of taxable private new construction (Table K.56, cols. 1 – 38) which tell much the same story: of rapid growth from 1861 to 1862, relatively high levels of activity in 1862-64, decline from 1864 to 1866, relatively low levels of activity in 1866-70, and a very limited recovery from 1870 to 1872. The exceptions to this rule are the equations in models F – H in which privately financed public works appear with large negative coefficients: the burst of such construction in 1863-65 yields a deep trough in those years, with a sharp recovery in 1866 and 1867.

The present extrapolation (Table K.56, col. 54) is based exclusively on models A – E. Privately financed public works are not taken into account, as the extrapolations produced by models F – H seem intrinsically weak (their basic pattern is not constant across sample periods, and a number include implausible levels or first differences), historically unlikely where they differ from the others (since they then imply that the financial crisis of 1866 was accompanied by a strong recovery in finance-sensitive construction), and logically unjustified (since the index of urban construction should be essentially unaffected by privately financed public works, which as seen in chapter K04 above consisted mainly of extra-urban hydraulic projects). For these same reasons, it seems best to exclude privately financed public works even from the single public works variable in the basic model, despite the fact that their inclusion in that variable (which would then equal Table K.05, cols. 6 plus 10) would improve the regression results, by the usual criteria, over the sample periods of intermediate length (Table K.55, models A – C and I – K; the extrapolations produced by models I – K fitted over those intermediate sample periods tend correspondingly to approach those produced by models F – H, Table K.56, cols. 27 – 53).

The present extrapolation in Table K.56, col. 54 is obtained as a weighted average of

cols. 1 – 26, adjusted to eliminate the error in 1872. The weighting scheme allows a weight of one half the norm to the extrapolations based on the shortest (11-year) sample period, since these are weakened by the small number of degrees of freedom in the corresponding regressions, and also to those based on the longest (42-year) sample period, since these are excessively influenced by the large magnitudes reached by the pre-war surge (quite apart from the relevance of that experience to events over forty years earlier). In addition, the basic model and its nearest substitute receive a rather higher weight than the other variants, since models A and D each contribute seven extrapolations, and models B – C and E only four. This weighted average yields an estimate for 1872 equal to 31.021 million lire, or 4.721 million above the actual value in Table K.53, col. 29. The pattern of standard errors is such that errors of this magnitude can be eliminated by adjusting either the constant or the coefficient of the trend variable by an amount that is very small next to their standard error, or by a comparatively much larger adjustment in the other coefficients; and the adjustments to the constant and to the trend yield very similar results. For example, equation D31 yields an estimate for 1872 about 6.23 million lire above the actual value. This error can be removed by adjusting the constant by 1.7% of its standard error (yielding a predicted value for 1861 of 22.22 million lire) or the coefficient of the trend variable by a similar percentage of its standard error (yielding a predicted value for 1861 of 22.25 million lire); in contrast, adjusting the other coefficients by 1.7% of their standard errors eliminates only 0.1 to 0.2 million lire of the error in 1872. In view of this, the present weighted average is adjusted by deducting 4.721 million lire from each year's figure; the result, of course, is to leave its first differences unchanged, and thus to extrapolate taxable private new construction on the basis of the weighted average of the first differences of the selected regression-based extrapolations. Table K.56, col. 54 is this adjusted series, rounded to three digits.

The maintenance of taxable private structures before 1875 is estimated by extrapolating the available estimates in Table K.53, col. 31 with the aid of the new-construction estimates for the years before 1872, following the procedure described in section K09.06 above. Table K.56, col. 55 extrapolates the maintainable-stock series in Table K.53, col. 30; these figures are calculated backward from 1875, with the figure for year t obtained by dividing .995 into the rounded figures for $t + 1$ minus Table K.56, col. 54 for $t - 3$. Table K.56, col. 56 extrapolates the maintenance series in Table K.53, col. 31. In 1864-74, it is calculated as .012 times the stock to be maintained. In 1861-63, it is calculated by allowing an annual increment of 0.1 million lire, on the presumption that new construction in the years just prior to 1861 was comparable to that in the later 1860s.

K10.03 Aggregate new construction and maintenance

The aggregate new construction of private buildings is estimated by extrapolating the figures for taxable private structures to include permanently exempt rural buildings as well. In the absence of more direct evidence, census evidence on the dispersed and agricultural population is used to estimate the number living in taxable and exempt structures at the census dates. The relative levels and intercensal changes in these figures suggest ratios of exempt to taxable new construction, for replacement and expansion, over the intercensal periods. The estimates of intercensal exempt new construction so obtained are then distributed over the intercensal years on the assumption that the short-term movements of exempt new construction were positively correlated both with those of taxable new construction in general and with those of the taxable new construction that is not explained by the regressions described in the preceding section. The maintenance of exempt structures is then estimated, like that of taxable structures, by extrapolating a benchmark estimate of the stock to be maintained on the basis of annual estimates of new construction and a standard allowance for demolitions.

Rural buildings owned by the same person as the land which they served were exempt from the tax on structures (*legge 26 gennaio 1865, n. 2136, art. 2*). Initially, buildings were only considered rural if they were dispersed; but by the early 1870s both legal definitions and administrative practice ignored the question of location (*regio decreto 25 maggio 1865, n. 2319, art. 14; regio decreto 28 agosto 1870, n. 5832, art. 5; regio decreto 24 agosto 1877, n. 4024, art. 4; A. P. Camera, XIIIth legislature, 1st session, Doc. 31, pp. 10-11, Discussioni, vol. 3, pp. 2943, 2946, 2968, 2970, 3001*). In 1906, the houses owned and used by landless peasants in Southern Italy were also declared permanently exempt (*legge 15 luglio 1906, n. 383, art. 2, and legge 9 luglio 1908, n. 434*). In 1907-12, transfers from taxed to exempt categories averaged 1.5 million lire p. a., against a norm of perhaps one third that figure, suggesting that those newly exempt houses accounted for an aggregate assessment of about 6 million lire, or 1% of the tax base (*Imposte dirette 1913-14, pp. 50-51; Table K.53, col. 1*). The exempt structures thus appear to be virtually all those used by the dispersed population (on the presumption that this population was overwhelmingly agricultural), and a significant minority of those used by the nucleated agricultural population. Since the Southern residential pattern was overwhelmingly nucleated, the 1906 extension of the exempt category somewhat broadened the latter group; as will be seen below, however, the absolute numbers in that group were then declining, so the impact of that change on the flows of interest here is unlikely to have been significant.

The censuses contain figures on the distribution of the population between nucleated and dispersed settlement. Working backwards, the dispersed population numbered some 9,876,600 (28.5% of the total) in 1911, 9,172,900 (28.2%) in 1901, 7,775,400 in 1881 (27.3%), and 6,879,500 (25.7%) in 1871 (*Censimento demografico, vol. 7, p. 17, 1901, vol. 5, p. XXVIII, 1871, vol. 1, p. XXII*). In 1861, there are two possible measures of the dispersed population within the then current borders: 6,966,500 (32.0%) including those in hamlets, and 5,116,800 (23.5%) excluding them (*Censimento 1861, vol. 1, p. 468*). If one compares the figures in the various censuses, particularly at the regional level, it is almost certain that the 1861 figures homogeneous to the later ones are those that count hamlets as nucleated settlements; and they are so treated here, despite the language to the contrary in the *Censimento 1881, Relazione generale, pp. XXI-XXII*. The present estimate of the dispersed population in 1861 is accordingly obtained as the lower of the reported figures, plus 41.6% and 13.1% (as in 1871) of the 1861 population of the Venetian and Roman provinces within their 1871 borders, plus 45.8% (the figure for Mantova in 1871) of the difference between the 1861 population of Lombardy within its borders of 1861 on the one hand and of 1871 on the other (*Censimento 1861, vol. 1, p. 468, 1871, vol. 1, pp. XIV, XXII-XXIII*); the resulting figure is 6,259,200 individuals, or 25.0% of the total, with a residual 18,757,600 in nucleated settlements. As noted in section K07.05 above, the shift in the census date from a winter day (December 31 in 1861, 1871, and 1881; February 10 in 1901) to a summer one (June 10) in 1911 no doubt introduced some non-comparability among the census figures. The de-seasonalized share of the dispersed population in 1911 may well be overstated; but the 1911 figures are so much a continuation of the trends established over the previous forty years that on this score at least the seasonal distortion can reasonably be considered negligible.

The censuses also include figures on the agricultural population; but a homogeneous series is somewhat more difficult to establish. The present figures are obtained by estimating the share of males 21 or more years old engaged in agriculture, and assuming that the relevant agricultural population was that same share of the total population. In 1911, the number of males 21 or over engaged in agriculture equaled some 4,482,800 (excluding those of unknown age), or 49.1% of the 9,127,800 males 21 or over (excluding those of unknown age or activity); including the males 15 or over but under 21, the percentage share declines to 48.9 (5,371,700 out of 10,986,400; *Censimento demografico, vol. 5, pp. 120-123, lines 311 and 376-377*). In

1901, the number of males 15 or over engaged in agriculture, comparably defined, equaled some 5,561,300, or 53.1% of the 10,473,000 males 15 or over (excluding those of unknown activity; *Censimento 1901*, vol. IV, p. 123, category A.II.4, pp. 162-163, category I, p. 169, category G); by analogy to the figures for 1911, the share of males 21 or over engaged in agriculture is estimated as (.491/.489) times 53.1%, or 53.3%. In 1881, the number of males 15 or over engaged in agriculture, comparably defined, equaled some 5,026,500, or 53.2% of the 9,446,400 males 15 or over (excluding those of unknown activity; *Censimento 1881*, vol. 3, p. 629, pp. 660-661, categories I – IV and V.5, pp. 688-689, category XX.2 and grand total); by analogy to the figures for 1911, the share of males 21 or over engaged in agriculture is estimated as (.491/.489) times 53.2%, or 53.4%. In 1871, the number of males 15 or over engaged in agriculture, comparably defined, equaled some 4,821,300 (including an estimated 1,000 hunters 15 or over), or 53.3% of the 9,049,200 males 15 or over (*Censimento 1871*, vol. 3, pp. 174-175, categories 1.1 – 1.5, pp. 176-177, grand total, p. 260, grand total); by analogy to the figures for 1911, the share of males 21 or over engaged in agriculture is estimated as (.491/.489) times 53.3%, or 53.5%. In 1861, the number of males 15 or over engaged in agriculture, apparently similarly defined, equaled some 3,956,000, or 53.9% of the 7,341,000 males 15 or over (*Censimento 1861*, vol. 3, p. 74, lines 1 – 2 and grand total). In 1871, within the borders of 1861 (i.e., excluding the provinces of Belluno, Mantova, Padova, Roma, Rovigo, Treviso, Udine, Venezia, Verona, and Vicenza), the number of males 15 or over engaged in agriculture equaled some 4,128,700 out of 7,740,400 (*Censimento 1871*, vol. 3, pp. 184-185, 260-261, category 1 less categories 1.61, 1.62, and 1.7, pp. 254, 330, grand total); by analogy to 1911 and 1871, therefore, the share of males 21 or over engaged in agriculture in 1861 within the borders of 1871-1913 is estimated as (.491/.489) times (4.8213/9.0492) times (7.7404/4.1287) times 53.9%, or 54.1%. Applied to the population figures in Table K.25, col. 2, these percentages yield estimates of the agricultural population equal to approximately 13,534,000 in 1861, 14,339,000 in 1871, 15,198,000 in 1881, 17,309,000 in 1901, and 17,023,000 in 1911.

That last figure, for 1911, is directly census-based, and reflects as noted the shift from a winter census date to a summer one. In summer, many workers were abroad as temporary migrants, and the local data suggest that these were disproportionately agricultural (Ciccarelli and Fenoaltea, 2013, p. 83). The reported numbers may thus underestimate the here more relevant *resident* agricultural population (both in absolute terms, and relative to the preceding censuses); a year-end winter figure would incorporate opposite corrections, for returning temporary migrants on the one hand and for second-semester permanent emigration on the other, and the net change may well augment, rather than reduce, the decline from 1901 (Fenoaltea, 1988, p. 633). Be that as it may, the census-based summer-1911 figure is the one used here; these particular estimates were frozen long ago, and for the reasons noted in the opening *Reader's guide* it seems best simply to retain them.

In Table K.57, cols. 1 – 4 summarize the reported aggregate population and the above estimates of the agricultural and dispersed population at the five census dates from 1861 to 1911. Cols. 5 – 8 are the corresponding estimates of the population living in taxable and exempt structures in dispersed and nucleated settlements. These are obtained on the assumption that 95% of the dispersed population was agricultural and in exempt structures, and that 20% of the residual agricultural population was also in exempt structures. Col. 5 thus equals 5% of col. 4; col. 6 equals col. 2 minus the sum of cols. 4 and 8; col. 7 equals 95% of col. 4; and col. 8 equals 20% of the difference between col. 3 and col. 7. An initial check on the reasonableness of these figures is provided by the ratio of the estimated stock of taxable structures at the census dates (Table K.56, col. 56 divided by .012, averaging over 1861 and 1862; Table K.56, col. 55, averaging over 1871 and 1872; Table K.53, col. 30, averaging over 1881 and 1882, over 1900 and 1901 with weights equal to .39 and .61, respectively, and 1910 and 1911 with weights equal

to .06 and .94, respectively) to the corresponding estimates of the population in taxed structures (col. 5 plus col. 6), which equals, successively, 136, 135, 137, 140, and 147 lire per person. Cols. 9 and 10 identify the years and length of the intercensal periods. Cols. 11 – 14 are the estimated annual additions to the population in taxable and exempt structures in dispersed and nucleated settlements; they equal the first differences in cols. 5 – 8, respectively, divided by col. 10.

Cols. 15 – 18 are the estimated annual relocations of the population in taxable and exempt structures in dispersed and nucleated settlements from demolished structures to new ones. Assuming, as above, that annual demolitions equal 0.5% of the corresponding stock, the figures in cols. 15 – 18 for the first three intercensal periods are obtained as 0.5% of the geometric average of each period's initial and terminal stock figures in cols. 5 – 8. In the fourth intercensal period, to allow for the earthquake of 1908, the annual demolition rate is increased to 0.56% of the corresponding average stock in the case of taxable structures, and 0.52% in that of exempt structures. In the case of taxed structures, the earthquake loss was estimated in section K09.06 above at 52.7 million lire of 1911-price value added. The corresponding intercensal average stock, calculated from Table K.53, col. 31 as the geometric average of the figures for the end of 1900 (3,089.8 million lire, obtained by averaging the estimates for 1900 and 1901) and mid-1911 (3,488.3 million lire), equals 3,283.0 million lire. Distributing the earthquake loss over the 10.33-year intercensal period, and assuming that 37% of the earthquake damage was made good by the succeeding census (as estimated in section K07.05 above), the annual additional relocation of the population in taxable structures is estimated as $((52.7)(.37))/((10.33)(3,283.0))$, or 0.06%. In the case of exempt structures, the earthquake loss is here estimated at 6.5 million lire of 1911-price value added, on the basis of the structure of the population of the municipality of Messina reported by the *Censimento demografico* (on the assumption that the relative shares of that population, at least, were little affected by the earthquake). The municipality's population included 115,598 people in nucleated settlements, and 10,959 people in dispersed housing (vol. 1, p. 285). Agriculture employed 8,298 males 10 or more years old, or 16.6% of the 50,063 reporting an occupation (vol. 4, pp. 88-91, lines 311, 376, and 377). In Sicily as a whole, agriculture employed 46.5% of the males 10 years old or more reporting an occupation, and 48.8% of the males 21 years old or more reporting an occupation (vol. 5, pp. 120-123, lines 311, 376, and 377). The agricultural population of the municipality of Messina is thus estimated as $(.488/.465)$ times 16.6% of the total, or 22,021 individuals. The population in exempt structures is estimated, as above, as 95% of the dispersed population plus 20% of the residual agricultural population, or 12,733 people. Given a residual 113,884 people in taxable structures, and assuming earthquake losses proportionate to the population, the loss of exempt structures is estimated initially as $(12,733/113,884)$ times 52.7 million lire, or 5.9 million lire. The present estimate of the actual loss adds 10% to that initial estimate, to allow for the greater role of agriculture in the minor municipalities also hit by the earthquake. The corresponding average stock is estimated by taking the geometric averages of the 1901 and 1911 figures for the population in taxable structures (cols. 5 plus 6) and in exempt structures (cols. 7 plus 8), and multiplying the average taxable stock estimated above by the ratio of these geometric averages; it equals $(10.669/22.885)$ times 3,283.0 million lire, or 1,530.5 million lire. Again allowing for the 10.33-year intercensal period, and assuming that 37% of the earthquake loss was made good by the 1911 census, the annual relocation of the population in exempt structures is estimated as $((6.5)(.37))/((10.33)(1,530.5))$, or 0.02%.

Cols. 19 and 20 are the estimates of the population annually housed in new taxable and exempt structures. In general, these equal the sums of cols. 11 – 12 and 15 – 16 on the one hand, and 13 – 14 and 17 – 18 on the other. In the last intercensal period, the population in exempt structures in nucleated settlements declined at a rate exceeding that at which that

population was displaced by demolitions (cols. 14 and 18). On the assumption that the housing so released could absorb some of the population looking for new taxable structures in nucleated settlements, in the last intercensal period col. 20 equals the sum of cols. 13 and 17 alone, and col. 19 equals the sum of cols. 11 – 12, 14 – 16, and 18. Cols. 21 and 22 are the estimates of the annual new construction of private structures, measured in millions of 1911-price lire of value added p. a. Col. 21 is obtained from Table K.56, col. 54, and Table K.53, col. 29, averaging respectively over 1862-71, over 1872-81, over 1882-1900 and 11% of 1901, and over 89% of 1901, 1902-10, and 44% of 1911. Col. 22 is the product of col. 21 and the ratio of col. 20 to col. 19. These estimates thus assume that value added in new construction per person needing new housing was the same in the exempt and taxable sectors, within each intercensal period but not across such periods. Since the exempt rural buildings included not only housing but those used for the storage and initial processing of agricultural products (e.g., *regio decreto 24 agosto 1877, n. 4024, art. 4*), and taxable structures included (other) commercial and industrial structures, the average value of construction per person in the exempt and taxable sectors would appear to be comparable, at least on average. This presumption of long-term equality in the stocks yields the present medium-term equality in the flows on the further and more stringent assumption that the differential prosperity of the taxable and exempt sectors would be captured by the relative population movements, so that the volume of construction per person needing new housing in each sector would vary over time in response to economy-wide changes in overall prosperity or capital costs. In general, there is little reason to reject the suggestion that such construction grew from 132 lire of 1911-price value added per person in the initial intercensal period to 163 lire in the succeeding two and 298 lire in the fourth, and that the relative prosperity of the exempt (agricultural) sector was greatest in the 1870s, before the “agrarian” (cereal-growing) crisis of the 1880s, and least in the 1900s, when the taxable (urban-industrial) sector was itself booming at unprecedented rates.

The present estimates of exempt and aggregate construction are presented in Table K.58. Cols. 1 – 3 present, rounded to three decimal places, three alternative estimates of annual exempt construction (Series A, B, and C). All three estimates are so constructed that their intercensal averages (obtained exactly as those in Table K.57, col. 21 were obtained from the underlying annual series) equal the figures in Table K.57, col. 22. All three estimates make use of smooth curves constructed of cubic splines and henceforth referred to as Smooth A, Smooth B, and Smooth C, respectively. Pairs of equal benchmarks are defined for the one-quarter and three-quarter marks of the first three intercensal periods (i.e., for 1864.5, 1869.5, 1874.5, 1879.5, 1886.7775, and 1896.3325), and a seventh benchmark is defined for the mid-point of the fourth intercensal period (1906.275); these benchmarks are then extrapolated to each mid-year point from 1861 to 1913 (i.e., 1861.5, 1862.5 . . . , 1913.5), with the acceptable root mean square relative deviation of the fitted curve set equal to .000001. These benchmarks are initially set equal to the values in Table K.57, col. 22 (taking each of the first three twice), and then adjusted, through a few iterations, so that the intercensal averages of the series (Series A, B, and C) equal the desired levels (the figures in Table K.57, col. 22, as indicated above). Series A is simply Smooth A, generated with benchmarks equal respectively to 13.208, 21.070, 20.241 (twice each), and 33.357. Series B is instead the product of Smooth B and Ratio B. Smooth B is generated with benchmarks equal respectively to 13.190, 21.099, 20.067 (twice each), and 33.543. Ratio B is the ratio of taxable private new construction (Table K.56, col. 54 and Table K.53, col. 29) to the corresponding value of a smooth curve generated exactly like Smooth A, B, and C with benchmarks equal to 27.045, 28.667, 37.855 (twice each), and 84.844; these benchmarks are so chosen that the intercensal averages (calculated in the usual way) of the corresponding smooth series (calculated like Smooth A, B, and C) equal the figures for taxable new construction in Table K.57, col. 21. Series C is instead the product of Smooth C and Ratio

C. Smooth C is generated with benchmarks equal to 13.276, 19.001, 21.201 (twice each) and 33.346. Ratio C equals unity from 1861.5 to 1871.5; from 1872.5 to 1913.5, it equals the geometric average of two ratios, themselves obtained as the ratio of taxable new construction (Table K.53, col. 29) to the corresponding fitted values obtained from regression equations A42 and E42 (respectively the one closest to the *a priori* model, and the one with the highest R^2) in Table K.55 above.

In summary, therefore, Series A is simply a smooth interpolation of the averages in Table K.57, col. 22; it incorporates no further information. Series B instead assumes that the deviations of exempt construction from its smooth interpolator were proportional to those of taxable construction from its own smooth interpolator; it incorporates information that improves the estimates to the extent that exempt and taxable construction responded similarly to common short-run influences. Series C instead assumes that the deviations of exempt construction from its smooth interpolator were proportional to those of taxable construction from the corresponding regression estimate; it incorporates information that improves the estimates to the extent that taxable construction included an urban-commercial component explained by the regressions (which use the index of urban construction derived in chapter K08 above), and a rural-agricultural component not explained by the regressions and closely correlated with exempt construction. On the assumption that the information included in Series B and C can in fact improve the estimates in Series A, but that in both cases the correlations are far from perfect, the present estimates of exempt construction are a weighted average of the (unrounded) Series A, B, and C. In 1861-71, when the regression results incorporated by Series C are not available, these weights equal respectively one quarter, one half, and one quarter; in 1872-1913, they each equal one third. Col. 4 presents the resulting figures, rounded to one decimal place. Total private new construction is estimated directly as the sum of these figures for exempt new construction and those for taxable new construction estimated above (Table K.56, col. 54 and Table K.53, col. 29); the resulting figures are presented in Table K.58, col. 5.

Table K.58, col. 6 transcribes the estimated maintainable stock of exempt structures. It is estimated, like the corresponding series for taxable structures (Table K.56, col. 55 and Table K.53, col. 30), by extrapolating an initial estimate for 1890. Allowing for the lag of the maintainable stock behind the actual stock, the exempt maintainable stock is estimated by multiplying the taxable maintainable stock in 1890 (2,865.9 million lire of 1911-price value added) by the estimated ratio of the population in exempt structures to that in taxable structures at the end of 1886 (respectively 9.3148 million, obtained by geometrically interpolating the sums of the figures in Table K.57, cols. 7 and 8, and 20.1445 million, similarly obtained from the corresponding figures in cols. 5 and 6). This benchmark estimate is then extrapolated, analogously to the figure for taxed structures, on the basis of a constant demolition rate (0.5% p. a.), with an extra allowance of 6.5 million lire for the earthquake of 1908, and estimated new construction. In 1891 ff., therefore, col. 6 in year t is calculated as the rounded figure for $t - 1$ times .995, plus col. 4 for $t - 4$, minus 6.5 when $t = 1909$. Before 1890, col. 6 in year t is calculated equivalently by dividing .995 into the rounded figure for $t + 1$ minus col. 4 for $t - 3$.

Col. 7 transcribes the estimated 1911-price value added in the maintenance of exempt structures. These figures are obtained, again analogously to those for taxed structures, as .012 times the stock to be maintained, from 1864 to 1913. In 1861-63, they are instead obtained by allowing an annual increment of 0.1 million lire, as in the immediately succeeding years. Again allowing for the lag of the maintainable stock behind the actual stock, the ratio of the population in exempt structures to that in taxable structures at the successive census dates can be interpreted as the ratio of the exempt to the taxable maintainable stock at about mid-1865, -1875, -1885, and -1904, and near the end of 1914. Applying these population ratios (calculated from Table K.57, respectively cols. 7 plus 8 and 5 plus 6) to the estimated maintenance of

taxable structures (Table K.56, col. 56 and Table K.53, col. 31, suitably extrapolated to 1915), one obtains direct estimates of the maintenance of exempt structures equal to 12.3 million lire in 1865, 13.3 in 1875, 15.0 in 1885, 18.0 in 1904, and 21.1 as the average of 1914 and 1915; these figures are virtually identical to those obtained here by extrapolating from 1890 (respectively 12.2 million lire in 1865, 13.2 in 1875, 15.0 in 1885, 18.1 in 1904, and 21.2 as the average of 1914 and 1915).

Table K.58, col. 8 transcribes the estimated value added in the maintenance of all private buildings. It is obtained directly as the sum of the figures for exempt structures (col. 7) and taxable structures (Table K.56, col. 56 and Table K.53, col. 31).

In general, it may be noted, the present estimates of aggregate new construction display the strong acceleration around the turn of the century suggested by the bits of direct evidence reviewed in chapter K07 above. A specific comparison of the intercensal value added figures in Table K.57, cols. 21 plus 22 to the intercensal room-construction estimates in Table K.25, col. 9 and note *a* suggests that the 1911-price value added (in all private buildings) per room (as defined by the censuses) grew from 180 lire in the first intercensal period to 223 in the second, 251 in the third, and 338 in the fourth. Dividing instead the estimated aggregate maintainable stock (Table K.56, col. 55 and Table K.53, col. 30 plus Table K.58, col. 6, suitably extrapolated) in mid-1865, mid-1875, mid-1885, mid-1904, and at the end of 1914 by the estimated stock of rooms at the census dates (Table K.25, col. 3), one obtains an average 1911-price value added (in all private buildings) per room (as defined by the censuses) declining from 193 lire at the first census date to 192 at the second, and then rising to 195 at the third, 205 at the fourth, and 224 at the fifth. The implied trend growth in the real investment per room, in the flows and in the stocks, is not unreasonable; it may include both qualitative improvements in the average room (as defined by the censuses), and a growth in the ratio of spaces that were not defined as rooms to those that were. The present estimates also imply a reasonable ratio of municipal to private expenditure for the maintenance of buildings in 1899 (.04, based on the municipal expenditure of 2.8 million lire and a private expenditure of 69.4 million lire, calculated as the value added in Table K.58, col. 8 divided by .60 and multiplied by .773; *Bilanci comunali 1899* pp. 104-105 item 11, and Table K.06, col. 10).

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Table K.01
Reported Labor Force and Factor Employment in Construction in 1911 (thousands)

A. *Censimento demografico*

| Census category | Professions | Labor force |
|-----------------|--|-------------|
| 5.(2,3)1 | Builders, contractors | 17.0 |
| 5.(2,3)2 | Bricklayers | 351.7 |
| 5.(2,3)3 | Laborers, pavers, etc. | 262.4 |
| 5.(2,3)4 | Carpenters | 3.6 |
| 5.(2,3)5 | Smiths, mechanics, glaziers, etc. | 3.2 |
| 5.(2,3)6 | Floor-layers, plasterers, painters, etc. | 36.8 |
| 5.(2,3)7 | Roofers, sheet-metal workers, etc. | .8 |
| 5.(2,3)8 | Equipment operators | 22.2 |
| 5.(2,3) | | 697.6 |

B. *Censimento industriale*

| Census category | Activity | Employment | | Unduplicated HP in use | |
|-----------------|---|-------------|-------|------------------------|----------|
| | | Blue-collar | Total | Primary | Electric |
| 5.21 | Erection of buildings | 76.4 | 85.6 | 1.0 | 1.0 |
| 5.22 | Finishing of buildings | 2.3 | 3.0 | .0 | .1 |
| 5.23 | Installation of equipment | 4.1 | 4.9 | .1 | .6 |
| 5.24 | Maintenance and demolition of buildings | .8 | .9 | .2 | .1 |
| 5.2 | Building-related construction and maint. | 83.7 | 94.4 | 1.2 | 1.8 |
| 5.31 | Earth-moving | .9 | 1.0 | .0 | .0 |
| 5.32 | Construction of wells and tunnels | .9 | .9 | .2 | .0 |
| 5.33 | Road and railroad construction and maint. | 15.1 | 16.4 | 1.1 | 1.2 |
| 5.34 | Waterwork and waterway constr. and maint. | 10.3 | 10.8 | 6.2 | 1.6 |
| 5.35 | Installation of power lines, cables, etc. | .3 | .3 | .0 | .0 |
| 5.3 | Other construction and maintenance | 27.5 | 29.4 | 7.6 | 2.8 |
| | Total | 111.1 | 123.8 | 8.8 | 4.6 |
| ω.71 | (4 ^a and 5 ^b) | 3.6 | 4.4 | 3.1 | .5 |

Numbers need not add, due to rounding.

^ametalmaking, engineering.

^bnon-metallic mineral processing, construction.

Sources: *Censimento demografico*, *Censimento industriale*.

Table K.02
Public Works Other Than Railways, 1861-1913:
Estimated State Expenditure^a (million lire)

| Year | (1) Initial estimates of State expenditure (fiscal years) | | | (4) Complementary estimates of State expenditure (fiscal years) | | |
|------|---|---------------|------------------------|---|---------------|------------------------|
| | Ordinary maintenance | New buildings | Other new construction | Ordinary maintenance | New buildings | Other new construction |
| | 1861-1914 | 1861-1914 | 1861-1914 | 1861-1914 | 1861-1914 | 1861-1914 |
| 1861 | | | | 15.3 | 2.9 | 18.3 |
| 1862 | 18.2 | 3.1 | 28.1 | 7.7 | 1.4 | 2.1 |
| 1863 | 16.3 | 1.5 | 17.7 | 7.9 | 1.5 | 3.2 |
| 1864 | 16.8 | 1.9 | 14.4 | 8.6 | 1.4 | 2.0 |
| 1865 | 16.5 | 6.9 | 18.2 | 7.1 | 2.3 | 8.1 |
| 1866 | 8.7 | 1.5 | 13.2 | 6.1 | 1.5 | 7.5 |
| 1867 | 12.3 | 1.3 | 12.9 | 5.8 | 1.1 | 6.5 |
| 1868 | 12.7 | 1.0 | 10.5 | 6.5 | 1.2 | 6.2 |
| 1869 | 14.0 | .2 | 15.8 | 6.5 | 1.2 | 2.2 |
| 1870 | 6.7 | .1 | 12.0 | 6.2 | .1 | 2.2 |
| 1871 | 13.8 | 5.0 | 15.7 | 8.1 | .6 | 4.3 |
| 1872 | 16.1 | 5.0 | 20.5 | 7.4 | .5 | 3.3 |
| 1873 | 15.4 | 3.9 | 34.1 | 8.9 | 2.3 | 2.4 |
| 1874 | 16.4 | 4.2 | 29.5 | 8.2 | 1.4 | 2.2 |
| 1875 | 15.1 | 7.7 | 21.8 | 8.7 | .1 | 2.5 |
| 1876 | 15.1 | 3.9 | 19.6 | 8.5 | .5 | 2.1 |
| 1877 | 16.8 | 6.3 | 25.5 | 8.5 | -.2 | 1.8 |
| 1878 | 17.6 | 5.3 | 35.6 | 8.2 | .3 | 1.6 |
| 1879 | 17.5 | 2.3 | 33.9 | 9.5 | .8 | 1.0 |
| 1880 | 20.4 | 4.2 | 38.0 | 9.9 | .4 | 1.2 |
| 1881 | 19.0 | 6.2 | 35.7 | 9.5 | .1 | 1.2 |
| 1882 | 24.3 | 8.3 | 46.8 | 10.2 | .1 | .5 |
| 1883 | 23.8 | 13.0 | 51.8 | 10.4 | .0 | .8 |
| 1884 | 10.4 | 7.2 | 27.1 | 5.3 | .0 | .6 |
| 1885 | 19.1 | 11.9 | 57.0 | 12.0 | .0 | 2.4 |
| 1886 | 20.1 | 12.1 | 59.8 | 12.7 | 1.2 | 2.8 |
| 1887 | 23.0 | 12.9 | 64.0 | 12.8 | .7 | 2.4 |
| 1888 | 20.6 | 14.2 | 64.3 | 13.9 | 2.8 | 7.1 |
| 1889 | 22.5 | 16.4 | 61.9 | 13.6 | .9 | 12.1 |
| 1890 | 23.8 | 13.3 | 68.4 | 13.0 | .7 | 11.8 |
| 1891 | 23.4 | 12.1 | 59.3 | 12.6 | .1 | 5.3 |
| 1892 | 21.9 | 10.7 | 48.7 | 12.2 | .1 | 2.6 |
| 1893 | 20.9 | 18.6 | 35.5 | 11.4 | .1 | 1.7 |
| 1894 | 18.6 | 14.9 | 26.2 | 12.2 | .1 | 2.6 |
| 1895 | 17.5 | 11.2 | 27.8 | 12.1 | .6 | 1.8 |
| 1896 | 19.5 | 12.4 | 27.2 | 12.7 | .4 | .7 |
| 1897 | 19.6 | 8.5 | 19.3 | 13.2 | .2 | .3 |
| 1898 | 19.8 | 9.4 | 22.1 | 14.2 | .1 | .2 |
| 1899 | 19.7 | 10.6 | 23.5 | 13.7 | .0 | .7 |
| 1900 | 19.1 | 10.6 | 31.3 | 13.1 | .0 | .1 |
| 1901 | 17.6 | 13.2 | 30.0 | 13.4 | .0 | .1 |
| 1902 | 18.1 | 13.7 | 30.5 | 13.9 | .0 | .1 |
| 1903 | 19.9 | 17.1 | 34.9 | 13.6 | .0 | .2 |
| 1904 | 18.9 | 16.4 | 32.9 | 13.9 | .1 | .1 |
| 1905 | 20.1 | 14.4 | 32.0 | 14.9 | .0 | .0 |
| 1906 | 19.1 | 19.8 | 41.5 | 14.4 | .1 | .0 |
| 1907 | 19.1 | 28.4 | 52.8 | 14.0 | 1.0 | .0 |
| 1908 | 20.7 | 31.8 | 65.9 | 16.6 | 1.6 | .3 |
| 1909 | 20.9 | 48.2 | 76.7 | 17.0 | 2.3 | .6 |
| 1910 | 22.9 | 67.6 | 103.7 | 18.8 | 2.4 | 2.2 |
| 1911 | 25.2 | 71.0 | 115.1 | 20.5 | 1.5 | 2.1 |
| 1912 | 26.4 | 60.3 | 124.8 | 23.5 | 1.2 | 1.2 |
| 1913 | 27.0 | 58.6 | 125.8 | 22.3 | 2.8 | .7 |
| 1914 | 28.4 | 52.8 | 115.7 | 25.6 | 2.1 | .2 |

Table K.02 (continued)

| Year | (7) | (8) | (9) | (10) | (11) | (12) |
|------|---|----------------------------|-------------------------------------|--|----------------------------|-------------------------------------|
| | Allowances for double-counted inter-governmental transfers (fiscal years) | | | Allowances for expenditure in areas not covered by the State budgets | | |
| | Ordinary maintenance 1861-1914 | New buildings 1861-1914 | Other new construction 1861-1914 | Ordinary maintenance 1861-1870 | New buildings 1861-1870 | Other new construction 1861-1870 |
| 1861 | .0 | .0 | .0 | 13.8 | 2.8 | 18.6 |
| 1862 | .1 | .0 | .0 | 7.1 | 2.2 | 7.7 |
| 1863 | .1 | .0 | .1 | 7.1 | 2.2 | 7.7 |
| 1864 | .0 | .0 | .0 | 7.1 | 2.2 | 7.7 |
| 1865 | .0 | .0 | .1 | 7.1 | 2.2 | 7.7 |
| 1866 | .1 | .0 | .2 | 5.2 | 1.6 | 5.1 |
| 1867 | .4 | .0 | .1 | 6.0 | 1.4 | 3.3 |
| 1868 | .5 | .0 | .5 | 2.4 | .5 | 1.9 |
| 1869 | .7 | .0 | .5 | 1.3 | .4 | 1.3 |
| 1870 | .0 | .0 | .1 | 1.3 | .4 | 1.3 |
| 1871 | 1.2 | .1 | 1.0 | | | |
| 1872 | 1.3 | .0 | 3.3 | | | |
| 1873 | 1.3 | .0 | 3.1 | | | |
| 1874 | 1.2 | .0 | 2.4 | | | |
| 1875 | 1.0 | .0 | 1.6 | | | |
| 1876 | .8 | .0 | 1.2 | | | |
| 1877 | 1.3 | .0 | 1.3 | | | |
| 1878 | 1.1 | .0 | 1.7 | | | |
| 1879 | .8 | .0 | 1.2 | | | |
| 1880 | 1.5 | .0 | 2.0 | | | |
| 1881 | 1.5 | .0 | 2.5 | | | |
| 1882 | 1.7 | .0 | 2.4 | | | |
| 1883 | 1.8 | .0 | 3.1 | | | |
| 1884 | .8 | .0 | 1.1 | | | |
| 1885 | 2.4 | .0 | 3.7 | | | |
| 1886 | 1.5 | .1 | 4.9 | | | |
| 1887 | 1.1 | .2 | 4.6 | | | |
| 1888 | 1.6 | 1.0 | 7.9 | | | |
| 1889 | 1.5 | .8 | 6.2 | | | |
| 1890 | 1.9 | .8 | 5.4 | | | |
| 1891 | 2.9 | .0 | 3.6 | | | |
| 1892 | 2.9 | .0 | 5.4 | | | |
| 1893 | 2.5 | .0 | 5.9 | | | |
| 1894 | 2.3 | .0 | 3.8 | | | |
| 1895 | 2.6 | .8 | 3.6 | | | |
| 1896 | 2.3 | .0 | 2.8 | | | |
| 1897 | 2.4 | .1 | 3.1 | | | |
| 1898 | 1.8 | .2 | 3.0 | | | |
| 1899 | 2.3 | .2 | 2.1 | | | |
| 1900 | 2.4 | .1 | 2.2 | | | |
| 1901 | 2.6 | .1 | 3.6 | | | |
| 1902 | 2.6 | .1 | 3.5 | | | |
| 1903 | 2.6 | .1 | 2.9 | | | |
| 1904 | 2.7 | .1 | 1.9 | | | |
| 1905 | 2.5 | .1 | 1.9 | | | |
| 1906 | 2.6 | .1 | 1.7 | | | |
| 1907 | 2.3 | .0 | 1.6 | | | |
| 1908 | 2.4 | .0 | 2.1 | | | |
| 1909 | 2.4 | .2 | 2.7 | | | |
| 1910 | 2.7 | .2 | 3.1 | | | |
| 1911 | 2.6 | .2 | 2.8 | | | |
| 1912 | 2.1 | .5 | 2.6 | | | |
| 1913 | 2.5 | .4 | 2.9 | | | |
| 1914 | 3.1 | .5 | 3.4 | | | |

Table K.02 (continued)

| Year | (13) | (14) | (15) |
|------|---|-------------------------------|--|
| | Estimated State expenditure for public works other than railways Ordinary maintenance 1861-1913 | New buildings 1861-1913 | Other new construction 1861-1913 |
| 1861 | 29.1 | 5.7 | 36.9 |
| 1862 | 31.3 | 6.4 | 35.6 |
| 1863 | 31.6 | 5.6 | 31.3 |
| 1864 | 32.1 | 5.4 | 25.4 |
| 1865 | 31.1 | 9.6 | 31.0 |
| 1866 | 22.1 | 6.4 | 27.3 |
| 1867 | 23.1 | 4.0 | 22.9 |
| 1868 | 20.9 | 2.8 | 19.1 |
| 1869 | 19.8 | 1.9 | 17.3 |
| 1870 | 20.0 | 1.1 | 21.6 |
| 1871 | 20.7 | 5.5 | 19.0 |
| 1872 | 22.2 | 5.5 | 20.5 |
| 1873 | 23.0 | 6.2 | 33.4 |
| 1874 | 23.4 | 5.6 | 29.3 |
| 1875 | 22.8 | 7.8 | 22.7 |
| 1876 | 22.8 | 4.4 | 20.5 |
| 1877 | 24.0 | 6.1 | 26.0 |
| 1878 | 24.7 | 5.6 | 35.5 |
| 1879 | 26.2 | 3.1 | 33.7 |
| 1880 | 28.8 | 4.6 | 37.2 |
| 1881 | 27.0 | 6.3 | 34.4 |
| 1882 | 32.8 | 8.4 | 44.9 |
| 1883 | 32.4 | 13.0 | 49.5 |
| 1884 | 29.3 | 13.2 | 54.5 |
| 1885 | 30.0 | 12.6 | 56.7 |
| 1886 | 33.0 | 13.3 | 59.8 |
| 1887 | 33.8 | 14.7 | 62.7 |
| 1888 | 33.8 | 16.3 | 65.7 |
| 1889 | 34.8 | 14.9 | 71.3 |
| 1890 | 34.0 | 12.7 | 67.9 |
| 1891 | 32.2 | 11.5 | 53.5 |
| 1892 | 30.5 | 14.8 | 38.6 |
| 1893 | 29.2 | 16.9 | 28.2 |
| 1894 | 27.8 | 13.0 | 25.5 |
| 1895 | 28.5 | 11.9 | 25.6 |
| 1896 | 30.2 | 10.7 | 20.8 |
| 1897 | 31.3 | 9.0 | 17.9 |
| 1898 | 31.7 | 9.9 | 20.7 |
| 1899 | 30.5 | 10.5 | 25.7 |
| 1900 | 29.1 | 11.8 | 27.9 |
| 1901 | 28.9 | 13.4 | 26.8 |
| 1902 | 30.2 | 15.3 | 29.7 |
| 1903 | 30.5 | 16.7 | 31.7 |
| 1904 | 31.3 | 15.4 | 30.6 |
| 1905 | 31.7 | 17.1 | 35.0 |
| 1906 | 30.9 | 24.6 | 45.5 |
| 1907 | 32.9 | 31.4 | 57.7 |
| 1908 | 35.2 | 41.9 | 69.4 |
| 1909 | 37.3 | 60.1 | 88.7 |
| 1910 | 41.1 | 71.1 | 108.6 |
| 1911 | 45.5 | 66.7 | 118.9 |
| 1912 | 47.3 | 61.0 | 123.5 |
| 1913 | 48.9 | 57.7 | 118.1 |
| 1914 | | | |

Table K.02 (continued)

^aextraordinary maintenance and improvements are counted as new construction; buildings include other structures with a low ratio of value added to value.

Sources: cols. 1 - 3: *Opere pubbliche*.

cols. 4 - 6: *Opere pubbliche, Rendiconto consuntivo*.

cols. 7 - 9: *Rendiconto consuntivo*.

cols. 10 - 15: see text.

Table K.03
Public Works Other Than Railways, 1861-1913:
Estimated Local Expenditure^a (million lire)

| Year | (1) | (2) | (3) | (4) | (5) | (6) |
|------|---|-------------------------------|--|--|-------------------------------|--|
| | Estimated municipal expenditure, gross of some intergovernmental transfers | | | Allowances for double-counted intergovern- mental transfers to the municipalities | | |
| | Ordinary maintenance 1861-1913 | New buildings 1861-1913 | Other new construction 1861-1913 | Ordinary maintenance 1861-1913 | New buildings 1861-1913 | Other new construction 1861-1913 |
| 1861 | 19.1 | 5.4 | 23.8 | .1 | .4 | .6 |
| 1862 | 22.5 | 5.8 | 28.4 | 1.1 | .5 | .7 |
| 1863 | 24.1 | 6.9 | 30.5 | 1.2 | .5 | .8 |
| 1864 | 23.9 | 7.2 | 31.8 | 1.2 | .6 | .8 |
| 1865 | 25.7 | 10.3 | 45.6 | 1.3 | .8 | 1.1 |
| 1866 | 23.6 | 7.9 | 35.2 | .6 | .6 | .9 |
| 1867 | 23.7 | 7.3 | 32.5 | .6 | .6 | .8 |
| 1868 | 23.5 | 9.3 | 41.2 | .6 | .7 | 1.0 |
| 1869 | 24.3 | 8.9 | 39.5 | .7 | .7 | 1.0 |
| 1870 | 25.3 | 11.8 | 49.4 | .7 | .7 | 1.1 |
| 1871 | 25.5 | 9.8 | 41.3 | .7 | .5 | .8 |
| 1872 | 26.6 | 13.8 | 55.0 | .7 | .6 | 1.0 |
| 1873 | 27.2 | 15.8 | 62.3 | .7 | 1.5 | 1.8 |
| 1874 | 27.8 | 10.9 | 54.5 | .8 | .9 | 1.6 |
| 1875 | 25.7 | 13.0 | 56.3 | .7 | 1.8 | 2.5 |
| 1876 | 25.8 | 13.8 | 65.9 | .7 | 3.7 | 5.5 |
| 1877 | 26.8 | 13.6 | 75.9 | .7 | 3.3 | 5.0 |
| 1878 | 27.1 | 12.7 | 73.8 | .8 | 3.2 | 5.0 |
| 1879 | 26.9 | 12.7 | 67.7 | .8 | 3.1 | 4.4 |
| 1880 | 28.1 | 14.4 | 67.5 | .8 | 3.3 | 4.5 |
| 1881 | 28.5 | 14.6 | 60.6 | .8 | 3.3 | 4.7 |
| 1882 | 28.5 | 12.3 | 65.5 | .9 | 5.5 | 4.6 |
| 1883 | 28.8 | 12.0 | 75.1 | .9 | 4.9 | 3.9 |
| 1884 | 29.4 | 14.2 | 86.0 | .9 | 5.6 | 4.2 |
| 1885 | 30.1 | 14.2 | 87.7 | .9 | 5.1 | 4.0 |
| 1886 | 31.6 | 16.1 | 90.9 | 1.0 | 4.9 | 3.8 |
| 1887 | 32.9 | 16.1 | 109.2 | 1.0 | 4.7 | 3.7 |
| 1888 | 33.9 | 20.0 | 120.1 | 1.0 | 4.6 | 3.6 |
| 1889 | 34.9 | 21.6 | 112.3 | 1.0 | 4.4 | 3.4 |
| 1890 | | | | | | |
| 1891 | 33.8 | 17.6 | 83.7 | 1.0 | 4.9 | 3.6 |
| 1892 | | | | | | |
| 1893 | | | | | | |
| 1894 | | | | | | |
| 1895 | 33.4 | 12.0 | 49.9 | 1.1 | 5.5 | 3.6 |
| 1896 | | | | | | |
| 1897 | 34.8 | 11.8 | 56.6 | 1.2 | 4.3 | 3.0 |
| 1898 | | | | | | |
| 1899 | 35.6 | 14.1 | 58.8 | 1.2 | 3.1 | 4.6 |
| 1900 | | | | | | |
| 1901 | | | | | | |
| 1902 | | | | | | |
| 1903 | | | | | | |
| 1904 | | | | | | |
| 1905 | | | | | | |
| 1906 | | | | | | |
| 1907 | 42.5 | 31.3 | 106.9 | 1.4 | 4.9 | 3.9 |
| 1908 | | | | | | |
| 1909 | | | | | | |
| 1910 | | | | | | |
| 1911 | | | | | | |
| 1912 | 56.9 | 66.4 | 191.8 | 1.8 | 3.0 | 6.7 |
| 1913 | | | | | | |
| 1914 | | | | | | |
| 1915 | | | | | | |

Table K.03 (continued)

| Year | Estimated municipal expenditure for public works other than railways | | | Estimated provincial expenditure, gross of some intergovernmental transfers | | |
|------|--|----------------------------|-------------------------------------|---|----------------------------|-------------------------------------|
| | (7) | (8) | (9) | (10) | (11) | (12) |
| | Ordinary maintenance 1861-1913 | New buildings 1861-1913 | Other new construction 1861-1913 | Ordinary maintenance 1861-1915 | New buildings 1861-1915 | Other new construction 1861-1915 |
| 1861 | 19.0 | 5.0 | 23.2 | | | |
| 1862 | 21.4 | 5.3 | 27.7 | | | |
| 1863 | 22.9 | 6.4 | 29.7 | | | |
| 1864 | 22.7 | 6.6 | 31.0 | | | |
| 1865 | 24.4 | 9.5 | 44.5 | | | |
| 1866 | 23.0 | 7.3 | 34.3 | 11.9 | 1.6 | 10.6 |
| 1867 | 23.1 | 6.7 | 31.7 | 12.5 | 2.0 | 11.6 |
| 1868 | 22.9 | 8.6 | 40.2 | 12.8 | 1.5 | 13.5 |
| 1869 | 23.6 | 8.2 | 38.5 | 14.1 | 1.9 | 12.4 |
| 1870 | 24.6 | 11.1 | 48.3 | 13.9 | 1.8 | 16.5 |
| 1871 | 24.8 | 9.3 | 40.5 | 14.6 | 1.7 | 15.4 |
| 1872 | 25.9 | 13.2 | 54.0 | 15.6 | 1.5 | 17.9 |
| 1873 | 26.5 | 14.3 | 60.5 | 15.6 | 1.3 | 14.2 |
| 1874 | 27.0 | 10.0 | 52.9 | 16.1 | 1.1 | 15.4 |
| 1875 | 25.0 | 11.2 | 53.8 | 16.7 | 1.3 | 14.7 |
| 1876 | 25.1 | 10.1 | 60.4 | 17.3 | 1.1 | 14.6 |
| 1877 | 26.1 | 10.3 | 70.9 | 17.7 | 1.3 | 14.7 |
| 1878 | 26.3 | 9.5 | 68.8 | 18.3 | 1.2 | 13.4 |
| 1879 | 26.1 | 9.6 | 63.3 | 18.0 | 1.1 | 12.5 |
| 1880 | 27.3 | 11.1 | 63.0 | 18.1 | 1.0 | 17.0 |
| 1881 | 27.7 | 11.3 | 55.9 | 18.5 | 1.2 | 13.7 |
| 1882 | 27.6 | 6.8 | 60.9 | 18.4 | .9 | 15.5 |
| 1883 | 27.9 | 7.1 | 71.2 | 18.9 | 1.1 | 16.5 |
| 1884 | 28.5 | 8.6 | 81.8 | 19.1 | 1.4 | 18.1 |
| 1885 | 29.2 | 9.1 | 83.7 | 19.6 | 1.2 | 19.8 |
| 1886 | 30.6 | 11.2 | 87.1 | 20.1 | 1.0 | 17.7 |
| 1887 | 31.9 | 11.4 | 105.5 | | | |
| 1888 | 32.9 | 15.4 | 116.5 | | | |
| 1889 | 33.9 | 17.2 | 108.9 | 22.2 | .7 | 18.2 |
| 1890 | 33.6 | 15.3 | 97.0 | 22.6 | 1.1 | 18.1 |
| 1891 | 32.8 | 12.7 | 80.1 | 22.8 | .7 | 16.4 |
| 1892 | 32.3 | 10.4 | 67.8 | | | |
| 1893 | 32.0 | 8.7 | 58.3 | | | |
| 1894 | 31.6 | 7.3 | 50.3 | | | |
| 1895 | 32.3 | 6.5 | 46.3 | | | |
| 1896 | 33.1 | 7.0 | 49.6 | | | |
| 1897 | 33.6 | 7.5 | 53.6 | | | |
| 1898 | 34.4 | 9.0 | 53.4 | | | |
| 1899 | 34.4 | 11.0 | 54.2 | 23.3 | .5 | 14.5 |
| 1900 | 34.2 | 12.1 | 58.1 | | | |
| 1901 | 34.7 | 12.9 | 60.0 | | | |
| 1902 | 36.1 | 14.4 | 65.1 | | | |
| 1903 | 36.9 | 15.8 | 69.2 | | | |
| 1904 | 38.0 | 16.4 | 69.8 | | | |
| 1905 | 39.0 | 18.4 | 76.0 | | | |
| 1906 | 39.2 | 22.2 | 89.4 | | | |
| 1907 | 41.1 | 26.4 | 103.0 | | | |
| 1908 | 43.5 | 32.7 | 120.4 | | | |
| 1909 | 45.8 | 42.1 | 146.4 | | | |
| 1910 | 49.1 | 51.4 | 168.6 | | | |
| 1911 | 52.9 | 57.6 | 178.1 | | | |
| 1912 | 55.1 | 63.4 | 185.1 | | | |
| 1913 | 57.3 | 68.9 | 189.8 | | | |
| 1914 | | | | | | |
| 1915 | | | | 38.7 | 1.3 | 49.8 |

Table K.03 (continued)

| Year | (13) Allowances for double-counted intergovernmental transfers to the provinces | | | (16) Estimated provincial expenditure for public works other than railways | | |
|------|---|---------------------------------|--|--|---------------------------------|--|
| | Ordinary maintenance 1861-1915 | (14) New buildings 1861-1915 | (15) Other new construction 1861-1915 | Ordinary maintenance 1861-1913 | (17) New buildings 1861-1913 | (18) Other new construction 1861-1913 |
| 1861 | | | | 1.6 | .8 | .2 |
| 1862 | | | | 1.6 | .8 | .2 |
| 1863 | | | | 1.6 | .9 | .2 |
| 1864 | | | | 1.7 | 1.1 | .2 |
| 1865 | | | | 1.8 | 1.3 | .2 |
| 1866 | .2 | .0 | .7 | 11.7 | 1.6 | 9.9 |
| 1867 | .2 | .0 | .7 | 12.3 | 2.0 | 10.9 |
| 1868 | .2 | .0 | .9 | 12.6 | 1.5 | 12.6 |
| 1869 | .3 | .0 | .8 | 13.8 | 1.9 | 11.6 |
| 1870 | .3 | .0 | 1.0 | 13.6 | 1.8 | 15.5 |
| 1871 | .3 | .0 | 1.0 | 14.3 | 1.7 | 14.4 |
| 1872 | .3 | .0 | 1.1 | 15.3 | 1.5 | 16.8 |
| 1873 | .3 | .0 | .9 | 15.3 | 1.3 | 13.3 |
| 1874 | .3 | .0 | .8 | 15.8 | 1.1 | 14.6 |
| 1875 | .3 | .0 | .9 | 16.4 | 1.3 | 13.8 |
| 1876 | .3 | .0 | 1.5 | 17.0 | 1.1 | 13.1 |
| 1877 | .3 | .0 | 1.5 | 17.4 | 1.3 | 13.2 |
| 1878 | .3 | .0 | 1.4 | 18.0 | 1.2 | 12.0 |
| 1879 | .3 | .0 | 1.3 | 17.7 | 1.1 | 11.2 |
| 1880 | .3 | .0 | 1.8 | 17.8 | 1.0 | 15.2 |
| 1881 | .3 | .0 | 1.4 | 18.2 | 1.2 | 12.3 |
| 1882 | .3 | .0 | 1.6 | 18.1 | .9 | 13.9 |
| 1883 | .2 | .0 | 1.4 | 18.7 | 1.1 | 15.1 |
| 1884 | .2 | .0 | 1.8 | 18.9 | 1.4 | 16.3 |
| 1885 | .2 | .0 | 3.2 | 19.4 | 1.2 | 16.6 |
| 1886 | .3 | .0 | 2.0 | 19.8 | 1.0 | 15.7 |
| 1887 | | | | 20.7 | 1.0 | 17.5 |
| 1888 | | | | 21.3 | .8 | 16.0 |
| 1889 | .2 | .0 | 2.3 | 22.0 | .7 | 15.9 |
| 1890 | .2 | .0 | 3.2 | 22.4 | 1.1 | 14.9 |
| 1891 | .2 | .0 | 2.8 | 22.6 | .7 | 13.6 |
| 1892 | | | | 22.2 | .6 | 12.6 |
| 1893 | | | | 22.0 | .6 | 11.8 |
| 1894 | | | | 21.7 | .5 | 11.1 |
| 1895 | | | | 21.9 | .5 | 10.9 |
| 1896 | | | | 22.3 | .5 | 10.1 |
| 1897 | | | | 22.5 | .5 | 9.4 |
| 1898 | | | | 22.9 | .5 | 10.0 |
| 1899 | .4 | .0 | 3.7 | 22.9 | .5 | 10.8 |
| 1900 | | | | 22.8 | .5 | 11.1 |
| 1901 | | | | 23.1 | .5 | 11.1 |
| 1902 | | | | 23.7 | .5 | 11.5 |
| 1903 | | | | 24.1 | .5 | 11.8 |
| 1904 | | | | 24.6 | .5 | 11.7 |
| 1905 | | | | 25.0 | .5 | 12.2 |
| 1906 | | | | 25.1 | .5 | 13.2 |
| 1907 | | | | 25.9 | .5 | 14.2 |
| 1908 | | | | 26.8 | .6 | 15.2 |
| 1909 | | | | 27.7 | .6 | 16.6 |
| 1910 | | | | 29.3 | .7 | 18.9 |
| 1911 | | | | 31.0 | .7 | 20.4 |
| 1912 | | | | 32.2 | .8 | 21.7 |
| 1913 | | | | 33.3 | .8 | 22.8 |
| 1914 | | | | | | |
| 1915 | .6 | .0 | 8.6 | | | |

Table K.03 (continued)

^aextraordinary maintenance and improvements are counted as new construction; buildings include other structures with a low ratio of value added to value.

Sources: see text.

Table K.04
Public Works Other Than Railways, 1861-1913:
Estimated Private Contributions

| Year | Estimated net private contributions to public works other than railways: maintenance | | | | | | | |
|------|--|---|--------------------------------------|---|---|--|---|---|
| | Expenditure (million lire) | | | | Value added at 1911 prices (million lire) | | | |
| | (1) Local roads 1861-1913 | (2) Land reclamation 1861-1913 | (3) Water control 1861-1913 | (4) Apulian aqueduct 1861-1913 | (5) Power systems ^a 1861-1913 | (6) Gas distribu- tion networks 1861-1913 | (7) Water works ^b 1861-1913 | (8) Irrigation works 1861-1913 |
| 1856 | | | | | | | | |
| 1857 | | | | | | | | |
| 1858 | | | | | | | | |
| 1859 | | | | | | | | |
| 1860 | | | | | | | | |
| 1861 | 5.9 | .6 | 1.6 | .0 | .0 | .1 | .1 | 1.0 |
| 1862 | 6.4 | .6 | 1.6 | .0 | .0 | .1 | .1 | 1.0 |
| 1863 | 6.6 | .6 | 1.6 | .0 | .0 | .1 | .1 | 1.3 |
| 1864 | 6.8 | .7 | 1.6 | .0 | .0 | .1 | .1 | 1.3 |
| 1865 | 6.9 | .7 | 1.6 | .0 | .0 | .1 | .1 | 1.3 |
| 1866 | 7.5 | .7 | 1.6 | .0 | .0 | .1 | .1 | 1.3 |
| 1867 | 7.6 | .7 | 1.5 | .0 | .0 | .1 | .1 | 1.3 |
| 1868 | 7.5 | .8 | 1.3 | .0 | .0 | .1 | .1 | 1.3 |
| 1869 | 7.6 | .8 | 1.1 | .0 | .0 | .2 | .2 | 1.4 |
| 1870 | 7.7 | .8 | .9 | .0 | .0 | .2 | .2 | 1.4 |
| 1871 | 7.8 | .8 | .7 | .0 | .0 | .2 | .2 | 1.4 |
| 1872 | 8.0 | .9 | .6 | .0 | .0 | .2 | .2 | 1.4 |
| 1873 | 8.6 | .9 | .6 | .0 | .0 | .2 | .2 | 1.4 |
| 1874 | 9.1 | .9 | .6 | .0 | .0 | .2 | .3 | 1.2 |
| 1875 | 9.5 | 1.0 | .6 | .0 | .0 | .2 | .3 | 1.0 |
| 1876 | 10.2 | 1.0 | .6 | .0 | .0 | .2 | .3 | 1.0 |
| 1877 | 8.9 | 1.0 | .6 | .0 | .0 | .2 | .3 | 1.0 |
| 1878 | 9.5 | 1.0 | .6 | .0 | .0 | .3 | .3 | 1.0 |
| 1879 | 8.6 | 1.1 | .6 | .0 | .0 | .3 | .3 | 1.0 |
| 1880 | 8.8 | 1.1 | .6 | .0 | .0 | .3 | .3 | 1.0 |
| 1881 | 8.7 | 1.1 | .6 | .0 | .0 | .3 | .4 | 1.0 |
| 1882 | 8.0 | 1.2 | .6 | .0 | .0 | .3 | .4 | 1.0 |
| 1883 | 7.7 | 1.2 | .6 | .0 | .0 | .3 | .4 | 1.0 |
| 1884 | 8.2 | 1.3 | .6 | .0 | .0 | .4 | .5 | 1.1 |

Table K.04 (continued)

| Year | Estimated net private contributions to public works other than railways: new construction | | | | | |
|------|---|---------------------------------------|--|--|---|--|
| | Expenditure (million lire) | | | Value added at 1911 prices (million lire) | | |
| | (9) Land reclamation 1861-1913 | (10) Water control 1861-1913 | (11) Apulian aqueduct 1861-1913 | (12) Power systems ^a 1861-1913 | (13) Gas distribu- tion networks 1861-1913 | (14) Water works ^b 1861-1913 |
| 1856 | | | | | | |
| 1857 | | | | | | |
| 1858 | | | | | | |
| 1859 | | | | | | |
| 1860 | | | | | | |
| 1861 | 2.2 | .6 | .0 | .0 | .0 | .1 |
| 1862 | 2.2 | .6 | .0 | .0 | .0 | .1 |
| 1863 | 2.2 | .6 | .0 | .0 | .1 | .1 |
| 1864 | 2.2 | .6 | .0 | .0 | .1 | .1 |
| 1865 | 2.3 | .6 | .0 | .0 | .1 | .2 |
| 1866 | 2.4 | .6 | .0 | .0 | .1 | .3 |
| 1867 | 2.6 | .6 | .0 | .0 | .1 | .2 |
| 1868 | 2.7 | .6 | .0 | .0 | .1 | 1.1 |
| 1869 | 2.6 | .6 | .0 | .0 | .1 | 2.1 |
| 1870 | 2.6 | .6 | .0 | .0 | .1 | 1.1 |
| 1871 | 2.7 | .6 | .0 | .0 | .1 | .2 |
| 1872 | 2.8 | .6 | .0 | .0 | .1 | .1 |
| 1873 | 2.9 | .6 | .0 | .0 | .1 | .2 |
| 1874 | 3.1 | .6 | .0 | .0 | .1 | .1 |
| 1875 | 2.8 | .6 | .0 | .0 | .1 | .1 |
| 1876 | 2.6 | .6 | .0 | .0 | .1 | .1 |
| 1877 | 2.5 | .6 | .0 | .0 | .1 | .1 |
| 1878 | 1.9 | .6 | .0 | .0 | .1 | .5 |
| 1879 | 1.4 | .6 | .0 | .0 | .1 | 1.1 |
| 1880 | 1.5 | .6 | .0 | .0 | .1 | .9 |
| 1881 | 1.4 | .6 | .0 | .0 | .1 | .6 |
| 1882 | 1.1 | .6 | .0 | .0 | .2 | .8 |
| 1883 | .9 | .6 | .0 | .0 | .2 | 3.3 |
| 1884 | 1.0 | .6 | .0 | .1 | .2 | 5.5 |

Table K.04 (continued)

| | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
|------|------|------|------|------|------|------|------|
| 1885 | 1.0 | .6 | .0 | .1 | .2 | 3.9 | 1.0 |
| 1886 | .9 | .6 | .0 | .1 | .2 | 2.0 | 8.6 |
| 1887 | .5 | .6 | .0 | .2 | .2 | 1.0 | 15.7 |
| 1888 | .0 | .6 | .0 | .4 | .2 | 1.5 | 15.1 |
| 1889 | .9 | .6 | .0 | .4 | .2 | 2.5 | 7.6 |
| 1890 | 1.3 | .6 | .0 | .6 | .2 | 1.4 | .0 |
| 1891 | 1.4 | .6 | .0 | .9 | .2 | .3 | .0 |
| 1892 | 1.1 | .6 | .0 | 1.1 | .2 | .4 | .0 |
| 1893 | 2.6 | .6 | .0 | 1.1 | .1 | 1.6 | .0 |
| 1894 | 4.8 | .3 | .0 | 1.3 | .2 | 2.6 | .0 |
| 1895 | 5.2 | .3 | .0 | 2.3 | .3 | 1.4 | .0 |
| 1896 | 6.3 | .4 | .0 | 4.6 | .3 | .4 | .0 |
| 1897 | 4.0 | .3 | .0 | 7.4 | .3 | .3 | .0 |
| 1898 | .9 | .2 | .0 | 7.6 | .2 | .3 | .0 |
| 1899 | -.7 | .2 | .0 | 8.6 | .1 | .4 | .0 |
| 1900 | -1.2 | .1 | .0 | 11.3 | .1 | .3 | .1 |
| 1901 | 3.1 | .1 | -.1 | 10.9 | .3 | .2 | .1 |
| 1902 | 4.5 | .1 | -.1 | 12.4 | .5 | .3 | .1 |
| 1903 | 4.3 | .1 | -.3 | 13.6 | .4 | .3 | .1 |
| 1904 | 4.5 | .1 | -.6 | 12.8 | .4 | .2 | .1 |
| 1905 | 4.1 | .1 | -.8 | 19.2 | .5 | .7 | .1 |
| 1906 | 5.7 | .2 | 2.1 | 25.8 | .5 | 1.2 | .0 |
| 1907 | .1 | .3 | 2.6 | 26.2 | .5 | .9 | .0 |
| 1908 | -1.0 | .4 | 3.0 | 28.0 | .4 | .5 | .0 |
| 1909 | -.7 | .4 | .8 | 34.2 | .4 | .4 | .0 |
| 1910 | -1.5 | .2 | 2.9 | 39.4 | .4 | .4 | .0 |
| 1911 | -.9 | .1 | .9 | 39.5 | .3 | .5 | .8 |
| 1912 | -1.6 | .1 | 6.8 | 41.8 | .3 | .6 | 1.5 |
| 1913 | 1.9 | .1 | 6.4 | 42.5 | .3 | .6 | 1.5 |
| 1914 | | | | | | | |
| 1915 | | | | | | | |

Table K.04 (continued)

| Year | (16) - (20) Estimated expenditure for road maintenance (million lire) | | | | | (21) - (24) Estimated expenditure for privately managed land reclamation projects ^c (million lire) | | | | (25) Estimated hydroelec. capacity added ^d 1861-1915 | |
|------|--|-------------------------------------|---------------------------------|----------------------------------|-----------------------------|---|----------------------|--------------------|-----------|--|------------------------------------|
| | Municipal exp. for local roads 1875-1899 | Aggregate expenditure, by road type | | | | Major: total 1861-1913 | Major: contributions | | | | Other: net private 1861-1913 |
| | | National roads 1861-1913 | Municipal roads 1861-1913 | Provincial roads 1861-1913 | Local roads 1861-1913 | | State 1861-1913 | Local 1861-1913 | 1861-1913 | | |
| 1856 | | | | | | | | | | | |
| 1857 | | | | | | | | | | | |
| 1858 | | | | | | | | | | | |
| 1859 | | | | | | | | | | | |
| 1860 | | | | | | | | | | | |
| 1861 | | 11.5 | 12.3 | 1.1 | 6.4 | 1.630 | .000 | .000 | .536 | .0 | |
| 1862 | | 13.6 | 13.5 | 1.1 | 6.9 | 1.650 | .000 | .000 | .543 | .0 | |
| 1863 | | 13.6 | 14.5 | 1.1 | 7.1 | 1.670 | .000 | .000 | .547 | .0 | |
| 1864 | | 13.5 | 14.3 | 1.1 | 7.3 | 1.690 | .000 | .000 | .559 | .0 | |
| 1865 | | 13.7 | 15.4 | 1.1 | 7.5 | 1.710 | .000 | .000 | .569 | .0 | |
| 1866 | | 8.6 | 14.7 | 10.5 | 8.1 | 1.830 | .000 | .000 | .580 | .0 | |
| 1867 | | 8.2 | 14.8 | 11.2 | 8.2 | 2.015 | .000 | .000 | .569 | .0 | |
| 1868 | | 6.7 | 14.7 | 11.7 | 8.1 | 2.075 | .000 | .000 | .575 | .0 | |
| 1869 | | 6.3 | 15.0 | 12.6 | 8.2 | 1.987 | .000 | .000 | .579 | .0 | |
| 1870 | | 5.5 | 16.1 | 12.6 | 8.3 | 2.047 | .000 | .000 | .589 | .0 | |
| 1871 | | 5.6 | 15.8 | 13.1 | 8.4 | 2.177 | .100 | .014 | .600 | .0 | |
| 1872 | | 6.2 | 16.6 | 14.1 | 8.7 | 2.187 | .041 | .014 | .626 | .0 | |
| 1873 | | 6.5 | 16.8 | 14.1 | 9.3 | 2.257 | .010 | .000 | .646 | .0 | |
| 1874 | | 6.2 | 17.3 | 14.5 | 9.8 | 2.482 | .012 | .000 | .626 | .0 | |
| 1875 | .82 | 6.6 | 16.1 | 15.0 | 10.3 | 2.232 | .057 | .000 | .634 | .0 | |
| 1876 | .93 | 6.1 | 16.3 | 15.5 | 11.1 | 1.982 | .002 | .000 | .635 | .0 | |
| 1877 | .71 | 7.2 | 16.0 | 15.8 | 9.6 | 1.862 | .003 | .004 | .621 | .0 | |
| 1878 | .79 | 7.3 | 16.6 | 16.5 | 10.3 | 1.282 | .000 | .004 | .626 | .0 | |
| 1879 | .65 | 7.7 | 16.3 | 16.2 | 9.3 | .780 | .036 | .004 | .639 | .0 | |
| 1880 | .66 | 7.7 | 17.5 | 16.3 | 9.5 | .830 | .014 | .004 | .649 | .0 | |
| 1881 | .65 | 7.8 | 17.7 | 16.7 | 9.4 | .730 | .017 | .004 | .651 | .0 | |
| 1882 | .51 | 7.6 | 18.2 | 16.8 | 8.5 | .600 | .009 | .000 | .467 | .0 | |
| 1883 | .45 | 8.0 | 18.5 | 17.3 | 8.2 | .650 | .009 | .000 | .283 | .0 | |
| 1884 | .52 | 7.6 | 18.8 | 17.7 | 8.7 | .700 | .003 | .000 | .289 | .0 | |

Table K.04 (continued)

| Year | (26) (27) (28) (29) Indices of accrued new construction | | | | (30) Estimated output of new privately built aqueducts (equivalent t-kms/day) ^g | (31) (32) (33) (34) Aqueducts other than the Apulian aqueduct | | | | (35) Indices of privately financed construction | | |
|------|--|--|---|---|--|--|--|-----|------|---|--------------------------------------|----------------------------------|
| | Electric power-related systems | | | Gas distri- bution networks ^f 1861-1913 | | Group A ^h Group B ^h Group C Group D ^h | | | | | New const. ⁱ 1861-1913 | Maint. ^j 1861-1913 |
| | Hydraulic works ^d 1861-1913 | Power lines ^d 1861-1913 | Local networks ^e 1861-1913 | | | 1856-1915 1856-1915 1889-1903 1856-1904 | | | | | | |
| | | | | | | | | | | | | |
| 1856 | | | | | 2,770 | 0 | | 0 | | | | |
| 1857 | | | | | 0 | 0 | | 0 | | | | |
| 1858 | | | | | 0 | 0 | | 0 | | | | |
| 1859 | | | | | 1,177 | 0 | | 0 | | | | |
| 1860 | | | | | 0 | 0 | | 0 | | | | |
| 1861 | .0 | .0 | .0 | 1.5 | 0 | 0 | | 0 | .3 | 6 | | |
| 1862 | .0 | .0 | .0 | 1.6 | 0 | 0 | | 0 | .3 | 6 | | |
| 1863 | .0 | .0 | .0 | 1.7 | 0 | 0 | | 0 | .3 | 7 | | |
| 1864 | .0 | .0 | .0 | 1.8 | 0 | 0 | | 0 | .3 | 7 | | |
| 1865 | .0 | .0 | .0 | 1.9 | 0 | 0 | | 0 | .6 | 7 | | |
| 1866 | .0 | .0 | .0 | 2.0 | 0 | 0 | | 0 | .9 | 8 | | |
| 1867 | .0 | .0 | .0 | 2.1 | 1,139 | 0 | | 0 | .6 | 9 | | |
| 1868 | .0 | .0 | .0 | 2.2 | 0 | 0 | | 0 | 3.7 | 11 | | |
| 1869 | .0 | .0 | .0 | 2.4 | 0 | 0 | | 0 | 7.1 | 16 | | |
| 1870 | .0 | .0 | .0 | 2.6 | 13,500 | 0 | | 0 | 3.7 | 22 | | |
| 1871 | .0 | .0 | .0 | 2.7 | 0 | 0 | | 0 | .3 | 24 | | |
| 1872 | .0 | .0 | .0 | 2.9 | 0 | 0 | | 0 | .3 | 24 | | |
| 1873 | .0 | .0 | .0 | 3.1 | 0 | 0 | | 0 | .3 | 24 | | |
| 1874 | .0 | .0 | .0 | 3.3 | 0 | 51 | | 0 | .3 | 25 | | |
| 1875 | .0 | .0 | .0 | 3.4 | 0 | 0 | | 0 | .3 | 25 | | |
| 1876 | .0 | .0 | .0 | 3.6 | 0 | 0 | | 0 | .3 | 25 | | |
| 1877 | .0 | .0 | .0 | 3.9 | 0 | 0 | | 0 | .3 | 26 | | |
| 1878 | .0 | .0 | .0 | 4.1 | 0 | 0 | | 0 | 1.7 | 27 | | |
| 1879 | .0 | .0 | .0 | 4.3 | 0 | 0 | | 111 | 3.5 | 29 | | |
| 1880 | .0 | .0 | .0 | 4.6 | 5,400 | 0 | | 0 | 2.9 | 32 | | |
| 1881 | .0 | .0 | .0 | 4.9 | 1,840 | 0 | | 0 | 1.5 | 35 | | |
| 1882 | .0 | .0 | .1 | 5.3 | 1,246 | 0 | | 0 | 2.2 | 36 | | |
| 1883 | .0 | .0 | .2 | 5.5 | 280 | 0 | | 0 | 10.9 | 43 | | |
| 1884 | .1 | .1 | .3 | 5.6 | 2,758 | 3,179 | | 0 | 18.3 | 58 | | |

Table K.04 (continued)

| | (26) | (27) | (28) | (29) | (30) | (31) | (32) | (33) | (34) | (35) |
|------|------|------|-------|------|--------|-------|------|------|------|------|
| 1885 | .1 | .1 | .9 | 5.9 | 30,180 | 0 | | 0 | 12.5 | 73 |
| 1886 | .3 | .1 | 1.1 | 6.1 | 5,743 | 0 | | 0 | 5.3 | 82 |
| 1887 | .5 | .2 | .8 | 6.2 | 6,793 | 374 | | 0 | 2.1 | 85 |
| 1888 | .8 | .3 | .9 | 6.4 | 38 | 58 | | 0 | 3.8 | 88 |
| 1889 | .9 | .3 | 1.4 | 6.2 | 0 | 171 | 139 | 0 | 7.2 | 94 |
| 1890 | 1.3 | .1 | 2.6 | 5.9 | 13,891 | 0 | 79 | 0 | 3.8 | 99 |
| 1891 | 2.0 | .7 | 3.5 | 7.6 | 348 | 0 | 0 | 9 | .4 | 102 |
| 1892 | 2.3 | 1.1 | 3.3 | 7.4 | 0 | 0 | 480 | 16 | 1.0 | 102 |
| 1893 | 2.5 | .9 | 2.7 | 4.5 | 0 | 0 | 79 | 0 | 5.2 | 105 |
| 1894 | 3.0 | 1.0 | 2.6 | 6.0 | 2,075 | 1,038 | 0 | 45 | 8.2 | 112 |
| 1895 | 5.1 | 1.6 | 4.0 | 8.4 | 14,304 | 37 | 0 | 102 | 4.2 | 118 |
| 1896 | 10.1 | 3.6 | 10.6 | 9.0 | 538 | 0 | 0 | 346 | .6 | 121 |
| 1897 | 15.7 | 9.6 | 26.7 | 9.3 | 439 | 0 | 0 | 37 | .3 | 121 |
| 1898 | 16.2 | 9.7 | 27.4 | 5.2 | 0 | 72 | 17 | 69 | .3 | 121 |
| 1899 | 19.2 | 6.1 | 17.7 | 2.0 | 0 | 0 | 0 | 80 | .6 | 122 |
| 1900 | 24.8 | 10.0 | 29.3 | 4.5 | 669 | 0 | 134 | 85 | .4 | 122 |
| 1901 | 23.5 | 12.2 | 35.2 | 10.7 | 7 | 0 | 143 | 0 | .3 | 123 |
| 1902 | 25.9 | 18.3 | 49.5 | 15.9 | 0 | 0 | 0 | 68 | .4 | 123 |
| 1903 | 27.0 | 27.1 | 76.0 | 14.9 | 0 | 421 | 170 | 54 | .4 | 123 |
| 1904 | 26.5 | 18.5 | 56.4 | 13.3 | 0 | 0 | | 112 | .3 | 124 |
| 1905 | 41.7 | 18.4 | 59.2 | 15.7 | 0 | 0 | | | 1.7 | 125 |
| 1906 | 54.2 | 33.9 | 102.2 | 17.6 | 141 | 0 | | | 3.1 | 127 |
| 1907 | 54.4 | 38.5 | 115.0 | 15.4 | 5,400 | 0 | | | 1.8 | 130 |
| 1908 | 58.8 | 36.9 | 113.4 | 13.5 | 304 | 0 | | | .4 | 131 |
| 1909 | 73.3 | 37.3 | 117.0 | 13.8 | 0 | 0 | | | .3 | 131 |
| 1910 | 83.3 | 49.2 | 154.3 | 12.6 | 0 | 0 | | | .4 | 131 |
| 1911 | 83.3 | 49.7 | 158.9 | 8.8 | 0 | 0 | | | .6 | 132 |
| 1912 | 88.6 | 49.3 | 161.3 | 9.2 | 329 | 0 | | | .7 | 133 |
| 1913 | 88.8 | 56.1 | 185.4 | 10.2 | 476 | 0 | | | .6 | 133 |
| 1914 | | | | | 165 | 0 | | | | |
| 1915 | | | | | 502 | 0 | | | | |

Table K.04 (continued)

| Year | (36) | (37) | (38) | (39) | (40) | (41) | (42) |
|------|--|--|-----------------------------------|-----------------------------------|-----------------------------------|---|---|
| | Estimated length of privately financed local water-distribution networks (kms) Major-city year-end total 1860-1913 | Elsewhere, in 1904: by the year the private aqueduct was built Group A ^k 1856-1904 | Group B ^k 1856-1904 | Group C ^k 1889-1903 | Group D ^k 1856-1904 | Aggregate year-end total 1860-1913 | Privately financed irrigation works: index of new construction ¹ 1861-1913 |
| 1856 | | 13 | 0 | | 0 | | |
| 1857 | | 0 | 0 | | 0 | | |
| 1858 | | 0 | 0 | | 0 | | |
| 1859 | | 0 | 0 | | 0 | | |
| 1860 | 74 | 0 | 0 | | 0 | 157 | |
| 1861 | 75 | 0 | 0 | | 0 | 164 | 17 |
| 1862 | 76 | 0 | 0 | | 0 | 171 | 35 |
| 1863 | 77 | 0 | 0 | | 0 | 178 | 2,290 |
| 1864 | 78 | 0 | 0 | | 0 | 186 | 3,024 |
| 1865 | 79 | 0 | 0 | | 0 | 193 | 3,007 |
| 1866 | 80 | 0 | 0 | | 0 | 200 | 751 |
| 1867 | 81 | 25 | 0 | | 0 | 216 | 95 |
| 1868 | 82 | 0 | 0 | | 0 | 227 | 305 |
| 1869 | 83 | 0 | 0 | | 0 | 238 | 0 |
| 1870 | 84 | 0 | 0 | | 0 | 249 | 0 |
| 1871 | 100 | 0 | 0 | | 0 | 275 | 352 |
| 1872 | 110 | 0 | 0 | | 0 | 292 | 615 |
| 1873 | 125 | 0 | 0 | | 0 | 314 | 398 |
| 1874 | 135 | 0 | 1 | | 0 | 331 | 135 |
| 1875 | 138 | 0 | 0 | | 0 | 341 | 0 |
| 1876 | 143 | 0 | 0 | | 0 | 353 | 0 |
| 1877 | 151 | 0 | 0 | | 0 | 369 | 0 |
| 1878 | 155 | 0 | 0 | | 0 | 380 | 0 |
| 1879 | 163 | 0 | 0 | | 5 | 395 | 0 |
| 1880 | 169 | 0 | 0 | | 0 | 409 | 103 |
| 1881 | 203 | 28 | 0 | | 0 | 460 | 205 |
| 1882 | 212 | 61 | 0 | | 0 | 503 | 205 |
| 1883 | 218 | 9 | 0 | | 0 | 532 | 103 |
| 1884 | 253 | 12 | 0 | | 0 | 592 | 63 |

Table K.04 (continued)

| | (36) | (37) | (38) | (39) | (40) | (41) | (42) |
|------|-------|------|------|------|------|-------|-------|
| 1885 | 328 | 9 | 0 | | 0 | 694 | 134 |
| 1886 | 409 | 123 | 0 | | 0 | 841 | 1,151 |
| 1887 | 480 | 0 | 60 | | 0 | 963 | 2,089 |
| 1888 | 552 | 10 | 9 | | 0 | 1,083 | 2,018 |
| 1889 | 634 | 0 | 3 | 8 | 0 | 1,207 | 1,009 |
| 1890 | 662 | 59 | 0 | 3 | 0 | 1,292 | 0 |
| 1891 | 693 | 41 | 0 | 0 | 1 | 1,362 | 0 |
| 1892 | 715 | 0 | 0 | 5 | 1 | 1,407 | 0 |
| 1893 | 739 | 0 | 0 | 0 | 0 | 1,451 | 0 |
| 1894 | 761 | 65 | 12 | 0 | 8 | 1,525 | 0 |
| 1895 | 795 | 24 | 0 | 0 | 1 | 1,592 | 0 |
| 1896 | 847 | 0 | 0 | 0 | 14 | 1,671 | 0 |
| 1897 | 898 | 11 | 0 | 0 | 1 | 1,749 | 0 |
| 1898 | 949 | 0 | 3 | 2 | 4 | 1,829 | 0 |
| 1899 | 999 | 0 | 0 | 0 | 2 | 1,894 | 0 |
| 1900 | 1,050 | 21 | 0 | 2 | 8 | 1,967 | 8 |
| 1901 | 1,085 | 7 | 0 | 0 | 0 | 2,017 | 17 |
| 1902 | 1,120 | 0 | 0 | 0 | 2 | 2,066 | 17 |
| 1903 | 1,156 | 0 | 2 | 1 | 2 | 2,116 | 17 |
| 1904 | 1,181 | 0 | 0 | | 2 | 2,154 | 17 |
| 1905 | 1,216 | | | | | 2,232 | 8 |
| 1906 | 1,265 | | | | | 2,316 | 0 |
| 1907 | 1,306 | | | | | 2,440 | 0 |
| 1908 | 1,345 | | | | | 2,570 | 0 |
| 1909 | 1,365 | | | | | 2,676 | 0 |
| 1910 | 1,383 | | | | | 2,786 | 0 |
| 1911 | 1,403 | | | | | 2,905 | 103 |
| 1912 | 1,422 | | | | | 3,030 | 205 |
| 1913 | 1,441 | | | | | 3,163 | 205 |
| 1914 | | | | | | | |
| 1915 | | | | | | | |

Table K.04 (continued)

^ahydraulic works, power lines, and local networks.

^bexcluding the Apulian aqueduct.

^cState-subsidized projects until 1882, and first-category projects from 1882, are considered major.

^dthousand kW.

^emillion kWh distributed.

^fmillion cubic meters distributed.

^gsee Table J.04, note d.

^hin 1856, cumulative through that year.

ⁱaccrued new capacity, in thousand equivalent t-kms/day (Table J.04, note d).

^jcompleted capacity at mid-year, in thousand equivalent t-kms/day (Table J.04, note d).

^kin 1856, cumulative through that year; includes allowances for networks not piping into private houses (in col. 37, 1 km in 1856, 10 kms in 1888; in col. 38, 2 kms in 1903; in col. 39, 8 kms in 1889, 3 kms in 1890, 2 kms in 1898, and 1 km in 1903; in col. 40, 1 km in 1892, 1895, 1897, and 1902, and 2 kms in 1899).

^laccrued new capacity, in t-kms/s (equivalent ton-kilometers times cubic meters/second).

Sources: see text.

Table K.05
Public Works Other Than Railways, 1861-1913:
Production Estimates^a (million lire)

| Year | (1) | (2) | (3) | (4) | (5) | (6) |
|--|---|--|--|--|--|--|
| | Ordinary maintenance | | | Aggregate value added at 1911 prices 1861-1913 | New buildings | |
| | Summary partial estimates | | | | Net public expenditure at current prices 1861-1913 | Aggregate value added at 1911 prices 1861-1913 |
| Net public expenditure at current prices 1861-1913 | Net private expenditure at current prices 1861-1913 | Net private value added at 1911 prices 1861-1913 | Aggregate value added at 1911 prices 1861-1913 | Net public expenditure at current prices 1861-1913 | Aggregate value added at 1911 prices 1861-1913 | |
| 1861 | 49.7 | 8.1 | 1.2 | 54.7 | 11.5 | 4.5 |
| 1862 | 54.3 | 8.6 | 1.2 | 58.9 | 12.5 | 4.9 |
| 1863 | 56.1 | 8.8 | 1.5 | 60.6 | 12.9 | 5.0 |
| 1864 | 56.5 | 9.1 | 1.5 | 59.9 | 13.1 | 5.0 |
| 1865 | 57.3 | 9.2 | 1.5 | 59.8 | 20.4 | 7.7 |
| 1866 | 56.8 | 9.8 | 1.5 | 58.7 | 15.3 | 5.7 |
| 1867 | 58.5 | 9.8 | 1.5 | 61.5 | 12.7 | 4.9 |
| 1868 | 56.4 | 9.6 | 1.5 | 59.1 | 12.9 | 5.0 |
| 1869 | 57.2 | 9.5 | 1.8 | 59.5 | 12.0 | 4.6 |
| 1870 | 58.2 | 9.4 | 1.8 | 59.4 | 14.0 | 5.4 |
| 1871 | 59.8 | 9.3 | 1.8 | 59.7 | 16.5 | 6.3 |
| 1872 | 63.4 | 9.5 | 1.8 | 60.1 | 20.2 | 7.2 |
| 1873 | 64.8 | 10.1 | 1.8 | 59.8 | 21.8 | 7.4 |
| 1874 | 66.2 | 10.6 | 1.7 | 63.0 | 16.7 | 5.8 |
| 1875 | 64.2 | 11.1 | 1.5 | 60.9 | 20.3 | 7.0 |
| 1876 | 64.9 | 11.8 | 1.5 | 61.9 | 15.6 | 5.4 |
| 1877 | 67.5 | 10.5 | 1.5 | 64.5 | 17.7 | 6.4 |
| 1878 | 69.0 | 11.1 | 1.6 | 65.8 | 16.3 | 5.8 |
| 1879 | 70.0 | 10.3 | 1.6 | 64.6 | 13.8 | 4.9 |
| 1880 | 73.9 | 10.5 | 1.6 | 66.9 | 16.7 | 5.8 |
| 1881 | 72.9 | 10.4 | 1.7 | 66.2 | 18.8 | 6.7 |
| 1882 | 78.5 | 9.8 | 1.7 | 69.3 | 16.1 | 5.7 |
| 1883 | 79.0 | 9.5 | 1.7 | 68.5 | 21.2 | 7.4 |
| 1884 | 76.7 | 10.1 | 2.0 | 66.4 | 23.2 | 8.0 |
| 1885 | 78.6 | 11.1 | 2.2 | 67.5 | 22.9 | 7.8 |
| 1886 | 83.4 | 11.3 | 2.2 | 71.2 | 25.5 | 8.8 |
| 1887 | 86.4 | 12.0 | 2.2 | 73.2 | 27.1 | 9.3 |
| 1888 | 88.0 | 11.8 | 2.4 | 75.0 | 32.5 | 11.2 |
| 1889 | 90.7 | 11.5 | 2.4 | 77.3 | 32.8 | 11.5 |
| 1890 | 90.0 | 11.8 | 2.6 | 77.2 | 29.1 | 10.2 |
| 1891 | 87.6 | 12.0 | 2.7 | 78.1 | 24.9 | 9.0 |
| 1892 | 85.0 | 11.7 | 2.8 | 78.3 | 25.8 | 9.7 |
| 1893 | 83.2 | 11.4 | 2.8 | 79.1 | 26.2 | 10.1 |
| 1894 | 81.1 | 11.1 | 2.9 | 77.6 | 20.8 | 8.1 |
| 1895 | 82.7 | 11.0 | 2.9 | 78.5 | 18.9 | 7.4 |
| 1896 | 85.6 | 11.9 | 3.1 | 80.8 | 18.2 | 7.0 |
| 1897 | 87.4 | 13.0 | 3.1 | 81.9 | 17.0 | 6.5 |
| 1898 | 89.0 | 12.8 | 3.1 | 82.4 | 19.4 | 7.3 |
| 1899 | 87.8 | 12.7 | 3.2 | 81.2 | 22.0 | 8.2 |
| 1900 | 86.1 | 12.7 | 3.3 | 77.9 | 24.4 | 8.7 |
| 1901 | 86.7 | 12.7 | 3.4 | 78.4 | 26.8 | 9.8 |
| 1902 | 90.0 | 12.8 | 3.4 | 80.5 | 30.2 | 11.0 |
| 1903 | 91.5 | 13.1 | 3.5 | 81.3 | 33.0 | 12.0 |
| 1904 | 93.9 | 13.4 | 3.6 | 83.1 | 32.3 | 11.7 |
| 1905 | 95.7 | 13.8 | 3.8 | 84.4 | 36.0 | 12.9 |
| 1906 | 95.2 | 14.2 | 3.9 | 81.2 | 47.3 | 16.4 |
| 1907 | 99.9 | 14.9 | 4.0 | 81.5 | 58.3 | 19.4 |
| 1908 | 105.5 | 15.7 | 4.3 | 81.6 | 75.2 | 24.1 |
| 1909 | 110.8 | 16.7 | 4.4 | 83.8 | 102.8 | 32.4 |
| 1910 | 119.5 | 17.8 | 4.5 | 87.6 | 123.2 | 38.2 |
| 1911 | 129.4 | 19.0 | 4.7 | 93.7 | 125.0 | 38.3 |
| 1912 | 134.6 | 20.4 | 4.8 | 95.1 | 125.2 | 37.2 |
| 1913 | 139.5 | 21.6 | 5.1 | 96.6 | 127.4 | 36.7 |

Table K.05 (continued)

| Year | (7) | (8) | (9) | (10) |
|--|---|--|------|--|
| | Other new construction | | | Aggregate value added at 1911 prices 1861-1913 |
| | Summary partial estimates | | | |
| Net public expenditure at current prices 1861-1913 | Net private expenditure at current prices 1861-1913 | Net private value added at 1911 prices 1861-1913 | | |
| 1861 | 60.3 | 2.8 | .2 | 48.7 |
| 1862 | 63.5 | 2.8 | .4 | 50.7 |
| 1863 | 61.2 | 2.8 | 17.4 | 65.6 |
| 1864 | 56.6 | 2.8 | 22.9 | 66.7 |
| 1865 | 75.7 | 2.9 | 22.9 | 79.9 |
| 1866 | 71.5 | 3.0 | 6.0 | 59.0 |
| 1867 | 65.5 | 3.2 | 1.0 | 50.8 |
| 1868 | 71.9 | 3.3 | 3.5 | 57.4 |
| 1869 | 67.4 | 3.2 | 2.2 | 52.5 |
| 1870 | 85.4 | 3.2 | 1.2 | 63.2 |
| 1871 | 73.9 | 3.3 | 2.9 | 56.0 |
| 1872 | 91.3 | 3.4 | 4.8 | 67.1 |
| 1873 | 107.2 | 3.5 | 3.3 | 74.0 |
| 1874 | 96.8 | 3.7 | 1.2 | 67.4 |
| 1875 | 90.3 | 3.4 | .2 | 61.1 |
| 1876 | 94.0 | 3.2 | .2 | 63.3 |
| 1877 | 110.1 | 3.1 | .2 | 75.3 |
| 1878 | 116.3 | 2.5 | .6 | 78.9 |
| 1879 | 108.2 | 2.0 | 1.2 | 72.3 |
| 1880 | 115.4 | 2.1 | 1.8 | 76.4 |
| 1881 | 102.6 | 2.0 | 2.2 | 68.4 |
| 1882 | 119.7 | 1.7 | 2.5 | 78.5 |
| 1883 | 135.8 | 1.5 | 4.3 | 89.0 |
| 1884 | 152.6 | 1.6 | 6.3 | 99.7 |
| 1885 | 157.0 | 1.6 | 5.2 | 99.6 |
| 1886 | 162.6 | 1.5 | 10.9 | 108.3 |
| 1887 | 185.7 | 1.1 | 17.1 | 127.1 |
| 1888 | 198.2 | .6 | 17.2 | 135.1 |
| 1889 | 196.1 | 1.5 | 10.7 | 128.6 |
| 1890 | 179.8 | 1.9 | 2.2 | 110.6 |
| 1891 | 147.2 | 2.0 | 1.4 | 93.4 |
| 1892 | 119.0 | 1.7 | 1.7 | 78.4 |
| 1893 | 98.3 | 3.2 | 2.8 | 69.4 |
| 1894 | 86.9 | 5.1 | 4.1 | 64.7 |
| 1895 | 82.8 | 5.5 | 4.0 | 61.9 |
| 1896 | 80.5 | 6.7 | 5.3 | 61.8 |
| 1897 | 80.9 | 4.3 | 8.0 | 62.4 |
| 1898 | 84.1 | 1.1 | 8.1 | 62.1 |
| 1899 | 90.7 | -.5 | 9.1 | 66.0 |
| 1900 | 97.1 | -1.1 | 11.8 | 71.0 |
| 1901 | 97.9 | 3.1 | 11.5 | 73.4 |
| 1902 | 106.3 | 4.5 | 13.3 | 80.8 |
| 1903 | 112.7 | 4.1 | 14.4 | 85.0 |
| 1904 | 112.1 | 4.0 | 13.5 | 83.4 |
| 1905 | 123.2 | 3.4 | 20.5 | 96.1 |
| 1906 | 148.1 | 8.0 | 27.5 | 117.0 |
| 1907 | 174.9 | 3.0 | 27.6 | 125.0 |
| 1908 | 205.0 | 2.4 | 28.9 | 135.9 |
| 1909 | 251.7 | .5 | 35.0 | 161.9 |
| 1910 | 296.1 | 1.6 | 40.2 | 185.7 |
| 1911 | 317.4 | .1 | 41.1 | 194.9 |
| 1912 | 330.3 | 5.3 | 44.2 | 202.2 |
| 1913 | 330.7 | 8.4 | 44.9 | 200.5 |

Table K.05 (continued)

^aextraordinary maintenance and improvements are counted as new construction; buildings include other structures with a low ratio of value added to value. Cols. 2 and 3, and similarly cols. 8 and 9, do not overlap.

Sources: col. 1: Table K.02, col. 13, plus Table K.03, cols. 7 and 16.
col. 2: Table K.04, sum of cols. 1 - 4.
col. 3: Table K.04, sum of cols. 5 - 8.
col. 4: col. 3 plus $.60((\text{col. 1} + \text{col. 2})/\text{Table K.06, col. 10})$.
col. 5: Table K.02, col. 14, plus Table K.03, cols. 8 and 17.
col. 6: $(.90)(.34)(\text{col. 5}/\text{Table K.06, col. 11})$
col. 7: Table K.02, col. 15, plus Table K.03, cols. 9 and 18.
col. 8: Table K.04, sum of cols. 9 - 11.
col. 9: Table K.04, sum of cols. 12 - 15.
col. 10: col. 9 plus $(.95)(.51)((\text{col. 7} + \text{col. 8})/\text{Table K.06, col. 12})$.

Table K.06
Estimated Construction Input Prices and Cost Indices, 1861-1916

| Year | (1) | (2) | (3) | (4) | (5) | (6) |
|------|--|-------------------------------------|--|--|---|--------------------------------------|
| | Building stone (lire/ton) 1861-1916 | Fat lime (lire/ton) 1861-1916 | Bricks and tiles (lire/ thousand) 1861-1916 | Lumber (lire/cubic meter) 1861-1916 | Wood fixtures (lire/ton) 1861-1916 | Iron bars (lire/ton) 1861-1916 |
| 1861 | 37.5 | 23.4 | 71.4 | 51.6 | 750 | 195 |
| 1862 | 37.5 | 23.4 | 71.4 | 48.5 | 750 | 187 |
| 1863 | 37.5 | 23.4 | 71.4 | 48.5 | 750 | 191 |
| 1864 | 37.5 | 23.4 | 71.4 | 48.5 | 750 | 232 |
| 1865 | 37.5 | 23.4 | 71.4 | 48.5 | 750 | 229 |
| 1866 | 37.5 | 23.4 | 71.4 | 51.6 | 750 | 239 |
| 1867 | 37.5 | 23.4 | 60.3 | 48.5 | 700 | 225 |
| 1868 | 37.5 | 23.4 | 60.3 | 47.0 | 700 | 215 |
| 1869 | 37.5 | 23.4 | 60.3 | 51.6 | 700 | 209 |
| 1870 | 37.5 | 23.4 | 55.5 | 53.1 | 700 | 218 |
| 1871 | 37.5 | 23.4 | 55.5 | 50.1 | 700 | 236 |
| 1872 | 50.0 | 25.0 | 55.5 | 54.6 | 750 | 249 |
| 1873 | 50.0 | 31.2 | 55.5 | 52.3 | 750 | 267 |
| 1874 | 50.0 | 31.2 | 55.5 | 52.3 | 750 | 264 |
| 1875 | 50.0 | 31.2 | 55.5 | 58.4 | 750 | 250 |
| 1876 | 50.0 | 31.2 | 55.5 | 61.4 | 750 | 234 |
| 1877 | 50.0 | 27.3 | 55.5 | 54.6 | 750 | 212 |
| 1878 | 50.0 | 27.3 | 63.4 | 52.3 | 750 | 197 |
| 1879 | 50.0 | 27.3 | 63.4 | 53.9 | 750 | 202 |
| 1880 | 50.0 | 27.3 | 63.4 | 53.1 | 750 | 207 |
| 1881 | 50.0 | 23.4 | 63.4 | 49.3 | 750 | 207 |
| 1882 | 50.0 | 23.4 | 63.4 | 49.3 | 750 | 206 |
| 1883 | 50.0 | 23.4 | 63.4 | 53.1 | 750 | 205 |
| 1884 | 50.0 | 23.4 | 63.4 | 54.6 | 800 | 199 |
| 1885 | 60.0 | 23.4 | 63.4 | 53.1 | 800 | 199 |
| 1886 | 60.0 | 23.4 | 63.4 | 50.1 | 750 | 198 |
| 1887 | 60.0 | 23.4 | 63.4 | 50.1 | 750 | 198 |
| 1888 | 60.0 | 23.4 | 63.4 | 50.1 | 700 | 199 |
| 1889 | 50.6 | 23.4 | 63.4 | 48.5 | 700 | 209 |
| 1890 | 50.6 | 23.4 | 63.4 | 45.5 | 700 | 219 |
| 1891 | 46.5 | 23.4 | 59.5 | 42.5 | 700 | 214 |
| 1892 | 46.5 | 19.5 | 59.5 | 42.5 | 700 | 218 |
| 1893 | 46.5 | 19.5 | 51.5 | 42.5 | 700 | 216 |
| 1894 | 46.5 | 19.5 | 49.2 | 42.5 | 700 | 215 |
| 1895 | 46.5 | 19.5 | 49.2 | 42.5 | 700 | 209 |
| 1896 | 46.5 | 19.5 | 46.0 | 44.3 | 700 | 232 |
| 1897 | 46.5 | 19.5 | 46.0 | 44.3 | 700 | 255 |
| 1898 | 46.5 | 19.5 | 46.0 | 45.5 | 700 | 255 |
| 1899 | 46.5 | 19.5 | 46.0 | 46.7 | 700 | 265 |
| 1900 | 46.5 | 19.5 | 46.0 | 54.6 | 700 | 336 |
| 1901 | 46.5 | 19.5 | 46.0 | 54.6 | 700 | 267 |
| 1902 | 46.5 | 19.5 | 46.1 | 50.6 | 700 | 265 |
| 1903 | 46.5 | 19.3 | 45.5 | 50.4 | 700 | 272 |
| 1904 | 58.0 | 19.4 | 45.8 | 52.6 | 700 | 235 |
| 1905 | 58.0 | 19.3 | 45.5 | 55.2 | 700 | 234 |
| 1906 | 58.0 | 19.1 | 44.9 | 57.8 | 710 | 265 |
| 1907 | 58.0 | 19.1 | 45.0 | 59.7 | 775 | 293 |
| 1908 | 65.0 | 19.8 | 46.3 | 59.8 | 775 | 278 |
| 1909 | 73.5 | 20.0 | 47.0 | 59.9 | 775 | 256 |
| 1910 | 73.5 | 20.0 | 44.3 | 65.8 | 800 | 245 |
| 1911 | 72.5 | 19.8 | 47.9 | 64.8 | 825 | 253 |
| 1912 | 57.2 | 21.7 | 50.3 | 79.3 | 825 | 263 |
| 1913 | 62.0 | 21.0 | 46.6 | 87.9 | 925 | 267 |
| 1914 | 49.6 | 22.1 | 46.3 | 74.5 | 965 | 266 |
| 1915 | 55.8 | 29.9 | 60.6 | 120.3 | 1,100 | 432 |
| 1916 | 62.0 | 42.9 | 77.5 | 270.0 | 1,375 | 808 |

Table K.06 (continued)

| Year | (7) | (8) | (9) | (10) | (11) | (12) |
|------|---|--------------------------------------|---|---|-------------------------------|--|
| | Estimated average wage (lire/hour) 1861-1916 | High-grade materials 1861-1916 | Estimated Labor and low-grade materials 1861-1916 | cost indices (1911 = 1.000) Ordinary maintenance 1861-1916 | New buildings 1861-1916 | Other new construction 1861-1916 |
| 1861 | .161 | .944 | .508 | .648 | .787 | .630 |
| 1862 | .166 | .931 | .524 | .654 | .784 | .638 |
| 1863 | .168 | .934 | .530 | .659 | .789 | .643 |
| 1864 | .171 | .961 | .539 | .674 | .809 | .657 |
| 1865 | .176 | .959 | .555 | .684 | .814 | .668 |
| 1866 | .180 | .973 | .568 | .698 | .827 | .681 |
| 1867 | .183 | .907 | .577 | .683 | .788 | .669 |
| 1868 | .187 | .897 | .590 | .688 | .786 | .676 |
| 1869 | .188 | .905 | .593 | .693 | .793 | .680 |
| 1870 | .194 | .898 | .612 | .704 | .795 | .692 |
| 1871 | .199 | .902 | .628 | .716 | .803 | .705 |
| 1872 | .204 | .974 | .644 | .750 | .855 | .736 |
| 1873 | .207 | 1.033 | .653 | .775 | .896 | .759 |
| 1874 | .197 | 1.031 | .621 | .752 | .883 | .736 |
| 1875 | .200 | 1.037 | .631 | .761 | .891 | .745 |
| 1876 | .201 | 1.034 | .634 | .762 | .890 | .746 |
| 1877 | .202 | .969 | .637 | .743 | .849 | .730 |
| 1878 | .203 | .981 | .640 | .749 | .858 | .735 |
| 1879 | .209 | .989 | .659 | .765 | .870 | .751 |
| 1880 | .214 | .990 | .675 | .776 | .877 | .763 |
| 1881 | .220 | .947 | .694 | .775 | .856 | .765 |
| 1882 | .224 | .947 | .707 | .784 | .861 | .774 |
| 1883 | .228 | .956 | .719 | .795 | .871 | .785 |
| 1884 | .233 | .966 | .735 | .809 | .883 | .800 |
| 1885 | .237 | .985 | .748 | .824 | .900 | .814 |
| 1886 | .240 | .966 | .757 | .824 | .891 | .816 |
| 1887 | .243 | .966 | .767 | .831 | .894 | .823 |
| 1888 | .242 | .957 | .763 | .825 | .887 | .817 |
| 1889 | .242 | .938 | .763 | .819 | .875 | .812 |
| 1890 | .242 | .937 | .763 | .819 | .874 | .812 |
| 1891 | .235 | .903 | .741 | .793 | .845 | .786 |
| 1892 | .228 | .872 | .719 | .768 | .817 | .762 |
| 1893 | .221 | .843 | .697 | .744 | .790 | .738 |
| 1894 | .221 | .835 | .697 | .741 | .785 | .736 |
| 1895 | .223 | .831 | .703 | .744 | .785 | .739 |
| 1896 | .226 | .839 | .713 | .753 | .794 | .748 |
| 1897 | .229 | .854 | .722 | .764 | .806 | .759 |
| 1898 | .231 | .858 | .729 | .770 | .812 | .765 |
| 1899 | .231 | .867 | .729 | .773 | .817 | .768 |
| 1900 | .231 | .934 | .729 | .795 | .860 | .786 |
| 1901 | .238 | .889 | .751 | .795 | .839 | .790 |
| 1902 | .242 | .878 | .763 | .800 | .837 | .795 |
| 1903 | .245 | .878 | .773 | .807 | .840 | .802 |
| 1904 | .245 | .888 | .773 | .810 | .847 | .805 |
| 1905 | .247 | .892 | .779 | .815 | .851 | .811 |
| 1906 | .259 | .917 | .817 | .849 | .881 | .845 |
| 1907 | .272 | .954 | .858 | .889 | .919 | .885 |
| 1908 | .294 | .971 | .927 | .941 | .955 | .939 |
| 1909 | .303 | .980 | .956 | .964 | .971 | .963 |
| 1910 | .315 | .984 | .994 | .991 | .988 | .991 |
| 1911 | .317 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| 1912 | .326 | 1.033 | 1.028 | 1.030 | 1.031 | 1.029 |
| 1913 | .333 | 1.070 | 1.050 | 1.056 | 1.063 | 1.056 |
| 1914 | .338 | 1.023 | 1.066 | 1.052 | 1.038 | 1.054 |
| 1915 | .353 | 1.407 | 1.114 | 1.208 | 1.302 | 1.196 |
| 1916 | .397 | 2.278 | 1.252 | 1.580 | 1.909 | 1.539 |

Sources: see text.

Table K.07
Construction-Industry Wages, 1862-1878 (lire/hour)

| Year | (1) | (2) | | (3) | (4) | (5) | (6) | (7) |
|------|---------------------------------|----------------------|----------------------|-----|---------------------------------|----------------------|-------------------|--------------------|
| | Master builders 1862-1878 | Bricklayers | | | Manual laborers 1862-1878 | Navvies 1862-1878 | Boys 1862-1878 | Women 1862-1878 |
| | | class 1 1862-1878 | class 2 1862-1878 | | | | | |
| 1862 | .354 | .242 | .201 | | .145 | .138 | .090 | .076 |
| 1863 | .358 | .245 | .202 | | .146 | .141 | .091 | .077 |
| 1864 | .363 | .249 | .205 | | .148 | .143 | .094 | .078 |
| 1865 | .383 | .256 | .214 | | .153 | .145 | .095 | .081 |
| 1866 | .384 | .261 | .217 | | .157 | .149 | .098 | .083 |
| 1867 | .391 | .264 | .221 | | .159 | .153 | .099 | .085 |
| 1868 | .401 | .269 | .225 | | .163 | .156 | .102 | .086 |
| 1869 | .401 | .271 | .225 | | .163 | .158 | .103 | .087 |
| 1870 | .413 | .281 | .234 | | .168 | .162 | .108 | .090 |
| 1871 | .430 | .289 | .243 | | .173 | .165 | .111 | .094 |
| 1872 | .442 | .294 | .243 | | .177 | .169 | .114 | .096 |
| 1873 | .452 | .299 | .249 | | .180 | .171 | .116 | .099 |
| 1874 | .424 | .294 | .239 | | .172 | .162 | .099 | .084 |
| 1875 | .429 | .297 | .244 | | .174 | .164 | .100 | .085 |
| 1876 | .436 | .298 | .243 | | .175 | .165 | .102 | .086 |
| 1877 | .443 | .299 | .244 | | .175 | .167 | .102 | .086 |
| 1878 | .444 | .299 | .245 | | .176 | .168 | .103 | .086 |

Source: *Salari edilizi 1862-78*.

Table K.08
Construction-Industry Wages in 1906 and 1878, by Province (lire/hour)

| Province | (1) | (2) | (3) | (4) | | (5) | (6) | (7) | (8) |
|---------------|--------------------|---------|----------------------|---------|-----------------------|------|---------|------|-------|
| | Master builders | class 1 | Bricklayers adult | class 2 | Average wages in 1906 | | Navvies | Boys | Women |
| Alessandria | | .402 | .359 | .314 | | | .259 | | |
| Ancona | | .295 | | .267 | | | | .092 | |
| Aquila | .450 | | | | | .300 | .250 | .140 | .140 |
| Arezzo | | | .320 | | | | .190 | | |
| Ascoli Piceno | .450 | .325 | | .275 | | .175 | .150 | .125 | .070 |
| Avellino | | | .435 | | | | .236 | .112 | .112 |
| Bari | | | .307 | | | | .211 | | .134 |
| Belluno | | .388 | | .347 | | | | | |
| Benevento | .545 | .362 | | .318 | | .217 | .232 | | .093 |
| Bergamo | | | .279 | | | | .172 | | |
| Bologna | | | .325 | | | | .336 | | |
| Brescia | | | .378 | | | .136 | | | |
| Cagliari | .374 | | .315 | | | | .222 | | |
| Caltanissetta | | | .368 | | | .212 | .200 | | .147 |
| Campobasso | | | .389 | | | | .278 | .112 | .144 |
| Caserta | .436 | | .335 | | | .190 | .211 | .114 | .098 |
| Catania | | | .314 | | | | .223 | .118 | .118 |
| Catanzaro | | | .380 | | | | .188 | .090 | .090 |
| Chieti | | .466 | | .377 | | .299 | .261 | .134 | .134 |
| Como | | | .355 | | | | | | |
| Cosenza | | | .400 | | | | .275 | .110 | .110 |
| Cremona | | | | | | | .240 | | |
| Cuneo | | | .386 | | | | .211 | | |
| Ferrara | | | .394 | | | | .276 | | |
| Firenze | | | .321 | | | | .233 | | |
| Foggia | | | .263 | | | | .215 | | .132 |
| Forlì | | .446 | | .347 | | | | | .160 |
| Genova | | .466 | .417 | .393 | | | | | |
| Girgenti | | | .351 | | | | .280 | | .137 |
| Grosseto | | | .400 | | | | .280 | | |
| Lecce | | | .390 | | | | .302 | .121 | |
| Livorno | | | .410 | | | | .408 | | |
| Lucca | | | .376 | | | .295 | | | |
| Macerata | | | .278 | | | .163 | | .082 | .082 |
| Mantova | | | .306 | | | .156 | | | |

Table K.08 (continued)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|-----------------|------|------|------|------|------|------|------|------|
| Massa Carrara | | | .330 | | .224 | .210 | .100 | .100 |
| Messina | | .375 | | .247 | .200 | .200 | | .120 |
| Milano | | | .440 | | | .275 | | |
| Modena | | | .309 | | .211 | | | |
| Napoli | | .298 | .400 | .255 | .203 | .160 | .075 | |
| Novara | | | .367 | | | | | |
| Padova | | .350 | | .300 | .210 | .250 | | |
| Palermo | | .370 | | .310 | | .266 | .106 | .143 |
| Parma | | | .340 | | .250 | .240 | | |
| Pavia | | | .390 | | .225 | .310 | | |
| Perugia | | | .277 | | | | | |
| Pesaro Urbino | | .285 | | .238 | .144 | .148 | | |
| Piacenza | | | .377 | | | | | |
| Pisa | .400 | | .275 | | | .253 | | |
| Porto Maurizio | | | .386 | | | | | |
| Potenza | | | .358 | | | .258 | .130 | .122 |
| Ravenna | .475 | | | | | .500 | .320 | .285 |
| Reggio Calabria | | | .493 | | | .251 | .130 | .120 |
| Reggio Emilia | | | .305 | | .184 | .250 | | |
| Roma | .390 | | .479 | | | .355 | | |
| Rovigo | | .322 | .303 | .272 | | .245 | | |
| Salerno | | | .415 | | .277 | .290 | .123 | .121 |
| Sassari | | | .300 | | | .200 | | |
| Siena | | .264 | | .220 | .159 | .157 | | |
| Siracusa | .286 | .294 | .236 | .271 | .151 | .177 | | |
| Sondrio | .500 | | .392 | | | .288 | | |
| Teramo | | | .392 | | | | | |
| Torino | | | .383 | | | .298 | | |
| Trapani | | | .360 | | | .289 | | |
| Treviso | | | .412 | | | .257 | | |
| Udine | | | .346 | | | .245 | | |
| Venezia | .514 | .375 | | .311 | | .247 | | |
| Verona | | | .283 | | | .184 | | |
| Vicenza | .486 | | .333 | | | .192 | | |

Table K.08 (continued)

| Province | (9) | (10) | (11) | (12) Average wages in 1878 | | | (13) | (14) | (15) |
|---------------|--------------------|-------------|---------|----------------------------|---------|------|-------|------|------|
| | Master builders | Bricklayers | | Manual laborers | Navvies | Boys | Women | | |
| | | class 1 | class 2 | | | | | | |
| Alessandria | | .345 | .305 | | .230 | | | | |
| Ancona | | .250 | .210 | | | .090 | | | |
| Aquila | .300 | | | .150 | .150 | .100 | | .100 | |
| Arezzo | | .350 | .275 | | .162 | | | | |
| Ascoli Piceno | .300 | .200 | .150 | .090 | .090 | .065 | | .065 | |
| Avellino | | .270 | .210 | | .130 | .065 | | .060 | |
| Bari | | .245 | .210 | | .135 | | | .102 | |
| Belluno | | .291 | .243 | | | | | | |
| Benevento | .251 | .201 | .181 | .121 | .126 | | | .061 | |
| Bergamo | | .250 | .190 | | .150 | | | | |
| Bologna | | .279 | .244 | | .144 | | | | |
| Brescia | | .333 | .278 | .167 | | | | | |
| Cagliari | .500 | .350 | .250 | | .200 | | | | |
| Caltanissetta | | .276 | .229 | .143 | .114 | | | | |
| Campobasso | | .291 | .191 | | .151 | .086 | | .086 | |
| Caserta | .500 | .280 | .220 | .150 | .140 | .070 | | .080 | |
| Catania | | .302 | .252 | | .217 | .112 | | .080 | |
| Catanzaro | | .300 | .250 | | .140 | .080 | | .080 | |
| Chieti | | .350 | .270 | .185 | .157 | .095 | | .078 | |
| Como | | .250 | .160 | | | | | | |
| Cosenza | | .255 | .220 | | .150 | .083 | | .073 | |
| Cremona | | | | | .130 | | | | |
| Cuneo | | .406 | .320 | | .200 | | | | |
| Ferrara | | .330 | .220 | | .220 | | | | |
| Firenze | | .293 | .228 | | .143 | | | | |
| Foggia | | .325 | .275 | | .180 | | | .125 | |
| Forlì | | .500 | .238 | | | | | | |
| Genova | | .350 | .250 | | | | | | |
| Girgenti | | .365 | .265 | | .215 | | | .083 | |
| Grosseto | | .300 | .280 | | .250 | | | | |
| Lecce | | .275 | .215 | | .140 | .095 | | | |
| Livorno | | .320 | .280 | | .180 | | | | |
| Lucca | | .270 | .240 | .150 | | | | | |
| Macerata | | .260 | .220 | .120 | | .070 | | .068 | |
| Mantova | | .275 | .200 | .140 | | | | | |

Table K.08 (continued)

| | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
|-----------------|------|------|------|------|------|------|------|
| Massa Carrara | | .300 | .250 | .150 | .140 | .110 | .070 |
| Messina | | .400 | .300 | .250 | .180 | | .100 |
| Milano | | .375 | .300 | | .250 | | |
| Modena | | .220 | .180 | .130 | | | |
| Napoli | | .230 | .180 | .150 | .200 | .090 | |
| Novara | | .300 | .250 | | | | |
| Padova | | .375 | .312 | .210 | .162 | | |
| Palermo | | .350 | .300 | | .200 | .150 | .150 |
| Parma | | .230 | .220 | .140 | .160 | | |
| Pavia | | .334 | .268 | .223 | .260 | | |
| Perugia | | .240 | .210 | | | | |
| Pesaro Urbino | | .250 | .200 | .130 | .120 | | |
| Piacenza | | .300 | .200 | | | | |
| Pisa | .450 | .300 | .250 | | .200 | | |
| Porto Maurizio | | .322 | .281 | | | | |
| Potenza | | .320 | .280 | | .195 | .098 | .088 |
| Ravenna | .400 | | | | .150 | .098 | .090 |
| Reggio Calabria | | .290 | .250 | | .150 | .065 | .090 |
| Reggio Emilia | | .250 | .200 | .150 | .150 | | |
| Roma | .500 | .300 | .275 | | .150 | | |
| Rovigo | | .375 | .300 | | .250 | | |
| Salerno | | .240 | .180 | .150 | .142 | .097 | .080 |
| Sassari | | .352 | .302 | | .205 | | |
| Siena | | .300 | .250 | .150 | .125 | | |
| Siracusa | .400 | .255 | .190 | .160 | .120 | | |
| Sondrio | .370 | .300 | .250 | | .190 | | |
| Teramo | | .300 | .222 | | | | |
| Torino | | .350 | .300 | | .180 | | |
| Trapani | | .398 | .298 | | .302 | | |
| Treviso | | .333 | .278 | | .139 | | |
| Udine | | .350 | .300 | | .160 | | |
| Venezia | .425 | .297 | .212 | | .170 | | |
| Verona | | .300 | .275 | | .200 | | |
| Vicenza | .400 | .250 | .250 | | | | |

Sources: cols. 1 - 8: *Salari edilizi 1906.*
 cols. 9 - 15: *Salari edilizi 1862-78.*

Table K.09
Construction-Industry Wages in 1906 and 1878: National Averages (lire/hour)

| Category | (1) | (2) | (3) | (4) |
|---------------------|--|--------------------------|--|---|
| | Average in the sample covering both 1906 and 1878 | | Reported national average in 1878 | Estimated national average in 1906 |
| | 1906 wage | 1878 wage | | |
| Master builders | .442 | .400 | .444 | .466 |
| Class 1 bricklayers | .358 | .313 | .299 | .363 |
| Adult bricklayers | .356 | .301 - .245 ^a | | |
| Class 2 bricklayers | .298 | .241 | .245 | .306 |
| Manual laborers | .208 | .155 | .176 | .222 |
| Navvies | .248 | .172 | .168 | .245 |
| Boys | .123 | .090 | .103 | .132 |
| Women | .124 | .086 | .086 | .124 |

^aclass 1 bricklayers and class 2 bricklayers, respectively.

Sources: cols. 1 - 2: Table K.08.
col. 3: Table K.07.
col. 4: see text.

Table K.10
Estimated Railway Construction, 1861-1913^a

| Year | (1) | (2) | (3) | | (4) | | (5) | | (6) | | (7) | (8) |
|------|------------------------------|--------------------------------|---|--------------------|-----------------------|--------------------|-----------------------|--------------------|--|---|-----------------------|--------------------|
| | All railways 1861-1917 | Minor railways 1861-1917 | Estimated network extensions completed (kilometers) | | Machine tramways | | Horse tramways | | Estimated horse tramways converted (kilometers) | | Suburban 1861-1915 | Urban 1861-1915 |
| | | | Suburban 1861-1915 | Urban 1861-1915 | Suburban 1861-1915 | Urban 1861-1915 | Suburban 1861-1915 | Urban 1861-1915 | | | | |
| 1861 | 368 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1862 | 332 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1863 | 610 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1864 | 440 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1865 | 381 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1866 | 705 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1867 | 194 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1868 | 370 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1869 | 190 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1870 | 295 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1871 | 217 | 62 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1872 | 339 | 101 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 1873 | 120 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| 1874 | 482 | 47 | 0 | 0 | 6 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1875 | 309 | 0 | 0 | 0 | 10 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1876 | 255 | 21 | 0 | 0 | 20 | 13 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1877 | 236 | 0 | 0 | 0 | 25 | 15 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1878 | 91 | 32 | 36 | 0 | 10 | 16 | 9 | 0 | 0 | 0 | 0 | 0 |
| 1879 | 121 | 76 | 185 | 0 | 6 | 17 | 18 | 0 | 0 | 0 | 0 | 0 |
| 1880 | 391 | 159 | 332 | 0 | 6 | 18 | 10 | 0 | 0 | 0 | 0 | 0 |
| 1881 | 176 | 23 | 401 | 0 | 6 | 19 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1882 | 255 | 0 | 346 | 0 | 6 | 19 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1883 | 395 | 113 | 280 | 0 | 6 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1884 | 463 | 169 | 190 | 0 | 5 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1885 | 416 | 115 | 61 | 0 | 5 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1886 | 815 | 264 | 228 | 0 | 5 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1887 | 423 | 163 | 25 | 0 | 5 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1888 | 763 | 407 | 71 | 0 | 5 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1889 | 459 | 216 | 81 | 0 | 5 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |

Table K.10 (continued)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|------|-----|-----|-----|-----|-----|-----|-----|-----|
| 1890 | 102 | 29 | 221 | 0 | 5 | 20 | 0 | 0 |
| 1891 | 305 | 93 | 39 | 0 | 5 | 20 | 0 | 0 |
| 1892 | 523 | 11 | 49 | 0 | 5 | 20 | 0 | 0 |
| 1893 | 518 | 188 | 146 | 4 | 5 | 20 | 0 | 4 |
| 1894 | 439 | 168 | 61 | 0 | 5 | 18 | 0 | 0 |
| 1895 | 475 | 120 | 17 | 8 | 5 | 16 | 7 | 7 |
| 1896 | 19 | 1 | 10 | 5 | 5 | 13 | 0 | 5 |
| 1897 | 194 | 34 | 60 | 27 | 5 | 10 | 14 | 25 |
| 1898 | 93 | 26 | 87 | 73 | 5 | 7 | 14 | 67 |
| 1899 | 7 | 0 | 41 | 49 | 4 | 4 | 6 | 45 |
| 1900 | 63 | 43 | 128 | 35 | 2 | 2 | 24 | 32 |
| 1901 | 24 | 24 | 132 | 30 | 0 | 0 | 6 | 28 |
| 1902 | 129 | 59 | 54 | 18 | 0 | 0 | 4 | 17 |
| 1903 | 99 | 97 | 47 | 9 | 0 | 0 | 10 | 8 |
| 1904 | 77 | 77 | 42 | 42 | 0 | 0 | 4 | 39 |
| 1905 | 231 | 63 | 8 | 21 | 0 | 0 | 0 | 19 |
| 1906 | 127 | 91 | 130 | 18 | 0 | 0 | 18 | 17 |
| 1907 | 219 | 93 | 76 | 30 | 0 | 0 | 8 | 27 |
| 1908 | 120 | 120 | 31 | 36 | 0 | 0 | 8 | 17 |
| 1909 | 93 | 82 | 85 | 25 | 0 | 0 | 8 | 17 |
| 1910 | 173 | 141 | 177 | 47 | 0 | 0 | 4 | 20 |
| 1911 | 262 | 248 | 207 | 27 | 0 | 0 | 4 | 2 |
| 1912 | 305 | 193 | 113 | 44 | 0 | 0 | 4 | 26 |
| 1913 | 293 | 192 | 75 | 26 | 0 | 0 | 2 | 8 |
| 1914 | 228 | 150 | 140 | 30 | 0 | 0 | 0 | 0 |
| 1915 | 589 | 489 | 57 | 17 | 0 | 0 | 0 | 0 |
| 1916 | 384 | 341 | | | | | | |
| 1917 | 97 | 71 | | | | | | |

Table K.10 (continued)

| Year | Estimated construction for network extensions (equivalent kilometers completed) | | | | | | Estimated rail consumption (thousand tons) | | | | |
|------|---|-----------------------------|------------------|---|----------------|----|--|-------|-----------------------------|-------------------------------------|---|
| | (9) | (10) | (11) | | (12) | | (13) | (14) | (15) | (16) | (17) |
| | Major railways 1861-1913 | Minor railways 1861-1913 | Machine tramways | | Horse tramways | | Suburban | Urban | Apparent total 1861-1915 | For network extensions 1861-1915 | For renovations and improvements 1861-1913 |
| 1861 | 425 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 29 | 0 | |
| 1862 | 476 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 27 | 0 | |
| 1863 | 484 | 1 | 0 | 0 | 0 | 0 | 0 | 27 | 49 | 0 | |
| 1864 | 432 | 5 | 0 | 0 | 0 | 0 | 0 | 24 | 35 | 0 | |
| 1865 | 409 | 10 | 0 | 0 | 0 | 0 | 0 | 22 | 30 | 0 | |
| 1866 | 352 | 8 | 0 | 0 | 0 | 0 | 0 | 16 | 56 | 0 | |
| 1867 | 253 | 8 | 0 | 0 | 0 | 0 | 0 | 11 | 16 | 0 | |
| 1868 | 249 | 8 | 0 | 0 | 0 | 0 | 0 | 6 | 29 | 0 | |
| 1869 | 214 | 12 | 0 | 0 | 0 | 0 | 0 | 20 | 15 | 0 | |
| 1870 | 223 | 46 | 0 | 0 | 0 | 0 | 0 | 27 | 24 | 0 | |
| 1871 | 229 | 72 | 0 | 0 | 0 | 1 | 1 | 15 | 16 | 0 | |
| 1872 | 259 | 42 | 0 | 0 | 0 | 3 | 3 | 23 | 25 | 0 | |
| 1873 | 285 | 24 | 0 | 0 | 2 | 5 | 5 | 26 | 10 | 8 | |
| 1874 | 289 | 20 | 0 | 0 | 7 | 8 | 8 | 49 | 38 | 14 | |
| 1875 | 209 | 11 | 0 | 0 | 13 | 11 | 11 | 52 | 26 | 23 | |
| 1876 | 164 | 12 | 0 | 0 | 21 | 14 | 14 | 39 | 22 | 31 | |
| 1877 | 132 | 27 | 9 | 0 | 21 | 15 | 15 | 56 | 22 | 27 | |
| 1878 | 125 | 73 | 73 | 0 | 9 | 16 | 16 | 36 | 10 | 24 | |
| 1879 | 179 | 110 | 222 | 0 | 6 | 17 | 17 | 55 | 19 | 17 | |
| 1880 | 227 | 67 | 349 | 0 | 6 | 18 | 18 | 58 | 45 | 22 | |
| 1881 | 248 | 25 | 387 | 0 | 6 | 19 | 19 | 73 | 35 | 48 | |
| 1882 | 303 | 82 | 330 | 0 | 6 | 19 | 19 | 133 | 39 | 66 | |
| 1883 | 331 | 141 | 258 | 0 | 6 | 20 | 20 | 119 | 45 | 75 | |
| 1884 | 355 | 156 | 158 | 0 | 5 | 20 | 20 | 99 | 44 | 56 | |
| 1885 | 371 | 197 | 103 | 0 | 5 | 20 | 20 | 103 | 36 | 43 | |
| 1886 | 331 | 235 | 177 | 0 | 5 | 20 | 20 | 67 | 72 | 38 | |
| 1887 | 251 | 293 | 37 | 0 | 5 | 20 | 20 | 107 | 33 | 50 | |
| 1888 | 246 | 255 | 74 | 0 | 5 | 20 | 20 | 104 | 57 | 71 | |
| 1889 | 235 | 104 | 116 | 0 | 5 | 20 | 20 | 116 | 38 | 70 | |

Table K.10 (continued)

| Year | (18) | (19) | (20) Estimated value added at 1911 prices (million lire) | | | | | (24) |
|------|-----------------------|-----------------------|--|--|-----------------------|-----------------------|--------------------|------|
| | Network extensions | | Renovations, improvements 1861-1913 | Total new construction 1861-1913 | Ordinary maintenance | | Total 1861-1913 | |
| | Railways 1861-1913 | Tramways 1861-1913 | | | Railways 1861-1913 | Tramways 1861-1913 | | |
| 1861 | 100.7 | .0 | .0 | 100.7 | 2.3 | .0 | 2.3 | |
| 1862 | 112.8 | .0 | .0 | 112.8 | 2.6 | .0 | 2.6 | |
| 1863 | 114.8 | .0 | .0 | 114.8 | 3.1 | .0 | 3.1 | |
| 1864 | 102.8 | .0 | .0 | 102.8 | 3.6 | .0 | 3.6 | |
| 1865 | 97.9 | .0 | .0 | 97.9 | 4.0 | .0 | 4.0 | |
| 1866 | 84.2 | .0 | .0 | 84.2 | 4.6 | .0 | 4.6 | |
| 1867 | 60.7 | .0 | .0 | 60.7 | 4.7 | .0 | 4.7 | |
| 1868 | 59.8 | .0 | .0 | 59.8 | 5.2 | .0 | 5.2 | |
| 1869 | 51.8 | .0 | .0 | 51.8 | 5.7 | .0 | 5.7 | |
| 1870 | 57.1 | .0 | .0 | 57.1 | 6.2 | .0 | 6.2 | |
| 1871 | 61.0 | .1 | .0 | 61.1 | 6.8 | .0 | 6.8 | |
| 1872 | 65.3 | .2 | .0 | 65.5 | 7.6 | .0 | 7.6 | |
| 1873 | 69.8 | .3 | 2.8 | 72.9 | 8.4 | .0 | 8.4 | |
| 1874 | 70.4 | .6 | 4.9 | 75.9 | 8.6 | .0 | 8.6 | |
| 1875 | 50.6 | .9 | 8.0 | 59.5 | 9.0 | .0 | 9.0 | |
| 1876 | 40.0 | 1.3 | 10.8 | 52.1 | 9.6 | .1 | 9.7 | |
| 1877 | 33.8 | 1.6 | 9.4 | 44.8 | 9.9 | .1 | 10.0 | |
| 1878 | 36.4 | 3.2 | 8.4 | 48.0 | 10.0 | .1 | 10.1 | |
| 1879 | 52.7 | 7.5 | 5.9 | 66.1 | 10.4 | .2 | 10.6 | |
| 1880 | 60.0 | 11.2 | 7.7 | 78.9 | 11.4 | .3 | 11.7 | |
| 1881 | 61.1 | 12.4 | 16.8 | 90.3 | 11.9 | .5 | 12.4 | |
| 1882 | 79.4 | 10.7 | 23.0 | 113.1 | 12.5 | .7 | 13.2 | |
| 1883 | 91.6 | 8.7 | 26.2 | 126.5 | 13.3 | .9 | 14.2 | |
| 1884 | 98.6 | 5.7 | 19.5 | 123.8 | 14.3 | 1.0 | 15.3 | |
| 1885 | 106.2 | 4.2 | 15.0 | 125.4 | 14.5 | 1.1 | 15.6 | |
| 1886 | 100.3 | 6.3 | 13.3 | 119.9 | 15.3 | 1.2 | 16.5 | |
| 1887 | 86.7 | 2.2 | 17.5 | 106.4 | 16.2 | 1.4 | 17.6 | |
| 1888 | 82.0 | 3.3 | 24.8 | 110.1 | 17.7 | 1.4 | 19.1 | |
| 1889 | 65.4 | 4.5 | 24.4 | 94.3 | 18.3 | 1.5 | 19.8 | |

Table K.10 (continued)

| | (18) | (19) | (20) | (21) | (22) | (23) | (24) |
|------|------|------|------|------|------|------|------|
| 1890 | 70.1 | 6.3 | 17.5 | 93.9 | 18.4 | 1.7 | 20.1 |
| 1891 | 89.1 | 2.4 | 5.6 | 97.1 | 18.2 | 1.8 | 20.0 |
| 1892 | 91.3 | 3.3 | 1.4 | 96.0 | 18.3 | 1.9 | 20.2 |
| 1893 | 76.1 | 4.9 | .0 | 81.0 | 19.0 | 2.0 | 21.0 |
| 1894 | 83.1 | 2.6 | 2.8 | 88.5 | 19.3 | 2.1 | 21.4 |
| 1895 | 36.5 | 1.7 | 1.0 | 39.2 | 19.4 | 2.2 | 21.6 |
| 1896 | 18.5 | 2.0 | 2.4 | 22.9 | 20.0 | 2.3 | 22.3 |
| 1897 | 17.0 | 4.5 | 3.1 | 24.6 | 20.8 | 2.3 | 23.1 |
| 1898 | 8.1 | 6.1 | 5.2 | 19.4 | 21.2 | 2.4 | 23.6 |
| 1899 | 6.8 | 4.5 | 7.0 | 18.3 | 22.1 | 2.5 | 24.6 |
| 1900 | 8.3 | 5.6 | 9.4 | 23.3 | 22.7 | 2.5 | 25.2 |
| 1901 | 13.1 | 4.7 | 9.4 | 27.2 | 23.2 | 2.6 | 25.8 |
| 1902 | 18.4 | 2.3 | 11.5 | 32.2 | 24.2 | 2.7 | 26.9 |
| 1903 | 20.7 | 2.2 | 8.0 | 30.9 | 25.0 | 2.8 | 27.8 |
| 1904 | 25.4 | 2.9 | 9.1 | 37.4 | 26.3 | 2.8 | 29.1 |
| 1905 | 26.3 | 2.2 | 10.8 | 39.3 | 26.8 | 2.9 | 29.7 |
| 1906 | 20.8 | 4.5 | 19.5 | 44.8 | 28.7 | 2.9 | 31.6 |
| 1907 | 18.8 | 3.5 | 26.5 | 48.8 | 29.0 | 3.0 | 32.0 |
| 1908 | 14.9 | 3.0 | 33.2 | 51.1 | 31.0 | 3.1 | 34.1 |
| 1909 | 22.4 | 4.7 | 35.2 | 62.3 | 32.3 | 3.1 | 35.4 |
| 1910 | 33.0 | 7.5 | 35.2 | 75.7 | 33.9 | 3.3 | 37.2 |
| 1911 | 38.9 | 6.9 | 34.9 | 80.7 | 35.1 | 3.5 | 38.6 |
| 1912 | 39.3 | 5.1 | 38.7 | 83.1 | 36.4 | 3.7 | 40.1 |
| 1913 | 38.8 | 4.0 | 38.4 | 81.2 | 37.9 | 3.8 | 41.7 |
| 1914 | | | | | | | |
| 1915 | | | | | | | |
| 1916 | | | | | | | |
| 1917 | | | | | | | |

Table K.10 (continued)

^aincludes tramway construction. Cols. 1 - 2, 9 - 10, 18, and 22 refer to railways excluding tramways; the narrow-gauge Sicilian railways are considered minor railways rather than tramways. Total new construction (col. 21) includes renovations and improvements.

Sources: col. 1: 1861-1900, 1902-1903: *Relazione S.F.I.*; 1901: *Relazione S.F.C.*; 1904-1917: see text.
col. 2: 1861-1909: *Relazione S.F.C.*; 1910-1917: see text.
cols. 3 - 4: 1861-1909: *Relazione tramvie*; 1910-1915: see text.
cols. 5 - 14, 17, 22 - 23: see text.
col. 15: 1861-1913: Table E.02, col. 9 + Table E.03, col. 6; 1914-1915: *Movimento commerciale, Rivista mineraria*.
col. 16: $.080(\text{col. 1} - \text{col. 2}) + .056(\text{col. 2}) + .048(\text{col. 3}) + .168(\text{col. 4}) + .048(\text{col. 5}) + .100(\text{col. 6})$.
col. 18: $.237(\text{col. 9}) + .093(\text{col. 10})$.
col. 19: $.029(\text{col. 11} + \text{col. 13}) + .051(\text{col. 12} + \text{col. 14})$.
col. 20: $.349(\text{col. 17})$.
col. 21: $\text{col. 18} + \text{col. 19} + \text{col. 20}$.
col. 24: $\text{col. 22} + \text{col. 23}$.

Table K.11
Construction Data for Nine Major Cities, 1870-1891^a

| Year | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|------|------------------------------|-------------------------------|--|-----------------------------------|---|------------------------------|--|--------------------------|-----------------------------------|
| | Houses built 1873-1890 | Houses raised 1873-1890 | Bologna Permits to renovate 1882-1890 | Houses demolished 1883-1890 | Catania Houses built 1882-1887 | Houses built 1882-1891 | Firenze Houses raised 1882-1891 | Renovations 1882-1891 | Houses demolished 1882-1891 |
| 1870 | | | | | | | | | |
| 1871 | | | | | | | | | |
| 1872 | | | | | | | | | |
| 1873 | 4 | 18 | | | | | | | |
| 1874 | 8 | 13 | | | | | | | |
| 1875 | 2 | 17 | | | | | | | |
| 1876 | 5 | 17 | | | | | | | |
| 1877 | 4 | 20 | | | | | | | |
| 1878 | 5 | 19 | | | | | | | |
| 1879 | 7 | 30 | | | | | | | |
| 1880 | 14 | 31 | | | | | | | |
| 1881 | 12 | 28 | | | | | | | |
| 1882 | 5 | 26 | 116 | | 98 | 6 | 12 | 675 | 0 |
| 1883 | 3 | 14 | 132 | 1 | 150 | 33 | 24 | 795 | 1 |
| 1884 | 12 | 36 | 129 | 3 | 276 | 68 | 37 | 822 | 3 |
| 1885 | 16 | 30 | 190 | 3 | 375 | 83 | 65 | 863 | 0 |
| 1886 | 12 | 40 | 132 | 13 | 150 | 86 | 90 | 589 | 3 |
| 1887 | 20 | 39 | 141 | 4 | 107 | 90 | 61 | 705 | 2 |
| 1888 | 11 | 44 | 143 | 5 | | 70 | 44 | 607 | 3 |
| 1889 | 4 | 27 | 130 | 3 | | 77 | 52 | 343 | 15 |
| 1890 | 6 | 25 | 129 | 2 | | 99 | 44 | 447 | 27 |
| 1891 | | | | | | 93 | 53 | 505 | 8 |

Table K.11 (continued)

| Year | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
|------|------------------------------|----------------------------------|-----------------------------------|---|------------------------------|----------------------------------|-----------------------------------|
| | Houses built 1881-1891 | Permits to raise 1881-1891 | Permits to add on 1881-1891 | Permits to redo facades 1881-1891 | Houses built 1881-1891 | Permits to raise 1881-1891 | Houses demolished 1881-1891 |
| 1870 | | | | | | | |
| 1871 | | | | | | | |
| 1872 | | | | | | | |
| 1873 | | | | | | | |
| 1874 | | | | | | | |
| 1875 | | | | | | | |
| 1876 | | | | | | | |
| 1877 | | | | | | | |
| 1878 | | | | | | | |
| 1879 | | | | | | | |
| 1880 | | | | | | | |
| 1881 | 19 | 12 | 7 | 15 | 38 | 7 | 11 |
| 1882 | 19 | 13 | 3 | 8 | 23 | 14 | 15 |
| 1883 | 15 | 12 | 3 | 8 | 59 | 17 | 30 |
| 1884 | 28 | 11 | 3 | 15 | 41 | 14 | 12 |
| 1885 | 27 | 19 | 9 | 6 | 19 | 30 | 24 |
| 1886 | 27 | 26 | 4 | 9 | 33 | 4 | 15 |
| 1887 | 55 | 22 | 6 | 19 | 47 | 1 | 17 |
| 1888 | 27 | 11 | 4 | 17 | 23 | 1 | 38 |
| 1889 | 32 | 9 | 2 | 14 | 75 | 24 | 37 |
| 1890 | 47 | 13 | 5 | 13 | 36 | 18 | 11 |
| 1891 | 61 | 12 | 3 | 15 | 31 | 16 | 8 |

Table K.11 (continued)

| Year | (17) | (18) | (19) | (20) | (21) | (22) | (23) |
|------|------------------------------|--|-----------------------------------|------------------------------|---|----------------------------------|-----------------------------------|
| | Houses built 1881-1891 | Milano (total) Permits to raise 1881-1891 | Houses demolished 1881-1891 | Houses built 1882-1890 | Palermo Permits to raise 1882-1890 | Houses renovated 1882-1890 | Houses demolished 1882-1890 |
| 1870 | | | | | | | |
| 1871 | | | | | | | |
| 1872 | | | | | | | |
| 1873 | | | | | | | |
| 1874 | | | | | | | |
| 1875 | | | | | | | |
| 1876 | | | | | | | |
| 1877 | | | | | | | |
| 1878 | | | | | | | |
| 1879 | | | | | | | |
| 1880 | | | | | | | |
| 1881 | 95 | 19 | 14 | | | | |
| 1882 | 100 | 37 | 19 | 90 | 186 | 179 | 16 |
| 1883 | 153 | 43 | 46 | 81 | 152 | 137 | 5 |
| 1884 | 194 | 35 | 26 | 66 | 106 | 134 | 18 |
| 1885 | 131 | 61 | 24 | 71 | 79 | 102 | 2 |
| 1886 | 103 | 10 | 18 | 108 | 110 | 138 | 9 |
| 1887 | 156 | 9 | 24 | 92 | 101 | 110 | 9 |
| 1888 | 75 | 4 | 39 | 70 | 93 | 79 | 12 |
| 1889 | 324 | 43 | 56 | 81 | 66 | 103 | 15 |
| 1890 | 184 | 31 | 19 | 212 | 55 | 115 | 18 |
| 1891 | 129 | 29 | 14 | | | | |

Table K.11 (continued)

| Year | (24) | (25) | (26) | (27) | (28) |
|------|------------------------------|-------------------------------|------------------------------|--|--|
| | Houses built 1870-1891 | Houses raised 1870-1891 | Houses built 1881-1891 | Raisings and additions 1881-1891 | Houses built or restored 1881-1890 |
| 1870 | 23 | 44 | | | |
| 1871 | 18 | 40 | | | |
| 1872 | 33 | 84 | | | |
| 1873 | 142 | 96 | | | |
| 1874 | 132 | 85 | | | |
| 1875 | 161 | 58 | | | |
| 1876 | 199 | 62 | | | |
| 1877 | 169 | 25 | | | |
| 1878 | 169 | 50 | | | |
| 1879 | 181 | 18 | | | |
| 1880 | 169 | 25 | | | |
| 1881 | 135 | 11 | 120 | 102 | 1 |
| 1882 | 164 | 11 | 105 | 108 | 0 |
| 1883 | 194 | 47 | 92 | 105 | 12 |
| 1884 | 135 | 33 | 74 | 97 | 15 |
| 1885 | 224 | 38 | 118 | 146 | 5 |
| 1886 | 219 | 26 | 120 | 130 | 2 |
| 1887 | 238 | 38 | 135 | 73 | 6 |
| 1888 | 148 | 33 | 104 | 91 | 1 |
| 1889 | 120 | 26 | 100 | 107 | 8 |
| 1890 | 135 | 32 | 94 | 61 | 12 |
| 1891 | 106 | 8 | 57 | 58 | |

^athe figures for 1870 cover October-December only.

Source: *Notizie città 1891*.

Table K.12
Construction Estimates for Nine Major Cities, 1871-1891
(equivalent houses built)

| Year | (1) Bologna 1873-1890 | (2) Catania 1882-1887 | (3) Firenze 1882-1891 | (4) Genova 1881-1891 | (5) Milano 1881-1891 | (6) Palermo 1882-1889 | (7) Roma 1871-1891 | (8) Torino 1881-1891 | (9) Venezia 1881-1890 | (10) Subtotal ^a 1881-1891 | (11) Total 1881-1891 |
|------|-----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|-----------------------------|--------------------------|----------------------------|-----------------------------|--|----------------------------|
| 1871 | | | | | | | 26 | | | | |
| 1872 | | | | | | | 50 | | | | |
| 1873 | 18 | | | | | | 161 | | | | |
| 1874 | 21 | | | | | | 149 | | | | |
| 1875 | 16 | | | | | | 173 | | | | |
| 1876 | 19 | | | | | | 211 | | | | |
| 1877 | 18 | | | | | | 174 | | | | |
| 1878 | 19 | | | | | | 179 | | | | |
| 1879 | 23 | | | | | | 185 | | | | |
| 1880 | 30 | | | | | | 174 | | | | |
| 1881 | 28 | | | 24 | 100 | | 137 | 140 | 1 | 630 | 767 |
| 1882 | 22 | 98 | 76 | 22 | 109 | 147 | 166 | 127 | 0 | 601 | 767 |
| 1883 | 19 | 150 | 118 | 18 | 166 | 126 | 203 | 113 | 6 | 716 | 919 |
| 1884 | 32 | 276 | 158 | 32 | 227 | 102 | 142 | 93 | 8 | 928 | 1,070 |
| 1885 | 41 | 375 | 182 | 33 | 146 | 97 | 232 | 147 | 3 | 1,024 | 1,256 |
| 1886 | 35 | 150 | 163 | 33 | 107 | 145 | 224 | 146 | 1 | 780 | 1,004 |
| 1887 | 42 | 107 | 173 | 62 | 160 | 124 | 246 | 150 | 1 | 819 | 1,065 |
| 1888 | 35 | | 140 | 31 | 80 | 98 | 155 | 122 | 4 | 587 | 742 |
| 1889 | 23 | | 123 | 35 | 338 | 106 | 125 | 121 | 6 | 865 | 990 |
| 1890 | 24 | | 155 | 51 | 192 | | 141 | 106 | 0 | 708 | 849 |
| 1891 | | | 155 | 65 | 136 | | 108 | 69 | | 595 | 703 |

^atotal excluding Roma.

Sources: see text.

Table K.13
Construction Data for a Broad Sample of Municipalities, 1904-1909
(rooms built or converted)

| Municipality | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---------------|-------------|--------------------|-------------|-------|-------------|-------|-------------|
| | 1904 | Other ^a | 1906 | | 1908 | | 1909 |
| | Residential | | Residential | Other | Residential | Other | Residential |
| Alessandria | 54 | 20 | 140 | | 300 | 30 | |
| Ancona | 665 | 105 | 400 | 50 | 450 | 45 | |
| Andria | 76 | 4 | 120 | | 135 | 2 | |
| Asti | 85 | | 270 | | 290 | 40 | 355 |
| Bari | 198 | 95 | | | | | 720 |
| Biella | 250 | 50 | | | 135 | 18 | |
| Bologna | 205 | | | 246 | 2,591 | 37 | 2,263 |
| Brescia | | | 504 | 36 | 690 | 47 | 1,311 |
| Brindisi | 419 | 185 | 229 | 9 | 285 | 11 | 299 |
| Busto Arsizio | | | 230 | 50 | 400 | 60 | 669 |
| Cagliari | | | 320 | | 240 | | 143 |
| Caltagirone | | | 100 | | | | 120 |
| Cesena | 88 | 5 | | 5 | | | 364 |
| Chioggia | 85 | | 168 | | 256 | 26 | 208 |
| Como | | | 214 | 30 | 313 | 7 | 680 |
| Corato | 236 | 16 | | | | | 218 |
| Cuneo | 121 | 26 | | | 242 | 20 | |
| Faenza | 86 | 19 | 35 | | | | 309 |
| Ferrara | 204 | 37 | | | | | 162 |
| Firenze | 1,428 | 40 | 2,154 | | 2,584 | 54 | 3,547 |
| Genova | 7,350 | 150 | | | | | 9,727 |
| Grosseto | 23 | | | 3 | 120 | | 74 |
| Jesi | 25 | 15 | 77 | 10 | | | |
| Lodi | 150 | | 300 | | | | 180 |
| Lucca | 166 | 48 | 200 | 3 | 150 | | 690 |
| Mantova | | 20 | 45 | | | | 208 |
| Milano | 5,011 | | 12,860 | 1,656 | 11,718 | 6,249 | 14,843 |
| Modena | 240 | | | | | | 2,840 |
| Monza | 1,400 | 100 | 1,150 | 96 | 1,720 | 80 | |
| Napoli | 930 | 90 | | | | | 2,485 |

Table K.13 (continued)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|------------------|-------|-----|-------|-----|-------|-----|--------|
| Novara | 603 | 12 | 211 | 39 | 650 | 120 | 650 |
| Padova | 468 | 28 | | | 940 | | 1,286 |
| Pavia | 47 | 68 | | | | | 240 |
| Pesaro | 91 | | 140 | | 493 | | 240 |
| Pinerolo | 42 | | | | | | 120 |
| Pisa | 338 | 2 | | | | | 343 |
| Prato | 198 | | 758 | | 559 | | 743 |
| Ragusa | 316 | 26 | | | 250 | | |
| Ravenna | 285 | 6 | | | 796 | 150 | 677 |
| Reggio Emilia | 432 | 120 | | | 400 | 150 | |
| Rimini | 238 | 2 | | | 1,000 | | |
| Roma | 4,148 | 68 | 6,981 | | 6,816 | 450 | 6,809 |
| Salerno | 255 | | | | 86 | | 80 |
| San Pier d'Arena | | | 920 | 6 | 950 | 11 | 2,250 |
| San Remo | 315 | | 399 | 10 | | | 361 |
| Sassari | 23 | | | | 240 | 3 | 321 |
| Savona | 406 | 4 | 1,050 | | 850 | | 1,992 |
| Sestri Ponente | | | 240 | 15 | 400 | 14 | 618 |
| Siena | | | 160 | 6 | 325 | | 119 |
| Spezia | | | 678 | 22 | 399 | | 770 |
| Taranto | 40 | 8 | | | | | 232 |
| Torino | | | | | 7,789 | | 11,572 |
| Torre del Greco | 18 | 10 | | | | | 3 |
| Treviso | | | 710 | | | | 1,034 |
| Venezia | | | 1,074 | | 1,213 | | 1,352 |
| Vercelli | | | 115 | 6 | 110 | 5 | 320 |

^afor Milano, included in col. 1.

Source: *Annuario città*.

Table K.14
Construction Data for Bologna, 1894-1913

| Year | (1) | (2) | (3) Board of health data | | | (4) | (5) | (6) | (7) Planning commission data: petitions received (1907, 1910-13) or permits granted (1906, 1908-09) | | | (8) | (9) | (10) |
|------|-------------------------------|-------------------------------------|--------------------------|-------------------------------|-------------------------------------|-----|--------------------|-------------------------------|---|--|-----------------------------------|-----|-----|------|
| | Plans submitted | | Total 1907-1909 | Occupancy permits granted | | | Total 1894-1905 | New buildings 1906-1913 | Raised buildings 1906-1913 | Additions, renovations 1910-1913 | Occupancy permits 1907-1913 | | | |
| | New buildings 1909-1913 | Renovated buildings 1909-1913 | | New buildings 1899-1913 | Renovated buildings 1899-1913 | | | | | | | | | |
| 1894 | | | | | | | 80 | | | | | | | |
| 1895 | | | | | | | 73 | | | | | | | |
| 1896 | | | | | | | 67 | | | | | | | |
| 1897 | | | | | | | 62 | | | | | | | |
| 1898 | | | | | | | | | | | | | | |
| 1899 | | | | 23 | | 43 | 66 | | | | | | | |
| 1900 | | | | 29 | | 44 | 73 | | | | | | | |
| 1901 | | | | 26 | | 40 | 66 | | | | | | | |
| 1902 | | | | | | | | | | | | | | |
| 1903 | | | | | | | | | | | | | | |
| 1904 | | | | | | | | | | | | | | |
| 1905 | | | | | | 35 | 67 | 102 | | | | | | |
| 1906 | | | | | | 68 | 36 | | 96 | 94 | | | | |
| 1907 | | | 212 | | | 72 | 79 | | 119 | 85 | | | | 119 |
| 1908 | | | 185 | | | 51 | 77 | | 148 | 77 | | | | |
| 1909 | 145 | 112 | 257 | | | 78 | 92 | | 187 | 84 | | | | |
| 1910 | 156 | 146 | | | | 113 | 89 | | 213 | 102 | 170 | | | 176 |
| 1911 | 128 | 172 | | | | 135 | 107 | | 240 | 110 | 174 | | | 115 |
| 1912 | 173 | 58 | | | | 108 | 115 | | 258 | 82 | 233 | | | 107 |
| 1913 | 175 | 160 | | | | 175 | 171 | | 282 | 74 | 179 | | | 118 |

Source: *Resoconto Bologna*.

Table K.15
Construction Data for Brescia, 1900-1913

| Year | (1) Construction permits | | (3) Occupancy permits 1900-1913 | (4) Recipients of occupancy permits | | | (7) Occupancy permits granted | | (8) Industrial 1908-1913 |
|------|--------------------------|--------------------|------------------------------------|-------------------------------------|-----------------|--------------------|-------------------------------|------------|-----------------------------|
| | Major ^a | Minor ^b | | New rooms | Renovated rooms | Industrial permits | Residential | Industrial | |
| | 1900-1913 | 1900-1913 | | 1908-1913 | 1908-1913 | 1908-1913 | 1908-1913 | 1908-1913 | |
| 1900 | 23 | 39 | 16 | | | | | | |
| 1901 | 18 | 57 | 12 | | | | | | |
| 1902 | 22 | 49 | 27 | | | | | | |
| 1903 | 22 | 76 | 24 | | | | | | |
| 1904 | 22 | 65 | 20 | | | | | | |
| 1905 | 42 | 46 | 48 | | | | | | |
| 1906 | 75 | 63 | 60 | | | | | | |
| 1907 | 76 | 50 | 42 | | | | | | |
| 1908 | 120 | 77 | 87 | 743 | 104 | 20 | 99 | | 3 |
| 1909 | 89 | 109 | 101 | 1,415 | 270 | 55 | 93 | | 4 |
| 1910 | 156 | 140 | 140 | 622 | 187 | 5 | 94 | | 3 |
| 1911 | 110 | 139 | 128 | 1,042 | 329 | 1 | 94 | | 1 |
| 1912 | 244 | 125 | 136 | 964 | 179 | 9 | 87 | | 7 |
| 1913 | 211 | 149 | 127 | 666 | 362 | 8 | 91 | | 8 |

^anew buildings, additions, etc.

^bfaçade restorations, new doors and windows, etc.

Source: *Statistica Brescia*.

Table K.16
Construction Data for Ferrara, 1909-1913

| Year | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|------|-------------------------------|----------------------------------|-------------------------------|---------------------------|---------------------------------|-------------------------|------------------------|-----|
| | Within the city | | | | In the rest of the municipality | | | |
| | New buildings 1909-1913 | Buildings raised 1909-1913 | New dwellings 1909-1911 | New rooms 1909-1911 | Residential | | Non-residential | |
| | | | | New bldgs. 1910-1913 | Additions 1910-1913 | New bldgs. 1910-1913 | Additions 1910-1913 | |
| 1909 | 8 | 16 | 22 | 162 | | | | |
| 1910 | | | 9 | 129 | 56 | 60 | 117 | 17 |
| 1911 | | | 89 | 386 | 94 | 110 | 214 | 54 |
| 1912 | 27 | 26 | | | 76 | 81 | 96 | 15 |
| 1913 | 26 | 29 | | | 53 | 68 | 153 | 86 |

Source: *Annuario Ferrara*.

Table K.17
Construction Data for Firenze, 1870-1913^a

| Year | Within the customs perimeter | | | (4) Total new buildings 1870-1913 | (5) Total buildings raised 1903-1913 | (6) Total new dwellings | | (8) Total new non-residential premises | | | |
|------|--------------------------------------|---|----------------------------------|---|--|----------------------------|--------------------|---|----------------------|-----------------------|--------------------|
| | (1) New buildings 1870-1910 | (2) Buildings raised 1903-1910 | (3) New rooms 1907-1910 | | | Units 1903-1913 | Rooms 1903-1913 | Workshops 1904-1913 | Offices 1904-1913 | Services 1904-1913 | Barns 1904-1913 |
| 1870 | 101 | | | 184 | | | | | | | |
| 1871 | 34 | | | 58 | | | | | | | |
| 1872 | 52 | | | 81 | | | | | | | |
| 1873 | 62 | | | 104 | | | | | | | |
| | | | | | | | | | | | |
| 1903 | 20 | 16 | | 63 | 31 | 178 | 1,210 | | | | |
| 1904 | 39 | 14 | | 93 | 27 | 281 | 1,689 | | 4 | | 5 |
| 1905 | 32 | 24 | | 94 | 37 | 325 | 2,091 | 10 | 4 | | 2 |
| 1906 | 36 | 18 | | 120 | 36 | 359 | 2,247 | 10 | 1 | | |
| 1907 | 61 | 20 | 852 | 170 | 40 | 414 | 2,584 | 45 | 3 | | 1 |
| 1908 | 63 | 20 | 1,160 | 195 | 48 | 526 | 3,279 | 54 | 3 | | |
| 1909 | 67 | 19 | 1,254 | 211 | 51 | 580 | 3,547 | 63 | 2 | | |
| 1910 | 138 | 12 | 1,916 | 350 | 24 | 869 | 4,856 | 54 | 46 | | |
| 1911 | | | | 416 | 38 | 1,229 | 6,791 | 71 | 50 | | |
| 1912 | | | | 285 | 33 | 708 | 4,495 | 53 | 3 | | 1 |
| 1913 | | | | 234 | 47 | 995 | 4,432 | 49 | | | |

^afrom 1907, cols. 1 - 4 ostensibly exclude non-residential construction; in 1903-1906, col. 7 is estimated (see text); col. 8 includes warehouses.

Sources: *Annuario Firenze, Atti Firenze.*

Table K.18
Construction Data for Milano, 1877-1913

| Year | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | |
|------|-------------------------------|---|-----------------------------|-------------------------|---------------------------------|--|-----------|-----------|--|
| | Built-up (thousand | ground area sq. meters) | Houses | Houses | Occupancy | Rooms receiving | | | |
| | Net increment 1875-1913 | Newly built or re-built 1895-1913 | newly built 1891-1913 | demolished 1891-1913 | permits (total) 1898-1913 | occupancy permits ^a in dwellings | | Total | |
| | | | | | Primary | Total | Total | | |
| | 1875-1913 | 1895-1913 | 1891-1913 | 1891-1913 | 1898-1913 | 1902-1913 | 1907-1913 | 1902-1907 | |
| 1875 | 81 | | | | | | | | |
| 1876 | 82 | | | | | | | | |
| 1877 | 80 | | | | | | | | |
| 1878 | 80 | | | | | | | | |
| 1879 | 80 | | | | | | | | |
| 1880 | 81 | | | | | | | | |
| 1881 | 90 | | | | | | | | |
| 1882 | 79 | | | | | | | | |
| 1883 | 69 | | | | | | | | |
| 1884 | 83 | | | | | | | | |
| 1885 | 83 | | | | | | | | |
| 1886 | 83 | | | | | | | | |
| 1887 | 82 | | | | | | | | |
| 1888 | 83 | | | | | | | | |
| 1889 | 82 | | | | | | | | |
| 1890 | 167 | | | | | | | | |
| 1891 | 97 | | ? | ? | | | | | |
| 1892 | 92 | | 67 | ? | | | | | |
| 1893 | 83 | | 74 | ? | | | | | |
| 1894 | 91 | | 94 | 4 | | | | | |
| 1895 | 100 | 101 | 119 | 7 | | | | | |
| 1896 | 122 | 123 | 116 | 4 | | | | | |
| 1897 | 132 | 135 | 123 | 7 | | | | | |
| 1898 | 154 | 154 | 160 | ? | 482 | | | | |
| 1899 | 191 | 196 | 178 | 17 | 675 | | | | |
| 1900 | 341 | 343 | 140 | 5 | 746 | | | | |
| 1901 | 117 | 127 | 114 | 16 | 712 | | | | |
| 1902 | 210 | 231 | 229 | 36 | 1,016 | 6,420 | | 8,876 | |
| 1903 | 142 | 163 | 181 | 41 | 1,069 | 11,012 | | 13,596 | |
| 1904 | 176 | 190 | 217 | 18 | 1,116 | 10,560 | | 13,614 | |
| 1905 | 417 | 430 | 434 | 18 | 805 | 10,961 | | 14,454 | |
| 1906 | 401 | 412 | 274 | 29 | 740 | 10,850 | | 14,753 | |
| 1907 | 120 | 133 | 140 | 43 | 872 | 12,593 | 13,955 | 19,189 | |
| 1908 | 370 | 398 | 252 | 44 | 844 | 11,718 | 13,635 | | |
| 1909 | 274 | 376 | 278 | 86 | 914 | 14,843 | 18,467 | | |
| 1910 | 337 | 351 | 388 | 25 | 834 | 14,503 | 17,309 | | |
| 1911 | 333 | 374 | 433 | 34 | 845 | 16,344 | 19,524 | | |
| 1912 | 386 | 398 | 388 | 15 | 1,604 | 27,227 | 31,916 | | |
| 1913 | 136 | 191 | 171 | 59 | 919 | 16,340 | 19,508 | | |

^aCol. 6 excludes halls, baths, kitchens, etc.; col. 8 includes business premises. In 1907, the total in col. 8 is the sum of 14,291 primary dwelling rooms (with a discrepancy with respect to col. 6) and 4,898 other rooms.

Source: *Statistica Milano*.

Table K.19
Construction Data for Roma, 1882-1913

| Year | (1) | (2) Construction permits | | | (4) | (5) | (6) Occupancy permits | | (7) |
|------|--|---|--------------------------------|--------|--------------------|---|-----------------------------|-------------------------------------|-----|
| | Area (thou- sand square meters) 1882-1913 | New and raised buildings 1901-1913 | Inhabitable rooms ^a | | Total 1901-1913 | New and raised buildings 1909-1913 | Total rooms 1909-1913 | Permitted occupancy 1909-1913 | |
| 1882 | 101 | | | | | | | | |
| 1883 | 171 | | | | | | | | |
| 1884 | 191 | | | | | | | | |
| 1885 | 372 | | | | | | | | |
| 1886 | 334 | | | | | | | | |
| 1887 | 336 | | | | | | | | |
| 1888 | 84 | | | | | | | | |
| 1889 | 55 | | | | | | | | |
| 1890 | 26 | | | | | | | | |
| 1891 | 14 | | | | | | | | |
| 1892 | 13 | | | | | | | | |
| 1893 | 5 | | | | | | | | |
| 1894 | 4 | | | | | | | | |
| 1895 | 4 | | | | | | | | |
| 1896 | 1 | | | | | | | | |
| 1897 | 7 | | | | | | | | |
| 1898 | 4 | | | | | | | | |
| 1899 | 38 | | | | | | | | |
| 1900 | 11 | | | | | | | | |
| 1901 | 41 | 66 | 1,645 | 1,806 | | | | | |
| 1902 | 36 | 60 | 1,561 | 1,791 | | | | | |
| 1903 | 27 | 56 | 2,038 | 2,088 | | | | | |
| 1904 | 76 | 79 | 2,657 | 3,148 | | | | | |
| 1905 | 112 | 82 | 4,505 | 4,556 | | | | | |
| 1906 | 215 | 197 | 6,782 | 7,969 | | | | | |
| 1907 | 209 | 178 | 7,261 | 9,174 | | | | | |
| 1908 | 145 | 200 | 4,604 | 5,544 | | | | | |
| 1909 | 399 | 325 | 13,922 | 14,436 | 199 | 4,593 | 10,719 | | |
| 1910 | 337 | 394 | 10,677 | 11,845 | 194 | 3,904 | 8,739 | | |
| 1911 | 218 | 324 | 8,068 | 8,758 | 166 | 4,734 | 11,190 | | |
| 1912 | 310 | 343 | 11,080 | 11,582 | 179 | 4,683 | 9,830 | | |
| 1913 | 262 | 365 | 10,473 | 11,010 | 279 | 5,812 | 11,410 | | |

^aCols. 3 - 4 include kitchens, but exclude halls and other rooms not designed for human occupancy; col. 4 includes business and public premises as well as dwellings. In 1904, col. 3 is estimated; the correct figure in col. 4 may be 1,348.

Source: *Annuario Roma 1913*.

Table K.20
Construction Data for Torino, 1861-1879

| Year | (1) | (2) | (3) Capital employed (thousand lire) | | (4) |
|------|-------------------------------|------------------------|---|-----------------------|------|
| | New buildings 1862-1879 | New rooms 1861-1879 | Total 1861-1879 | Per room 1861-1879 | |
| 1861 | | 1,094 | 1,641 | | 1.50 |
| 1862 | 85 | 2,293 | 3,440 | | 1.50 |
| 1863 | 130 | 3,265 | 4,898 | | 1.50 |
| 1864 | 100 | 3,972 | 5,958 | | 1.50 |
| 1865 | 50 | 502 | 703 | | 1.40 |
| 1866 | 38 | 443 | 532 | | 1.20 |
| 1867 | 43 | 608 | 491 | | .81 |
| 1868 | 54 | 998 | 798 | | .80 |
| 1869 | 53 | 675 | 579 | | .86 |
| 1870 | 69 | 1,414 | 990 | | .70 |
| 1871 | 51 | 1,342 | 939 | | .70 |
| 1872 | 118 | 2,017 | 2,420 | | 1.20 |
| 1873 | 134 | 2,380 | 2,856 | | 1.20 |
| 1874 | 114 | 2,827 | 3,392 | | 1.20 |
| 1875 | 142 | 2,338 | 2,338 | | 1.00 |
| 1876 | 94 | 2,637 | 3,956 | | 1.50 |
| 1877 | 141 | 3,558 | 5,337 | | 1.50 |
| 1878 | 255 | 4,040 | 6,056 | | 1.50 |
| 1879 | 215 | 3,250 | 4,875 | | 1.50 |

Source: Costanza (1978).

Table K.21
Construction Data for Torino, 1891-1913

| Year | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|------|-------------------------------|--|---|--|--|--|----------------------------------|--|
| | New buildings 1891-1907 | Construction Buildings raised 1891-1907 | permits Additions, renovations 1891-1907 | Construction permits (variant A) Total 1891-1907 | Construction permits ^a (variant B) 1901-1913 | Minor and rural works 1901-1910 | Dwelling permits 1900-1913 | Rooms granted permits 1900-1913 |
| 1891 | 49 | 26 | 97 | 172 | | | | |
| 1892 | 43 | 32 | 82 | 157 | | | | |
| 1893 | 28 | 25 | 97 | 150 | | | | |
| 1894 | 47 | 19 | 74 | 140 | | | | |
| 1895 | 34 | 30 | 91 | 155 | | | | |
| 1896 | 50 | 25 | 98 | 173 | | | | |
| 1897 | 62 | 32 | 107 | 201 | | | | |
| 1898 | 48 | 33 | 86 | 167 | | | | |
| 1899 | 104 | 56 | 97 | 257 | | | | |
| 1900 | 104 | 41 | 51 | 196 | | | 314 | 3,785 |
| 1901 | 103 | 45 | 91 | 239 | 239 | 1,508 | 326 | 4,271 |
| 1902 | 139 | 54 | 95 | 288 | 353 | 1,813 | 389 | 4,449 |
| 1903 | 238 | 61 | 50 | 349 | 449 | 2,146 | 500 | 5,313 |
| 1904 | 250 | 83 | 91 | 424 | 483 | 1,533 | 605 | 7,474 |
| 1905 | 268 | 66 | 75 | 409 | 514 | 1,823 | 552 | 7,185 |
| 1906 | 265 | 70 | 73 | 408 | 578 | 1,778 | 659 | 9,735 |
| 1907 | 277 | 120 | 93 | 490 | 490 | 1,669 | 623 | 8,976 |
| 1908 | | | | | 629 | 2,131 | 658 | 7,789 |
| 1909 | | | | | 1,092 | 2,128 | 957 | 11,572 |
| 1910 | | | | | 1,074 | 2,609 | 1,022 | 15,860 |
| 1911 | | | | | 1,046 | | 904 | 14,028 |
| 1912 | | | | | 1,240 | | 1,061 | 17,201 |
| 1913 | | | | | 919 | | 996 | 12,725 |

^aalternative figures for 1904-1906 are 600, 568, and 582, respectively.

Source: *Annuario Torino*.

Table K.22
Construction Data for Venezia, 1903-1913
(thousand cubic meters)

| Year | (1) | (2) | (3) | (4) |
|------|-----------------------------|--------------------|---------------------------------|--------------------------|
| | New buildings and additions | | | Demolitions 1903-1913 |
| | Residential 1903-1913 | Other 1903-1913 | Total ^a 1903-1913 | |
| 1903 | 43.1 | 1.0 | 44.2 | 24.6 |
| 1904 | 48.5 | 9.7 | 58.2 | 19.6 |
| 1905 | 69.5 | 7.7 | 77.1 | 2.6 |
| 1906 | 173.3 | 173.1 | 346.4 | 18.6 |
| 1907 | 220.9 | 58.3 | 279.2 | 13.7 |
| 1908 | 182.7 | 10.6 | 193.3 | 26.8 |
| 1909 | 123.4 | 12.7 | 136.1 | 5.7 |
| 1910 | 234.1 | 9.4 | 243.4 | 24.3 |
| 1911 | 161.6 | 18.1 | 179.7 | 9.2 |
| 1912 | 156.6 | 19.9 | 176.6 | 2.6 |
| 1913 | 200.5 | 16.0 | 216.4 | 3.6 |

^anumbers need not add, due to rounding.

Sources: *Rendiconto Venezia*.

Table K.23
Construction Estimates for Eight Major Cities, 1900-1913 (new rooms)

| Year | (1) Bologna 1900-1913 | (2) Brescia 1901-1913 | (3) Ferrara 1909-1913 | (4) Firenze 1903-1913 | (5) Milano 1902-1913 | (6) Roma 1903-1913 | (7) Torino 1900-1913 | (8) Venezia 1903-1913 | (9) Subtotal ^a 1903-1913 | (10) Total 1903-1913 |
|------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|--------------------------|----------------------------|-----------------------------|---|----------------------------|
| 1900 | 480 | | | | | | 3,785 | | | |
| 1901 | 432 | 308 | | | | | 4,271 | | | |
| 1902 | 479 | 294 | | | 6,420 | | 4,449 | | | |
| 1903 | 527 | 318 | | 1,237 | 11,012 | 965 | 5,313 | 884 | 4,351 | 20,676 |
| 1904 | 534 | 372 | | 1,716 | 10,560 | 957 | 7,474 | 1,164 | 5,250 | 23,284 |
| 1905 | 621 | 350 | | 2,139 | 10,961 | 1,115 | 7,185 | 1,542 | 6,383 | 24,529 |
| 1906 | 924 | 512 | | 2,280 | 10,850 | 1,682 | 9,735 | 6,928 | 13,642 | 34,227 |
| 1907 | 1,101 | 876 | | 2,746 | 12,593 | 2,434 | 8,976 | 5,584 | 14,102 | 35,671 |
| 1908 | 843 | 867 | | 3,471 | 11,718 | 4,257 | 7,789 | 3,866 | 14,725 | 34,232 |
| 1909 | 1,212 | 1,740 | 1,532 | 3,775 | 14,843 | 4,901 | 11,572 | 2,722 | 15,882 | 42,297 |
| 1910 | 1,623 | 814 | 1,499 | 5,171 | 14,503 | 3,996 | 15,860 | 4,868 | 17,971 | 48,334 |
| 1911 | 1,941 | 1,372 | 2,865 | 7,193 | 16,344 | 5,117 | 14,028 | 3,594 | 22,082 | 52,454 |
| 1912 | 1,641 | 1,152 | 1,861 | 4,687 | 27,227 | 4,495 | 17,021 | 3,532 | 17,368 | 61,616 |
| 1913 | 2,613 | 1,036 | 2,189 | 4,603 | 16,340 | 5,217 | 12,725 | 4,328 | 19,986 | 49,051 |

^aexcluding Milano and Torino.

Sources: see text.

Table K.24
Summary Census Housing Stock Statistics, 1881, 1901, and 1911^a (thousands)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|-------------------------------|-------|-----------|-------|-----------------|----------------------|-------|-----------|-------|-----------------|
| | In the principal urban places | | | | Persons present | In the residual area | | | | |
| | Apartments | | Rooms | | | Apartments | | Rooms | | Persons present |
| | Inhabited | Empty | Inhabited | Empty | | Inhabited | Empty | Inhabited | Empty | |
| A. 1881 | | | | | | | | | | |
| in inhabited houses: | | | | | | | | | | |
| 1. in municipalities that are provincial capitals | 773.6 | 43.9 | 2,560 | n.a. | 3,385 | 221.8 | 20.1 | 647 | n.a. | 1,105 |
| 2. in the Kingdom | 3,831.4 | 450.6 | 10,382 | n.a. | 16,601 | 2,304.0 | 287.1 | 6,864 | n.a. | 11,787 |
| B. 1901 | | | | | | | | | | |
| in 92 major municipalities | 1,158.0 | 141.4 | n.a. | n.a. | 5,320 | n.a. | n.a. | n.a. | n.a. | n.a. |
| C. 1911 | | | | | | | | | | |
| in 263 major municipalities | 1,801.5 | 208.7 | 5,616 | 493 | 7,981 | 605.3 | 115.0 | 1,846 | 295 | 3,050 |

^ain principle, cols. 1 - 5 refer to a single urban unit per municipality. In 1911, cols. 2 and 7 include apartments used as offices; cols. 3 - 4 and 8 - 9 are estimated (see text).

Sources: *Censimento 1881, Censimento 1901, Censimento demografico.*

Table K.25
Summary Census-based Housing Stock and Intercensal Construction Estimates, 1861-1911

| (1) | (2) | (3) | | (4) | (5) | (6) | | (7) | (8) | (9) | (10) |
|-------------|--------------------------|---------------------------------|---------|-------------------|---------------------------------------|--|-------|--------------|--|------|------|
| Census date | Population (millions) | <u>Estimated stock of rooms</u> | | <u>Per capita</u> | Inter- censal period (years) | <u>Intercensal growth rate</u> (percent per year) | | <u>Rooms</u> | <u>Intercensal construction rate</u> (thousand rooms per year) ^a with a share demolished each year equal to | | |
| | | Total (millions) | (units) | | | Population | Rooms | | .000 | .005 | .010 |
| XII.31.1861 | 25.017 | 17.787 | .711 | | | | | | | | |
| | | | | | 10.00 | 0.69 | 0.72 | 132 | | 225 | 318 |
| XII.31.1871 | 26.801 | 19.109 | .713 | | | | | | | | |
| | | | | | 10.00 | 0.60 | 0.63 | 124 | | 223 | 323 |
| XII.31.1881 | 28.460 | 20.351 | .715 | | | | | | | | |
| | | | | | 19.11 | 0.69 | 0.59 | 127 | | 235 | 345 |
| II.10.1901 | 32.475 | 22.780 | .701 | | | | | | | | |
| | | | | | 10.33 | 0.64 | 0.90 | 214 | | 334 | 455 |
| VI.10.1911 | 34.671 | 24.992 | .721 | | | | | | | | |

^athe 1908 earthquake appears to have demolished the equivalent of 16,000 rooms per year between the 1901 and 1911 censuses; these are to be added to the construction estimates in cols. 8 - 10 if the demolition rate excludes earthquake losses.

Sources: see text.

Table K.26
Taxed Construction Materials: Alessandria, 1861-1913

| Year | (1) Taxed binders (thousand tons) ^a 1861-1905 | (2) Taxed bricks (million units) ^b 1861-1889 | (3) Taxed lumber (thousand tons) ^b 1861-1889 | (4) Total yield (thousand lire) ^c 1861-1913 |
|------|---|--|--|---|
| 1861 | 2.21 | 1.20 | 2.06 | |
| 1862 | 2.74 | 2.89 | 2.90 | 23.0 |
| 1863 | 1.73 | 2.87 | 2.11 | |
| 1864 | 1.33 | 1.12 | 2.16 | |
| 1865 | 1.41 | 0.60 | 1.63 | |
| 1866 | 0.92 | 0.21 | 1.30 | |
| 1867 | 1.31 | 0.27 | 1.13 | |
| 1868 | 1.28 | 0.36 | 0.77 | 17.9 |
| 1869 | 1.22 | 0.31 | 1.02 | 20.6 |
| 1870 | 1.44 | 0.46 | 1.30 | 19.9 |
| 1871 | 1.75 | 0.69 | 1.44 | 25.4 |
| 1872 | 2.05 | 0.95 | 1.70 | 28.4 |
| 1873 | 2.23 | 0.71 | 2.19 | 31.5 |
| 1874 | | | | |
| 1875 | | | | |
| 1876 | | | | |
| 1877 | 1.63 | 0.52 | 1.72 | 44.3 |
| 1878 | 1.74 | 0.83 | 1.48 | 39.6 |
| 1879 | | | | |
| | | | | |
| 1885 | 3.16 | 4.31 | 2.90 | |
| 1886 | 4.92 | 9.97 | 3.82 | |
| 1887 | | | | |
| 1888 | 5.52 | 10.15 | 2.08 | 97.3 |
| 1889 | 6.39 | 11.28 | 3.83 | 113.3 |
| | | | | |
| 1895 | | | | |
| 1896 | | | | |
| 1897 | 3.70 | | | 65.6 |
| 1898 | 3.51 | | | 62.2 |
| 1899 | | | | |
| 1900 | | | | |
| 1901 | | | | |
| 1902 | 4.18 | | | 74.2 |
| 1903 | 4.18 | | | 82.8 |
| 1904 | | | | |
| 1905 | 4.75 | | | 75.0 |
| 1906 | | | | |
| 1907 | | | | |
| 1908 | | | | |
| 1909 | | | | |
| 1910 | | | | 76.2 |
| 1911 | | | | 49.3 |
| 1912 | | | | 79.4 |
| 1913 | | | | 130.8 |

^ain 1873, 1877-1878, 1897-1898, 1902-1903, and 1905, estimated: see text.

^bin 1877-1878, estimated: see text.

^cin 1877-1878 and 1902, estimated: see text.

Source: *Archivio Alessandria*.

Table K.27
Taxed Construction Materials: Bologna, 1865-1913^a

| Year | (1) Taxed binders (thousand tons) ^b 1865-1913 | (2) Taxed bricks and tiles (million units) ^c 1865-1891 | (3) Taxed bricks and tiles (thousand cubic meters) 1892-1913 | (4) Taxed lumber (thousand tons) ^d 1865-1901 | (5) Taxed freestone (thousand tons) ^c 1865-1913 | (6) Total yield (thousand lire) ^e 1871-1913 |
|------|---|---|---|--|---|---|
| 1865 | 10.19 | 7.50 | | 3.28 | 2.93 | |
| 1866 | 7.61 | 4.48 | | 2.74 | 1.59 | |
| 1867 | 7.52 | 4.36 | | 2.42 | 2.39 | |
| 1868 | 6.39 | 5.36 | | 2.26 | 1.33 | |
| 1869 | 8.39 | 5.94 | | 3.23 | 3.43 | |
| 1870 | 7.33 | 4.38 | | 2.90 | 2.49 | |
| 1871 | 8.50 | | | | | 87.5 |
| 1872 | 8.00 | | | | | 82.3 |
| 1873 | 6.98 | 4.03 | | 3.26 | .76 | 69.8 |
| 1874 | 7.19 | 4.67 | | 3.34 | 1.89 | 76.8 |
| 1875 | 6.77 | 3.68 | | 3.08 | 1.83 | 73.6 |
| 1876 | 6.87 | 3.69 | | 3.27 | 2.03 | 75.9 |
| 1877 | 7.68 | 4.02 | | 3.79 | 1.60 | 83.8 |
| 1878 | 6.71 | 3.91 | | 3.01 | 1.10 | 69.4 |
| 1879 | 7.95 | 4.89 | | 3.34 | 1.61 | 82.1 |
| 1880 | 8.28 | 5.23 | | 3.88 | 1.14 | 88.5 |
| 1881 | 9.37 | 6.65 | | 4.01 | 1.43 | 98.5 |
| 1882 | 9.15 | 5.45 | | 3.68 | 1.48 | 91.0 |
| 1883 | 7.69 | 4.69 | | 3.62 | 1.52 | 83.6 |
| 1884 | 9.49 | 6.70 | | 3.89 | 1.38 | 96.8 |
| 1885 | 10.22 | 7.60 | | 3.93 | 1.14 | 101.4 |
| 1886 | 12.05 | 10.33 | | 4.53 | 1.48 | 127.8 |
| 1887 | 11.27 | 7.67 | | 3.96 | 2.40 | 111.2 |
| 1888 | 11.15 | 6.80 | | 3.92 | 2.15 | 107.2 |
| 1889 | 10.55 | 7.02 | | 3.52 | .89 | 96.3 |
| 1890 | 8.88 | 6.95 | | 3.23 | .94 | 88.6 |
| 1891 | 8.89 | 5.63 | | 3.17 | 1.01 | 85.1 |
| 1892 | 8.18 | | 11.25 | 2.85 | .90 | 75.3 |
| 1893 | 9.30 | | 15.04 | 3.10 | 1.53 | 91.6 |
| 1894 | 8.46 | | 13.00 | 2.94 | 1.32 | 88.3 |
| 1895 | 9.45 | | 16.62 | 3.08 | 1.96 | 96.3 |
| 1896 | 9.23 | | 14.52 | 3.00 | 1.39 | 94.7 |
| 1897 | 8.61 | | 13.39 | 3.23 | .91 | 86.4 |
| 1898 | 8.71 | | 13.57 | 3.18 | 1.08 | 86.3 |
| 1899 | 8.63 | | 14.14 | 3.55 | .89 | 91.9 |
| 1900 | 8.11 | | 11.46 | 3.24 | 1.11 | 84.4 |
| 1901 | 8.53 | | 13.10 | 2.03 | 1.28 | 71.4 |
| 1902 | 12.93 | | 30.95 | | 1.30 | 78.6 |
| 1903 | 13.99 | | 26.96 | | 1.47 | 83.8 |
| 1904 | 13.20 | | 25.03 | | 3.09 | 92.1 |
| 1905 | 15.75 | | 33.23 | | 1.37 | 103.3 |
| 1906 | 18.61 | | 45.85 | | 1.37 | 126.9 |
| 1907 | 24.72 | | 55.81 | | 1.34 | 156.7 |
| 1908 | 26.98 | | 62.68 | | 1.61 | 176.3 |
| 1909 | 25.86 | | 53.42 | | 1.60 | 160.0 |
| 1910 | 33.29 | | 75.15 | | 2.79 | 213.1 |
| 1911 | 35.70 | | 73.95 | | 2.65 | 222.3 |
| 1912 | 35.60 | | 67.42 | | 2.74 | 221.1 |
| 1913 | 41.22 | | 83.98 | | 6.90 | 261.6 |

Table K.27 (continued)

^athe customs perimeter was significantly expanded on August 1, 1901.

^bin 1868 and 1871-1872, estimated: see text.

^cin 1868, estimated: see text.

^din 1901, through August 20; in 1868, estimated: see text.

^eplus, from the open municipality, 14.2 thousand lire in 1911, 75.4 in 1912, and 34.6 in 1913.

Sources: *Archivio Bologna, Dazio Bologna.*

Table K.28 (continued)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|------|-------|-----|-------|------|------|-------|------|-------|------|
| 1895 | 1.79 | | | | | | | 30.3 | |
| 1896 | 1.75 | | | | | | | 29.7 | |
| 1897 | 1.71 | | | | | | | 29.0 | |
| 1898 | 1.79 | | | | | | | 30.3 | |
| 1899 | 1.94 | | | | | | | 32.8 | |
| 1900 | 1.77 | | | | | | | 32.8 | |
| 1901 | 2.35 | | | | | | | 43.6 | |
| 1902 | 2.19 | | | | | | | 40.6 | |
| 1903 | 2.26 | | | | | | | 41.9 | |
| 1904 | 2.73 | | | | | | | 50.5 | |
| 1905 | 3.23 | | | | | | | 59.9 | |
| 1906 | 3.09 | | | | | | | 57.3 | |
| 1907 | 3.12 | | 5.96 | 1.85 | 1.28 | .14 | | 58.3 | |
| 1908 | 6.15 | | 14.16 | 1.32 | 1.65 | 8.53 | 3.5 | 81.3 | 7.2 |
| 1909 | 10.27 | | 21.29 | | 2.39 | 9.85 | 43.6 | 145.2 | 68.3 |
| 1910 | 9.90 | | 23.42 | | 2.11 | 11.29 | 40.8 | 153.5 | 62.2 |
| 1911 | 9.64 | | 20.66 | | 1.55 | 17.72 | 37.1 | 147.6 | 76.4 |
| 1912 | 10.20 | | 21.16 | | 3.33 | 20.07 | 31.4 | 148.9 | 51.0 |
| 1913 | 8.75 | | 18.41 | | 1.59 | 11.82 | 33.9 | 135.1 | 23.7 |

^athe customs perimeter was significantly expanded on September 1, 1908.

^bin 1878-1879, 1881-1883, 1885, and 1894-1906, estimated: see text.

^cin 1878-1879, 1881-1883, and 1885, estimated: see text.

^din 1908, through August 31; in 1878-1879, 1881-1883, and 1885, estimated: see text.

^ein 1865, 1878-1879, 1881-1883, and 1885, estimated: see text.

^fthrough August 1908, taxed by the cartload; in 1865-1908, estimated: see text.

^gin 1908, from September 1.

^hin 1895, estimated: see text.

Sources: *Archivio Brescia, Statistica Brescia.*

Table K.29
Taxed Construction Materials: Carrara, 1886-1895

| Year | (1) Taxed binders (thousand tons) ^a 1886-1905 | (2) Taxed bricks and flat tiles (thousand tons) 1886-1895 | (3) Taxed lumber (thousand tons) 1886-1895 | (4) Total yield (thousand lire) 1886-1895 |
|------|---|--|---|--|
| 1886 | 2.78 | 8.90 | 1.77 | 30.7 |
| 1887 | 2.83 | 11.33 | 1.50 | 31.7 |
| 1888 | 1.95 | | | 23.6 |
| 1889 | 1.10 | 2.98 | .99 | 14.4 |
| 1890 | 1.03 | 3.36 | 1.23 | 16.3 |
| 1891 | .80 | 3.00 | 1.04 | 14.2 |
| 1892 | 1.18 | 3.29 | 1.17 | 17.6 |
| 1893 | .84 | 1.92 | 1.04 | 15.0 |
| 1894 | | | | |
| 1895 | .41 | 1.04 | .73 | 8.7 |

^ain 1888, estimated: see text.

Source: *Archivio Carrara*.

Table K.30
Taxed Construction Materials: Ferrara, 1861-1913

| Year | (1) | (2) | (3) | (4) | (5) | (6) Total yield (thousand lire) | | (7) |
|------|---|--|--|--|--|---|----------------------------|-----|
| | Taxed binders (thousand tons) ^a 1861-1913 | Taxed bricks (thousand cubic meters) ^b 1865-1908 | and tiles (thousand tons) 1909-1913 | Taxed lumber (thousand tons) ^c 1861-1913 | Taxed timber (thousand tons) ^b 1861-1913 | Closed municip. ^d 1870-1913 | Open municip. 1910-1913 | |
| 1861 | 2.56 | | | 1.05 | | | | |
| 1862 | 2.88 | | | 1.30 | | | | |
| 1863 | 2.56 | | | 1.05 | | | | |
| 1864 | | | | | | | | |
| 1865 | 2.29 | 3.11 | | 1.13 | .03 | | | |
| 1866 | 2.09 | 4.23 | | .99 | .32 | | | |
| 1867 | 1.59 | 3.17 | | .73 | .23 | | | |
| 1868 | 1.67 | 3.55 | | .80 | .34 | | | |
| 1869 | | | | | | | | |
| 1870 | 1.57 | 2.71 | | .77 | .37 | 24.9 | | |
| 1871 | 1.85 | 3.55 | | .87 | .34 | 30.4 | | |
| 1872 | 1.83 | 3.33 | | .80 | .33 | 28.1 | | |
| 1873 | 1.50 | 3.12 | | .73 | .35 | 26.3 | | |
| 1874 | 1.55 | 2.58 | | .73 | .36 | 24.1 | | |
| 1875 | 1.66 | 3.14 | | .83 | .33 | 26.4 | | |
| 1876 | | | | | | | | |
| 1877 | | | | | | | | |
| 1878 | | | | | | | | |
| 1879 | | | | | | | | |
| 1880 | 1.56 | 3.39 | | .82 | .02 | 24.0 | | |
| 1881 | 1.77 | 4.50 | | .82 | .02 | 28.4 | | |
| 1882 | 1.92 | 6.27 | | 1.29 | .03 | 36.8 | | |
| 1883 | 1.58 | | | | | 27.3 | | |
| 1884 | 1.68 | | | | | 29.0 | | |
| 1885 | | | | | | | | |
| 1886 | 1.89 | | | | | 32.6 | | |
| 1887 | 2.22 | 4.55 | | 1.14 | .05 | 33.9 | | |
| 1888 | 1.78 | 4.33 | | 1.14 | .01 | 31.7 | | |
| 1889 | 1.88 | | | | | 32.4 | | |

Table K.30 (continued)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|------|------|------|-------|------|-----|-------|------|
| 1890 | 1.35 | | | | | 23.4 | |
| 1891 | | | | | | | |
| 1892 | | | | | | | |
| 1893 | | | | | | | |
| 1894 | | | | | | | |
| 1895 | 1.64 | | | | | 28.3 | |
| 1896 | 1.86 | | | | | 32.0 | |
| 1897 | 1.64 | | | | | 28.2 | |
| 1898 | 1.57 | | | | | 27.1 | |
| 1899 | 1.66 | | | | | 28.7 | |
| 1900 | 1.60 | | | | | 27.5 | |
| 1901 | | | | | | | |
| 1902 | | | | | | | |
| 1903 | | | | | | | |
| 1904 | | | | | | | |
| 1905 | | | | | | | |
| 1906 | 3.22 | 7.81 | | 1.41 | .25 | 49.1 | |
| 1907 | 3.44 | 6.38 | | 1.43 | .03 | 49.8 | |
| 1908 | 3.57 | 8.54 | | 1.40 | .81 | 58.5 | |
| 1909 | 4.80 | | 17.85 | 1.81 | .61 | 89.1 | |
| 1910 | 5.73 | | 21.25 | 2.14 | .31 | 102.0 | 30.6 |
| 1911 | 4.94 | | 16.61 | 1.79 | .01 | 84.1 | 46.3 |
| 1912 | 7.11 | | 20.84 | 2.24 | .13 | 115.3 | 33.2 |
| 1913 | 6.08 | | 17.55 | 1.87 | .03 | 97.9 | 27.7 |

^ain 1861, 1863, 1883-1884, 1886, 1889-1890, and 1895-1900, estimated: see text.

^bin 1865, May-December only.

^cin 1861 and 1863, estimated: see text.

^din 1884, 1886, 1889-1890, 1895, and 1900, estimated: see text.

Sources: *Annuario Ferrara*, *Archivio Ferrara*.

Table K.31
Taxed Construction Materials: Firenze, 1865-1913^a

| Year | (1) | (2) | (3) | (4) (5) | | (6) | (7) (8) | |
|------|--|---|------------------------------|--|---|--|---|----------------------------|
| | Taxed binders (thousand tons) ^b 1865-1913 | Taxed bricks and small tiles (million units) ^c 1867-1895 | (thousand tons) 1895-1913 | Taxed lumber (thousand cubic meters) 1867-1875 | (thousand tons) ^d 1875-1913 | Taxed rubble (thousand cartloads) ^c 1867-1913 | Total yield (thousand lire) | |
| | | | | | | | Closed municip. ^e 1865-1913 | Open municip. 1902-1913 |
| 1865 | 13.36 | | | | | | 180.1 | |
| 1866 | 12.01 | | | | | | 169.6 | |
| 1867 | 16.79 | 14.97 | | 13.07 | | 68.43 | 150.0 | |
| 1868 | 13.92 | 17.21 | | 13.25 | | 60.89 | 132.6 | |
| 1869 | 22.26 | 21.70 | | 17.36 | | 98.03 | 182.7 | |
| 1870 | 24.11 | 22.49 | | 16.47 | | 115.80 | 197.1 | |
| 1871 | 16.07 | 11.82 | | 11.65 | | 61.20 | 122.4 | |
| 1872 | 14.45 | 10.17 | | 11.63 | | 57.12 | 111.7 | |
| 1873 | 16.49 | 12.62 | | 12.65 | | 65.20 | 125.6 | |
| 1874 | 13.45 | 10.42 | | 11.08 | | 46.39 | 102.1 | |
| 1875 | 11.47 | 8.75 | | 8.32 | .88 | 33.31 | 89.7 | |
| 1876 | 8.79 | | | | | | 67.6 | |
| 1877 | 7.50 | | | | | | 57.7 | |
| 1878 | 5.54 | | | | | | 42.6 | |
| 1879 | 4.73 | 3.29 | | | 3.74 | 7.85 | 35.8 | |
| 1880 | 4.98 | 3.93 | | | 4.17 | 13.91 | 45.2 | |
| 1881 | 6.19 | 4.69 | | | 5.26 | 21.34 | 57.2 | |
| 1882 | 6.18 | 5.00 | | | 5.16 | 20.78 | 54.4 | |
| 1883 | 7.51 | 6.25 | | | 5.43 | 26.05 | 64.8 | |
| 1884 | 8.07 | 8.08 | | | 1.27 | 34.21 | 69.4 | |
| 1885 | 9.12 | 8.55 | | | | 36.55 | 71.2 | |
| 1886 | 10.39 | 9.55 | | | | 40.83 | 78.3 | |
| 1887 | 9.83 | 8.88 | | | | 38.69 | 75.6 | |
| 1888 | 10.85 | 8.20 | | | | 43.02 | 77.4 | |
| 1889 | 10.09 | 6.84 | | | | 43.15 | 71.6 | |
| 1890 | 11.43 | 6.23 | | | | 36.52 | 71.3 | |
| 1891 | 13.10 | 7.52 | | | | 33.13 | 80.6 | |
| 1892 | 10.47 | 4.96 | | | | 42.56 | 66.7 | |
| 1893 | 10.72 | 5.88 | | | | 23.02 | 65.1 | |
| 1894 | 9.86 | 5.16 | | | | 20.28 | 61.1 | |

Table K.31 (continued)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|------|-------|------|-------|-----|-------|-------|-------|------|
| 1895 | 10.15 | 4.83 | 1.63 | | .49 | 22.08 | 68.0 | |
| 1896 | 8.94 | | 17.31 | | 2.72 | 25.63 | 87.5 | |
| 1897 | 8.02 | | 13.18 | | 2.21 | 23.45 | 73.3 | |
| 1898 | 7.71 | | 13.74 | | 5.53 | 24.97 | 72.1 | |
| 1899 | 7.25 | | 14.50 | | 6.90 | 26.42 | 73.6 | |
| 1900 | 7.35 | | 15.54 | | 6.90 | 27.32 | 77.9 | |
| 1901 | | | | | | | | |
| 1902 | 7.30 | | 10.78 | | 6.49 | 24.57 | 72.1 | 21.3 |
| 1903 | 7.63 | | 12.40 | | 6.98 | 26.28 | 75.9 | 17.6 |
| 1904 | 7.81 | | 14.29 | | 6.84 | 29.57 | 79.9 | 21.4 |
| 1905 | 8.20 | | 15.35 | | 6.61 | 22.49 | 83.4 | 25.8 |
| 1906 | 11.39 | | 17.24 | | 8.29 | 21.79 | 95.6 | 32.6 |
| 1907 | 14.38 | | 23.68 | | 9.35 | 28.25 | 126.4 | 41.6 |
| 1908 | 15.65 | | 23.31 | | 9.16 | 22.51 | 133.9 | 44.9 |
| 1909 | 15.46 | | 23.86 | | 9.04 | 25.90 | 127.9 | 61.2 |
| 1910 | 17.29 | | 25.08 | | 9.65 | 20.74 | 133.6 | 62.8 |
| 1911 | 23.85 | | 20.74 | | 11.73 | 41.35 | 169.4 | 9.6 |
| 1912 | 31.12 | | 51.77 | | 12.31 | 62.27 | 240.2 | .5 |
| 1913 | 27.72 | | 46.09 | | 9.89 | 46.96 | 205.3 | |

^athe customs perimeter was expanded in 1869, 1870, and 1875, contracted between 1877 and 1878, and greatly expanded on September 11, 1911.

^bin 1865-1866 and 1876-1881, estimated: see text.

^cin 1879-1881, estimated: see text.

^din 1884 and 1895, part of the year only; in 1879-1881, estimated: see text.

^efrom 1867, excludes taxes on wood and metals; in 1867, including taxes on wood and metals, 248.9 thousand lire.

Sources: *Annuario Firenze, Archivio Firenze, Relazione Firenze.*

Table K.32
Taxed Construction Materials: Forlì, 1861-1904

| Year | (1) Taxed binders (thousand tons) ^a 1861-1903 | (2) Taxed bricks (million units) ^b 1867-1886 | (3) Taxed lumber (thousand tons) ^c 1861-1886 | (4) Total yield (thousand lire) ^d 1882-1904 |
|------|---|--|--|---|
| 1861 | .85 | | .39 | |
| 1862 | 1.22 | | .45 | |
| 1863 | 1.51 | | .60 | |
| 1864 | | | | |
| 1865 | | | | |
| 1866 | .68 | | .23 | |
| 1867 | .56 | .56 | .21 | |
| 1868 | | | | |
| 1869 | | | | |
| 1870 | 1.04 | .69 | .31 | |
| 1871 | 1.15 | .59 | .34 | |
| 1872 | 1.06 | .60 | .34 | |
| 1873 | 1.14 | .92 | .36 | |
| 1874 | .97 | .66 | .47 | |
| 1875 | .93 | .62 | .43 | |
| 1876 | .91 | .67 | .42 | |
| 1877 | .82 | .71 | .35 | |
| 1878 | .82 | .78 | .42 | |
| 1879 | 1.03 | .79 | .45 | |
| 1880 | .90 | .79 | .50 | |
| 1881 | .98 | .82 | .49 | |
| 1882 | 1.11 | .99 | .62 | 10.5 |
| 1883 | .93 | .87 | .52 | 9.2 |
| 1884 | 1.07 | | | 10.3 |
| 1885 | 1.25 | | | 12.0 |
| 1886 | 1.30 | 1.40 | .57 | 14.0 |
| 1887 | | | | |
| 1888 | 1.29 | | | 14.9 |
| 1889 | .81 | | | 9.4 |
| 1890 | 1.01 | | | 11.7 |
| 1891 | 1.14 | | | 13.2 |
| 1892 | .89 | | | 10.3 |
| 1893 | 1.36 | | | 13.1 |
| 1894 | .90 | | | 8.7 |
| 1895 | .77 | | | 7.4 |
| 1896 | .83 | | | 8.0 |
| 1897 | .67 | | | 6.4 |
| 1898 | .77 | | | 7.4 |
| 1899 | .83 | | | 8.0 |
| 1900 | .80 | | | 7.7 |
| 1901 | .79 | | | 7.6 |
| 1902 | 1.15 | | | 11.1 |
| 1903 | .88 | | | 8.9 |
| 1904 | | | | 3.4 |

^alime and plaster; in 1866, 1875, and 1884-1903, estimated: see text.

^bin 1875 and 1886, estimated: see text.

^cin 1866 and 1875, estimated: see text.

^din 1904, part of the year only.

Source: *Archivio Forlì*.

Table K.33
Taxed Construction Materials: Genova, 1863-1908^a

| Year | (1) Taxed binders (thousand tons) ^b 1863-1908 | (2) Taxed bricks (thousand tons) 1880-1908 | (3) <u>Taxed timber and lumber</u> (thousand tons) 1880-1908 | (4) (thousand board meters) 1880-1883 | (5) Taxed stone (thousand tons) ^c 1880-1908 | (6) Taxed sand and gravel (thousand tons) 1880-1908 | (7) Total yield (thousand lire) 1863-1908 |
|------|---|---|--|---|---|--|--|
| 1863 | 9.0 | | | | | | 99 |
| 1864 | 11.8 | | | | | | 126 |
| 1865 | 12.5 | | | | | | 125 |
| 1866 | 10.2 | | | | | | 102 |
| 1867 | 12.3 | | | | | | 126 |
| 1868 | 10.7 | | | | | | 110 |
| 1869 | 10.1 | | | | | | 131 |
| 1870 | 9.8 | | | | | | 127 |
| 1871 | 14.7 | | | | | | 230 |
| 1872 | 15.0 | | | | | | 243 |
| 1873 | 14.1 | | | | | | 227 |
| 1874 | 15.3 | | | | | | 247 |
| 1875 | 14.8 | | | | | | 239 |
| 1876 | 13.1 | | | | | | 270 |
| 1877 | 11.6 | | | | | | 239 |
| 1878 | 10.3 | | | | | | 218 |
| 1879 | 11.4 | | | | | | 245 |
| 1880 | 14.1 | 14.8 | 5.7 | 300 | 14.7 | 52.5 | 304 |
| 1881 | 14.8 | 12.9 | 5.3 | 271 | 13.3 | 53.5 | 287 |
| 1882 | 15.1 | 14.5 | 4.8 | 297 | 13.3 | 53.1 | 285 |
| 1883 | 12.5 | 11.3 | 4.7 | 249 | 13.7 | 54.1 | 265 |
| 1884 | 11.0 | 9.7 | 7.4 | | 12.3 | 50.8 | 260 |
| 1885 | 12.1 | 10.1 | 8.3 | | 15.2 | 49.6 | 293 |
| 1886 | 14.7 | 16.6 | 8.6 | | 16.1 | 56.8 | 339 |
| 1887 | 16.4 | 21.2 | 7.6 | | 16.8 | 61.1 | 373 |
| 1888 | 17.7 | 22.9 | 9.3 | | 23.1 | 88.3 | 435 |
| 1889 | 14.7 | 19.1 | 8.0 | | 27.4 | 78.2 | 450 |
| 1890 | 15.0 | 27.2 | 8.5 | | 37.4 | 85.0 | 538 |
| 1891 | 22.0 | 29.7 | 9.0 | | 46.4 | 106.8 | 641 |
| 1892 | 27.4 | 34.1 | 10.1 | | 42.2 | 108.9 | 678 |
| 1893 | 20.0 | 29.6 | 10.5 | | 29.6 | 102.9 | 595 |
| 1894 | 16.0 | 23.5 | 9.3 | | 24.3 | 79.6 | 517 |

Table K.33 (continued)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|------|------|------|------|-----|------|-------|-------|
| 1895 | 18.1 | 38.4 | 11.1 | | 24.2 | 81.3 | 557 |
| 1896 | 21.4 | 38.3 | 11.3 | | 24.8 | 94.3 | 590 |
| 1897 | 18.4 | 29.7 | 11.5 | | 19.5 | 73.5 | 555 |
| 1898 | | | | | | | |
| 1899 | 30.6 | 49.0 | 18.2 | | 20.7 | 103.0 | 1,079 |
| 1900 | 35.7 | 53.7 | 16.6 | | 19.0 | 115.5 | 1,187 |
| 1901 | 27.9 | 32.4 | 14.6 | | 15.6 | 91.8 | 977 |
| 1902 | 33.1 | 47.3 | 14.6 | | 25.5 | 117.6 | 1,023 |
| 1903 | 32.2 | 54.6 | 15.7 | | 18.1 | 102.2 | 976 |
| 1904 | 35.0 | 62.9 | 16.7 | | 18.6 | 126.6 | 1,055 |
| 1905 | 41.2 | 77.9 | 18.4 | | 24.4 | 156.9 | 1,236 |
| 1906 | 48.6 | 83.6 | 21.2 | | 28.9 | 191.4 | 1,529 |
| 1907 | 49.8 | 71.8 | 20.0 | | 21.2 | 178.3 | 1,513 |
| 1908 | 54.1 | 74.4 | 20.5 | | 34.9 | 208.5 | 1,602 |

^athe customs perimeter was significantly expanded on June 26, 1892.

^bin 1863-1879, estimated: see text.

^cincludes marble, slate, and their products; in 1880-1901, estimated: see text.

Source: *Resoconto Genova*.

Table K.34
Taxed Construction Materials: Grosseto, 1868-1903

| Year | (1) Taxed binders (thousand tons) ^a 1868-1903 | (2) Taxed bricks and flat tiles (million units) ^b 1871-1903 | (3) Taxed lumber (thousand tons) ^c 1868-1903 | (4) Taxed freestone (thousand tons) ^c 1868-1903 |
|------|---|---|--|---|
| 1868 | .306 | | .073 | .020 |
| 1869 | | | | |
| 1870 | | | | |
| 1871 | .381 | .226 | .118 | .240 |
| 1872 | .348 | .226 | .152 | .146 |
| 1873 | .333 | .145 | .170 | .168 |
| 1874 | .267 | .140 | .150 | .148 |
| 1875 | .440 | .186 | .147 | .182 |
| 1876 | .269 | .107 | .107 | .210 |
| 1877 | .125 | .065 | .066 | .052 |
| 1878 | .189 | .089 | .098 | .086 |
| 1879 | .186 | .070 | .079 | .109 |
| 1880 | .152 | .071 | .096 | .060 |
| 1881 | .214 | .095 | .105 | .066 |
| 1882 | .178 | .059 | .111 | .073 |
| 1883 | .153 | .073 | .103 | .024 |
| 1884 | .165 | .066 | .064 | .020 |
| 1885 | .178 | .051 | .051 | .024 |
| 1886 | .528 | .255 | .140 | .140 |
| 1887 | .233 | .122 | .086 | .187 |
| 1888 | .258 | .077 | .068 | .541 |
| 1889 | .393 | .197 | .148 | .223 |
| 1890 | .204 | .187 | .062 | .077 |
| 1891 | .239 | .147 | .090 | .127 |
| 1892 | .127 | .084 | .078 | .226 |
| 1893 | .183 | .072 | .056 | .067 |
| 1894 | .215 | .068 | .056 | .098 |
| 1895 | .250 | .176 | .142 | .105 |
| 1896 | .184 | .106 | .044 | .281 |
| 1897 | .116 | .087 | .060 | .029 |
| 1898 | .235 | .113 | .068 | .208 |
| 1899 | .247 | .180 | .069 | .104 |
| 1900 | .122 | .076 | .043 | .072 |
| 1901 | .198 | .173 | .081 | .060 |
| 1902 | | | | |
| 1903 | .132 | .102 | .073 | .037 |

^ain 1891, 1896, and 1898, estimated: see text.

^bin 1898-1899, estimated: see text.

^cin 1898, estimated: see text.

Source: *Archivio Grosseto*.

Table K.35
Taxed Construction Materials: Mantova, 1891-1913

| Year | (1) Taxed binders (thousand tons) 1868-1903 | (2) Taxed bricks and tiles (thousand tons) 1871-1903 | (3) Taxed lumber (thousand tons) 1868-1903 |
|------|--|---|---|
| 1891 | 1.25 | 4.11 | 1.28 |
| 1892 | 1.57 | 4.88 | 1.16 |
| 1893 | 1.12 | 3.25 | 1.10 |
| 1894 | 1.15 | 2.99 | 1.05 |
| 1895 | .98 | 2.97 | 1.08 |
| 1896 | 1.06 | 2.89 | 1.02 |
| 1897 | 1.04 | 2.55 | .92 |
| 1898 | 1.04 | 2.62 | 1.08 |
| 1899 | 1.21 | 3.14 | 1.11 |
| 1900 | 1.06 | 2.38 | 1.13 |
| 1901 | 1.20 | 2.66 | 1.09 |
| 1902 | 1.24 | 2.75 | 1.08 |
| 1903 | 1.34 | 2.75 | 1.28 |
| 1904 | 1.89 | 2.75 | 1.27 |
| 1905 | 1.35 | 2.76 | 1.44 |
| 1906 | 2.31 | 2.75 | 2.06 |
| 1907 | 1.96 | 4.25 | 1.71 |
| 1908 | 2.83 | 8.19 | 1.85 |
| 1909 | 2.66 | 7.53 | 1.96 |
| 1910 | 2.66 | 5.50 | 2.16 |
| 1911 | 4.23 | 12.73 | 2.78 |
| 1912 | 4.21 | 9.84 | 2.19 |
| 1913 | 3.92 | 10.27 | 2.23 |

Source: *Relazione Mantova*.

Table K.36
 Taxed Construction Materials: Massa, 1870-1898

| Year | (1) Taxed binders (thousand tons) ^a 1870-1898 | (2) Total yield (thousand lire) 1870-1898 |
|------|---|--|
| 1870 | .035 | 1.07 |
| 1871 | .041 | 1.27 |
| | | |
| 1880 | .100 | 2.96 |
| | | |
| 1886 | .244 | 6.98 |
| 1887 | .182 | 5.20 |
| | | |
| 1893 | .037 | .90 |
| 1894 | .020 | .48 |
| 1895 | .015 | .36 |
| 1896 | .019 | .47 |
| 1897 | | |
| 1898 | .086 | 2.10 |

^aestimated: see text.

Source: *Archivio Massa*.

Table K.37
Taxed Construction Materials: Milano, 1868-1913^a

| Year | (1) Taxed binders (thousand tons) ^b 1865-1913 | (2) Taxed bricks and tiles (million units) ^c 1881-1913 | (3) Taxed lumber (thousand tons) ^d 1881-1898 | (4) Taxed freestone (thousand tons) 1881-1913 | (5) Volume- based tax (thousand lire) ^d 1898-1913 | (6) Total yield (thousand lire) 1870-1913 |
|------|---|--|--|--|---|--|
| 1868 | 12.2 | | | | | |
| 1869 | 11.7 | | | | | |
| 1870 | 10.2 | | | | | 214 |
| 1871 | 13.6 | | | | | 289 |
| 1872 | 14.0 | | | | | 335 |
| 1873 | 17.2 | | | | | 390 |
| 1874 | 17.5 | | | | | 377 |
| 1875 | 18.9 | | | | | 388 |
| 1876 | 18.5 | | | | | 361 |
| 1877 | 19.6 | | | | | 382 |
| 1878 | 18.7 | | | | | 389 |
| 1879 | 16.6 | | | | | 376 |
| 1880 | 17.9 | | | | | 416 |
| 1881 | 17.6 | 43.7 | 16.1 | 17.5 | | 525 |
| 1882 | 15.5 | 37.3 | 11.7 | 17.3 | | 449 |
| 1883 | 16.2 | 40.4 | 12.8 | 16.1 | | 493 |
| 1884 | 16.9 | 39.6 | 12.3 | 16.0 | | 494 |
| 1885 | 16.8 | 34.6 | 11.4 | 15.1 | | 461 |
| 1886 | 15.3 | 28.5 | 11.0 | 10.5 | | 413 |
| 1887 | 15.4 | 32.2 | 12.5 | 11.8 | | 450 |
| 1888 | 24.0 | 57.6 | 17.1 | 23.2 | | 721 |
| 1889 | 27.0 | 67.1 | 16.5 | 29.1 | | 802 |
| 1890 | 22.8 | 46.8 | 13.0 | 23.5 | | 643 |
| 1891 | 18.1 | 38.1 | 11.0 | 19.6 | | 516 |
| 1892 | 15.7 | 28.1 | 9.4 | 12.5 | | 414 |
| 1893 | 17.6 | 33.5 | 10.0 | 13.1 | | 458 |
| 1894 | 18.7 | 35.4 | 10.8 | 17.9 | | 506 |
| 1895 | 16.4 | 27.0 | 10.4 | 10.7 | | 444 |
| 1896 | 15.9 | 22.9 | 10.1 | 9.6 | | 399 |
| 1897 | 18.7 | 30.5 | 11.3 | 12.5 | | 489 |
| 1898 | 24.9 | 42.4 | 7.6 | 16.2 | 10 | 551 |
| 1899 | 42.9 | 62.6 | | 29.0 | 241 | 887 |
| 1900 | 45.8 | 68.8 | | 26.6 | 276 | 966 |
| 1901 | 43.5 | 63.0 | | 36.9 | 349 | 1,023 |
| 1902 | 57.1 | 96.4 | | 48.9 | 491 | 1,427 |
| 1903 | 57.5 | 89.9 | | 42.2 | 463 | 1,345 |
| 1904 | 72.0 | 113.4 | | 41.4 | 503 | 1,569 |
| 1905 | 78.7 | 117.2 | | 47.9 | 522 | 1,700 |
| 1906 | 90.3 | 109.1 | | 53.3 | 587 | 1,825 |
| 1907 | 95.2 | 135.7 | | 51.6 | 661 | 2,042 |
| 1908 | 102.4 | 150.1 | | 58.7 | 676 | 2,217 |
| 1909 | 145.8 | 198.5 | | 55.9 | 823 | 2,888 |
| 1910 | 138.9 | 193.4 | | 52.8 | 843 | 2,839 |
| 1911 | 138.6 | 183.9 | | 53.0 | 936 | 2,907 |
| 1912 | 111.9 | 149.2 | | 43.7 | 756 | 2,368 |
| 1913 | 96.3 | 120.4 | | 32.0 | 534 | 1,886 |

^athe customs perimeter was expanded in 1889, and greatly expanded on September 1, 1898 and December 30, 1908.

^bincludes the corresponding limestone and gypsum; in 1868 and 1873-1875, estimated: see text.

^cin 1890-1893 the unit of measurement is reported as ten thousand cartloads.

^din 1898, part of the year only.

Sources: *Relazione Milano, Statistica Milano*, Zaninelli (1974).

Table K.38
Taxed Construction Materials: Novara, 1865-1913^a

| Year | (1) | (2) | (3) | (4) Total yield (thousand lire) | | (5) |
|------|--|--|---|------------------------------------|----------------------------|-----|
| | Taxed binders (thousand tons) ^b 1865-1913 | Taxed bricks and tiles (million units) 1865-1913 | Taxed lumber (thousand tons) ^c 1865-1912 | Closed municip. 1884-1913 | Open municip. 1906-1913 | |
| 1865 | 1.25 | 1.43 | .92 | | | |
| 1866 | 1.15 | 1.41 | .68 | | | |
| 1867 | .96 | .93 | 1.05 | | | |
| 1868 | .61 | .59 | 1.04 | | | |
| 1869 | .44 | .51 | 1.08 | | | |
| 1870 | .44 | .89 | 1.11 | | | |
| 1871 | .47 | .85 | 1.12 | | | |
| 1872 | .47 | .69 | 1.24 | | | |
| 1873 | .52 | .59 | 1.44 | | | |
| 1874 | .58 | 1.04 | 1.72 | | | |
| 1875 | .39 | .34 | 1.81 | | | |
| 1876 | .48 | .53 | 1.43 | | | |
| 1877 | .95 | 2.34 | 1.62 | | | |
| 1878 | .59 | .85 | 1.31 | | | |
| 1879 | .44 | .76 | 1.23 | | | |
| 1880 | | | | | | |
| 1881 | | | | | | |
| 1882 | | | | | | |
| 1883 | | | | | | |
| 1884 | 1.58 | 3.26 | 1.36 | 10.6 | | |
| 1885 | 1.76 | 2.49 | .94 | 9.3 | | |
| 1886 | 2.07 | 6.16 | 2.18 | 17.9 | | |
| 1887 | 2.57 | 4.22 | 1.70 | 15.6 | | |
| 1888 | 2.13 | 3.65 | 1.84 | 14.1 | | |
| 1889 | 2.19 | 4.71 | 2.00 | 15.7 | | |
| 1890 | 2.12 | 4.16 | 1.55 | 16.5 | | |
| 1891 | 1.49 | 2.72 | 1.28 | 12.8 | | |
| 1892 | .77 | .65 | 1.13 | 8.0 | | |
| 1893 | .90 | .22 | 1.02 | 8.0 | | |
| 1894 | .94 | 1.02 | 1.19 | 9.1 | | |
| 1895 | 1.27 | .92 | 1.45 | 10.7 | | |
| 1896 | 1.51 | 1.53 | 1.64 | 12.4 | | |
| 1897 | 1.76 | 1.08 | 1.27 | 12.4 | | |
| 1898 | 1.77 | 1.10 | 1.29 | 12.6 | | |
| 1899 | 1.43 | 1.86 | .84 | 11.5 | | |
| 1900 | 1.10 | 1.08 | .88 | 9.5 | | |
| 1901 | .94 | .87 | 1.00 | 9.2 | | |
| 1902 | 1.20 | .62 | .94 | 10.3 | | |
| 1903 | 1.90 | 1.58 | 1.03 | 12.1 | | |
| 1904 | 1.91 | 3.87 | 1.30 | 17.4 | | |
| 1905 | 1.71 | 3.13 | 1.20 | 15.0 | | |
| 1906 | 2.31 | 3.17 | 1.22 | 18.9 | 3.0 | |
| 1907 | 1.81 | 3.13 | .98 | 17.6 | 15.2 | |
| 1908 | 1.92 | 1.71 | 1.11 | 15.5 | 25.4 | |
| 1909 | 1.59 | 1.11 | 1.03 | 13.7 | 34.5 | |
| 1910 | 1.67 | 1.38 | 1.02 | 13.5 | 40.6 | |
| 1911 | 3.20 | 2.74 | 1.29 | 19.1 | 33.2 | |
| 1912 | 6.26 | 5.13 | .27 | 48.7 | 29.5 | |
| 1913 | 8.26 | 10.00 | | 76.8 | 11.6 | |

^athe customs perimeter was expanded on February 1, 1886, and greatly expanded on April 12, 1912.

^bin 1865-1866, estimated; in 1884 and 1885, includes 300 and 600 tons, respectively, estimated for the the area added to the closed municipality in 1886: see text.

^cin 1912, part of the year only.

Sources: *Archivio Novara, Atti Novara.*

Table K.39
Taxed Construction Materials: Padova, 1869-1913

| Year | (1) | (2) | (3) | (4) |
|------|--|--|-------|---|
| | Taxed binders (thousand tons) ^a 1869-1913 | Taxed bricks and tiles (million units) ^a 1869-1904 1904-1913 | | Taxed lumber (thousand tons) ^a 1869-1903 |
| 1869 | 1.44 | 1.99 | | 2.16 |
| 1870 | 1.42 | 1.94 | | 1.87 |
| 1871 | 1.64 | 3.23 | | 2.34 |
| 1872 | 1.81 | 3.12 | | 2.17 |
| 1873 | 1.98 | 2.82 | | 2.58 |
| 1874 | 2.24 | 4.33 | | 2.47 |
| 1875 | 2.07 | 3.38 | | 2.54 |
| 1876 | 2.40 | 3.87 | | 2.11 |
| 1877 | 1.90 | 2.85 | | 2.23 |
| 1878 | 1.70 | 2.59 | | 2.00 |
| 1879 | 1.83 | 3.53 | | 1.94 |
| 1880 | 1.70 | 2.65 | | 2.14 |
| 1881 | 1.69 | 2.99 | | 2.40 |
| 1882 | 1.81 | 2.91 | | 2.23 |
| 1883 | 1.80 | 2.56 | | 2.22 |
| 1884 | 2.00 | 2.99 | | 2.49 |
| 1885 | 1.92 | 3.24 | | 2.45 |
| 1886 | 1.72 | 2.83 | | 2.30 |
| 1887 | 1.96 | 2.86 | | 2.48 |
| 1888 | 2.65 | 6.01 | | 3.23 |
| 1889 | 2.24 | 4.64 | | 2.94 |
| 1890 | 1.72 | 3.13 | | 2.27 |
| 1891 | 1.76 | 3.03 | | 2.39 |
| 1892 | 1.51 | 2.29 | | 2.42 |
| 1893 | 1.80 | 2.77 | | 2.42 |
| 1894 | 2.01 | 3.19 | | 2.76 |
| 1895 | 1.88 | 2.82 | | 2.58 |
| 1896 | 1.86 | 2.85 | | 2.46 |
| 1897 | 1.67 | 2.36 | | 2.56 |
| 1898 | 1.79 | 2.58 | | 2.57 |
| 1899 | 2.00 | 2.59 | | 2.70 |
| 1900 | 2.08 | 2.67 | | 2.50 |
| 1901 | 1.79 | 2.13 | | 2.35 |
| 1902 | 1.95 | 2.63 | | 2.45 |
| 1903 | 2.17 | 3.25 | | 2.48 |
| 1904 | 2.45 | .29 | 9.49 | |
| 1905 | 2.76 | | 9.53 | |
| 1906 | 5.26 | | 20.74 | |
| 1907 | 4.66 | | 14.73 | |
| 1908 | 5.30 | | 21.02 | |
| 1909 | 5.81 | | 21.36 | |
| 1910 | 6.98 | | 30.85 | |
| 1911 | 7.87 | | 31.75 | |
| 1912 | 7.01 | | 24.80 | |
| 1913 | 6.11 | | 20.22 | |

^ain 1885, estimated: see text.

Sources: *Consuntivo Padova, Rendiconto Padova.*

Table K.40
Taxed Construction Materials: Pavia, 1865-1913

| Year | (1) Taxed binders (thousand tons) ^a 1865-1913 | (2) <u>Taxed bricks and tiles</u> (million units) 1865-1872 | (3) (thousand tons) 1889-1913 | (4) Taxed lumber (thousand tons) 1865-1913 | (5) Taxed stone (thousand tons) ^b 1865-1913 | (6) Total yield (thousand lire) 1886-1913 |
|------|---|---|--|---|---|--|
| 1865 | .79 | 1.17 | | 1.22 | 1.06 | |
| | | | | | | |
| 1871 | .74 | 1.27 | | 1.17 | 1.09 | |
| 1872 | .92 | 2.09 | | 1.19 | 1.45 | |
| | | | | | | |
| 1886 | .94 | | | | | 26.7 |
| 1887 | 1.00 | | | | | 28.5 |
| 1888 | 1.41 | | | | | 40.3 |
| 1889 | 1.24 | | 5.27 | 1.07 | 1.80 | 35.4 |
| 1890 | .99 | | 2.05 | .87 | 1.99 | 29.6 |
| 1891 | .93 | | | | | 28.7 |
| 1892 | 1.01 | | | | | 32.4 |
| 1893 | .93 | | | | | 31.0 |
| 1894 | .98 | | | | | 33.8 |
| 1895 | 1.12 | | 3.75 | 1.10 | 2.03 | 39.8 |
| 1896 | 1.20 | | 4.12 | 1.07 | 2.93 | 30.9 |
| 1897 | .94 | | 2.97 | .97 | 2.42 | 29.1 |
| 1898 | 1.08 | | 2.94 | .92 | 2.20 | 26.7 |
| 1899 | 1.10 | | 3.20 | .99 | 2.08 | 28.7 |
| 1900 | 1.23 | | 2.96 | .99 | 2.30 | 29.3 |
| | | | | | | |
| 1906 | 2.13 | | | | | 65.6 |
| 1907 | 1.51 | | | | | 46.7 |
| 1908 | 2.08 | | 11.21 | 1.32 | 1.14 | 64.2 |
| 1909 | 2.52 | | 10.52 | 1.43 | 1.75 | 74.8 |
| 1910 | 1.87 | | 8.22 | 1.26 | 1.38 | 56.8 |
| 1911 | 2.72 | | 9.01 | 3.03 | 1.25 | 69.0 |
| 1912 | 2.85 | | 11.10 | 2.97 | 1.36 | 71.0 |
| 1913 | 1.78 | | 5.24 | 1.88 | .92 | 51.8 |

^ain 1886-1888, 1891-1894, and 1906-1907, estimated: see text.

^bincludes stone products.

Sources: *Archivio Pavia, Rendiconto Pavia.*

Table K.41
Taxed Construction Materials: Perugia, 1861-1913

| Year | (1) | (2) | (3) | (4) | (5) (6) (7) Tax yield (thousand lire) | | |
|------|--|-----------------------------------|-----------------------------------|----------------------------------|--|-------------------------------------|---|
| | Taxed binders (thousand tons) ^a 1906-1913 | Taxed bricks (million units) 1906 | Taxed lumber (thousand tons) 1906 | Taxed stone (thousand tons) 1906 | Tax on bricks 1906-1911 | Taxes on bricks and stone 1910-1913 | Taxes on lumber and wood products 1906-1913 |
| 1906 | 2.25 | 1.00 | 1.09 | 1.03 | 2.19 | | 3.18 |
| 1907 | 2.07 | | | | 2.03 | | 2.92 |
| 1908 | 2.32 | | | | 2.17 | | 3.37 |
| 1909 | 2.86 | | | | 2.99 | | 3.83 |
| 1910 | 3.12 | | | | 3.36 | 3.67 | 4.05 |
| 1911 | 2.71 | | | | 2.81 | 3.05 | 3.67 |
| 1912 | 2.31 | | | | | 2.50 | 3.23 |
| 1913 | 2.21 | | | | | 2.13 | 3.35 |

^ain 1907-1913, estimated: see text.

Sources: *Annuario Perugia, Resoconto Perugia*.

Table K.42
Taxed Construction Materials: Piacenza, 1861-1893

| Year | (1) Taxed binders (thousand tons) ^a 1861-1893 | (2) Taxed bricks and tiles (million units) ^b 1861-1872 | (3) Taxed lumber (thousand tons) ^c 1861-1872 | (4) Taxed freestone (thousand tons) ^b 1863-1872 | (5) Total yield (thousand lire) 1868-1893 |
|------|---|--|--|---|--|
| 1861 | 1.48 | 1.17 | 4.62 | | |
| 1862 | 1.98 | 2.84 | 3.80 | | |
| 1863 | 1.20 | 1.74 | 3.39 | 2.41 | |
| 1864 | | | | | |
| 1865 | 2.56 | 2.38 | 1.69 | .54 | |
| 1866 | 1.95 | 3.57 | 1.53 | .71 | |
| 1867 | 2.05 | 2.15 | 1.24 | 1.52 | |
| 1868 | 1.41 | 1.08 | 1.26 | 1.33 | 18.0 |
| 1869 | 1.14 | .67 | 1.02 | .68 | 13.3 |
| 1870 | .97 | .58 | 1.46 | .76 | 13.9 |
| 1871 | 1.00 | .56 | 1.51 | .66 | 14.2 |
| 1872 | 1.14 | .29 | 1.61 | .56 | 13.3 |
| 1873 | 1.21 | | | | 14.1 |
| 1874 | 1.20 | | | | 14.0 |
| 1875 | 1.07 | | | | 14.9 |
| 1876 | 1.05 | | | | 16.5 |
| 1877 | 1.17 | | | | 19.1 |
| 1878 | 1.25 | | | | 20.4 |
| 1879 | 1.23 | | | | 20.0 |
| 1880 | 1.57 | | | | 25.6 |
| 1881 | 1.60 | | | | 26.0 |
| 1882 | 1.34 | | | | 21.8 |
| 1883 | 1.58 | | | | 25.8 |
| 1884 | 1.27 | | | | 20.6 |
| 1885 | 1.48 | | | | 28.4 |
| 1886 | 1.34 | | | | 25.7 |
| 1887 | 1.43 | | | | 27.5 |
| 1888 | 1.53 | | | | 29.3 |
| 1889 | 1.28 | | | | 24.6 |
| 1890 | 1.15 | | | | 22.1 |
| 1891 | 1.27 | | | | 24.4 |
| 1892 | 1.76 | | | | 33.8 |
| 1893 | 1.66 | | | | 31.8 |

^ain 1866 and 1873-1893, estimated: see text.

^bin 1866, estimated: see text.

^cin 1861-1863, thousand cubic meters; in 1866, estimated: see text.

Source: *Archivio Piacenza*.

Table K.43
Taxed Construction Materials: Prato, 1876-1913

| Year | (1) Taxed binders (thousand tons) 1876-1913 | (2) Taxed bricks (thousand tons) ^a 1876-1913 | (3) Taxed timber (thousand tons) 1876-1913 | (4) <u>Taxed rubble and freestone</u> (thousand tons) 1876-1913 | (5) <u>(thousand cubic meters)</u> 1881-1913 |
|------|--|--|---|---|--|
| 1876 | .43 | .24 | .35 | .46 | |
| 1877 | .56 | .41 | .35 | .92 | |
| 1878 | .52 | .33 | .23 | .68 | |
| 1879 | .56 | .41 | .29 | .79 | |
| 1880 | .65 | .74 | .38 | .95 | |
| 1881 | .24 | .07 | .26 | .01 | .08 |
| 1882 | .22 | .08 | .21 | .02 | .02 |
| 1883 | .53 | .53 | .35 | .37 | .03 |
| 1884 | .58 | .83 | .38 | .80 | .03 |
| 1885 | .74 | .92 | .42 | .83 | .25 |
| 1886 | .68 | 1.03 | .41 | .73 | .63 |
| 1887 | .87 | 1.31 | .52 | .58 | .21 |
| 1888 | .73 | 1.04 | .44 | .95 | .34 |
| 1889 | .93 | 1.41 | .55 | 1.33 | 1.07 |
| 1890 | .93 | .45 | .38 | 1.19 | .25 |
| 1891 | .62 | .99 | .40 | .92 | .20 |
| 1892 | .65 | 1.02 | .34 | .80 | .23 |
| 1893 | .65 | .79 | .29 | .96 | .12 |
| 1894 | .70 | 1.01 | .33 | .85 | .23 |
| 1895 | .69 | .72 | .37 | .93 | .24 |
| 1896 | .71 | 1.10 | .40 | .84 | .35 |
| 1897 | .85 | 1.55 | .35 | .90 | .43 |
| 1898 | .70 | .80 | .51 | 1.04 | .18 |
| 1899 | .81 | .79 | .65 | .85 | .17 |
| 1900 | .82 | .71 | .59 | .99 | .20 |
| 1901 | .91 | 1.03 | .54 | .82 | .27 |
| 1902 | .91 | .89 | .51 | .98 | .19 |
| 1903 | 1.06 | 1.16 | .53 | .82 | .28 |
| 1904 | 1.05 | 1.03 | .50 | 1.19 | .13 |
| 1905 | .94 | 1.21 | .54 | 1.13 | .26 |
| 1906 | .98 | .94 | .51 | .82 | .21 |
| 1907 | 1.12 | .87 | .63 | 1.32 | .41 |
| 1908 | 1.16 | 1.42 | .59 | 1.03 | .61 |
| 1909 | 1.25 | 1.47 | .45 | 1.17 | .51 |
| 1910 | 1.03 | .83 | .48 | 1.09 | .31 |
| 1911 | 1.29 | 1.55 | .55 | 1.27 | .50 |
| 1912 | 1.40 | 1.61 | .55 | 1.48 | .44 |
| 1913 | 1.73 | 2.07 | .55 | 1.22 | .80 |

^ain 1884, estimated: see text.

Source: *Archivio Prato*.

Table K.44
Taxed Construction Materials: Ravenna, 1862-1878

| Year | (1) Taxed binders (thousand tons) ^a 1862-1878 | (2) Taxed bricks, tiles, stones (million units) ^a 1865-1878 | (3) Taxed lumber (thousand tons) ^a 1862-1878 |
|------|---|---|--|
| 1862 | 1.45 | | .54 |
| 1863 | 1.28 | | .46 |
| 1864 | | | |
| 1865 | .90 | 1.02 | .36 |
| 1866 | .73 | .75 | .22 |
| 1867 | .65 | .48 | .26 |
| 1868 | .50 | .43 | .19 |
| 1869 | .64 | .51 | .29 |
| 1870 | .47 | .32 | .20 |
| 1871 | .56 | .52 | .26 |
| 1872 | .71 | .63 | .31 |
| 1876 | .60 | .60 | .31 |
| 1874 | .49 | .63 | .28 |
| 1875 | .64 | .56 | .32 |
| 1876 | .78 | .71 | .33 |
| 1877 | .69 | .57 | .30 |
| 1878 | .70 | .40 | .31 |

^ain 1870 and 1878, estimated: see text.

Source: *Archivio Ravenna*.

Table K.45
Taxed Construction Materials: Roma, 1871-1913^a

| Year | (1) Taxed binders (thousand tons) ^b 1871-1913 | (2) Taxed bricks and tiles (million units) ^c 1871-1913 | (3) Taxed lumber (thousand tons) 1885-1913 | (4) Taxed freestone (thousand cu. m.) ^c 1871-1913 | (5) Taxed rubble (thousand cu. m.) ^c 1871-1913 |
|------|---|--|---|---|--|
| 1871 | 10.7 | 13.0 | | 2.2 | 210 |
| 1872 | 18.9 | 15.1 | | 1.9 | 225 |
| 1873 | 34.8 | 26.6 | | 4.4 | 227 |
| 1874 | 39.5 | 47.6 | | 6.9 | 300 |
| 1875 | 27.3 | 23.3 | | 4.8 | 233 |
| 1876 | 19.6 | 22.4 | | 3.9 | 170 |
| 1877 | 21.4 | 23.7 | | 3.5 | 161 |
| 1878 | 21.8 | 24.5 | | 2.8 | 177 |
| 1879 | 25.0 | 33.5 | | 3.1 | 213 |
| 1880 | 31.0 | 47.4 | | 4.7 | 288 |
| 1881 | 38.5 | 53.5 | | 4.3 | 276 |
| 1882 | 41.1 | 62.3 | | 6.1 | 319 |
| 1883 | 52.0 | 78.7 | | 5.0 | 348 |
| 1884 | 68.6 | 87.6 | | 6.2 | 499 |
| 1885 | 93.9 | 118.4 | 38.7 | 9.2 | 769 |
| 1886 | 122.8 | 144.4 | 46.8 | 8.6 | 1,036 |
| 1887 | 153.7 | 188.9 | 52.3 | 9.7 | 1,367 |
| 1888 | 118.6 | 129.3 | 32.0 | 10.2 | 955 |
| 1889 | 87.8 | 82.2 | 22.3 | 12.4 | 775 |
| 1890 | 58.1 | 66.3 | 22.2 | 16.0 | 516 |
| 1891 | 36.3 | 41.0 | 14.3 | 15.6 | 348 |
| 1892 | 26.3 | 26.0 | 12.6 | 13.3 | 201 |
| 1893 | 23.4 | 22.5 | 14.5 | 10.7 | 163 |
| 1894 | 19.6 | 20.7 | 12.3 | 6.6 | 118 |
| 1895 | 21.2 | 14.8 | 11.0 | 3.3 | 123 |
| 1896 | 17.8 | 16.7 | | 1.9 | 101 |
| 1897 | 18.4 | 18.4 | | 4.5 | 100 |
| 1898 | 20.4 | 16.6 | 16.1 | 7.6 | 99 |
| 1899 | 27.8 | 32.0 | 20.4 | 9.8 | 172 |
| 1900 | 31.6 | 33.0 | 20.7 | 7.9 | 191 |
| 1901 | 37.3 | 41.6 | | 5.8 | 225 |
| 1902 | 40.1 | 45.0 | | 5.4 | 256 |
| 1903 | 40.5 | 42.9 | | 4.3 | 223 |
| 1904 | 43.0 | 47.7 | | 4.8 | 248 |
| 1905 | 45.5 | 46.6 | | 3.2 | 278 |
| 1906 | 62.8 | 57.8 | | 2.5 | 420 |
| 1907 | 65.3 | 55.4 | 35.6 | 1.2 | 380 |
| 1908 | 53.6 | 44.8 | 26.7 | .8 | 315 |
| 1909 | 62.0 | 62.7 | 38.8 | 4.3 | 401 |
| 1910 | 87.1 | 45.0 | 57.9 | 4.2 | 500 |
| 1911 | | | | | |
| 1912 | 104.8 | 51.8 | 38.1 | 5.4 | 568 |
| 1913 | 103.7 | 45.9 | 41.5 | 4.7 | 480 |

^athe customs perimeter was expanded on April 16, 1886 and April 2, 1888.

^bin 1871-1872, estimated: see text.

^cin 1871, estimated: see text.

Sources: *Annuario Roma, Notizie città, Relazione Roma, Rivista mineraria.*

Table K.46
Taxed Construction Materials: Savona, 1861-1888

| Year | (1) Taxed lime (thousand tons) 1861-1888 | (2) Taxed bricks (million units) 1861-1888 | (3) Taxed square tiles (million units) 1861-1888 | (4) Total yield (thousand lire) 1861-1888 |
|------|---|---|---|--|
| 1861 | .39 | .04 | .04 | 12.2 |
| 1862 | .58 | .07 | .05 | 12.0 |
| 1863 | .78 | .10 | .08 | 13.9 |
| 1864 | 1.42 | .27 | .09 | 17.3 |
| 1865 | 1.27 | .21 | .05 | 17.8 |
| 1866 | 1.08 | .02 | .05 | 17.8 |
| 1867 | 1.49 | .07 | .09 | 24.1 |
| 1868 | 1.71 | .02 | .25 | 26.1 |
| 1869 | 3.18 | .04 | .30 | 37.6 |
| 1870 | 3.47 | .15 | .65 | 37.8 |
| 1871 | 3.13 | .12 | .36 | 37.1 |
| 1872 | 3.80 | .15 | .37 | 40.5 |
| 1873 | 2.54 | .04 | .48 | 33.7 |
| 1874 | 2.28 | .02 | .69 | 34.3 |
| 1875 | 1.39 | .12 | .31 | 23.1 |
| 1876 | 2.02 | .79 | .73 | 25.6 |
| 1877 | 1.34 | .02 | .44 | 18.6 |
| 1878 | 1.84 | .12 | .21 | 19.3 |
| 1879 | 1.64 | .15 | .53 | 21.3 |
| 1880 | 1.93 | .08 | .43 | 23.4 |
| 1881 | 2.56 | .29 | .90 | 33.4 |
| 1882 | 3.19 | .33 | 1.01 | 40.0 |
| 1883 | 3.44 | .43 | .97 | 43.0 |
| 1884 | 3.82 | .20 | 1.32 | 55.2 |
| 1885 | 2.93 | .25 | 1.25 | 44.4 |
| 1886 | 2.64 | .26 | .85 | 35.7 |
| 1887 | 3.27 | .48 | .66 | 47.1 |
| 1888 | 4.09 | .28 | .79 | 54.8 |

Source: *Archivio Savona*.

Table K.47
Taxed Construction Materials: Siena, 1865-1886

| Year | (1) Taxed binders (thousand tons) ^a 1865-1886 | (2) Taxed marble, lime, and clay products (thousand tons) 1865-1886 | (3) Taxed lumber (thousand tons) 1865-1886 |
|------|---|--|---|
| 1865 | 2.06 | 8.24 | .97 |
| 1866 | 1.85 | 7.38 | .87 |
| 1867 | 2.28 | 9.13 | .85 |
| 1868 | 1.80 | 7.21 | .95 |
| 1869 | 1.61 | 6.45 | 1.05 |
| 1870 | 2.75 | 11.03 | 1.20 |
| 1871 | 2.23 | 8.93 | .91 |
| 1872 | 1.87 | 7.46 | .89 |
| 1873 | 1.72 | 6.87 | .99 |
| 1874 | 1.63 | 6.50 | .89 |
| 1875 | 1.33 | 5.32 | .87 |
| 1876 | 1.55 | 6.21 | .85 |
| 1877 | 1.43 | 5.70 | .78 |
| 1878 | 1.88 | 7.52 | .83 |
| 1879 | 1.49 | 5.97 | .77 |
| 1880 | 1.59 | 6.36 | .89 |
| 1881 | 1.10 | 4.38 | .97 |
| 1882 | 1.05 | 4.20 | .84 |
| 1883 | .79 | 3.15 | .96 |
| 1884 | 1.28 | 5.10 | 1.01 |
| 1885 | 1.25 | 4.98 | 1.06 |
| 1886 | 1.16 | 4.62 | 1.03 |

^aestimated: see text.

Source: *Dazio Siena*.

Table K.48
Taxed Construction Materials: Torino, 1898-1913^a

| Year | (1) Taxed binders (thousand tons) ^b 1898-1910 | (2) Taxed bricks (million units) ^c 1898-1910 | (3) Taxed lumber (thousand tons) ^d 1908-1913 | (4) Taxed freestone (thousand tons) ^e 1898-1913 | (5) Taxed rubble (thousand tons) ^f 1901-1910 | (6) Total yield (thousand lire) ^g 1898-1913 | (7) Volume- based tax (thousand lire) ^h 1910-1913 |
|------|---|--|--|---|--|---|---|
| 1898 | 22.3 | 26.5 | | 4.7 | | 116 | |
| 1899 | 41.7 | 56.8 | | 10.3 | | 194 | |
| 1900 | 46.1 | 58.2 | | 10.9 | | 135 | |
| 1901 | 45.6 | 55.7 | | 14.9 | 11.6 | 224 | |
| 1902 | 44.2 | 54.0 | | 17.1 | 11.2 | 230 | |
| 1903 | 51.1 | 66.8 | | 19.8 | 15.5 | 264 | |
| 1904 | 62.4 | 85.7 | | 21.0 | 19.6 | 320 | |
| 1905 | 66.6 | 81.1 | | 24.9 | 18.8 | 357 | |
| 1906 | 66.9 | 86.7 | | 26.5 | 25.6 | 431 | |
| 1907 | 64.0 | 77.1 | | 22.5 | 18.1 | 412 | |
| 1908 | 65.6 | 91.2 | 78.8 | 22.0 | 22.2 | 489 | |
| 1909 | 72.4 | 106.8 | 83.3 | 23.1 | 17.5 | 437 | |
| 1910 | 5.5 | 8.4 | 79.4 | 23.6 | 1.5 | 382 | 536 |
| 1911 | | | 72.8 | 25.4 | | 437 | 986 |
| 1912 | | | 92.3 | 26.9 | | 420 | 1,475 |
| 1913 | | | 83.7 | 29.3 | | 460 | 1,030 |

^athe customs perimeter was significantly expanded on September 2, 1912.

^bin 1898, from May 22; in 1910, through February 9.

^cin 1898, from May 22; in 1910, through February 9; in 1906-1910, estimated: see text.

^din 1913, includes 5,000 tons actually imported in 1911 or earlier.

^ein 1898, from May 22.

^fin 1910, through February 9.

^gtaxes on goods imported through the customs perimeter, excluding lumber; in 1898, from May 22.

^hyield from the entire municipality; in 1910, from February 10.

Sources: *Annuario Torino, Statistica Torino.*

Table K.49
Taxed Construction Materials: Treviso, 1869-1913^a

| Year | (1) | (2) | (3) | (4) Total yield (thousand lire) | | (5) |
|------|--|---|--|------------------------------------|----------------------------|------|
| | Taxed binders (thousand tons) ^b 1869-1913 | Taxed bricks and tiles (thousand tons) ^c 1872-1910 | Taxed lumber (thousand tons) 1872-1910 | Closed municip. 1869-1913 | Open municip. 1909-1913 | |
| 1869 | .59 | | | 14.7 | | |
| 1870 | .44 | | | 11.0 | | |
| 1871 | .38 | | | 9.6 | | |
| 1872 | .37 | .60 | .75 | 9.0 | | |
| 1873 | .42 | | | 10.4 | | |
| 1874 | .47 | | | 11.8 | | |
| 1875 | .60 | | | 14.9 | | |
| 1876 | .50 | | | 12.6 | | |
| 1877 | .49 | | | 12.2 | | |
| 1878 | .54 | | | 13.4 | | |
| 1879 | .45 | | | 11.3 | | |
| 1880 | .43 | | | 10.7 | | |
| 1881 | .37 | 1.47 | .67 | 9.6 | | |
| 1882 | .44 | 1.83 | .70 | 10.8 | | |
| 1883 | .51 | 1.86 | .82 | 11.6 | | |
| 1884 | .71 | 2.82 | .93 | 14.6 | | |
| 1885 | .60 | 1.74 | .73 | 11.7 | | |
| 1886 | | | | | | |
| 1887 | .73 | | | 14.6 | | |
| 1888 | .66 | | | 13.2 | | |
| 1889 | .55 | | | 11.0 | | |
| 1890 | .65 | | | 13.0 | | |
| 1891 | | | | | | |
| 1892 | | | | | | |
| 1893 | .56 | 1.84 | .77 | 12.4 | | |
| 1894 | | | | | | |
| 1895 | | | | | | |
| 1896 | | | | | | |
| 1897 | .89 | 3.75 | .94 | 16.5 | | |
| 1898 | | | | | | |
| 1899 | | | | | | |
| | | | | | | |
| 1905 | .80 | 1.57 | 1.02 | 15.1 | | |
| 1906 | 1.07 | 3.13 | 1.06 | 18.5 | | |
| 1907 | 1.49 | 4.95 | 1.26 | 25.3 | | |
| 1908 | 1.43 | 4.24 | 1.27 | 26.0 | | |
| 1909 | 1.93 | 6.08 | 1.37 | 30.7 | | 5.4 |
| 1910 | 2.15 | 8.14 | 1.97 | 39.8 | | 25.0 |
| 1911 | 1.67 | | | 31.0 | | 39.1 |
| 1912 | 1.26 | | | 23.4 | | 35.1 |
| 1913 | 1.10 | | | 20.3 | | 48.0 |

^athe figures reported for 1893 and 1897 are the averages over 1891-1895 and 1896-1899, respectively.

^bin 1869-1871, 1873-1880, and 1911-1913, estimated: see text.

^cin 1872, million units.

Sources: *Archivio Treviso, Dazio Treviso, Resoconto Treviso.*

Table K.50
Taxed Construction Materials: Verona, 1871-1885

| Year | (1) Taxed binders (thousand tons) ^a 1871-1885 | (2) Taxed bricks and tiles (thousand tons) 1877 | (3) Taxed lumber (thousand tons) 1877 | (4) Taxed rubble (thousand tons) 1877 | (5) Total yield (thousand lire) 1871-1885 |
|------|---|--|--|--|--|
| 1871 | 1.38 | | | | 35.8 |
| 1872 | 1.28 | | | | 33.2 |
| 1873 | 1.66 | | | | 42.6 |
| 1874 | 1.56 | | | | 40.4 |
| 1875 | | | | | |
| 1876 | | | | | |
| 1877 | 1.47 | 3.10 | 3.50 | 3.91 | 40.9 |
| 1878 | 1.43 | | | | 39.7 |
| 1879 | | | | | |
| 1880 | | | | | |
| 1881 | 1.80 | | | | 62.4 |
| 1882 | 2.20 | | | | 76.4 |
| 1883 | 2.60 | | | | 90.4 |
| 1884 | 2.07 | | | | 71.9 |
| 1885 | 1.69 | | | | 58.9 |

^ain 1871-1874, 1878, and 1881-1885, estimated: see text.

Sources: *Archivio Verona, Resoconto Verona.*

Table K.51
Taxed Construction Materials: Vicenza, 1901-1913

| Year | (1) Taxed binders (thousand tons) ^a 1901-1913 | (2) Taxed bricks and tiles (thousand tons) 1908-1913 | (3) Taxed lumber (thousand tons) 1908-1913 | (4) Total yield (thousand lire) 1901-1913 |
|------|---|---|---|--|
| 1901 | 1.05 | | | 37.8 |
| 1902 | | | | |
| 1903 | | | | |
| 1904 | | | | |
| 1905 | 1.37 | | | 49.2 |
| 1906 | 1.62 | | | 58.3 |
| 1907 | | | | |
| 1908 | 2.02 | 8.18 | 1.64 | 72.5 |
| 1909 | 1.73 | 6.68 | 1.55 | 74.3 |
| 1910 | 1.79 | 8.50 | 1.85 | 77.1 |
| 1911 | 1.87 | 9.03 | 1.68 | 77.4 |
| 1912 | 2.38 | 10.59 | 1.38 | 73.3 |
| 1913 | 2.00 | 9.27 | 1.13 | 65.6 |

^ain 1901 and 1905-1906, estimated: see text.

Sources: *Consuntivo Vicenza, Resoconto Vicenza.*

Table K.52
An Index of Urban Construction
Based on Binder Consumption Data, 1861-1913

| Year | (1) | (2) | (3) | (4) | (5) | (6) |
|------|---|----------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| | Ratio of current year's binder consumption to previous year's | | | | | |
| | Alessandria ^a 1862-1905 | Bologna 1866-1913 | Brescia ^b 1866-1913 | Carrara ^c 1887-1895 | Ferrara ^d 1862-1913 | Firenze ^e 1866-1913 |
| 1861 | | | | | | |
| 1862 | 1.240 | | | | 1.125 | |
| 1863 | .631 | | | | .889 | |
| 1864 | .769 | | | | .946 | |
| 1865 | 1.060 | | | | .946 | |
| 1866 | .652 | .747 | .937 | | .913 | .899 |
| 1867 | 1.424 | .988 | .937 | | .761 | 1.398 |
| 1868 | .977 | 1.177 | .937 | | 1.050 | .829 |
| 1869 | .953 | 1.313 | .937 | | .970 | 1.599 |
| 1870 | 1.180 | .874 | .937 | | .970 | 1.083 |
| 1871 | 1.215 | 1.160 | .937 | | 1.178 | .667 |
| 1872 | 1.171 | .941 | 1.130 | | .989 | .899 |
| 1873 | 1.088 | .873 | 1.238 | | .820 | 1.141 |
| 1874 | .925 | 1.030 | 1.291 | | 1.033 | .816 |
| 1875 | .925 | .942 | .933 | | 1.071 | .853 |
| 1876 | .925 | 1.015 | .933 | | .988 | .766 |
| 1877 | .925 | 1.118 | .933 | | .988 | .853 |
| 1878 | 1.067 | .874 | .933 | | .988 | .739 |
| 1879 | 1.089 | 1.185 | 1.088 | | .988 | .854 |
| 1880 | 1.089 | 1.042 | 1.130 | | .988 | 1.053 |
| 1881 | 1.089 | 1.132 | .907 | | 1.135 | 1.243 |
| 1882 | 1.089 | .977 | .921 | | 1.085 | .998 |
| 1883 | 1.089 | .840 | 1.388 | | .823 | 1.215 |
| 1884 | 1.089 | 1.234 | .962 | | 1.063 | 1.075 |
| 1885 | 1.089 | 1.077 | .985 | | 1.061 | 1.130 |
| 1886 | 1.557 | 1.179 | .992 | | 1.061 | 1.139 |
| 1887 | 1.059 | .935 | .992 | 1.018 | 1.175 | .946 |
| 1888 | 1.059 | .989 | .992 | .689 | .802 | 1.104 |
| 1889 | 1.158 | .946 | .992 | .564 | 1.056 | .930 |
| 1890 | .934 | .842 | .992 | .936 | .718 | 1.133 |
| 1891 | .934 | 1.001 | .992 | .777 | 1.040 | 1.146 |
| 1892 | .934 | .920 | .992 | 1.475 | 1.040 | .799 |
| 1893 | .934 | 1.137 | .992 | .712 | 1.040 | 1.024 |
| 1894 | .934 | .910 | .992 | .699 | 1.040 | .920 |
| 1895 | .934 | 1.117 | .962 | .699 | 1.040 | 1.029 |
| 1896 | .934 | .977 | .978 | | 1.134 | .881 |
| 1897 | .934 | .933 | .977 | | .882 | .897 |
| 1898 | .949 | 1.012 | 1.047 | | .957 | .961 |
| 1899 | 1.045 | .991 | 1.084 | | 1.057 | .940 |
| 1900 | 1.045 | .940 | .912 | | .964 | 1.014 |
| 1901 | 1.045 | | 1.328 | | 1.124 | .997 |
| 1902 | 1.045 | | .932 | | 1.124 | .997 |
| 1903 | 1.000 | 1.082 | 1.032 | | 1.124 | 1.045 |
| 1904 | 1.066 | .944 | 1.208 | | 1.124 | 1.024 |
| 1905 | 1.066 | 1.193 | 1.183 | | 1.124 | 1.050 |
| 1906 | | 1.182 | .957 | | 1.124 | 1.389 |
| 1907 | | 1.328 | 1.010 | | 1.068 | 1.263 |
| 1908 | | 1.091 | | | 1.038 | 1.088 |
| 1909 | | .958 | | | 1.345 | .988 |
| 1910 | | 1.287 | .964 | | 1.194 | 1.118 |
| 1911 | | 1.072 | .974 | | .862 | |
| 1912 | | .997 | 1.058 | | 1.439 | |
| 1913 | | 1.158 | .858 | | .855 | .891 |

Table K.52 (continued)

| Year | (7) | (8) | (9) | (10) | (11) | (12) |
|------|---|----------------------------------|------------------------------------|----------------------|---------------------------------|---------------------|
| | Ratio of current year's binder consumption to previous year's (cont.) | | | | | |
| | Forlì ^f 1862-1903 | Genova ^g 1864-1908 | Grosseto ^h 1869-1903 | Mantova 1892-1913 | Massa ⁱ 1871-1898 | Milano 1869-1913 |
| 1861 | | | | | | |
| 1862 | 1.435 | | | | | |
| 1863 | 1.238 | | | | | |
| 1864 | .766 | 1.311 | | | | |
| 1865 | .766 | 1.059 | | | | |
| 1866 | .766 | .816 | | | | |
| 1867 | .824 | 1.206 | | | | |
| 1868 | 1.229 | .870 | | | | |
| 1869 | 1.229 | .944 | 1.076 | | | .959 |
| 1870 | 1.229 | .970 | 1.076 | | | .872 |
| 1871 | 1.106 | 1.500 | 1.076 | | 1.171 | 1.333 |
| 1872 | .922 | 1.020 | .913 | | 1.104 | 1.029 |
| 1873 | 1.075 | .940 | .957 | | 1.104 | 1.229 |
| 1874 | .851 | 1.085 | .802 | | 1.104 | 1.017 |
| 1875 | .959 | .967 | 1.648 | | 1.104 | 1.080 |
| 1876 | .978 | .885 | .611 | | 1.104 | .979 |
| 1877 | .901 | .885 | .465 | | 1.104 | 1.059 |
| 1878 | 1.000 | .888 | 1.512 | | 1.104 | .954 |
| 1879 | 1.256 | 1.107 | .984 | | 1.104 | .888 |
| 1880 | .874 | 1.237 | .817 | | 1.104 | 1.078 |
| 1881 | 1.089 | 1.050 | 1.408 | | 1.160 | .983 |
| 1882 | 1.133 | 1.020 | .832 | | 1.160 | .881 |
| 1883 | .838 | .828 | .860 | | 1.160 | 1.045 |
| 1884 | 1.151 | .880 | 1.078 | | 1.160 | 1.043 |
| 1885 | 1.168 | 1.100 | 1.079 | | 1.160 | .994 |
| 1886 | 1.057 | 1.215 | 2.966 | | 1.160 | .911 |
| 1887 | .996 | 1.116 | .441 | | .746 | 1.007 |
| 1888 | .996 | 1.079 | 1.107 | | .767 | 1.558 |
| 1889 | .628 | .831 | 1.523 | | .767 | 1.125 |
| 1890 | 1.247 | 1.020 | .519 | | .767 | .844 |
| 1891 | 1.129 | 1.467 | 1.172 | | .767 | .794 |
| 1892 | .781 | | .531 | 1.256 | .767 | .867 |
| 1893 | 1.528 | | 1.441 | .713 | .767 | 1.121 |
| 1894 | .662 | .800 | 1.175 | 1.027 | .541 | 1.063 |
| 1895 | .856 | 1.131 | 1.163 | .852 | .750 | .877 |
| 1896 | 1.078 | 1.182 | .736 | 1.082 | 1.267 | .970 |
| 1897 | .807 | .860 | .630 | .981 | 2.128 | 1.176 |
| 1898 | 1.149 | 1.290 | 2.026 | 1.000 | 2.128 | |
| 1899 | 1.078 | 1.290 | 1.051 | 1.163 | | |
| 1900 | .964 | 1.167 | .494 | .876 | | 1.068 |
| 1901 | .988 | .782 | 1.623 | 1.132 | | .950 |
| 1902 | 1.456 | 1.186 | .816 | 1.033 | | 1.313 |
| 1903 | .765 | .973 | .816 | 1.081 | | 1.007 |
| 1904 | | 1.087 | | 1.410 | | 1.252 |
| 1905 | | 1.177 | | .714 | | 1.093 |
| 1906 | | 1.180 | | 1.711 | | 1.147 |
| 1907 | | 1.025 | | .848 | | 1.054 |
| 1908 | | 1.086 | | 1.444 | | 1.076 |
| 1909 | | | | .940 | | |
| 1910 | | | | 1.000 | | .953 |
| 1911 | | | | 1.590 | | .998 |
| 1912 | | | | .995 | | .807 |
| 1913 | | | | .931 | | .861 |

Table K.52 (continued)

| Year | (13) | (14) | (15) | (16) | (17) | (18) |
|------|---|---------------------|---------------------------------|----------------------|------------------------------------|--------------------|
| | Ratio of current year's binder consumption to previous year's (cont.) | | | | | |
| | Novara ^j 1866-1911 | Padova 1870-1913 | Pavia ^k 1866-1913 | Perugia 1907-1913 | Piacenza ^l 1862-1893 | Prato 1877-1913 |
| 1861 | | | | | | |
| 1862 | | | | | 1.338 | |
| 1863 | | | | | .606 | |
| 1864 | | | | | 1.461 | |
| 1865 | | | | | 1.461 | |
| 1866 | .920 | | .989 | | .762 | |
| 1867 | .835 | | .989 | | 1.051 | |
| 1868 | .635 | | .989 | | .688 | |
| 1869 | .721 | | .989 | | .809 | |
| 1870 | 1.000 | .986 | .989 | | .851 | |
| 1871 | 1.068 | 1.155 | .989 | | 1.031 | |
| 1872 | 1.000 | 1.104 | 1.243 | | 1.140 | |
| 1873 | 1.106 | 1.094 | | | 1.061 | |
| 1874 | 1.115 | 1.131 | | | .992 | |
| 1875 | .672 | .924 | | | .892 | |
| 1876 | 1.231 | 1.159 | | | .981 | |
| 1877 | 1.979 | .792 | | | 1.114 | 1.302 |
| 1878 | .621 | .895 | | | 1.068 | .929 |
| 1879 | .746 | 1.076 | | | .984 | 1.077 |
| 1880 | 1.292 | .929 | | | 1.276 | 1.161 |
| 1881 | 1.292 | .994 | | | 1.019 | .369 |
| 1882 | 1.292 | 1.071 | | | .838 | .916 |
| 1883 | 1.292 | .994 | | | 1.179 | 2.409 |
| 1884 | 1.292 | 1.111 | | | .804 | 1.094 |
| 1885 | 1.114 | .960 | | | 1.165 | 1.276 |
| 1886 | 1.176 | .896 | | | .905 | .919 |
| 1887 | 1.242 | 1.140 | 1.064 | | 1.067 | 1.279 |
| 1888 | .829 | 1.352 | 1.410 | | 1.070 | .839 |
| 1889 | 1.028 | .845 | .879 | | .837 | 1.274 |
| 1890 | .968 | .768 | .798 | | .898 | 1.000 |
| 1891 | .703 | 1.023 | .939 | | 1.104 | .667 |
| 1892 | .517 | .858 | 1.086 | | 1.386 | 1.048 |
| 1893 | 1.169 | 1.192 | .921 | | .943 | 1.000 |
| 1894 | 1.044 | 1.117 | 1.054 | | | 1.077 |
| 1895 | 1.351 | .935 | 1.143 | | | .986 |
| 1896 | 1.189 | .989 | 1.071 | | | 1.029 |
| 1897 | 1.166 | .898 | .783 | | | 1.197 |
| 1898 | 1.006 | 1.072 | 1.149 | | | .824 |
| 1899 | .808 | 1.117 | 1.019 | | | 1.157 |
| 1900 | .769 | 1.040 | 1.118 | | | 1.012 |
| 1901 | .855 | .861 | 1.096 | | | 1.110 |
| 1902 | 1.277 | 1.089 | 1.096 | | | 1.000 |
| 1903 | 1.583 | 1.113 | 1.096 | | | 1.165 |
| 1904 | 1.005 | 1.129 | 1.096 | | | .991 |
| 1905 | .895 | 1.127 | 1.096 | | | .895 |
| 1906 | 1.351 | 1.906 | 1.096 | | | 1.043 |
| 1907 | .784 | .886 | .709 | .920 | | 1.143 |
| 1908 | 1.061 | 1.137 | 1.377 | 1.121 | | 1.036 |
| 1909 | .828 | 1.096 | 1.212 | 1.233 | | 1.078 |
| 1910 | 1.050 | 1.201 | .742 | 1.091 | | .824 |
| 1911 | 1.916 | 1.128 | 1.455 | .869 | | 1.252 |
| 1912 | | .891 | 1.048 | .852 | | 1.085 |
| 1913 | | .872 | .625 | .957 | | 1.236 |

Table K.52 (continued)

| Year | (19) | (20) | (21) | (22) | (23) | (24) |
|------|---|--------------------------------|---------------------|--------------------|---------------------|-----------------------------------|
| | Ratio of current year's binder consumption to previous year's (cont.) | | | | | |
| | Ravenna ¹ 1863-1878 | Roma ^m 1872-1913 | Savona 1862-1888 | Siena 1866-1886 | Torino 1900-1909 | Treviso ⁿ 1870-1913 |
| 1861 | | | | | | |
| 1862 | | | 1.487 | | | |
| 1863 | .883 | | 1.345 | | | |
| 1864 | .839 | | 1.821 | | | |
| 1865 | .839 | | .894 | | | |
| 1866 | .811 | | .850 | .898 | | |
| 1867 | .890 | | 1.380 | 1.232 | | |
| 1868 | .769 | | 1.148 | .789 | | |
| 1869 | 1.280 | | 1.860 | .894 | | |
| 1870 | .734 | | 1.091 | 1.708 | | .746 |
| 1871 | 1.191 | | .902 | .811 | | .864 |
| 1872 | 1.268 | 1.766 | 1.214 | .839 | | .974 |
| 1873 | .845 | 1.841 | .668 | .920 | | 1.135 |
| 1874 | .817 | 1.135 | .898 | .948 | | 1.119 |
| 1875 | 1.306 | .691 | .610 | .816 | | 1.277 |
| 1876 | 1.219 | .718 | 1.453 | 1.165 | | .833 |
| 1877 | .885 | 1.092 | .663 | .923 | | .980 |
| 1878 | 1.014 | 1.019 | 1.373 | 1.315 | | 1.102 |
| 1879 | | 1.147 | .891 | .793 | | .833 |
| 1880 | | 1.240 | 1.177 | 1.067 | | .956 |
| 1881 | | 1.242 | 1.326 | .692 | | .860 |
| 1882 | | 1.068 | 1.246 | .955 | | 1.189 |
| 1883 | | 1.265 | 1.078 | .752 | | 1.159 |
| 1884 | | 1.319 | 1.110 | 1.620 | | 1.392 |
| 1885 | | 1.369 | .767 | .977 | | .845 |
| 1886 | | 1.308 | .901 | .928 | | 1.103 |
| 1887 | | 1.252 | 1.239 | | | 1.103 |
| 1888 | | .772 | 1.251 | | | .904 |
| 1889 | | .740 | | | | .833 |
| 1890 | | .662 | | | | 1.182 |
| 1891 | | .625 | | | | .880 |
| 1892 | | .725 | | | | .880 |
| 1893 | | .890 | | | | 1.000 |
| 1894 | | .838 | | | | 1.130 |
| 1895 | | 1.082 | | | | 1.130 |
| 1896 | | .840 | | | | 1.130 |
| 1897 | | 1.034 | | | | 1.130 |
| 1898 | | 1.109 | | | | 1.130 |
| 1899 | | 1.363 | | | | 1.130 |
| 1900 | | 1.137 | | | 1.106 | .956 |
| 1901 | | 1.180 | | | .989 | .956 |
| 1902 | | 1.075 | | | .969 | .956 |
| 1903 | | 1.010 | | | 1.156 | .956 |
| 1904 | | 1.062 | | | 1.221 | .956 |
| 1905 | | 1.058 | | | 1.067 | .956 |
| 1906 | | 1.380 | | | 1.005 | 1.338 |
| 1907 | | 1.040 | | | .957 | 1.393 |
| 1908 | | .821 | | | 1.025 | .960 |
| 1909 | | 1.157 | | | 1.104 | 1.350 |
| 1910 | | 1.405 | | | | 1.114 |
| 1911 | | 1.097 | | | | .777 |
| 1912 | | 1.097 | | | | .754 |
| 1913 | | .990 | | | | .873 |

Table K.52 (continued)

| Year | (25) | (26) | (27) | (28) | (29) | (30) |
|------|-------------------------|----------------------|---|------------------------|--------------------------|----------------------|
| | Ratio etc. 1872-1885 | (cont.) 1902-1913 | Distribution of ratios (percent) ^a | | | |
| | Verona ^o | Vicenza ^p | ≤ .749 1862-1913 | .750-.999 1862-1913 | 1.000-1.249 1862-1913 | ≥ 1.250 1862-1913 |
| 1861 | | | | | | |
| 1862 | | | 0 | 0 | 40 | 60 |
| 1863 | | | 33 | 33 | 17 | 17 |
| 1864 | | | 0 | 57 | 0 | 43 |
| 1865 | | | 0 | 57 | 29 | 14 |
| 1866 | | | 15 | 85 | 0 | 0 |
| 1867 | | | 0 | 54 | 23 | 23 |
| 1868 | | | 15 | 54 | 31 | 0 |
| 1869 | | | 7 | 53 | 13 | 27 |
| 1870 | | | 12 | 47 | 35 | 6 |
| 1871 | | | 6 | 28 | 56 | 11 |
| 1872 | .928 | | 0 | 40 | 50 | 10 |
| 1873 | 1.297 | | 5 | 32 | 53 | 11 |
| 1874 | .940 | | 0 | 47 | 47 | 5 |
| 1875 | .980 | | 16 | 53 | 16 | 16 |
| 1876 | .980 | | 11 | 53 | 32 | 5 |
| 1877 | .980 | | 10 | 55 | 25 | 10 |
| 1878 | .973 | | 10 | 40 | 35 | 15 |
| 1879 | 1.080 | | 5 | 42 | 47 | 5 |
| 1880 | 1.080 | | 0 | 26 | 63 | 11 |
| 1881 | 1.080 | | 11 | 21 | 53 | 16 |
| 1882 | 1.222 | | 0 | 42 | 53 | 5 |
| 1883 | 1.182 | | 0 | 37 | 37 | 21 |
| 1884 | .796 | | 0 | 21 | 58 | 21 |
| 1885 | .816 | | 0 | 37 | 53 | 11 |
| 1886 | | | 0 | 39 | 44 | 17 |
| 1887 | | | 11 | 21 | 58 | 11 |
| 1888 | | | 5 | 47 | 26 | 21 |
| 1889 | | | 17 | 44 | 22 | 11 |
| 1890 | | | 17 | 56 | 28 | 0 |
| 1891 | | | 17 | 39 | 39 | 6 |
| 1892 | | | 17 | 50 | 17 | 17 |
| 1893 | | | 11 | 33 | 44 | 11 |
| 1894 | | | 17 | 33 | 50 | 0 |
| 1895 | | | 6 | 44 | 44 | 6 |
| 1896 | | | 6 | 41 | 47 | 6 |
| 1897 | | | 6 | 59 | 29 | 6 |
| 1898 | | | 0 | 25 | 56 | 19 |
| 1899 | | | 0 | 20 | 67 | 13 |
| 1900 | | | 6 | 41 | 53 | 0 |
| 1901 | | | 0 | 50 | 38 | 13 |
| 1902 | | 1.069 | 0 | 29 | 53 | 18 |
| 1903 | | 1.069 | 6 | 17 | 72 | 6 |
| 1904 | | 1.069 | 0 | 19 | 69 | 13 |
| 1905 | | 1.069 | 6 | 19 | 75 | 0 |
| 1906 | | 1.182 | 0 | 7 | 47 | 40 |
| 1907 | | 1.117 | 6 | 31 | 44 | 19 |
| 1908 | | 1.117 | 0 | 13 | 73 | 13 |
| 1909 | | .856 | 0 | 38 | 46 | 15 |
| 1910 | | 1.035 | 7 | 21 | 57 | 14 |
| 1911 | | 1.045 | 0 | 38 | 31 | 31 |
| 1912 | | 1.273 | 0 | 50 | 33 | 17 |
| 1913 | | .840 | 8 | 77 | 15 | 0 |

Table K.52 (continued)

| Year | (31) | (32) |
|------|-------------------------------|------------------------------------|
| | Average ratio 1862-1913 | Index (1911 = 100) 1861-1913 |
| 1861 | | 30.6 |
| 1862 | 1.318 | 40.3 |
| 1863 | .891 | 35.9 |
| 1864 | 1.072 | 38.5 |
| 1865 | .984 | 37.9 |
| 1866 | .838 | 31.8 |
| 1867 | 1.048 | 33.3 |
| 1868 | .912 | 30.4 |
| 1869 | 1.068 | 32.4 |
| 1870 | .998 | 32.4 |
| 1871 | 1.058 | 34.2 |
| 1872 | 1.064 | 36.4 |
| 1873 | 1.052 | 38.3 |
| 1874 | .994 | 38.1 |
| 1875 | .956 | 36.4 |
| 1876 | .977 | 35.6 |
| 1877 | .961 | 34.2 |
| 1878 | 1.000 | 34.2 |
| 1879 | .999 | 34.2 |
| 1880 | 1.076 | 36.8 |
| 1881 | 1.021 | 37.5 |
| 1882 | 1.038 | 39.0 |
| 1883 | 1.085 | 42.3 |
| 1884 | 1.103 | 46.6 |
| 1885 | 1.049 | 48.9 |
| 1886 | 1.132 | 55.4 |
| 1887 | 1.019 | 56.4 |
| 1888 | 1.006 | 56.7 |
| 1889 | .916 | 52.0 |
| 1890 | .883 | 45.9 |
| 1891 | .931 | 42.7 |
| 1892 | .904 | 38.6 |
| 1893 | 1.008 | 38.9 |
| 1894 | .928 | 36.1 |
| 1895 | .989 | 35.7 |
| 1896 | 1.019 | 36.4 |
| 1897 | .989 | 36.0 |
| 1898 | 1.135 | 40.9 |
| 1899 | 1.079 | 44.1 |
| 1900 | .960 | 42.3 |
| 1901 | 1.047 | 44.3 |
| 1902 | 1.074 | 47.6 |
| 1903 | 1.048 | 49.9 |
| 1904 | 1.097 | 54.7 |
| 1905 | 1.040 | 56.9 |
| 1906 | 1.244 | 70.8 |
| 1907 | 1.018 | 72.1 |
| 1908 | 1.090 | 78.6 |
| 1909 | 1.076 | 84.6 |
| 1910 | 1.056 | 89.3 |
| 1911 | 1.120 | 100.0 |
| 1912 | 1.009 | 100.9 |
| 1913 | .908 | 91.6 |

Table K.52 (continued)

^ainterpolated in 1874-1877, 1879-1885, 1887-1888, 1890-1897, 1899-1902, and 1904-1905.

^binterpolated in 1866-1871, 1875-1878, and 1886-1894.

^cinterpolated in 1894-1895.

^dinterpolated in 1864-1865, 1869-1870, 1876-1880, 1885-1886, 1891-1895, and 1901-1906.

^einterpolated in 1901-1902.

^finterpolated in 1864-1866, 1868-1870, and 1887-1888.

^ginterpolated in 1898-1899.

^hinterpolated in 1869-1871 and 1902-1903.

ⁱinterpolated in 1872-1880, 1881-1886, 1888-1893, and 1897-1898.

^jinterpolated in 1880-1884.

^kinterpolated in 1866-1871 and 1901-1906.

^linterpolated in 1864-1865.

^minterpolated in 1911-1912.

ⁿinterpolated in 1886-1887 and estimated in 1891-1905: see text.

^ointerpolated in 1875-1877 and 1879-1881.

^pinterpolated in 1902-1905 and 1907-1908.

^qnumbers need not add, due to rounding.

Sources: cols. 1 - 26: calculated from Tables K.26 - K.51: see text.

cols. 27 - 31: calculated from cols. 1 - 26: see text.

col. 32: calculated from col. 31: see text.

Table K.53
Structure-Tax Assessment Data and Related
Construction Estimates, 1861-1913 (million lire)

| Year | (1) | (2) | | (3) | (4) | (5) |
|------|---|--------------------------------|----------------------------------|--------------------|--|-----------------------------|
| | Principal rolls (cur- rent year) 1874-1917 | Reported aggregate assessments | | Total 1876-1917 | Current- year total 1874-1891 | Grand total 1876-1917 |
| | | Current year 1874-1913 | Supplementary rolls ^a | | | |
| 1872 | | | | | | |
| 1873 | | | | | | |
| 1874 | 326.621 | 1.928 | | | 328.549 | |
| 1875 | 326.907 | 2.790 | | | 329.697 | |
| 1876 | 329.638 | 3.192 | 4.677 | | 332.830 | 334.315 |
| 1877 | 332.658 | 5.268 | 8.322 | | 337.926 | 340.980 |
| 1878 | 337.308 | 2.860 | | | 340.168 | |
| 1879 | 375.217 | 8.836 | | | 384.053 | |
| 1880 | 382.737 | 3.002 | | | 385.739 | |
| 1881 | 385.153 | 2.940 | | | 388.093 | |
| 1882 | 388.021 | 2.336 | | | 390.357 | |
| 1883 | 390.038 | 3.180 | | | 393.218 | |
| 1884 | 393.988 | 3.104 | | | 397.092 | |
| 1885 | 397.912 | 4.016 | | | 401.928 | |
| 1886 | 403.025 | 3.998 | | | 407.023 | |
| 1887 | 407.548 | 4.188 | | | 411.736 | |
| 1888 | 411.765 | 4.897 | | | 416.662 | |
| 1889 | 416.611 | 7.164 | | | | |
| 1890 | 424.823 | 4.863 | | | 429.686 | |
| 1891 | 486.624 | 20.822 | | | 507.446 | |
| 1892 | 508.440 | | | | | |
| 1893 | 515.037 | | | | | |
| 1894 | 523.255 | 4.876 | 13.409 | | | 536.664 |
| 1895 | 528.063 | 4.721 | 15.605 | | | |
| 1896 | 529.973 | 6.224 | 11.785 | | | |
| 1897 | 533.944 | 4.567 | 8.902 | | | |
| 1898 | 536.975 | 3.006 | 6.012 | | | 542.987 |
| 1899 | 539.541 | 3.356 | 7.688 | | | 547.229 |
| 1900 | 542.307 | 2.809 | 6.181 | | | 548.488 |
| 1901 | 545.555 | 3.606 | 7.970 | | | 553.525 |
| 1902 | 549.504 | 3.302 | 7.463 | | | 556.967 |
| 1903 | 553.837 | 4.205 | 8.914 | | | 562.751 |
| 1904 | 558.244 | 4.460 | 8.932 | | | 567.176 |
| 1905 | 562.280 | 6.494 | 12.747 | | | 575.027 |
| 1906 | 567.946 | 7.327 | 5.023 | | | 572.969 |
| 1907 | 574.136 | 7.661 | 12.200 | | | 586.336 |
| 1908 | 579.627 | 8.932 | 14.848 | | | 594.475 |
| 1909 | 580.570 | 9.824 | 18.427 | | | 598.997 |
| 1910 | 592.302 | 10.287 | 19.635 | | | 611.937 |
| 1911 | 605.488 | 13.666 | 25.139 | | | 630.627 |
| 1912 | 622.448 | 14.613 | 30.037 | | | 652.485 |
| 1913 | 639.792 | 20.000 | 39.735 | | | 679.527 |
| 1914 | 664.568 | | 43.900 | | | 708.468 |
| 1915 | 689.608 | | 39.825 | | | 729.433 |
| 1916 | 709.382 | | 47.948 | | | 757.330 |
| 1917 | 727.302 | | 38.625 | | | 765.927 |
| 1918 | | | | | | |

Table K.53 (continued)

| Year | (6) | (7) | (8) | (9) |
|------|---|---|--|---------------------------------------|
| | Gross increase due to new construction 1889-1914 | Net increase due to rent movements 1889-1914 | Gross decrease due to demolitions 1889-1914 | Total net increase 1875-1917 |
| 1872 | | | | |
| 1873 | | | | |
| 1874 | | | | |
| 1875 | | | | .286 |
| 1876 | | | | 2.731 |
| 1877 | | | | 3.020 |
| 1878 | | | | 4.650 |
| 1879 | | | | 37.909 |
| 1880 | | | | 7.520 |
| 1881 | | | | 2.416 |
| 1882 | | | | 2.868 |
| 1883 | | | | 2.017 |
| 1884 | | | | 3.950 |
| 1885 | | | | 3.924 |
| 1886 | | | | 5.113 |
| 1887 | | | | 4.523 |
| 1888 | | | | 4.217 |
| 1889 | 6.631 | .301 | 2.228 | 4.846 |
| 1890 | 9.016 | .402 | 1.324 | 8.212 |
| 1891 | 5.978 | .000 | .490 | 6.379 |
| 1892 | 4.802 | -.005 | .489 | 3.396 |
| 1893 | 4.113 | .063 | 1.398 | 2.502 |
| 1894 | 7.554 | .092 | 1.593 | 5.867 |
| 1895 | 6.844 | -.600 | 1.301 | 4.794 |
| 1896 | 5.342 | -1.204 | 2.088 | 1.966 |
| 1897 | 6.582 | -1.567 | 1.245 | 3.971 |
| 1898 | 5.744 | -1.944 | 1.019 | 3.031 |
| 1899 | 4.954 | -1.392 | 1.167 | 2.566 |
| 1900 | 5.100 | -.756 | 1.683 | 2.766 |
| 1901 | 4.877 | -.599 | 1.214 | 3.248 |
| 1902 | 5.173 | -.016 | 1.416 | 3.950 |
| 1903 | 5.154 | .004 | 1.167 | 4.333 |
| 1904 | 5.202 | .108 | 1.149 | 4.407 |
| 1905 | 5.718 | .130 | 1.161 | 4.037 |
| 1906 | 7.384 | .508 | 2.277 | 5.666 |
| 1907 | 8.553 | .510 | 1.869 | 6.190 |
| 1908 | 8.467 | 1.020 | 1.900 | 5.491 |
| 1909 | 10.330 | 1.452 | 8.586 | .943 |
| 1910 | 17.022 | 4.734 | 9.506 | 11.732 |
| 1911 | 10.848 | 3.932 | 1.436 | 13.186 |
| 1912 | 12.736 | 6.095 | 1.428 | 16.960 |
| 1913 | 13.734 | 4.820 | 1.218 | 17.344 |
| 1914 | 18.445 | 7.705 | 1.490 | 24.776 |
| 1915 | | | | 25.040 |
| 1916 | | | | 19.774 |
| 1917 | | | | 17.920 |
| 1918 | | | | |

Table K.53 (continued)

| Year | (10) | (11) | (12) | (13) |
|------|---|---|--|---------------------------------|
| | Reported changes in provincial-capital principal-roll assessments ^b Gross increase due to new construction 1889-1914 | Net increase due to rent movements 1889-1914 | Gross decrease due to demolitions 1889-1914 | Total net increase 1889-1914 |
| 1872 | | | | |
| 1873 | | | | |
| 1874 | | | | |
| 1875 | | | | |
| 1876 | | | | |
| 1877 | | | | |
| 1878 | | | | |
| 1879 | | | | |
| 1880 | | | | |
| 1881 | | | | |
| 1882 | | | | |
| 1883 | | | | |
| 1884 | | | | |
| 1885 | | | | |
| 1886 | | | | |
| 1887 | | | | |
| 1888 | | | | |
| 1889 | 4.452 | .117 | 1.912 | 2.594 |
| 1890 | 6.447 | .292 | 1.068 | 5.604 |
| 1891 | | | | |
| 1892 | | | | |
| 1893 | | | | |
| 1894 | | | | |
| 1895 | | | | |
| 1896 | | | | |
| 1897 | | | | |
| 1898 | | | | |
| 1899 | | | | |
| 1900 | | | | |
| 1901 | | | | |
| 1902 | | | | |
| 1903 | | | | |
| 1904 | | | | |
| 1905 | | | | |
| 1906 | | | | |
| 1907 | 5.263 | .434 | 1.245 | 4.365 |
| 1908 | 4.722 | .937 | 1.003 | 4.641 |
| 1909 | 6.158 | 1.229 | 4.848 | 2.502 |
| 1910 | 10.994 | 1.956 | 6.400 | 6.462 |
| 1911 | 5.900 | 3.773 | 1.072 | 9.189 |
| 1912 | 7.160 | 5.698 | .980 | 12.115 |
| 1913 | 7.234 | 4.193 | .803 | 10.619 |
| 1914 | 10.455 | 6.792 | 1.070 | 16.187 |
| 1915 | | | | |
| 1916 | | | | |
| 1917 | | | | |
| 1918 | | | | |

Table K.53 (continued)

| Year | (14) | (15) | (16) | (17) | (18) | (19) |
|------|---|--------------------------------|-----------------------|-----------------------------------|--------------------------------|-----------------------|
| | Current-year assessments, by groups of municipalities | | | | | |
| | Principal rolls only | | | Principal and supplementary rolls | | |
| | Leading six 1890-1914 | Other capitals 1890-1914 | Residual 1890-1914 | Leading six 1878-1891 | Other capitals 1878-1891 | Residual 1878-1891 |
| 1872 | | | | | | |
| 1873 | | | | | | |
| 1874 | | | | | | |
| 1875 | | | | | | |
| 1876 | | | | | | |
| 1877 | | | | | | |
| 1878 | | | | 111.857 | 71.906 | 156.405 |
| 1879 | | | | 127.873 | 78.264 | 177.916 |
| 1880 | | | | 128.936 | 78.455 | 178.348 |
| 1881 | | | | 130.543 | 78.569 | 178.981 |
| 1882 | | | | 131.916 | 78.793 | 179.648 |
| 1883 | | | | 133.806 | 79.149 | 180.263 |
| 1884 | | | | 135.816 | 79.624 | 181.652 |
| 1885 | | | | 138.041 | 79.997 | 183.890 |
| 1886 | | | | 140.537 | 80.653 | 185.833 |
| 1887 | | | | 142.564 | 81.212 | 187.960 |
| 1888 | | | | 145.307 | 82.009 | 189.346 |
| 1889 | | | | 148.946 | 83.022 | 191.807 |
| 1890 | 149.577 | 83.019 | 192.227 | 152.229 | 83.797 | 193.660 |
| 1891 | 170.702 | 97.036 | 218.886 | 179.088 | 100.400 | 221.958 |
| 1892 | 179.528 | 100.025 | 228.887 | | | |
| 1893 | 182.465 | 101.147 | 231.425 | | | |
| 1894 | 188.565 | 101.974 | 232.716 | | | |
| 1895 | 191.382 | 102.906 | 233.775 | | | |
| 1896 | 192.317 | 103.130 | 234.526 | | | |
| 1897 | 193.748 | 103.589 | 236.607 | | | |
| 1898 | 194.068 | 104.886 | 238.021 | | | |
| 1899 | 194.543 | 105.515 | 239.483 | | | |
| 1900 | 194.861 | 106.171 | 241.275 | | | |
| 1901 | 195.899 | 106.775 | 242.881 | | | |
| 1902 | 197.120 | 107.306 | 245.078 | | | |
| 1903 | 198.624 | 107.927 | 247.286 | | | |
| 1904 | 200.142 | 108.514 | 249.588 | | | |
| 1905 | 201.994 | 109.132 | 251.154 | | | |
| 1906 | 205.004 | 109.939 | 253.003 | | | |
| 1907 | 208.612 | 110.696 | 254.828 | | | |
| 1908 | 212.269 | 111.680 | 255.678 | | | |
| 1909 | 217.208 | 109.243 | 253.328 | | | |
| 1910 | 222.470 | 110.626 | 259.206 | | | |
| 1911 | 228.579 | 113.523 | 263.386 | | | |
| 1912 | 238.181 | 116.036 | 268.231 | | | |
| 1913 | 245.677 | 119.409 | 274.706 | | | |
| 1914 | 255.848 | 125.168 | 283.552 | | | |
| 1915 | | | | | | |
| 1916 | | | | | | |
| 1917 | | | | | | |
| 1918 | | | | | | |

Table K.53 (continued)

| Year | Estimated increases in principal-roll assessments due to new construction, by groups of municipalities | | | (23) Weighted total 1875-1918 | Estimated new construction of taxed structures (current assessed values) | |
|------|--|-------------------------------------|-------------------------------|-------------------------------------|--|------------------------------|
| | (20) Leading six 1875-1914 | (21) Other capitals 1875-1914 | (22) Residual 1875-1914 | | (24) Total 1872-1913 | (25) Private 1872-1913 |
| 1872 | | | | | 2.489 | 1.916 |
| 1873 | | | | | 3.426 | 2.804 |
| 1874 | | | | | 3.915 | 3.425 |
| 1875 | 1.377 | .297 | .937 | 1.725 | 2.907 | 2.335 |
| 1876 | 1.992 | .430 | 1.356 | 2.497 | 2.495 | 2.051 |
| 1877 | 2.279 | .492 | 1.551 | 2.856 | 2.410 | 1.917 |
| 1878 | 3.357 | .910 | 2.866 | 4.937 | 2.223 | 1.764 |
| 1879 | 2.022 | .446 | 1.405 | 2.571 | 2.167 | 1.759 |
| 1880 | 2.287 | .454 | 1.229 | 2.507 | 2.501 | 2.007 |
| 1881 | 2.563 | .461 | 1.042 | 2.436 | 3.065 | 2.507 |
| 1882 | 2.718 | .193 | 1.071 | 2.313 | 3.693 | 3.187 |
| 1883 | 1.918 | .313 | .932 | 1.950 | 3.926 | 3.275 |
| 1884 | 2.845 | .536 | .926 | 2.493 | 4.239 | 3.537 |
| 1885 | 2.181 | .515 | 1.507 | 2.791 | 4.896 | 4.199 |
| 1886 | 2.502 | .419 | 2.517 | 3.853 | 5.139 | 4.378 |
| 1887 | 2.652 | .697 | 2.065 | 3.683 | 4.060 | 3.268 |
| 1888 | 2.439 | .673 | 2.559 | 4.073 | 3.160 | 2.225 |
| 1889 | 3.547 | .905 | 2.179 | 4.322 | 3.260 | 2.331 |
| 1890 | 5.085 | 1.362 | 2.569 | 5.693 | 3.960 | 3.127 |
| 1891 | 3.257 | .795 | 1.926 | 3.865 | 4.157 | 3.433 |
| 1892 | 2.701 | .397 | 1.704 | 3.102 | 3.733 | 2.989 |
| 1893 | 2.384 | .508 | 1.222 | 2.582 | 4.186 | 3.445 |
| 1894 | 5.193 | .946 | 1.415 | 4.249 | 3.921 | 3.315 |
| 1895 | 2.991 | 1.324 | 1.529 | 3.785 | 3.658 | 3.138 |
| 1896 | 2.694 | .920 | 1.428 | 3.242 | 3.643 | 3.153 |
| 1897 | 3.216 | 1.059 | 2.307 | 4.441 | 3.597 | 3.136 |
| 1898 | 2.223 | 1.938 | 1.583 | 4.023 | 3.727 | 3.208 |
| 1899 | 2.078 | 1.168 | 1.709 | 3.475 | 3.837 | 3.251 |
| 1900 | 1.766 | 1.141 | 2.193 | 3.812 | 4.057 | 3.404 |
| 1901 | 2.110 | .963 | 1.804 | 3.418 | 4.572 | 3.854 |
| 1902 | 1.997 | .790 | 2.386 | 3.817 | 5.450 | 4.639 |
| 1903 | 2.123 | .827 | 2.204 | 3.715 | 6.315 | 5.432 |
| 1904 | 2.048 | .763 | 2.391 | 3.821 | 7.088 | 6.218 |
| 1905 | 2.364 | .788 | 2.566 | 4.142 | 7.956 | 6.988 |
| 1906 | 3.826 | 1.077 | 2.481 | 4.873 | 8.611 | 7.343 |
| 1907 | 4.216 | 1.047 | 3.290 | 5.814 | 9.721 | 8.162 |
| 1908 | 3.707 | 1.015 | 3.745 | 6.040 | 11.257 | 9.254 |
| 1909 | 4.958 | 1.200 | 4.172 | 7.115 | 13.524 | 10.791 |
| 1910 | 4.385 | 1.376 | 4.345 | 7.200 | 16.608 | 13.330 |
| 1911 | 4.207 | 1.693 | 4.948 | 7.985 | 18.214 | 14.883 |
| 1912 | 5.209 | 1.951 | 5.576 | 9.220 | 18.988 | 15.647 |
| 1913 | 4.781 | 2.453 | 6.500 | 10.375 | 18.746 | 15.348 |
| 1914 | 6.044 | 4.411 | 7.990 | 13.936 | | |
| 1915 | | | | 15.397 | | |
| 1916 | | | | 15.397 | | |
| 1917 | | | | 16.816 | | |
| 1918 | | | | 13.547 | | |

Table K.53 (continued)

| Year | (26) Estimated rent indices (1911 = 1.000) | | (27) Cost index 1872-1913 | (28) Average tax rate (percent) ^c 1872-1913 | (29) Estimated construction of taxable private structures (1911-price value added) | | |
|------|--|----------------------------|------------------------------------|---|---|--------------------------------------|-------------------------------|
| | Revenue index 1872-1913 | Cost index 1872-1913 | | | New construction 1872-1913 | Maintain- able stock 1875-1913 | Main- tenance 1875-1913 |
| 1872 | .492 | .796 | | 28.1 | 26.3 | | |
| 1873 | .502 | .863 | | 29.1 | 36.6 | | |
| 1874 | .513 | .851 | | 29.4 | 44.6 | | |
| 1875 | .524 | .837 | | 30.5 | 30.3 | 2,567.0 | 30.8 |
| 1876 | .535 | .839 | | 31.1 | 26.3 | 2,580.5 | 31.0 |
| 1877 | .546 | .806 | | 31.2 | 24.9 | 2,604.2 | 31.3 |
| 1878 | .557 | .824 | | 31.6 | 22.4 | 2,635.8 | 31.6 |
| 1879 | .571 | .840 | | 30.1 | 21.8 | 2,652.9 | 31.8 |
| 1880 | .586 | .857 | | 31.5 | 24.4 | 2,665.9 | 32.0 |
| 1881 | .600 | .844 | | 32.0 | 30.3 | 2,677.5 | 32.1 |
| 1882 | .615 | .856 | | 32.4 | 37.8 | 2,686.5 | 32.2 |
| 1883 | .631 | .868 | | 32.1 | 38.1 | 2,694.9 | 32.3 |
| 1884 | .646 | .867 | | 32.3 | 40.6 | 2,705.8 | 32.5 |
| 1885 | .663 | .883 | | 32.5 | 47.2 | 2,722.6 | 32.7 |
| 1886 | .679 | .870 | | 32.6 | 49.0 | 2,746.8 | 33.0 |
| 1887 | .696 | .871 | | 32.5 | 36.1 | 2,771.2 | 33.3 |
| 1888 | .684 | .865 | | 32.4 | 24.9 | 2,797.9 | 33.6 |
| 1889 | .673 | .854 | | | 26.4 | 2,831.1 | 34.0 |
| 1890 | .661 | .851 | | 32.3 | 35.9 | 2,865.9 | 34.4 |
| 1891 | .655 | .820 | | 31.2 | 40.3 | 2,887.7 | 34.7 |
| 1892 | .648 | .794 | | 31.4 | 35.8 | 2,898.2 | 34.8 |
| 1893 | .642 | .768 | | 31.5 | 42.2 | 2,910.1 | 34.9 |
| 1894 | .635 | .764 | | 31.5 | 40.9 | 2,931.4 | 35.2 |
| 1895 | .629 | .765 | | | 38.9 | 2,957.0 | 35.5 |
| 1896 | .635 | .771 | | 32.2 | 38.8 | 2,978.0 | 35.7 |
| 1897 | .641 | .776 | | 32.1 | 38.2 | 3,005.3 | 36.1 |
| 1898 | .648 | .766 | | 32.1 | 39.2 | 3,031.2 | 36.4 |
| 1899 | .654 | .763 | | 32.2 | 39.6 | 3,054.9 | 36.7 |
| 1900 | .661 | .797 | | 32.2 | 40.3 | 3,078.4 | 36.9 |
| 1901 | .667 | .780 | | 32.4 | 46.0 | 3,101.2 | 37.2 |
| 1902 | .674 | .785 | | 32.5 | 55.0 | 3,124.9 | 37.5 |
| 1903 | .681 | .788 | | 32.8 | 63.9 | 3,148.9 | 37.8 |
| 1904 | .698 | .790 | | 33.0 | 72.6 | 3,173.5 | 38.1 |
| 1905 | .733 | .795 | | 33.2 | 80.1 | 3,203.6 | 38.4 |
| 1906 | .784 | .828 | | 33.7 | 80.1 | 3,242.6 | 38.9 |
| 1907 | .839 | .870 | | 34.1 | 85.0 | 3,290.3 | 39.5 |
| 1908 | .898 | .911 | | 34.3 | 91.9 | 3,346.4 | 40.2 |
| 1909 | .943 | .937 | | 35.0 | 111.7 | 3,357.1 | 40.3 |
| 1910 | .971 | .964 | | 35.5 | 132.6 | 3,420.4 | 41.0 |
| 1911 | 1.000 | 1.000 | | 36.1 | 143.1 | 3,488.3 | 41.9 |
| 1912 | 1.030 | 1.048 | | 37.2 | 145.1 | 3,562.8 | 42.8 |
| 1913 | 1.061 | 1.113 | | 38.5 | 138.6 | 3,656.7 | 43.9 |
| 1914 | | | | | | | |
| 1915 | | | | | | | |
| 1916 | | | | | | | |
| 1917 | | | | | | | |
| 1918 | | | | | | | |

^aestimated: see text.^bcurrent year less previous year.^cgross of local surtaxes.Sources: cols. 1 - 19: *Imposte directe*.
cols. 20 - 31: see text.

Table K.54
Estimated Construction of Temporarily Tax-Exempt Structures, 1901-1913

| Year | (1) | (2) | (3) Low-income housing: reported sponsors and rooms ^c , by date of sponsor's incorporation | | | | | | | |
|------|---|------------------------|---|------------------|----------------|---------------------|--|------------------|----------------|---------------------|
| | Railway workers' housing: capital expenditure | | Cooperatives and mutual-aid associations | | | | Corporations and charitable institutions | | | |
| | Reported ^a | Estimated ^b | Number active | Number reporting | Rooms reported | | Number active | Number reporting | Rooms reported | |
| | 1901-1914 | 1901-1913 | 1901-1914 | 1901-1914 | Total | Exempt ^d | 1901-1914 | 1901-1914 | Total | Exempt ^d |
| 1901 | .000 | .000 | 6 | 4 | 1,203 | 1,203 | 0 | 0 | 0 | 0 |
| 1902 | .000 | .000 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1903 | .000 | .000 | 12 | 12 | 4,671 | 4,671 | 0 | 0 | 0 | 0 |
| 1904 | .000 | .000 | 11 | 9 | 2,857 | 1,962 | 1 | 1 | 7,259 | 7,259 |
| 1905 | .000 | .000 | 17 | 10 | 1,855 | 1,855 | 0 | 0 | 0 | 0 |
| 1906 | .000 | .000 | 31 | 22 | 5,676 | 5,590 | 5 | 4 | 5,400 | 5,400 |
| 1907 | .000 | .000 | 25 | 19 | 4,136 | 1,997 | 3 | 3 | 8,683 | 8,683 |
| 1908 | .000 | .001 | 29 | 23 | 5,157 | 5,157 | 5 | 5 | 4,871 | 4,567 |
| 1909 | .002 | .428 | 78 | 60 | 6,535 | 6,514 | 5 | 5 | 3,662 | 3,662 |
| 1910 | .829 | 1.309 | 58 | 47 | 4,690 | 4,373 | 2 | 2 | 516 | 457 |
| 1911 | 1.757 | 3.579 | 52 | 39 | 4,824 | 4,743 | 3 | 1 | 40 | 40 |
| 1912 | 5.401 | 4.933 | 88 | 68 | 5,200 | 5,056 | 9 | 9 | 7,270 | 7,225 |
| 1913 | 4.771 | 4.306 | 57 | 33 | 1,326 | 1,270 | 4 | 2 | 733 | 733 |
| 1914 | 4.382 | | 39 | 15 | 1,005 | 1,005 | 1 | 1 | 2,327 | 2,180 |

Table K.54 (continued)

| Year | (11) | (12) | (13) | (14) | (15) | (16) |
|------|--|--------------------------------|---|-----------------------|-------------------------------------|-----------------|
| | Low-income housing: estimated exempt rooms ^c of sponsor's incorporation 1901-1914 | of actual production 1901-1913 | Estimated value added in the construction of temporarily exempt structures (million lire at 1911 prices) Low-income housing 1901-1913 | Other Roman 1901-1913 | Earthquake reconstruction 1901-1913 | Total 1901-1913 |
| 1901 | 1,455 | 0 | .000 | .000 | .000 | .00 |
| 1902 | 126 | 235 | .117 | .000 | .000 | .12 |
| 1903 | 4,671 | 255 | .126 | .000 | .000 | .13 |
| 1904 | 9,473 | 1,026 | .509 | .039 | .000 | .55 |
| 1905 | 2,736 | 2,611 | 1.295 | .119 | .000 | 1.41 |
| 1906 | 13,341 | 3,076 | 1.525 | .172 | .000 | 1.70 |
| 1907 | 11,435 | 5,185 | 2.571 | .301 | .000 | 2.87 |
| 1908 | 10,479 | 7,197 | 3.569 | .347 | .000 | 3.92 |
| 1909 | 12,440 | 8,459 | 4.326 | .210 | 8.430 | 12.97 |
| 1910 | 6,214 | 9,496 | 5.109 | .546 | 8.430 | 14.09 |
| 1911 | 8,855 | 10,356 | 6.231 | .448 | 8.430 | 15.11 |
| 1912 | 14,797 | 10,702 | 6.816 | .331 | 8.430 | 15.58 |
| 1913 | 7,459 | 14,033 | 8.276 | .438 | 8.430 | 17.14 |
| 1914 | 6,204 | | | | | |

^amillion lire at current prices, by fiscal year ending June 30 of the indicated year.

^bmillion lire at 1911 prices.

^cincludes shops; excludes railway workers' and municipal low-income housing.

^destimated: see text.

Sources: col. 1: *Relazione F. S.*
 cols. 2, 6, 10 - 16: see text.
 cols. 3 - 5, 7 - 9: *Relazione case 1914.*

Table K.55
Taxable Private New Construction, 1872-1913: Regression Equations

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
|-----------|----------------------|------------------|----------------|------------------|-----------|------------|------------|------------|-----------------|-----------------|-----------------------|-----------|-----------|-----------|
| <i>EQ</i> | <i>C</i> | <i>T</i> | <i>IUC</i> | <i>APF</i> | <i>PB</i> | <i>OP1</i> | <i>OP2</i> | <i>TPW</i> | <i>RR</i> | <i>M</i> | <i>R</i> ² | <i>DW</i> | <i>SE</i> | <i>SP</i> |
| A42 | -754.40 (-1.64) | .386 (1.57) | 1.88 (5.51) | -.192 (-1.42) | | | | | | | .9053 | .61 | 10.65 | 1872-1913 |
| A37 | -489.64 (-1.54) | .260 (1.53) | 1.81 (7.53) | -.477 (-4.72) | | | | | | | .8415 | .97 | 7.21 | 1872-1908 |
| A31 | -440.92 (-1.54) | .243 (1.58) | 1.05 (3.10) | -.304 (-2.84) | | | | | | | .4403 | .94 | 6.28 | 1872-1902 |
| A26 | -579.60 (-1.79) | .316 (1.83) | 1.25 (3.13) | -.392 (-2.94) | | | | | | | .3531 | 1.04 | 6.35 | 1872-1897 |
| A21 | -1,428.49 (-1.87) | .772 (1.88) | 1.48 (3.27) | -.601 (-2.85) | | | | | | | .3419 | 1.25 | 6.74 | 1872-1892 |
| A16 | -28.86 (-.02) | .015 (.02) | 1.63 (3.15) | -.375 (-1.25) | | | | | | | .5206 | 1.30 | 6.19 | 1872-1887 |
| A11 | 890.67 (.96) | -.531 (-1.05) | 3.56 (4.39) | .078 (.28) | | | | | | | .6379 | 1.82 | 4.36 | 1872-1882 |
| B42 | 715.87 (.59) | -.430 (-.64) | 2.17 (5.38) | -.321 (-1.93) | | | | | | .952 (1.31) | .9161 | .69 | 10.56 | 1872-1913 |
| B31 | -1,083.50 (-1.06) | .600 (1.06) | .934 (2.42) | -.259 (-2.02) | | | | | | -.415 (-.65) | .4282 | 1.00 | 6.35 | 1872-1902 |
| B21 | -2,227.11 (-1.22) | 1.22 (1.21) | 1.37 (2.69) | -.553 (-2.33) | | | | | | -.512 (-.49) | .3109 | 1.33 | 6.89 | 1872-1892 |
| B11 | 3,203.49 (1.39) | -1.81 (-1.43) | 3.28 (3.92) | -.146 (-.43) | | | | | | 1.75 (1.10) | .6482 | 1.75 | 4.30 | 1872-1882 |
| C42 | -628.86 (-1.24) | .321 (1.19) | 1.82 (5.09) | -.137 (-.85) | | | | | -.049 (-.63) | | .9038 | .63 | 10.74 | 1872-1913 |
| C31 | -805.02 (-3.05) | .438 (3.09) | 1.04 (3.62) | -.477 (-4.62) | | | | | .151 (3.44) | | .6007 | 1.25 | 5.31 | 1872-1902 |
| C21 | -409.64 (-.50) | .228 (.52) | .737 (1.41) | -.381 (-1.79) | | | | | .202 (2.26) | | .4699 | 1.25 | 6.05 | 1872-1892 |
| C11 | 347.05 (.20) | -.254 (-.28) | 4.41 (1.84) | .072 (.24) | | | | | -.091 (-.38) | | .5876 | 2.09 | 4.66 | 1872-1882 |

Table K.55 (continued)

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
|-----------|----------------------|------------------|----------------|------------------|------------------|------------------|------------------|------------|-----------------|----------|-----------------------|-----------|-----------|-----------|
| <i>EQ</i> | <i>C</i> | <i>T</i> | <i>IUC</i> | <i>APF</i> | <i>PB</i> | <i>OP1</i> | <i>OP2</i> | <i>TPW</i> | <i>RR</i> | <i>M</i> | <i>R</i> ² | <i>DW</i> | <i>SE</i> | <i>SP</i> |
| D42 | -52.17 (-.16) | .030 (.17) | 1.04 (3.88) | | 2.51 (5.90) | -.423 (-4.22) | | | | | .9547 | 1.03 | 7.37 | 1872-1913 |
| D37 | -233.33 (-.70) | .127 (.71) | 1.40 (4.49) | | 1.05 (1.30) | -.483 (-4.97) | | | | | .8532 | 1.09 | 6.94 | 1872-1908 |
| D31 | -332.29 (-.89) | .185 (.92) | 1.02 (2.91) | | .225 (.19) | -.325 (-2.75) | | | | | .4234 | 1.00 | 6.38 | 1872-1902 |
| D26 | -578.96 (-1.42) | .316 (1.45) | 1.25 (3.04) | | -.388 (-.31) | -.392 (-2.63) | | | | | .3223 | 1.04 | 6.50 | 1872-1897 |
| D21 | -1,514.85 (-1.86) | .819 (1.88) | 1.50 (3.21) | | -1.22 (-.79) | -.567 (-2.45) | | | | | .3078 | 1.18 | 6.91 | 1872-1892 |
| D16 | 398.01 (.26) | -.214 (-.26) | 1.90 (2.60) | | -2.00 (-.67) | -.330 (-1.03) | | | | | .4910 | 1.17 | 6.38 | 1872-1887 |
| D11 | 1,602.16 (1.50) | -.911 (-1.59) | 3.99 (4.67) | | -2.54 (-1.19) | .116 (.43) | | | | | .6638 | 1.95 | 4.20 | 1872-1882 |
| E42 | -273.75 (-.83) | .148 (.84) | 1.07 (4.20) | | 2.82 (6.67) | -.611 (-4.93) | | | .134 (2.35) | | .9596 | 1.17 | 6.96 | 1872-1913 |
| E31 | -648.11 (-1.98) | .354 (2.02) | .987 (3.36) | | .317 (.33) | -.513 (-4.55) | | | .154 (3.48) | | .5958 | 1.38 | 5.34 | 1872-1902 |
| E21 | -335.21 (-.37) | .188 (.38) | .703 (1.25) | | -.063 (-.04) | -.391 (-1.74) | | | .208 (2.16) | | .4362 | 1.31 | 6.24 | 1872-1892 |
| E11 | 870.57 (.51) | -.540 (-.60) | 5.25 (2.18) | | -2.73 (-1.19) | .110 (.39) | | | -.131 (-.57) | | .6209 | 2.40 | 4.46 | 1872-1882 |
| F42 | -564.18 (-1.15) | .291 (1.12) | 1.42 (2.61) | -.144 (-1.01) | | | .625 (1.09) | | | | .9058 | .63 | 10.63 | 1872-1913 |
| F31 | -682.68 (-2.50) | .362 (2.49) | 1.94 (4.31) | -.454 (-4.08) | | | -1.16 (-2.69) | | | | .5456 | 1.04 | 5.66 | 1872-1902 |
| F21 | 26.08 (.04) | -.032 (-.09) | 3.04 (6.29) | -.508 (-3.39) | | | -2.45 (-4.29) | | | | .6751 | 1.42 | 4.73 | 1872-1892 |
| F11 | 2,079.77 (2.20) | -1.18 (-2.30) | 4.59 (5.59) | .180 (.78) | | | -2.27 (-2.12) | | | | .7583 | 2.97 | 3.56 | 1872-1882 |

Table K.55 (continued)

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
|-----------|----------------------|------------------|----------------|------------|-----------------|------------------|------------------|------------------|----------------|----------|-----------------------|-----------|-----------|-----------|
| <i>EQ</i> | <i>C</i> | <i>T</i> | <i>IUC</i> | <i>APF</i> | <i>PB</i> | <i>OP1</i> | <i>OP2</i> | <i>TPW</i> | <i>RR</i> | <i>M</i> | <i>R</i> ² | <i>DW</i> | <i>SE</i> | <i>SP</i> |
| G42 | -105.89 (-.30) | .057 (.31) | 1.20 (3.15) | | 2.57 (5.81) | -.450 (-4.06) | -.249 (-.59) | | | | .9539 | 1.03 | 7.44 | 1872-1913 |
| G31 | -514.87 (-1.51) | .272 (1.49) | 1.92 (4.24) | | .399 (.39) | -.494 (-4.05) | -1.20 (-2.76) | | | | .5401 | 1.18 | 5.69 | 1872-1902 |
| G21 | 83.64 (.12) | -.064 (-.17) | 3.05 (6.11) | | -.223 (-.20) | -.522 (-3.18) | -2.49 (-4.14) | | | | .6459 | 1.49 | 4.88 | 1872-1892 |
| G11 | 2,377.62 (2.27) | -1.32 (-2.36) | 4.70 (5.46) | | -1.37 (-.69) | .188 (.79) | -1.96 (-1.68) | | | | .7416 | 2.90 | 3.69 | 1872-1882 |
| H42 | -270.63 (-.79) | .147 (.81) | 1.05 (2.86) | | 2.81 (6.48) | -.610 (-4.79) | .021 (.05) | | .135 (2.23) | | .9585 | 1.18 | 7.06 | 1872-1913 |
| H31 | -697.50 (-2.22) | .374 (2.22) | 1.57 (3.65) | | .409 (.44) | -.581 (-5.07) | -.761 (-1.79) | | .122 (2.64) | | .6284 | 1.42 | 5.12 | 1872-1902 |
| H21 | 709.82 (1.00) | -.396 (-1.04) | 2.34 (4.03) | | .453 (.42) | -.407 (-2.53) | -2.21 (-3.91) | | .141 (1.98) | | .7114 | 1.73 | 4.46 | 1872-1892 |
| H11 | 5,047.71 (2.00) | -2.73 (-2.06) | 1.85 (.72) | | .230 (.10) | .273 (1.13) | -3.77 (-1.97) | | .365 (1.17) | | .7590 | 2.82 | 3.56 | 1872-1882 |
| I42 | -891.72 (-2.04) | .458 (1.95) | 1.89 (4.33) | | | | | -.157 (-1.10) | | | .9033 | .58 | 10.76 | 1872-1913 |
| I37 | -571.21 (-1.98) | .299 (1.93) | 2.30 (7.73) | | | | | -.575 (-5.32) | | | .8569 | 1.06 | 6.85 | 1872-1908 |
| I31 | -464.60 (-1.81) | .252 (1.83) | 1.48 (3.82) | | | | | -.399 (-3.57) | | | .5062 | .98 | 5.90 | 1872-1902 |
| I26 | -686.83 (-2.48) | .368 (2.49) | 1.97 (4.55) | | | | | -.571 (-4.38) | | | .5183 | 1.21 | 5.48 | 1872-1897 |
| I21 | -1,272.93 (-2.11) | .682 (2.11) | 2.11 (4.41) | | | | | -.687 (-4.00) | | | .4989 | 1.39 | 5.88 | 1872-1892 |
| I16 | -74.39 (-.07) | .035 (.06) | 2.09 (3.74) | | | | | -.489 (-2.05) | | | .5984 | 1.40 | 5.66 | 1872-1887 |
| I11 | 726.52 (.84) | -.439 (-.94) | 3.52 (4.38) | | | | | -.015 (-.06) | | | .6339 | 1.80 | 4.39 | 1872-1882 |

Table K.55 (continued)

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
|-----------|---------------------|------------------|----------------|------------|-----------|------------|------------|------------------|-----------------|-----------------|-----------------------|-----------|-----------|-----------|
| <i>EQ</i> | <i>C</i> | <i>T</i> | <i>IUC</i> | <i>APF</i> | <i>PB</i> | <i>OP1</i> | <i>OP2</i> | <i>TPW</i> | <i>RR</i> | <i>M</i> | <i>R</i> ² | <i>DW</i> | <i>SE</i> | <i>SP</i> |
| J42 | 327.02 (.27) | -.220 (-.33) | 2.22 (4.19) | | | | | -.276 (-1.53) | | .814 (1.09) | .9038 | .65 | 10.74 | 1872-1913 |
| J31 | -783.87 (-.83) | .429 (.82) | 1.40 (3.11) | | | | | -.374 (-2.78) | | -.210 (-.35) | .4896 | 1.00 | 6.00 | 1872-1902 |
| J21 | -1,201.54 (-.73) | .642 (.70) | 2.13 (3.75) | | | | | -.692 (-3.43) | | .045 (.05) | .4677 | 1.38 | 6.06 | 1872-1892 |
| J11 | 3,641.50 (1.62) | -2.05 (-1.66) | 3.31 (4.30) | | | | | -.258 (-.86) | | 2.09 (1.39) | .6770 | 1.91 | 4.12 | 1872-1882 |
| K42 | -675.49 (-1.35) | .345 (1.29) | 1.79 (4.00) | | | | | -.094 (-.59) | -.066 (-.89) | | .9028 | .61 | 10.79 | 1872-1913 |
| K31 | -854.62 (-3.43) | .460 (3.44) | 1.47 (4.45) | | | | | -.531 (-5.12) | .130 (3.30) | | .6386 | 1.25 | 5.05 | 1872-1902 |
| K21 | -545.98 (-.81) | .295 (.82) | 1.39 (2.39) | | | | | -.507 (-2.75) | .160 (1.92) | | .5675 | 1.37 | 5.46 | 1872-1892 |
| K11 | 190.51 (.12) | -.168 (-.20) | 4.41 (1.82) | | | | | -.005 (-.02) | -.094 (-.39) | | .5836 | 2.05 | 4.68 | 1872-1882 |

The dependent variable is Table K.53, col. 29, taxable private new construction (million lire of value added at 1911 prices).

The method of estimation is ordinary least squares; the figures in parentheses are *t* statistics.

Table K.55 (continued)

Key to the column headings:

| | |
|------------|---|
| <i>EQ</i> | Equation code: the letter identifies the model, the number identifies the number of observations, beginning with 1872, in the sample period. |
| <i>C</i> | Constant. |
| <i>T</i> | Time (current year). |
| <i>IUC</i> | Index of urban construction (1911 = 100.0). Source: Table K.52, col. 32. |
| <i>APF</i> | New construction of non-railway public works: all publicly financed (million lire of value added at 1911 prices). Source: Table K.05, col. 6 + (.51)(.95)((Table K.05, col. 7)/(Table K.06, col. 12)). |
| <i>PB</i> | New construction of non-railway public works: public buildings (million lire of value added at 1911 prices). Source: Table K.05, col. 6. |
| <i>OP1</i> | New construction of non-railway public works: other publicly financed public works (million lire of value added at 1911 prices). Source: (.51)(.95)((Table K.05, col. 7)/(Table K.06, col. 12)). |
| <i>OP2</i> | New construction of non-railway public works: other privately financed public works (million lire of value added at 1911 prices). Source: Table K.05, col. 9 + (.51)(.95)((Table K.05, col. 8)/(Table K.06, col. 12)). |
| <i>TPW</i> | New construction of non-railway public works: total (million lire of value added at 1911 prices). Source: Table K.05, col. 6 + Table K.05, col. 10. |
| <i>RR</i> | New construction of railway public works (million lire of value added at 1911 prices). Source: Table K.10, col. 21. |
| <i>M</i> | Maintenance of non-railway public works (million lire of value added at 1911 prices). Source: Table K.05, col. 4. |
| R^2 | R-squared |
| <i>DW</i> | Durbin-Watson statistic. |
| <i>SE</i> | Standard error. |
| <i>SP</i> | Sample period. |

Table K.56 (continued)

| Year | (41) | (42) | (43) | (44) | (45) | (46) | (47) | (48) | (49) | (50) |
|------|--|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| | Regression-based extrapolations of the new construction series (cont.) | | | | | | | | | |
| | Equa- tion I31 1861- 1872 | Equa- tion I26 1861- 1872 | Equa- tion I21 1861- 1872 | Equa- tion I16 1861- 1872 | Equa- tion I11 1861- 1872 | Equa- tion J42 1861- 1872 | Equa- tion J31 1861- 1872 | Equa- tion J21 1861- 1872 | Equa- tion J11 1861- 1872 | Equa- tion K42 1861- 1872 |
| 1861 | 27.8 | 27.0 | 23.8 | 29.1 | 16.5 | 14.5 | 26.8 | 24.1 | 30.0 | 9.9 |
| 1862 | 41.4 | 45.1 | 43.4 | 48.3 | 50.1 | 38.5 | 39.0 | 43.9 | 68.3 | 26.6 |
| 1863 | 29.2 | 28.2 | 24.4 | 31.8 | 34.0 | 25.8 | 27.3 | 24.9 | 51.4 | 17.5 |
| 1864 | 32.8 | 33.1 | 29.9 | 36.7 | 42.7 | 30.4 | 31.1 | 30.3 | 56.2 | 23.2 |
| 1865 | 25.9 | 23.2 | 18.4 | 27.7 | 39.9 | 24.4 | 24.8 | 18.6 | 47.8 | 21.3 |
| 1866 | 26.3 | 24.6 | 21.9 | 26.2 | 18.3 | 16.1 | 25.5 | 22.1 | 29.2 | 13.8 |
| 1867 | 32.3 | 33.1 | 31.9 | 33.8 | 23.3 | 24.0 | 30.8 | 32.3 | 40.3 | 19.2 |
| 1868 | 25.6 | 23.9 | 21.9 | 24.5 | 12.6 | 13.5 | 25.1 | 22.0 | 21.9 | 13.8 |
| 1869 | 30.9 | 31.2 | 30.4 | 31.3 | 19.2 | 19.4 | 30.3 | 30.6 | 28.4 | 18.7 |
| 1870 | 26.6 | 25.0 | 23.2 | 25.7 | 18.6 | 16.0 | 26.4 | 23.3 | 23.4 | 17.6 |
| 1871 | 32.0 | 32.5 | 32.0 | 32.6 | 24.6 | 21.8 | 31.6 | 32.1 | 29.6 | 21.5 |
| 1872 | 30.7 | 30.4 | 29.1 | 31.3 | 31.8 | 23.5 | 30.6 | 29.1 | 32.6 | 24.4 |
| 1873 | | | | | | | | | | |
| 1874 | | | | | | | | | | |

| Year | (51) | (52) | (53) | (54) | (55) | (56) |
|------|---------------------------------------|---------------------------------------|---------------------------------------|---|--|--|
| | Regression-based etc. (cont.) | | | Estimated new con- struction 1861-1871 | Estimated maintain- able stock 1864-1874 | Estimated main- tenance 1861-1874 |
| | Equa- tion K31 1861- 1872 | Equa- tion K21 1861- 1872 | Equa- tion K11 1861- 1872 | | | |
| 1861 | 4.7 | 34.6 | 3.8 | 21.4 | | 28.6 |
| 1862 | 16.6 | 49.1 | 45.2 | 37.1 | | 28.7 |
| 1863 | 2.3 | 36.0 | 25.4 | 31.0 | | 28.8 |
| 1864 | 7.6 | 37.4 | 37.8 | 36.6 | 2,411.5 | 28.9 |
| 1865 | -.6 | 28.0 | 35.4 | 30.1 | 2,420.8 | 29.0 |
| 1866 | 4.8 | 29.3 | 9.8 | 21.9 | 2,445.8 | 29.3 |
| 1867 | 15.3 | 32.5 | 18.5 | 25.4 | 2,464.6 | 29.6 |
| 1868 | 8.1 | 25.2 | 5.6 | 19.3 | 2,488.9 | 29.9 |
| 1869 | 15.3 | 29.7 | 15.0 | 23.9 | 2,506.6 | 30.1 |
| 1870 | 9.0 | 25.0 | 14.3 | 19.8 | 2,516.0 | 30.2 |
| 1871 | 14.9 | 31.6 | 21.7 | 26.0 | 2,528.8 | 30.3 |
| 1872 | 11.7 | 29.6 | 30.7 | | 2,535.5 | 30.4 |
| 1873 | | | | | 2,546.7 | 30.6 |
| 1874 | | | | | 2,553.8 | 30.6 |

Sources: cols. 1 - 53: calculated from the indicated regression equations in Table K.55, with six-digit coefficients, and the corresponding independent variables in 1861-1872.
cols. 54 - 56: see text.

Table K.57
Exempt Private New Construction, 1862-1911: Intercensal Estimates
(million people housed)

| (1) Census date | (2) Total population | (3) Agri- cultural population | (4) Dispersed population | (5) Population in <u>taxable structures</u> | | (6) Population in <u>exempt structures</u> | |
|--------------------|----------------------------|--|--------------------------------|---|-----------|--|-----------|
| | | | | Dispersed | Nucleated | Dispersed | Nucleated |
| XII.31.1861 | 25.017 | 13.534 | 6.259 | .313 | 17.240 | 5.946 | 1.518 |
| XII.31.1871 | 26.801 | 14.339 | 6.880 | .344 | 18.360 | 6.536 | 1.561 |
| XII.31.1881 | 28.460 | 15.198 | 7.775 | .389 | 19.123 | 7.386 | 1.562 |
| II.10.1901 | 32.475 | 17.309 | 9.173 | .459 | 21.583 | 8.714 | 1.719 |
| VI 10.1911 | 34.671 | 17.023 | 9.877 | .494 | 23.266 | 9.383 | 1.528 |

| (9) <u>Intercensal period</u> Census years | (10) <u>Length</u> (years) | (11) <u>Annual additions to the population</u> | | | |
|---|----------------------------------|---|-----------|-----------------------------|-----------|
| | | <u>In taxable structures</u> | | <u>In exempt structures</u> | |
| | | Dispersed | Nucleated | Dispersed | Nucleated |
| 1861-1871 | 10.00 | .0031 | .1120 | .0590 | .0043 |
| 1871-1881 | 10.00 | .0045 | .0763 | .0850 | .0001 |
| 1881-1901 | 19.11 | .0037 | .1287 | .0695 | .0082 |
| 1901-1911 | 10.33 | .0034 | .1629 | .0648 | -.0185 |

| (9) Inter- censal period | (15) <u>Annual relocations of the population^a</u> | | | | (19) Population annually <u>housed in new structures</u> | |
|-----------------------------------|---|-----------|-----------------------------|-----------|--|--------|
| | <u>In taxable structures</u> | | <u>In exempt structures</u> | | Taxable | Exempt |
| | Dispersed | Nucleated | Dispersed | Nucleated | | |
| 1861-1871 | .0016 | .0890 | .0312 | .0077 | .2057 | .1022 |
| 1871-1881 | .0018 | .0937 | .0347 | .0078 | .1763 | .1276 |
| 1881-1901 | .0021 | .1016 | .0401 | .0082 | .2361 | .1260 |
| 1901-1911 | .0027 | .1255 | .0470 | .0084 | .2844 | .1118 |

| (9) Inter- censal period | (21) <u>Estimated new construction of private structures^b</u> | |
|-----------------------------------|---|--------|
| | Taxable | Exempt |
| 1861-1871 | 27.110 | 13.469 |
| 1871-1881 | 28.790 | 20.837 |
| 1881-1901 | 38.475 | 21.533 |
| 1901-1911 | 84.879 | 33.367 |

^afrom demolished structures to new ones.

^bvalue added at 1911 prices (million lire p. a.).

Sources: see text.

Table K.58
Estimated Private Construction, 1861-1913
(million lire of value added at 1911 prices)

| Year | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|------|--|-----------------------|-----------------------|------------------------------------|--------------------|--|---|--------------------|
| | Alternative estimates of exempt private new construction | | | Estimated private new construction | | Estimated maintainable stock of exempt structures 1864-1913 | Estimated maintenance of private structures | |
| | Series A 1861-1913 | Series B 1861-1913 | Series C 1861-1913 | Exempt 1861-1913 | Total 1861-1913 | | Exempt 1861-1913 | Total 1861-1913 |
| 1861 | 14.228 | 11.139 | 14.033 | 12.6 | 34.0 | | 11.8 | 40.4 |
| 1862 | 14.100 | 19.160 | 13.939 | 16.6 | 53.7 | | 11.9 | 40.6 |
| 1863 | 13.718 | 15.630 | 13.655 | 14.7 | 45.7 | | 12.0 | 40.8 |
| 1864 | 13.208 | 17.850 | 13.276 | 15.5 | 52.1 | 1,006.5 | 12.1 | 41.0 |
| 1865 | 12.698 | 14.179 | 12.897 | 13.5 | 43.6 | 1,014.1 | 12.2 | 41.2 |
| 1866 | 12.316 | 10.041 | 12.613 | 11.3 | 33.2 | 1,025.6 | 12.3 | 41.6 |
| 1867 | 12.188 | 11.538 | 12.519 | 11.9 | 37.3 | 1,035.2 | 12.4 | 42.0 |
| 1868 | 12.443 | 8.930 | 12.708 | 10.8 | 30.1 | 1,045.5 | 12.5 | 42.4 |
| 1869 | 13.208 | 11.656 | 13.276 | 12.4 | 36.3 | 1,053.8 | 12.6 | 42.7 |
| 1870 | 14.546 | 10.507 | 14.268 | 12.5 | 32.3 | 1,059.8 | 12.7 | 42.9 |
| 1871 | 16.261 | 15.200 | 15.536 | 15.5 | 41.5 | 1,066.4 | 12.8 | 43.1 |
| 1872 | 18.094 | 16.868 | 15.262 | 16.7 | 43.0 | 1,071.9 | 12.9 | 43.3 |
| 1873 | 19.783 | 25.396 | 22.199 | 22.5 | 59.1 | 1,078.9 | 12.9 | 43.5 |
| 1874 | 21.070 | 32.826 | 28.322 | 27.4 | 72.0 | 1,086.0 | 13.0 | 43.6 |
| 1875 | 21.763 | 23.126 | 19.692 | 21.5 | 51.8 | 1,096.1 | 13.2 | 44.0 |
| 1876 | 21.952 | 20.404 | 19.913 | 20.8 | 47.1 | 1,107.3 | 13.3 | 44.3 |
| 1877 | 21.794 | 19.291 | 24.107 | 21.7 | 46.6 | 1,124.3 | 13.5 | 44.8 |
| 1878 | 21.447 | 17.044 | 23.557 | 20.7 | 43.1 | 1,146.1 | 13.8 | 45.4 |
| 1879 | 21.070 | 16.045 | 19.442 | 18.9 | 40.7 | 1,161.9 | 13.9 | 45.7 |
| 1880 | 20.790 | 17.158 | 17.850 | 18.6 | 43.0 | 1,176.9 | 14.1 | 46.1 |
| 1881 | 20.611 | 20.211 | 18.021 | 19.6 | 49.9 | 1,192.7 | 14.3 | 46.4 |
| 1882 | 20.505 | 23.869 | 23.704 | 22.7 | 60.5 | 1,207.4 | 14.5 | 46.7 |
| 1883 | 20.446 | 22.824 | 21.220 | 21.5 | 59.6 | 1,220.3 | 14.6 | 46.9 |
| 1884 | 20.405 | 23.199 | 20.933 | 21.5 | 62.1 | 1,232.8 | 14.8 | 47.3 |
| 1885 | 20.357 | 25.928 | 23.050 | 23.1 | 70.3 | 1,246.2 | 15.0 | 47.7 |
| 1886 | 20.274 | 26.135 | 19.892 | 22.1 | 71.1 | 1,262.7 | 15.2 | 48.2 |
| 1887 | 20.132 | 18.913 | 16.036 | 18.4 | 54.5 | 1,277.9 | 15.3 | 48.6 |
| 1888 | 19.943 | 12.948 | 10.978 | 14.6 | 39.5 | 1,293.0 | 15.5 | 49.1 |
| 1889 | 19.735 | 13.734 | 13.550 | 15.7 | 42.1 | 1,309.6 | 15.7 | 49.7 |
| 1890 | 19.541 | 18.788 | 21.570 | 20.0 | 55.9 | 1,325.2 | 15.9 | 50.3 |
| 1891 | 19.390 | 21.287 | 23.308 | 21.3 | 61.6 | 1,337.0 | 16.0 | 50.7 |
| 1892 | 19.312 | 19.097 | 20.083 | 19.5 | 55.3 | 1,344.9 | 16.1 | 50.9 |
| 1893 | 19.338 | 22.685 | 21.026 | 21.0 | 63.2 | 1,353.9 | 16.2 | 51.1 |
| 1894 | 19.499 | 22.043 | 22.060 | 21.2 | 62.1 | 1,367.1 | 16.4 | 51.6 |
| 1895 | 19.823 | 20.859 | 22.951 | 21.2 | 60.1 | 1,381.6 | 16.6 | 52.1 |
| 1896 | 20.343 | 20.503 | 22.918 | 21.3 | 60.1 | 1,394.2 | 16.7 | 52.4 |
| 1897 | 21.074 | 19.705 | 23.639 | 21.5 | 59.7 | 1,408.2 | 16.9 | 53.0 |
| 1898 | 21.999 | 19.612 | 20.745 | 20.8 | 60.0 | 1,422.4 | 17.1 | 53.5 |
| 1899 | 23.096 | 19.150 | 19.808 | 20.7 | 60.3 | 1,436.5 | 17.2 | 53.9 |
| 1900 | 24.343 | 18.818 | 22.268 | 21.8 | 62.1 | 1,450.6 | 17.4 | 54.3 |
| 1901 | 25.718 | 20.755 | 24.121 | 23.5 | 69.5 | 1,464.8 | 17.6 | 54.8 |
| 1902 | 27.199 | 24.021 | 27.536 | 26.3 | 81.3 | 1,478.3 | 17.7 | 55.2 |
| 1903 | 28.763 | 27.079 | 31.662 | 29.2 | 93.1 | 1,491.6 | 17.9 | 55.7 |
| 1904 | 30.389 | 29.932 | 33.539 | 31.3 | 103.9 | 1,505.9 | 18.1 | 56.2 |
| 1905 | 32.054 | 32.219 | 37.374 | 33.9 | 114.0 | 1,521.9 | 18.3 | 56.7 |
| 1906 | 33.736 | 31.519 | 30.040 | 31.8 | 111.9 | 1,540.6 | 18.5 | 57.4 |
| 1907 | 35.413 | 32.805 | 32.610 | 33.6 | 118.6 | 1,562.1 | 18.7 | 58.2 |
| 1908 | 37.063 | 34.873 | 32.509 | 34.8 | 126.7 | 1,585.6 | 19.0 | 59.2 |
| 1909 | 38.664 | 41.772 | 36.801 | 39.1 | 150.8 | 1,605.1 | 19.3 | 59.6 |
| 1910 | 40.193 | 48.973 | 42.339 | 43.8 | 176.4 | 1,628.9 | 19.5 | 60.5 |
| 1911 | 41.629 | 52.301 | 42.724 | 45.6 | 188.7 | 1,654.4 | 19.9 | 61.8 |
| 1912 | 42.949 | 52.581 | 44.724 | 46.8 | 191.9 | 1,680.9 | 20.2 | 63.0 |
| 1913 | 44.132 | 49.889 | 48.291 | 47.4 | 186.0 | 1,711.6 | 20.5 | 64.4 |

Sources: cols. 1 - 4, 6 - 7: see text.
col. 5: col. 4 + Table K.56, col. 54 + Table K.53, col. 29.
col. 8: col. 7 + Table K.56, col. 56 + Table K.53, col. 31.

Summary Table K.1
The construction industries: value added at 1911 prices, 1861-1913
(million lire)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---------|--------------------------------|----------|---------|-------|-------------|----------|-------|
| | Rail- and tramway construction | | | | | | |
| | New construction | | | | Maintenance | | |
| | Network extensions | | Reno- | Total | Railways | Tramways | Total |
| | Railways | Tramways | vations | | | | |
| code: | kaa01v | kaa02v | kaa03v | kaav | kab01v | kab02v | kabv |
| source: | k10c18 | k10c19 | k10c20 | | k10c22 | k10c23 | |
| note: | (a) | (a) | (b) | (c) | (d) | (d) | (e) |
| 1861 | 100.7 | .0 | .0 | 100.7 | 2.3 | .0 | 2.3 |
| 1862 | 112.8 | .0 | .0 | 112.8 | 2.6 | .0 | 2.6 |
| 1863 | 114.8 | .0 | .0 | 114.8 | 3.1 | .0 | 3.1 |
| 1864 | 102.8 | .0 | .0 | 102.8 | 3.6 | .0 | 3.6 |
| 1865 | 97.9 | .0 | .0 | 97.9 | 4.0 | .0 | 4.0 |
| 1866 | 84.2 | .0 | .0 | 84.2 | 4.6 | .0 | 4.6 |
| 1867 | 60.7 | .0 | .0 | 60.7 | 4.7 | .0 | 4.7 |
| 1868 | 59.8 | .0 | .0 | 59.8 | 5.2 | .0 | 5.2 |
| 1869 | 51.8 | .0 | .0 | 51.8 | 5.7 | .0 | 5.7 |
| 1870 | 57.1 | .0 | .0 | 57.1 | 6.2 | .0 | 6.2 |
| 1871 | 61.0 | .1 | .0 | 61.1 | 6.8 | .0 | 6.8 |
| 1872 | 65.3 | .2 | .0 | 65.5 | 7.6 | .0 | 7.6 |
| 1873 | 69.8 | .3 | 2.8 | 72.9 | 8.4 | .0 | 8.4 |
| 1874 | 70.4 | .6 | 4.9 | 75.9 | 8.6 | .0 | 8.6 |
| 1875 | 50.6 | .9 | 8.0 | 59.5 | 9.0 | .0 | 9.0 |
| 1876 | 40.0 | 1.3 | 10.8 | 52.1 | 9.6 | .1 | 9.7 |
| 1877 | 33.8 | 1.6 | 9.4 | 44.8 | 9.9 | .1 | 10.0 |
| 1878 | 36.4 | 3.2 | 8.4 | 48.0 | 10.0 | .1 | 10.1 |
| 1879 | 52.7 | 7.5 | 5.9 | 66.1 | 10.4 | .2 | 10.6 |
| 1880 | 60.0 | 11.2 | 7.7 | 78.9 | 11.4 | .3 | 11.7 |
| 1881 | 61.1 | 12.4 | 16.8 | 90.3 | 11.9 | .5 | 12.4 |
| 1882 | 79.4 | 10.7 | 23.0 | 113.1 | 12.5 | .7 | 13.2 |
| 1883 | 91.6 | 8.7 | 26.2 | 126.5 | 13.3 | .9 | 14.2 |
| 1884 | 98.6 | 5.7 | 19.5 | 123.8 | 14.3 | 1.0 | 15.3 |
| 1885 | 106.2 | 4.2 | 15.0 | 125.4 | 14.5 | 1.1 | 15.6 |
| 1886 | 100.3 | 6.3 | 13.3 | 119.9 | 15.3 | 1.2 | 16.5 |
| 1887 | 86.7 | 2.2 | 17.5 | 106.4 | 16.2 | 1.4 | 17.6 |
| 1888 | 82.0 | 3.3 | 24.8 | 110.1 | 17.7 | 1.4 | 19.1 |
| 1889 | 65.4 | 4.5 | 24.4 | 94.3 | 18.3 | 1.5 | 19.8 |
| 1890 | 70.1 | 6.3 | 17.5 | 93.9 | 18.4 | 1.7 | 20.1 |
| 1891 | 89.1 | 2.4 | 5.6 | 97.1 | 18.2 | 1.8 | 20.0 |
| 1892 | 91.3 | 3.3 | 1.4 | 96.0 | 18.3 | 1.9 | 20.2 |
| 1893 | 76.1 | 4.9 | .0 | 81.0 | 19.0 | 2.0 | 21.0 |
| 1894 | 83.1 | 2.6 | 2.8 | 88.5 | 19.3 | 2.1 | 21.4 |
| 1895 | 36.5 | 1.7 | 1.0 | 39.2 | 19.4 | 2.2 | 21.6 |
| 1896 | 18.5 | 2.0 | 2.4 | 22.9 | 20.0 | 2.3 | 22.3 |
| 1897 | 17.0 | 4.5 | 3.1 | 24.6 | 20.8 | 2.3 | 23.1 |
| 1898 | 8.1 | 6.1 | 5.2 | 19.4 | 21.2 | 2.4 | 23.6 |
| 1899 | 6.8 | 4.5 | 7.0 | 18.3 | 22.1 | 2.5 | 24.6 |
| 1900 | 8.3 | 5.6 | 9.4 | 23.3 | 22.7 | 2.5 | 25.2 |
| 1901 | 13.1 | 4.7 | 9.4 | 27.2 | 23.2 | 2.6 | 25.8 |
| 1902 | 18.4 | 2.3 | 11.5 | 32.2 | 24.2 | 2.7 | 26.9 |
| 1903 | 20.7 | 2.2 | 8.0 | 30.9 | 25.0 | 2.8 | 27.8 |
| 1904 | 25.4 | 2.9 | 9.1 | 37.4 | 26.3 | 2.8 | 29.1 |
| 1905 | 26.3 | 2.2 | 10.8 | 39.3 | 26.8 | 2.9 | 29.7 |
| 1906 | 20.8 | 4.5 | 19.5 | 44.8 | 28.7 | 2.9 | 31.6 |
| 1907 | 18.8 | 3.5 | 26.5 | 48.8 | 29.0 | 3.0 | 32.0 |
| 1908 | 14.9 | 3.0 | 33.2 | 51.1 | 31.0 | 3.1 | 34.1 |
| 1909 | 22.4 | 4.7 | 35.2 | 62.3 | 32.3 | 3.1 | 35.4 |
| 1910 | 33.0 | 7.5 | 35.2 | 75.7 | 33.9 | 3.3 | 37.2 |
| 1911 | 38.9 | 6.9 | 34.9 | 80.7 | 35.1 | 3.5 | 38.6 |
| 1912 | 39.3 | 5.1 | 38.7 | 83.1 | 36.4 | 3.7 | 40.1 |
| 1913 | 38.8 | 4.0 | 38.4 | 81.2 | 37.9 | 3.8 | 41.7 |

Summary Table K.1 (continued)

| | (8) | (9) | | (10) | (11) | (12) | | (13) | (14) |
|---------------------------|-------------------------|-------------------------|-------------|-----------------------|-----------------------|--------------------------|---------------|------------------|---|
| | Public buildings | Other public works | | Total | Main- tenance | Private buildings | | Main- tenance | Index of urban con- struction (1911 = 100) |
| | | New construction | | | | New construc- tion | | | |
| code: source: note: | kba01v k05c06 (f) | kba02v k05c10 (g) | kbav (h) | kbbv k05c04 (g) | kcav k58c05 (i) | kcbv k58c08 (i) | k52c32 (j) | | |
| 1861 | 4.5 | 48.7 | 53.2 | 54.7 | 34.0 | 40.4 | 30.6 | | |
| 1862 | 4.9 | 50.7 | 55.6 | 58.9 | 53.7 | 40.6 | 40.3 | | |
| 1863 | 5.0 | 65.6 | 70.6 | 60.6 | 45.7 | 40.8 | 35.9 | | |
| 1864 | 5.0 | 66.7 | 71.7 | 59.9 | 52.1 | 41.0 | 38.5 | | |
| 1865 | 7.7 | 79.9 | 87.6 | 59.8 | 43.6 | 41.2 | 37.9 | | |
| 1866 | 5.7 | 59.0 | 64.7 | 58.7 | 33.2 | 41.6 | 31.8 | | |
| 1867 | 4.9 | 50.8 | 55.7 | 61.5 | 37.3 | 42.0 | 33.3 | | |
| 1868 | 5.0 | 57.4 | 62.4 | 59.1 | 30.1 | 42.4 | 30.4 | | |
| 1869 | 4.6 | 52.5 | 57.1 | 59.5 | 36.3 | 42.7 | 32.4 | | |
| 1870 | 5.4 | 63.2 | 68.6 | 59.4 | 32.3 | 42.9 | 32.4 | | |
| 1871 | 6.3 | 56.0 | 62.3 | 59.7 | 41.5 | 43.1 | 34.2 | | |
| 1872 | 7.2 | 67.1 | 74.3 | 60.1 | 43.0 | 43.3 | 36.4 | | |
| 1873 | 7.4 | 74.0 | 81.4 | 59.8 | 59.1 | 43.5 | 38.3 | | |
| 1874 | 5.8 | 67.4 | 73.2 | 63.0 | 72.0 | 43.6 | 38.1 | | |
| 1875 | 7.0 | 61.1 | 68.1 | 60.9 | 51.8 | 44.0 | 36.4 | | |
| 1876 | 5.4 | 63.3 | 68.7 | 61.9 | 47.1 | 44.3 | 35.6 | | |
| 1877 | 6.4 | 75.3 | 81.7 | 64.5 | 46.6 | 44.8 | 34.2 | | |
| 1878 | 5.8 | 78.9 | 84.7 | 65.8 | 43.1 | 45.4 | 34.2 | | |
| 1879 | 4.9 | 72.3 | 77.2 | 64.6 | 40.7 | 45.7 | 34.2 | | |
| 1880 | 5.8 | 76.4 | 82.2 | 66.9 | 43.0 | 46.1 | 36.8 | | |
| 1881 | 6.7 | 68.4 | 75.1 | 66.2 | 49.9 | 46.4 | 37.5 | | |
| 1882 | 5.7 | 78.5 | 84.2 | 69.3 | 60.5 | 46.7 | 39.0 | | |
| 1883 | 7.4 | 89.0 | 96.4 | 68.5 | 59.6 | 46.9 | 42.3 | | |
| 1884 | 8.0 | 99.7 | 107.7 | 66.4 | 62.1 | 47.3 | 46.6 | | |
| 1885 | 7.8 | 99.6 | 107.4 | 67.5 | 70.3 | 47.7 | 48.9 | | |
| 1886 | 8.8 | 108.3 | 117.1 | 71.2 | 71.1 | 48.2 | 55.4 | | |
| 1887 | 9.3 | 127.1 | 136.4 | 73.2 | 54.5 | 48.6 | 56.4 | | |
| 1888 | 11.2 | 135.1 | 146.3 | 75.0 | 39.5 | 49.1 | 56.7 | | |
| 1889 | 11.5 | 128.6 | 140.1 | 77.3 | 42.1 | 49.7 | 52.0 | | |
| 1890 | 10.2 | 110.6 | 120.8 | 77.2 | 55.9 | 50.3 | 45.9 | | |
| 1891 | 9.0 | 93.4 | 102.4 | 78.1 | 61.6 | 50.7 | 42.7 | | |
| 1892 | 9.7 | 78.4 | 88.1 | 78.3 | 55.3 | 50.9 | 38.6 | | |
| 1893 | 10.1 | 69.4 | 79.5 | 79.1 | 63.2 | 51.1 | 38.9 | | |
| 1894 | 8.1 | 64.7 | 72.8 | 77.6 | 62.1 | 51.6 | 36.1 | | |
| 1895 | 7.4 | 61.9 | 69.3 | 78.5 | 60.1 | 52.1 | 35.7 | | |
| 1896 | 7.0 | 61.8 | 68.8 | 80.8 | 60.1 | 52.4 | 36.4 | | |
| 1897 | 6.5 | 62.4 | 68.9 | 81.9 | 59.7 | 53.0 | 36.0 | | |
| 1898 | 7.3 | 62.1 | 69.4 | 82.4 | 60.0 | 53.5 | 40.9 | | |
| 1899 | 8.2 | 66.0 | 74.2 | 81.2 | 60.3 | 53.9 | 44.1 | | |
| 1900 | 8.7 | 71.0 | 79.7 | 77.9 | 62.1 | 54.3 | 42.3 | | |
| 1901 | 9.8 | 73.4 | 83.2 | 78.4 | 69.5 | 54.8 | 44.3 | | |
| 1902 | 11.0 | 80.8 | 91.8 | 80.5 | 81.3 | 55.2 | 47.6 | | |
| 1903 | 12.0 | 85.0 | 97.0 | 81.3 | 93.1 | 55.7 | 49.9 | | |
| 1904 | 11.7 | 83.4 | 95.1 | 83.1 | 103.9 | 56.2 | 54.7 | | |
| 1905 | 12.9 | 96.1 | 109.0 | 84.4 | 114.0 | 56.7 | 56.9 | | |
| 1906 | 16.4 | 117.0 | 133.4 | 81.2 | 111.9 | 57.4 | 70.8 | | |
| 1907 | 19.4 | 125.0 | 144.4 | 81.5 | 118.6 | 58.2 | 72.1 | | |
| 1908 | 24.1 | 135.9 | 160.0 | 81.6 | 126.7 | 59.2 | 78.6 | | |
| 1909 | 32.4 | 161.9 | 194.3 | 83.8 | 150.8 | 59.6 | 84.6 | | |
| 1910 | 38.2 | 185.7 | 223.9 | 87.6 | 176.4 | 60.5 | 89.3 | | |
| 1911 | 38.3 | 194.9 | 233.2 | 93.7 | 188.7 | 61.8 | 100.0 | | |
| 1912 | 37.2 | 202.2 | 239.4 | 95.1 | 191.9 | 63.0 | 100.9 | | |
| 1913 | 36.7 | 200.5 | 237.2 | 96.6 | 186.0 | 64.4 | 91.6 | | |

Summary Table K.1 (continued)

| | (15) | (16) | (17) | (18) |
|---------|-----------------------------|--------------------------|---------------------------|-------|
| | Aggregate construction | | | |
| | Railways and tramways | Other public works | Private buil- dings | Total |
| code: | kav | kbv | kcv | kv |
| source: | | | | |
| note: | (k) | (l) | (m) | (n) |
| 1861 | 103.0 | 107.9 | 74.4 | 285.3 |
| 1862 | 115.4 | 114.5 | 94.3 | 324.2 |
| 1863 | 117.9 | 131.2 | 86.5 | 335.6 |
| 1864 | 106.4 | 131.6 | 93.1 | 331.1 |
| 1865 | 101.9 | 147.4 | 84.8 | 334.1 |
| 1866 | 88.8 | 123.4 | 74.8 | 287.0 |
| 1867 | 65.4 | 117.2 | 79.3 | 261.9 |
| 1868 | 65.0 | 121.5 | 72.5 | 259.0 |
| 1869 | 57.5 | 116.6 | 79.0 | 253.1 |
| 1870 | 63.3 | 128.0 | 75.2 | 266.5 |
| 1871 | 67.9 | 122.0 | 84.6 | 274.5 |
| 1872 | 73.1 | 134.4 | 86.3 | 293.8 |
| 1873 | 81.3 | 141.2 | 102.6 | 325.1 |
| 1874 | 84.5 | 136.2 | 115.6 | 336.3 |
| 1875 | 68.5 | 129.0 | 95.8 | 293.3 |
| 1876 | 61.8 | 130.6 | 91.4 | 283.8 |
| 1877 | 54.8 | 146.2 | 91.4 | 292.4 |
| 1878 | 58.1 | 150.5 | 88.5 | 297.1 |
| 1879 | 76.7 | 141.8 | 86.4 | 304.9 |
| 1880 | 90.6 | 149.1 | 89.1 | 328.8 |
| 1881 | 102.7 | 141.3 | 96.3 | 340.3 |
| 1882 | 126.3 | 153.5 | 107.2 | 387.0 |
| 1883 | 140.7 | 164.9 | 106.5 | 412.1 |
| 1884 | 139.1 | 174.1 | 109.4 | 422.6 |
| 1885 | 141.0 | 174.9 | 118.0 | 433.9 |
| 1886 | 136.4 | 188.3 | 119.3 | 444.0 |
| 1887 | 124.0 | 209.6 | 103.1 | 436.7 |
| 1888 | 129.2 | 221.3 | 88.6 | 439.1 |
| 1889 | 114.1 | 217.4 | 91.8 | 423.3 |
| 1890 | 114.0 | 198.0 | 106.2 | 418.2 |
| 1891 | 117.1 | 180.5 | 112.3 | 409.9 |
| 1892 | 116.2 | 166.4 | 106.2 | 388.8 |
| 1893 | 102.0 | 158.6 | 114.3 | 374.9 |
| 1894 | 109.9 | 150.4 | 113.7 | 374.0 |
| 1895 | 60.8 | 147.8 | 112.2 | 320.8 |
| 1896 | 45.2 | 149.6 | 112.5 | 307.3 |
| 1897 | 47.7 | 150.8 | 112.7 | 311.2 |
| 1898 | 43.0 | 151.8 | 113.5 | 308.3 |
| 1899 | 42.9 | 155.4 | 114.2 | 312.5 |
| 1900 | 48.5 | 157.6 | 116.4 | 322.5 |
| 1901 | 53.0 | 161.6 | 124.3 | 338.9 |
| 1902 | 59.1 | 172.3 | 136.5 | 367.9 |
| 1903 | 58.7 | 178.3 | 148.8 | 385.8 |
| 1904 | 66.5 | 178.2 | 160.1 | 404.8 |
| 1905 | 69.0 | 193.4 | 170.7 | 433.1 |
| 1906 | 76.4 | 214.6 | 169.3 | 460.3 |
| 1907 | 80.8 | 225.9 | 176.8 | 483.5 |
| 1908 | 85.2 | 241.6 | 185.9 | 512.7 |
| 1909 | 97.7 | 278.1 | 210.4 | 586.2 |
| 1910 | 112.9 | 311.5 | 236.9 | 661.3 |
| 1911 | 119.3 | 326.9 | 250.5 | 696.7 |
| 1912 | 123.2 | 334.5 | 254.9 | 712.6 |
| 1913 | 122.9 | 333.8 | 250.4 | 707.1 |

Summary Table K.1 (continued)

NOTES

- (a) The underlying real indices are network-specific kilometers completed, distributed over the relevant construction periods.
- (b) The underlying real index is rail consumption in excess of that attributable to network extensions.
- (c) The series is the sum of series kaa01v--kaa03v.
- (d) The underlying real indices refer to track length and use.
- (e) The series is the sum of series kab01v--kab02v.
- (f) The underlying real indices are deflated expenditure figures.
- (g) The underlying real indices include both deflated expenditure figures and physical indicators of privately financed power, gas, and water works.
- (h) The series is the sum of series kba01v--kba02v.
- (i) The underlying real index is a deflated tax-assessment series, augmented to allow for exempt buildings.
- (j) The underlying real measures track binder consumption in a sample of urban areas.
- (k) The series is the sum of series kaav--kabv.
- (l) The series is the sum of series kbav--kbbv.
- (m) The series is the sum of series kcav--kcbv.
- (n) The series is the sum of series kav--kcv.