Reconstructing the Past: The New Expenditure-Side and Composition-Of-Investment Estimates for Italy, 1861–1913

Fenoaltea, Stefano

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Stefano Fenoaltea*
Fellow, Fondazione Luigi Einaudi, Turin

stefano.fenoaltea@uniroma2.it

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ABSTRACT

This paper documents the derivation of the new expenditure-side historical national accounts, and of the estimated composition of investment, presented in the author's "Reconstructing the past: Italy's historical national accounts, 1861–1913," *M.P.R.A.* n. 98350, January 2020.

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1. INTRODUCTION

A series of papers revise the Italian historical national accounts from 1861 to 1913. These are to be taken together; the title "Reconstructing the past" is common to all, their subtitles are suitably specific. The first paper (Fenoaltea 2020a) is subtitled "The measurement of aggregate product"; it is devoted to methodological issues of general import, and in no way specific to Italy. The second paper is subtitled "Italy's historical national accounts, 1861–1913" (Fenoaltea 2020b). It presents the latest revised estimates of the production account and the expenditure account, compares them to their predecessors in the literature, and also presents estimates of the composition of investment; it focuses on the results, on their quantitative significance, and provides only a summary description of their derivation. The documentation of the underlying sources and methods – in sufficient detail to allow the estimates' verification, replication, and (one may hope) improvement – is provided in two further papers, essentially appendices to the sections on the new estimates in that second paper (Fenoaltea 2020b, taken as read): the one specifically to its §3.1, on the production side, the other to its §3.2, on the expenditure side, and §3.3, on the composition of investment.

The third paper of the series (Fenoaltea 2020c) documents the derivation of the production side of the national accounts. The present paper is the fourth: it documents the derivation of the expenditure side – not directly from the sources, in the main, as they are too thin upon the ground to support the exercise, but by suitably disaggregating the GDP estimates obtained from the production side – and of the composition of investment – entirely from estimates already obtained. In principle if not necessarily in practice the new estimates documented here differ from their immediate predecessors (in Fenoaltea 2018a, 2018b, now superseded) rather less than the corresponding production-side estimates: where the latter incorporated new evidence, and were in part conceptually recast, the expenditure-side and composition-of-investment estimates are obtained exactly as before, and simply apply the same algorithms to the updated production-side and derivative estimates.

The new expenditure-side estimates presented in Fenoaltea (2020b), Table 4 are reproduced here, for convenience, in Table 1. Table 1 is laid out in the usual manner, as if the GDP series in col. 7 were obtained from the components in cols. 1–6; in fact, that series simply transcribes the production-side estimates of GDP (Fenoaltea 2020b, Table 1, col. 28). Fenoaltea (2020b), Figure 5 illustrates the new series and compares them to their immediate predecessors, the preliminary second-generation estimates in Fenoaltea (2012) and the sesquicentennial estimates in Baffigi (2011, 2013, 2015, 2017); it is similarly reproduced here as Figure 1.

The derivation of the new estimates of the various expenditure-side components of GDP is described in the order imposed by the procedure that generates them: exports and imports (section 2), public consumption (3), fixed investment (4, in many ways the heart of the exercise), and, together, private consumption and (inventory and total) investment (5).[1] These new estimates, like those in Fenoaltea (2012) and, *de facto*, Baffigi (1911) consider maintenance net production which is included in GDP (as opposed to canceling out, as intermediate production). With that proviso the present expenditure-side estimates are United-Nations-standard estimates; in this they differ from Baffigi's,

[1] The estimates of the investment goods produced and acquired in Italy draw on the author's estimates of industrial production; their derivation is documented in Fenoaltea (2015a–h, 2019).

which were based on Vitali's "benchmark" expenditure side that *excludes* from investment the maintenance of equipment (and the acquisition of naval vessels), and therefore, again *de facto*, counts those as consumption (Fenoaltea 2020b, footnote 10).

The new composition-of-investment estimates appear in Fenoaltea (2020b), Tables 5 and 6, reproduced here, for convenience, as Tables 14 and 18. The derivation of the estimates at constant prices is described in section 6; the derivation of the conjectural estimates at a constant price level but at approximate current relative prices, in section 7.

2. EXPORTS AND IMPORTS

The aggregate export and import series transcribed in Table 1, cols. 5 and 6 are constructed in Table 2.

In Table 2, cols. 1 and 6 refer to 1911-price exports and imports, as derived, from 1862 to 1913, from the Federico *et al.* (2011) database. These differ slightly from their preceding versions (Fenoaltea 2012, Table 1, cols. 4 and 5): where the latter were obtained by deflating total exports on the one hand and total imports on the other by the corresponding price indices, the present export and import series are obtained by separately deflating primary products and manufactures by their specific price indices (Federico *et al.* 2011, pp. 226, 228), and then summing the results. The Federico *et al.* (2011) database excludes 1861; the present figures for that year in cols. 1 and 6 are obtained from those for 1862, using as indices the corresponding 2012 estimates (and, indirectly, Istat series, Fenoaltea 2012, p. 304).

Cols. 2 and 7 are very tentative corrections for border changes.[2] In 1871, of the national male population over 15, Latium accounted for 3.5 percent, Venetia for 9.8 percent (Fenoaltea 2011, p. 206); on this simple basis, the exports and imports of the missing regions are estimated, in the first instance, as 15.3 percent of the Kingdom's figures in 1861–66 and 3.6 percent in 1867–70. But these initial estimates attribute to Latium and Venetia the same reduced exports, and bloated imports, that the Kingdom owed to its massive capital imports. Those regions' trade was presumably far more nearly balanced; here, for simplicity, the initial estimates of their exports and imports are simply averaged together, and that average is transcribed in both cols. 2 and 7.

Cols. 3−5 and 8−10 tentatively correct the data in the *Movimento commerciale* itself. Before 1881 that source appears to omit seagoing ships (but to count trivial quantities of vessels for internal navigation, at least in 1862−76), while in later years it apparently continues to omit imports of naval vessels, and to count poorly what it does count (Fenoaltea 2018c); the Federico *et al.* (2011) database inherits these apparent errors and omissions.[3] Cols. 3 and 8 are the ship-related *Movimento commerciale* value figures in the database (Fenoaltea 2018c, Table 6, panel A, cols. 3 and 6), deflated by the appropriate Federico *et al.* (2011) manufactured-goods price indices. Cols. 4−5 and 9−10 are estimates based on high-quality ship-specific sources, taken from Fenoaltea (2018c): cols. 4 and 9 from Table 1, respectively cols. 54 and 55 (from 1861), cols. 5 and 10 from Table 5, respectively col.

[2] Reckoning by indivisible years, the Kingdom included Venetia only from 1867, and Latium only from 1871. Baffigi (2015, 2017) appears to have scaled up the Kingdom's total exports and total imports by some 5 percent in 1867–70, to allow for Latium, and 16 percent in 1861–66, to allow for both Latium and Venetia.

[3] The Federico *et al.* data-base also mismeasures the physical units of the ships it does count, as ships' tons (units of internal volume) are taken to be units of weight: the reported quantities are multiplied by 10, and said to be in quintals.

10 and col. 11 (from 1865; both are extrapolated back to 1861 in proportion to net imports, col. 12 minus col. 9 in that same Table 5).

Col. 11 is a further correction, of a different order, applied to the import series alone. Because imports are valued c.i.f., the import figures include the value of the transportation services as well as the (embarkation) value of the goods themselves; and those services were in fact imported only if performed by foreign-flag carriers. Fenoaltea (2015f), Table F.26, transcribes reported port movements; despite their faults (ibid., section F02.05), they are here taken at face value. The net tonnage of Italian-flag arrivals is reported there, distinguishing sail and steam (cols. 6 and 8), as is that of Italian-flag international arrivals (cols. 10 and 12).[4] The sail and steam figures are summed to obtain total tonnages for Italian-flag total and international arrivals, whence total domestic-arrival tonnages are obtained as a residual. The international- and domestic-arrival tonnages are then summed with weights of 10 and 1, respectively (at a guess, the relative trip lengths). The international share of that sum is calculated (it equals near 70 percent in the 1860s and '70s, and then nearer 60 percent), and applied to the estimated value added in maritime transportation (Table 7.1, col. 6). The figures in col. 11 are the resulting estimates of value added in Italian-flag international navigation, here identified, for simplicity, directly with the relevant value.[5]

Aggregate 1911-price exports and imports, transcribed in Table 1, cols. 5 and 6, are obtained from Table 2: the export series as col. 1 + col. 2 − col. 3 + col. 4 + col. 5, the import series as col. 6 + col. 7 − col. 8 + col. 9 + col. 10 − col. 11.

3. PUBLIC CONSUMPTION

Public consumption is here identified with the absorption by the public sector of non-durables, as logic requires (and the United Nations now accepts, *SNA*, p. 123); the acquisition of durable goods by the public sector, as by firms, is here considered investment, as is their maintenance.[6]

The earnings of public employees are the largest component of public consumption, and the residual consumption of goods and services is plausibly tied to their number. The public-consumption series in Table 1, col. 4 is simply the government-services value added series in Fenoaltea (2020b), Table 1, col. 24, suitably scaled up.

The 1911 government-services value added estimate incorporated there, 1,239 million lire, comes from Battilani, Felice, and Zamagni (2014); comfortingly, it is closely confirmed by the centennial-corpus estimate of 1,217 million lire, derived from the same public budgets (*Reddito nazionale*, pp. 149−154, 238). The corresponding purchases of (consumption) goods and services are less easily ascertained. Zamagni presented an estimate for 1911 of 831 million lire (Rey 1992, p. 233; also Rey 2000, p. 369), without, however, a single word to clarify its content. More usefully,

[4] The missing data for 1897−1900 in cols. 10 and 12 are here estimated. The 1896 figures are extrapolated in proportion to total arrivals (col. 8), with the annual growth of the latter series so rescaled, in each case, as to interpolate the reported figures for 1901.

[5] Materials costs, notably fuel costs for steam transportation, were significant, but coal was of course imported.

[6] Vitali's estimates, apparently informed by the standard conventions of the day, count the increment in public roads, for example, as investment, and the increment in other public durables as consumption (Vitali in Rey 1992, pp. 314−315), an absurdity up with which one cannot put. The convention that attributes consumer durables to consumption rather than to investment is equally absurd, but here accepted, albeit with a bad conscience.

the *Reddito nazionale* includes an estimate of the value of public goods and services (1,939 million lire), which is explicitly said to be the sum of public-sector labor costs (in essence, value added) and the cost of currently consumed materials (*materiali di servizio*), clearly excluding investment goods (ibid., pp. 152−153, 240).[7] Here, the cost of current materials is set equal to the difference between Istat's goods-and-services figure (1,939 million lire) and their value added estimate (1,217 million lire), or 722 million lire.

The present public-consumption series in Table 1, col. 4 accordingly scales up the production-side value added series by a factor of ((1,239 + 722)/1,239).

4. FIXED INVESTMENT

4.1 Introduction

Fixed investment − simply "investment," through the rest of this section − is here estimated by summing the investment-good components of production, activity by activity, and the analogous components of international trade; all components are measured at 1911 prices, the production figures (normally) in terms of value added, exports and imports in terms of value. The order in which these are considered reflects the logical sequencing of the estimates themselves.

The (fixed) investment component of industry's product is estimated first; the time series obtained here are presented, by industry group, in Table 3.

4.2 Investment goods: industry

4.2.1 The extractive industries

Table 3, col. 1 refers to the extractive industries. The annual physical product of each of the 32 identified goods (Fenoaltea 2015b, Summary Table B.1) is weighted by the conventional 1911-price unit value added (ibid., Summary Table B.2, panel B1).[8] Of the resulting value added, the investment-good share is set equal to 50 percent for the mineral fuels (ibid., Summary Table B.1, cols. 1−4), 100 percent for the non-precious metal ores excluding mercury and pyrite (ibid., cols. 5−8, 11−12, and 15−16), again 100 percent for asphalt rock (ibid., col. 22) and all quarry products (ibid., cols. 28−32), and zero otherwise.[9] Over the period at hand quarry products dominate the resulting total, with a 71 percent share of the cumulative total; the main metal ores accounted for another 25 percent.

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[7] Following the Italian conventions of the day, which made more sense than those since imposed by the hegemonic powers, the (1957) *Reddito nazionale* distinguished between intermediate and final public goods and services, and excluded the former from public consumption and *GDP*; and this is why the estimate of *G* (827 million lire, p. 261) falls short, as the present estimate cannot, of the corresponding public-sector value added estimate.

[8] In another absurdity, as noted (Fenoaltea 2020a, §2.5, footnote 42) the national accounts conventionally measure the "value added" of the extractive industries by the value of output, excluding minor items (e.g., purchased fuel for the pumps) but not the value of the principal raw material (the goods below ground that are extracted). Here, the conventional measure is conveniently close to a value measure (excluding as noted purchased fuel, here counted elsewhere).

[9] This is of course an approximation. Most retained sulphur (from sulphur ore and pyrite) was used for sulphuric acid and thence fertilizer; comparatively small quantities, here neglected, entered the manufacture of explosives and thus (again in part) mining and quarrying.

4.2.2 The manufacturing industries: food and tobacco

The food and the tobacco industries are here assumed to have produced only consumer goods, and do not appear in Table 3. Some slaughterhouse by-products are an exception; these are recovered in the leather-industry estimates below.

4.2.3 The manufacturing industries: textiles and apparel

Table 3, col. 2 refers to the textile and apparel industries together; this series is derived in Table 4. These too are essentially consumer-goods industries, with, however, some here relevant exceptions, notably within the hemp industry. The investment goods considered here are (hemp) rope, sailcloth, and tarpaulins; for simplicity (so that the agricultural-investment-good estimates below can simply ignore hemp), the entire value of these final products is counted here in col. 2.

The rope component is obtained easily enough: the output series is ready-made (Fenoaltea 2019, Summary Table H.1, col. 31, transcribed in Table 4, col. 1), and at 1911 prices rope is valued at 1,250 lire per ton (ibid., section H05.08).

The sail component is altogether more tentative, at every stage. First, output is estimated in proportion to domestic demand alone, as if international trade were negligible. Demand was presumably both for new ships and for replacement, but the relevant coefficients are not easy to pin down. The *Enciclopedia italiana*, vol. 24, p. 360 reports some figures for large metal-hulled sailing vessels; the *Melbourne* is attributed 1,953 square meters of sail and a displacement of 3,500 tons, the *Preussen* 11,580 displacement tons and 5,080 gross register tons, whence, assuming everything scales, some 1.3 square meters of sail per gross register ton (and per net ton as well: in the case of sailing ships net tons are only a few percentage points under gross tons, and the present margin of error is greater than that).

The weight of sailcloth is also uncertain. The *Movimento commerciale* does not identify hemp cloth by weight per unit area, but it does suggest that the heaviest yarn was of the order of 7,000 meters per kilogram (tariff category 143a), and that a square piece of cloth 5 mm. on the side might contain some 30 threads (tariff category 151a1). One square meter would thus contain 6,000 linear meters of yarn, or (6/7) = .86 kilograms of cloth; assuming seagoing vessels carried a full set of spare sails, a 1,000-gross-register-ton sailing vessel would come equipped with 2,600 square meters of sails weighing some (2.6)(.86) = 2.2 tons. Table 4, col. 2 transcribes the estimated weight of the sails for new ships, obtained simply as 2.2 (tons of sail per thousand gross tons) times the gross tonnage constructed (Fenoaltea 2015f, Table F.21, col. 4); the 25,000 gross tons constructed in 1861, for example, correspond to just 55 tons of sails. Table 4, col. 3 transcribes the estimated weight of the replacement sails. Assuming that a (double) set of sails lasted 4 years, on average, the production of replacement sails for the extant fleet is calculated from the total (net) tonnage of the latter (ibid., Table F.24, col. 6) by deducting the above (gross) tonnage of the new vessels and multiplying the residual by .25 times 2.2 (tons of sail per thousand gross tons). In 1861, for example, the (517,000 − 25,000) = 492,000 tons of old ships are taken to have been reequipped with some 271 tons of sails. Sailcloth is here valued at 4,000 lire per ton (from the export prices for hemp cloth, *Movimento commerciale* tariff category 151a1).

Table 4, col. 4 transcribes the estimated weight of the tarpaulins produced, essentially for carters, again neglecting international trade. In 1911, the *Censimento demografico* reports some 234,000 men (and a handful of women) in category 8.31, "road transportation," which includes drivers of animals and (all) vehicles, and stable hands; the *Censimento 1901* reported in category XVII.10 some 125,000 carters, muleteers, and stable hands. Here, very tentatively, the number of carters is set equal to 100,000 in 1900, and attributed and average of 3 kilograms of tarpaulins (4 square meters at 1 kilogram each, for 75 percent of the carters), for a tarpaulin stock of some 300 tons in 1900. That stock is further assumed to have increased 2.5-fold from 1861 to 1911 (the approximate increase in the road-transport series, Fenoaltea 2020c, Table 5, col. 5, ignoring the cyclical movements tied to construction materials that did not, in the main, need to be covered); the estimated stock in 1900 is accordingly extrapolated at the corresponding growth rate (near 1.85 percent p. a.).

Annual tarpaulin production (Table 4, col. 4) is estimated very simply as the annual increment in the stock plus (assuming a ten-year life) one tenth of the previous year's stock; reassuringly, the quantities involved seem trivial. Tarpaulins are here valued at 3,800 lire per ton (*Movimento commerciale*, tariff category 153a).

Table 3, col. 2 is the sum of the four series in Table 4, weighted by, respectively, 1,250, 4,000, 4,000, and 3,800 lire per ton. Again (perhaps) reassuringly, the first component (ropes) always accounts for at least nine-tenths of the total.

4.2.4 The manufacturing industries: leather

Table 3, col. 3 refers to the leather industry.[10] The estimates of the investment component of its product cannot be anything but crude; but the evidence points here to small values, so even large relative errors remain small in absolute terms and not overly disturbing in the larger scheme of things. The relevant production would seem to be that of saddlery and belting, to which Fenoaltea (2019) attributes a value added of some 17.2 million lire in 1911 (section H09.05); the tanned leather consumed is estimated in turn at some 4,200 tons (section H09.09), worth perhaps another 2.0 million lire (using the import price for *Movimento commerciale* category 627, tanned leather n.e.c., rather than the lower export price, apparently dominated by sole leather). Allowing for ancillary materials, the saddlery-and-belting value product in 1911 is here estimated at some 19.5 million lire.

The investment component of that value product is anybody's guess. Belting was worth about one third less, per ton, than harnesses (*Movimento commerciale* categories 645 and 651), implying that roughly equal tonnages would have left belting with some 40 percent of the value product, and harnesses some 60 percent, of which perhaps 50 for "business" horses and 10 for "household" horses (less numerous, §4.3.4 below, and much less intensively used; military horses, the fewest in number, *Annuario 1913*, p. 401 and plausibly the least intensively used, are ignored). The present guess is accordingly that in 1911 leather investment goods included some 8 million lire of belting, and 10 million lire of harnesses and the like. These are again estimates of value rather than value added, so that the earlier stages of production need not be considered in their own right.

The harness component is here extrapolated using the road-transport series (Fenoaltea 2020c, Table 5, col. 5). Assuming a ten-year life, the index of harness demand in year t is calculated as the increment in that series from $t-1$ to t, plus 10 percent of its value in $t-1$; the missing figure for 1861 is simply set equal to that obtained for 1862. The resulting index is then rescaled to set 1911 = 10 (million lire at 1911 prices). The extrapolation of the belting series is similarly adventurous. The *Censimento industriale*, vol. 4, p. 522 lists a total of 1.6 million primary horsepower in use (in the part of industry it covered), of which 1.0 million converted to electricity; excluding categories 3 (where power use was dominated by milling, which did not use belting) and 8 (dominated by the utilities), these figures fall to .53 and .19 million horsepower, suggesting that in 1911 some 36 percent were converted to electricity, a figure comparable to the 39 percent obtained for category 6 (textiles) alone. Fenoaltea (2015f), Table F.51, col. 15 reports annual estimates of coal (or coal-equivalent) used to raise steam to drive industrial and agricultural machinery; to allow for the replacement of belting by wiring, that series is here reduced by 2 percent in 1894, 4 percent in 1895, and so on through 36 percent in 1911 to 40 percent in 1913. Proceeding as before but assuming a six-year life, the index of belting demand in year t is calculated as the increment in that amended series from $t-1$ to t, plus one sixth of its value in $t-1$; the missing figure for 1861 is simply set equal to that obtained for 1862. The resulting index is then rescaled to set 1911 = 8 (million lire at 1911 prices). The sum of these two series is the present tentative estimate of 1911-price value of leather-investment-good production.

4.2.5 The manufacturing industries: wood

[10] These estimates differ from those in Fenoaltea (2018a), as they take advantage of the recently compiled second-generation estimates for the leather industry.

Table 3, col. 4 refers to the wood industry: a largely artisanal, poorly documented industry, like the leather industry, but, unlike it, not dominated by the new production and maintenance of consumer durables, and above all not yet adequately researched. The wood industry is here taken to coincide with 1911-census categories 3.1 ("wood") and 3.2 ("wood-like materials"), excluding 3.22 "straw ware" (essentially braid and hats, here included in the apparel industry). In 1911, it is attributed a value added of 386 million lire, of which 344 million for its labor force (over 415,000, again overwhelmingly male) and 42 million to capital (Rey 1992, pp. 143−145).

Two basic stages of production are usefully distinguished: the production of lumber from timber, and that of the industry's final products from lumber. The first stage corresponds to census category 3.11, "initial processing of wood" (sawmills and more, *Censimento demografico*, vol. 4, p. 8), with some 19,000 workers. The analogous data in the *Censimento industriale* (vol. 4, pp. 508−509, 520−521) attribute to that category over 40 percent of the wood industry's horsepower, but implicitly, given the simplicity of the machinery, a lower share of the return to the industry's capital. On this slim evidence, the production of lumber is here attributed a value added of 30 million lire, leaving 356 million to that of wood products from lumber.

The consumer-good component of the latter may be gauged from the detailed labor-force figures in the *Censimento demografico* (vol. 4, pp. 8−9). The labor force in categories 3.12 (small ware, mostly consumer goods: 16,700), 3.17 (furniture: 60,100), 3.18 (musical instruments: 3,200), 3.21 (caneware: 19,800), and 3.25 (brooms: 2,300) totals 102,000. These figures suggest that in 1911 a quarter or so of wood-products value added, or some 89 million lire, was generated in the production of consumer durables (which are also investment goods, of course, but not so recognized by the standard conventions to which this paper reluctantly conforms), and 267 million lire in that of producer durables ("investment goods").

As luck would have it, the *Movimento commerciale* suggests that trade in wood and wood products was overwhelmingly in timber and lumber (and firewood), and that trade in finished products was, in comparison, negligible; the investment content of wood-products consumption can accordingly be estimated from domestic production alone. With accuracy *ultra vires*, the present estimates aim at least for simplicity: domestic production is here estimated directly in value terms, so that the value added in producing the raw materials need not be considered in its own right.

Cianci (1933) reports the price of pine beams in 1911 as 65 lire per cubic meter, or some 110 lire per ton (Colombo, 1919, p. 61).[11] In 1911, the *Movimento commerciale* assigns a price of 650 lire per ton to generic wood products (category 560), 800 lire per ton to spools (561), 850 lire per ton to ordinary vehicle parts (559), 1,050 lire per ton to flooring (542) and 1,600 lire per ton to ordinary wood furniture (543). Tentatively allowing a 900-lire-per-ton average and 25 percent weight losses, and using Cianci's lumber price, a ton of output may have consumed lumber worth near 150 lire, whence, with a further small allowance for other costs, a value added in the neighborhood of 720 lire per ton of output, or 80 percent of value. The 1911 benchmark estimate of the value of investment-goods production (and consumption) in 1911 is accordingly 125 percent of the corresponding value added estimate, or some 334 million lire; the corresponding estimate of the value of consumer goods equals 111 million lire. For future reference, in quantitative terms the total value of 445 million lire corresponds to some .49 million tons of output, consuming .66 million tons of lumber worth an estimated 72.5 million lire.

In principle, of course, the consumption- and investment-good value benchmarks should be differently extrapolated; but there is little useful evidence with which to distinguish their time paths, not least because the cyclical movements of the consumer-goods component may well have been dominated by the alternating fortunes of the wealthy classes, and the path of luxury-good consumption (e.g., that of precious-metal products, Fenoaltea 2015f, Table F.54, col. 4) much resembles that of the wood industry's estimated aggregate product (Fenoaltea 2020b, Table 1, col. 8).

[11] The *Sommario*, p. 181, reports the price of railway ties at an incongruously low 56.2 lire per ton; one suspects an inappropriate conversion from volume units to weight units.

The assumption that the two components moved together seems as good as any, and the above investment-good benchmark is accordingly extrapolated in direct proportion to the cited production series. The resulting estimates are transcribed in Table 5, col. 1.

These estimates of the 1911-price value of the finished investment goods produced by the wood industry are to be complemented by estimates of the lumber consumed as such by other investment-good industries, notable engineering and construction.[12] The engineering-industry component is practically ready-made, as that industry's lumber consumption (for ships and railway vehicles) has been estimated. Table 5, col. 2 is the sum of those tonnage estimates (Fenoaltea 2015f, Table F.20, col. 10, Table F.38, col. 5, Table F.41 col. 6, Table F.42, col. 9), simply multiplied by the above-cited price of lumber (110 lire/ton). For future reference, in 1911 the total tonnage is just over 68,000 tons, for a value of some 7.5 million lire.

The construction-industry component is instead very tentatively estimated here, starting with a quantity figure for 1911. As noted above, the census data point to a value added in lumber production near 30 million lire; a quantity estimate is derived from that figure, and an estimate of value added per ton of output. The price of lumber is set, as above, at 110 lire/ton. The difficulty is that part of the lumber was derived from rough-hewn logs, which the *Movimento commerciale* valued at 65 lire per ton (category 524), and part from imported squared-off or cut logs, valued at 95 lire per ton. In producing lumber from rough-hewn logs, allowing a 20 percent weight loss, the margin between the price of lumber and the cost of the raw material was some 29 lire per ton of lumber; deducting one-fifteenth of that for energy and other costs value added can be estimated at some 27 lire per ton. In producing lumber from squared-off logs, on the other hand, allowing a 3 to 4 percent weight loss, the margin between the price of lumber and the cost of the raw material was near 12 lire per ton of lumber, pointing to a value added of perhaps 11 lire per ton.

Imports of squared-off logs rose significantly, from .9 million tons 1904 to 1.2 million tons in 1913, but the length of time they were left to season in unknown; here, in round figures, the resulting lumber output in 1911 is estimated to have been near 1.1 million tons, for a value added near 12 million lire. This estimate leaves a residual value added of 18 million lire for lumber from rough-hewn logs; at the 27 lire per ton estimated above, the implied output is some .7 million tons, for a total of 1.8 million tons, with an aggregate value of 198 million lire.[13]

Of that, from the preceding estimates, wood products are estimated to have consumed lumber worth some 72.5 million lire, the engineering industry lumber worth another 7.5 million lire; the value of the implied residual consumed by the construction industry was accordingly some 118 million lire. For simplicity, this benchmark is here extrapolated in direct proportion to the value added of the construction industry (here transcribed in Table 3, col. 10); the resulting figures are transcribed in Table 5, col. 3.

The value of the wood industry's investment goods, transcribed in Table 3, col. 4, is simply the rounded sum of Table 5, cols. 1−3.

4.2.6 The manufacturing industries: metalmaking and engineering

4.2.6.1 Introduction

Table 3, cols. 5 and 6 refer to the metalmaking industry and the engineering industry, respectively. Like the wood industry, the engineering industry produced durables − including consumer durables, which are here to be (artificially) excluded; the metal industry supplied the raw material. Unlike the wood industry, the metal and engineering industries have been extensively

[12] The construction industry also consumed lumber in the form of finished wood products (e.g., doors and window frames incorporated in buildings), which are covered by Table 5, col. 1.

[13] The quantity estimate sits well with the evidence that the State railways handled 1.7 million tons of lumber in 1911 (Fenoaltea 1983, p. 79).

researched (Fenoaltea 2015e,f), but not with an eye to this particular distinction. Table 3, cols. 5 and 6, must accordingly be constructed; the estimates of the industry aggregates are given (Fenoaltea 2020b, Table 1, cols. 9 and 10), those of the consumer-goods components are collected in Table 6.[14]

The engineering industry comprised four major subgroups, producing, respectively, fabricated metal ("hardware"), general equipment ("ordinary" – non-precision – machines, including ships and railway vehicles, and structural components), precision equipment, and precious-metal products. The structure of the industry in 1911 is documented by the census data, here collected in Table 7 (extracted from Fenoaltea 2015f, Table F.01); as argued elsewhere, the best guide to actual employment (at the peak of the boom) is provided by the labor-force totals in col. 2.[15] The detailed description of each category's content (e.g., *Censimento demografico*, vol. 4, pp. 12−14) is an invaluable guide to the goods actually produced, albeit not always, for present purposes, an adequate one. In the case of fabricated metal, for example, the largest categories refer to blacksmiths (4.31) and other smiths (4.32); they are said to cover those employed doing what those smiths do, which is of little help.

4.2.6.2 Fabricated metal

Consumer-good fabricated-metal maintenance is estimated as follows. For 1911, the *Censimento demografico*, vol. 4 reports some 9 million persons over age 10 working in agriculture, under 5 million working in industry, and 27 million persons in all; of these last, those engaged in "family production" were perhaps 40 percent (a woman and a girl in a family of 5 over age 10). Daily hours spent handling metal tools averaged perhaps near 8 for agricultural workers (allowing for the time spent tending animals and the like), as many again for industrial workers (allowing for the factory workers that tended machines), and just 1 for family workers; and an index of roughness of use set equal to 1 for family production (cooking) may equal 3 for industry, and say 120 percent of that, or 3.6, for agriculture. Together, these coefficients point to a relative maintenance burden per person over age 10 equal to 72 per person in agriculture and 60 per person in industry, against 1 per person at large; together with the census figures recalled above, they suggest that of total fabricated metal maintenance activity some 66 percent was devoted to agricultural tools, 31 percent to industrial tools, and just 2.8 percent to household equipment. Similar calculations using the same weights and the corresponding data from the earlier censuses yield shares equal to 71, 27, and 2.6 percent, respectively, in 1901, and 73, 25, and 2.3 percent, respectively, in 1871.[16]

The successive shares of the maintenance total thus attributed to agriculture (73, 71, and 66 percent) are very close to corresponding shares attributed to blacksmiths (73, 70, and 68 percent, from Fenoaltea 2015f, Summary Table F.1); this sits well with the assumption that the blacksmiths' maintenance activity and the maintenance of agricultural tools essentially coincided (ibid., section F04.10). At the same time, the successive consumer-goods shares of all fabricated-metal maintenance (2.3, 2.6, and 2.8 percent), applied to the corresponding totals (140.67, 177.12, and 195.05 million

[14] The engineering-industry estimates in Table 3 include value added in new production, and in maintenance; Vitali's estimates, apparently informed by the then standard conventions, exclude maintenance (Rey 1992, pp. 314−315). The estimates in Fenoaltea (2015f) are sufficiently detailed to allow alternative calculations.

[15] See Fenoaltea (2015i). The industrial-census totals in col. 4 are much lower, as they tabulate only the questionnaires sent to workshops (with at least two workers) separate from the owner/manager's residence, and correspondingly exclude much artisanal production; they remain useful, as the horsepower data are a guide to capital intensity. It may be noted that the two censuses used the same categories, save that the industrial census placed vertically integrated shops in separate categories (with an ω in the appropriate position). Not included in Table 7 are the workers the industrial census attributed to shops integrated across the major branches of engineering (14,321), engineering and metalmaking (29,286), metal-processing and wood-working (10,980), and metal-processing and construction or construction materials (4,371).

[16] The 1881 census notoriously overcounted female employment, and was not used (Vitali 1970, pp. 31−43).

1911 lire, ibid.,, Summary Table F.3), yield shares of fabricated-metal maintenance excluding blacksmiths (37.87, 52.64, and 62.37 million 1911 lire, ibid., Summary Table F.1) that grow only from 8.54 to 8.75 and finally 8.76 percent. For simplicity, the estimates of consumer-good value added in fabricated-metal maintenance transcribed in Table 6, col. 1 are obtained by linearly interpolating these last percentage shares, and applying them to aggregate fabricated-metal maintenance, net of blacksmiths'.

The corresponding consumer-good new production shares are even more tentative. Excluding smithing, the fabricated-metal group is here identified with category 4.3 net of 4.31 and 4.32, plus 4.52 (weights and scales, mostly traditional steelyards rather than machines). Using the labor-force figures in Table 7 and allocating to consumer goods 100 percent of categories 4.36 (base-metal medals and coins), 4.37 (base-metal tableware, kitchenware) and 4.39 (knife-grinding, presuming that those who used knives professionally sharpened their own), 90 percent of 4.33 (metal furniture and metal signs), 50 percent of 4.35 (cables, springs, tin cans) and 4.38 (cutting tools from knives to sickles and swords), 10 percent of 4.34 (general hardware, covering everything from nails to hairpins), and 5 percent of 4.311 (a residual that includes plating and enameling) and 4.52 (weights and scales), one obtains an overall consumer-goods share of the fabricated-metal group, excluding smiths, equal to 48 percent of the labor force and, by extension, of value added. The value added estimates for this sub-group equal 62.83 million lire in all, of which 8.65 in maintenance (Fenoaltea 2015f, Tables F.03, F.46) and, implicitly, 54.18 million lire in new production; consumer goods are attributed 48 percent of the total, or some 30.2 million lire in all. Allowing consumer-goods maintenance 8.76 percent (as above) of the 8.65 million lire maintenance figure, or some .8 million lire, the residual attributed to this group's value added in the new production of consumer goods equals some 29.4 million lire, or a not unreasonable 54 percent of the sub-group's new-good total.

Blacksmithing (4.31) and other smithing (4.32) are attributed a value added of 216.66 and 68.18 million lire, respectively, of which 132.68 and 53.72, respectively, in maintenance (ibid., Tables F.03, F.46) and, implicitly, 83.98 and 14.46 million lire in new production. Blacksmiths' new production would appear to have involved very few consumer goods, other smiths' perhaps rather more; here, very tentatively, consumer goods are attributed 3 percent of blacksmiths' new production and 10 percent of other smiths', or another 4.0 million lire. The total value added in the new production of fabricated-metal consumer goods in 1911 is accordingly set equal to 33.4 million lire. The corresponding time series is transcribed in Table 6, col. 2. The new-production figure for 1911 is here extrapolated in proportion to total fabricated-metal value added, including maintenance (ibid., Summary Table F.3, col. 14): that series shares the cyclical movements of new production, but with the cycle, essentially related to new construction (Fenoaltea 2017), dampened by the maintenance component. Reasonably enough, next to the population figures in the *Sommario* (p. 39, col. 1), it implies a per-capita value added rising from .61 1911 lire in 1871 to .66 in 1881, .68 in 1901, and .96 in 1911, the only census year that was in fact a long-cycle peak.

4.2.6.3 General equipment

Table 6, cols. 3 and 4 refer in turn to the general equipment component of the engineering industry (ordinary machinery and structural components); in Table 7 this group corresponds to all of the industries in category group 4.4, plus those in categories 4.54, 4.55, 4.57, and 4.58 (Fenoaltea 2015f, chapter F01). The only category producing consumer goods of any significance would appear to be 4.43, bicycles and automobiles; the production of sewing machines, in particular, appears to have been negligible (ibid., p. 118), but the stock of such machines was obviously maintained.[17] The estimates for group 4.4 excluding ships and railway vehicles total 79,900 workers, 32,750 horsepower, and a value added of some 162 million lire, of which 96 million labor costs and 66

[17] All ships (seagoing vessels), including naval ones, are here considered (private or public) investment goods (Fenoaltea 2020b, §3.2, footnote 37). Once again, the estimates in Fenoaltea (2015f) are sufficiently detailed to allow alternative calculations (for ships; other armaments are not distinguished). Trucks, apparently few in number (ibid., p. 119) are not here explicitly considered.

million capital costs (ibid., Tables F.02 and F.03). In category 4.43 alone the censuses counted near 16,800 workers (none of them artisans, oddly, given those engaged in our own day in bicycle assembly and repair) and some 4,100 horsepower (Table 7); these figures suggest that bicycles and automobiles accounted for some 21.0 percent of the above labor cost and 12.5 percent of the above capital cost, for a total value added of some 28 million lire. The "large" shops (with over 10 employees) alone employed approximately 8,900 persons and 3,400 horsepower (ibid., Table F.01), pointing to a value added near 18 million lire; assuming that new production occupied all the large shops and a fifth of the residual, 20 million lire are here attributed to the new production, and 8 million lire to the maintenance, of cars and bicycles.

These figures are here extrapolated as follows. In 1911, the circulating stock of metal road vehicles can be estimated, in units of weight, near 17,300 tons of bicycles, and 11,400 tons of automobiles and motorcycles (ibid., p. 119). The annual tonnage of circulating bicycles is estimated, allowing 20 kilograms per bicycle, from the number taxed (ibid., Table F.51, col. 21), smoothed and shifted by calculating the stock in year t as the sum of .25 times that taxed in years t and $t - 2$ and .5 times that number in year $t - 1$. The annual tonnage of circulating motor vehicles is instead estimated on the simple assumption that that stock increased by a third from year to year (so that, working backwards, the stock becomes negligible around the turn of the century). The sum of these two tonnage series is used to extrapolate the 8-million-lire maintenance benchmark. The 20-million-lire new-production benchmark is instead extrapolated using the sum of the annual increments in those circulating-stock tonnages, reduced by the corresponding net imports (ibid., Table F.45, col. 11). The annual new-production estimates so obtained are transcribed in Table 6, col. 4; the maintenance series in col. 3 sums over these estimates for cars and bicycles, and separate estimates for the maintenance of sewing machines, obtained as follows.

The national production estimates allow sewing-machine maintenance in 1911 one third the maintenance burden of bicycles, or some 1.6 million lire (= 8 million lire × .33 × (17,300/(17,300 + 11,400)), and extrapolate that benchmark in proportion to the estimated stock (ibid., section F04.10 and Table F.51, col. 20). As noted there sewing machines appear to have been largely household goods, but the apparel industry's smaller share (perhaps a quarter?) was surely used far more intensively (by a factor of 10?), suggesting that households accounted for something near a quarter of the overall maintenance burden. Table 6 accordingly includes an allowance for the maintenance of household sewing machines equal to .4 million lire in 1911, again extrapolated in proportion to the estimated stock.

4.2.6.4 Precision equipment

Table 6, cols. 5 and 6 refer to precision equipment; in Table 7 this group corresponds to the industries in categories 4.51, optical and precision instruments, 4.53, clocks and watches, and 4.56, metal musical instruments. To a first approximation clocks and watches can be considered consumer goods (ignoring tower clocks), metal musical instruments investment goods (of bands and orchestras); optical and precision instruments involved a mix, as they include eyeglasses as well as specialized investment goods.

The clock-and-watch value added series are ready-made: Fenoaltea (2015f), Summary Table F.1, cols. 24 and 25, times 8,000 and 15,000 lire per ton, respectively, cover new production, and col. 45 covers maintenance. In 1911, estimated value added equals 3.6 million lire in new production, and 10.6 million lire in maintenance.

The eyeglasses series must instead be teased out. The ready-made estimates are for categories 4.51 and 4.56 together; in 1911 they are attributed labor costs of 3.56 million lire and capital costs of 2.37 million lire, for a value added of 5.93 million lire, of which 4.57 in new production and 1.36 in maintenance (ibid., Tables F.03, F.46). The labor-force and horsepower figures for categories 4.51 and 4.56 in Table 12.5 (cols. 2, 5 and 6) suggest that the former category accounted for some 60 percent of the labor costs and 80 percent of the capital costs, for a total of some 4.0 million lire. Absent useful evidence, eyeglasses are tentatively allowed a value added of 1.5 million lire in new

production, and .5 million lire in maintenance. There is no reason to attribute to the new production (maintenance) of eyeglasses the violent (growth) cycle attributed to all precision instruments (ibid., cols. 23 and 44); for simplicity, both the new production and the maintenance value added attributed to eyeglasses are extrapolated at the 1861-to-1911 growth rate attributed to the maintenance of all precision instruments.[18]

The sums of these estimates of value added in the maintenance, and in the new production, of clocks and watches on the one hand and eyeglasses on the other are transcribed in Table 6, cols. 5 and 6.

4.2.6.5 Precious-metal products

Table 6, col. 7 refers to consumer-goods precious-metal products. The aggregate value added estimates appear in Fenoaltea (2015f), Summary Table F.3, col. 6 (attributed entirely to new production); at a guess, the consumer-good component is calculated as a constant 80 percent of that aggregate, leaving the balance as investment goods for Church and State.

4.2.6.6 All engineering

The investment-good value added attributed to the engineering industry, transcribed in Table 3, col. 6 is of course the industry aggregate (Fenoaltea 2020b, Table 1, col. 10) less the sum of Table 6, cols. 1−7.

4.2.6.7 Metalmaking

The investment-good value added attributed to the metalmaking industry, transcribed in Table 3, col. 5 is the corresponding industry aggregate (Fenoaltea 2020b, Table 1, col. 9) less the consumer-good component, here estimated as if it came entirely out of domestic metal output (and imported metal went entirely into investment goods). The metalmaking component of precious-metal ware is ignored: the raw material came presumably from stock, and was of course conserved in the final product.

For non-precious metals the ratio of metalmaking value added to engineering value added in any particular branch of new production can be expressed as the product of two coefficients, metalmaking value added per ton of metal and tons of metal per ton of engineering product (the input-output ratio), divided by a third one, engineering value added per ton of output. At 1911 prices ferrous metalmaking value added per ton of metal, including the reduction of the ore, equaled some 100 lire per ton (Fenoaltea 2015e, section E02.04). The standard coefficients in Fenoaltea (2015f), Table F.46 for fabricated metal, general equipment, and precision instruments, respectively, are input-output ratios of 1.35, 1.25, and 2.5, and values added per ton of output of 415, 900, and 16,500 lire. Together, these yield metalmaking value added to engineering value added ratios equal to some .325, .139, and .015, respectively.

The ratio of metalmaking value added to engineering value added in maintenance is similarly obtained, again using 100 lire per ton of metal, and, directly, the ratio of tons of metal consumed in maintenance to the corresponding engineering-industry value added. Again using the estimates in Fenoaltea (2015f), Table F.46 (cols. 1 and 3, rows 5, 11, and 14), one obtains metalmaking value added to engineering value added ratios equal to .003 in the maintenance of fabricated metal, .012 in the maintenance of general equipment, and .001 in the maintenance of general equipment.

The consumer-goods component of metalmaking value added in Table 6, col. 8 is accordingly

[18] That growth rate (the fiftieth root of 1.36/.23, near 3.6 percent p.a.) is a multiple of the demographic growth rate, implying a rapid diffusion of eyeglasses among the poorer strata as incomes grew. The precision-instrument maintenance estimates may well grow excessively rapidly, but the absolute figures are too small to be worth revising.

obtained as the sum of cols. 1−6, weighted by .003, .325, .012, .139, .001, and .015, respectively.[19] The investment-good value added attributed to the metalmaking industry, transcribed in Table 3, col. 5 is thus the industry aggregate (Fenoaltea 2020b, Table 1, col. 9) less Table 6, col. 8.

4.2.7 The manufacturing industries: non-metallic mineral products

Table 3, col. 7 refers to the non-metallic mineral products industry. The production estimates distinguish eight kiln products − plaster, lime, cement, bricks and tiles, terra cotta, ceramic, glass, and other products (essentially cement and plaster objects) − and two other products − cut/carved marble, and other processed stone, sand, and earth (Fenoaltea 2015c).

The investment component of the industry's aggregate 1911-price value added is here calculated in three parts. The first includes all the value added attributed to plaster, lime, cement, and bricks and tiles (Fenoaltea 2015c, Summary Table C.1, cols. 1−4 and Summary Table C.2). The second includes a part of that attributed to terra cotta, ceramic, and glass calculated as 22.5 percent of their 1911 total, or 13.15 million lire, extrapolated with the corresponding construction-related index (ibid., section C02.06 and Table C.07, col. 1). The value added attributed to the other kiln products is excluded altogether; the third part of the investment component includes all the value added attributed to the other (non-kiln) products (ibid., Summary Table C.3, col. 2).

The sum of these three components is transcribed in Table 3, col. 7. The tonnages of terra cotta, ceramic, and glass were a minuscule share of the total (under one percent in 1911, ibid., Summary Table C.1), and the corresponding extractive-industry value added is here neglected.

4.2.8 The manufacturing industries: chemicals

Table 3, col. 8 refers to the chemical industry. The chemical industry was small but complex, and its non-traditional, non-artisanal component was quite well documented, especially over the later part of the period at hand; the reconstruction of its production (Fenoaltea 2015d) distinguishes 98 separate products. Most of these, however, including both traditional components (soaps) and modern ones (fertilizer), were or flowed into consumer goods; for simplicity, only a limited subset is here attributed to investment, and measured as usual by 1911-price value added (calculated from the physical units in Fenoaltea 2015d, Summary Table D.1, and the unit value added weights in Summary Table D.2).

Specifically, the value added of the chemical industry here attributed to investment is that attributed to the following products and product groups: of the principal acids group, soda nitric acid (Summary Table D.1, col. 2), used largely for explosives; the entire explosives group (ibid., cols. 10−13); the entire coloring-materials group, excluding only natural dyestuffs (ibid., cols. 14−20 and 22); of the electrochemicals and gases group, arc nitric acid (ibid., col. 25) and carbon electrodes (ibid., col. 44); of the other inorganic chemicals group, saltpetre (ibid., col. 64); and all of the coal and petroleum products group, excluding only briquettes (ibid., cols. 89 and 91−97). The resulting estimates run from some 7 million lire p. a. in the 1860s to a peak of some 41 million in 1913.

4.2.9 The manufacturing industries: rubber

Table 3, col. 9 refers to the rubber industry. The rubber industry was a very small industry, with an estimated peak value added of under 13 million lire in 1912 (Fenoaltea 2015d, Summary Table D.3, col. 15), but it produced a complex mix of consumer and investment goods (*Censimento demografico*, vol. 4, p. 19, category 7.111). The present very tentative estimates of its investment component assume that the latter equaled two thirds of the industry's value added, net (from the 1890s) of that attributable to bicycle and motor-vehicle tires.

The circulating stock of circulating bicycles and motor vehicles was calculated above (§4.2.6), in units of weight. Annual tire consumption in units of weight is here calculated, in the case of

[19] The precision-instrument figures could be increased to reflect the use of non-ferrous metals, but the effect of that correction would be trivial.

bicycles, at 10 percent of the weight of the bicycles themselves (allowing for example 20 kg per bicycle, 2 kg for the tires, and replacement once a year); in that of motor vehicles, at 2.4 percent of the weight of the motor vehicles (allowing for example one ton per automobile, 16 kg for a set of tires, and replacement 1.5 times per year). These estimates imply a tire consumption of some 2,000 tons in 1911, and 2,700 tons in 1913, here attributed, like other rubber products, a value added of 1,780 lire/ton (Fenoaltea 2015d, Summary Table D.2).

Again to obviate more complex calculations, Table 3, col. 9 is directly the estimate of the value of those investment goods, rather than their value added. The prices of rubber goods varied widely; an average of 10,000 lire per ton seems reasonable (ibid., section D05.03), and Table 3, col. 9 is simply two thirds of the industry's value added excluding that attributed to tires, scaled up by (10,000/1,780).

4.2.10 The manufacturing industries: paper, printing and sundry manufacturing

The paper, printing and sundry manufacturing industries are here assumed to have produced negligible quantities of investment goods, and do not appear in Table 3.

4.2.11 The manufacturing industries: aggregate manufacturing

Table 3, col. 10 transcribes the estimated investment content of the entire manufacturing group's product; it is simply the sum of cols. 2−9.

4.2.12 Construction

Table 3, col. 11 refers to the construction industry. Its entire value added (including that in maintenance, Fenoaltea 2020a, Appendix A) is attributed to investment; the present series accordingly reproduces the corresponding production series (Fenoaltea 2020b, Table 1, col. 16).

4.2.13 Utilities

Table 3, col. 12 refers to the utilities. The water and gas industries appear to have supplied, in essence, consumer goods; the product of the electric utilities needs instead to be allocated. The investment component would appear to consist in the main in the power supplied to the durable-goods industries. The *Censimento industriale*, vol. 4, reports the power of the electric motors in use running on purchased power; the figures reported for categories 2.1 (mining), 2.2 (quarrying), 3.1 (wood products), 4 (metal and metal products), and 5 (construction and construction materials) total approximately 150,000 horsepower. Most of these presumably operated intermittently, suggesting that a mean of 2,000 hours per year should not be far wrong; total power consumption in durable-goods production thus works out to some 300 million kWh. In 1911 the electric utilities generated just over 1,000 million kWh (Fenoaltea 2015g, Summary Table J.1, col. 1 and 2); here, the electric utilities' investment component is simply estimated as a constant 30 percent of their total value added (ibid., Summary Table J.3, col. 1).

Neglecting gas and water, as indicated, the resulting figures are attributed directly to the utilities as a whole, and transcribed in Table 3, col. 12.

4.2.14 All industry

Table 3, col. 13, reports the total for industry (the sum of cols. 1 and 9−11). Col. 14 reports, as a *curiosum*, the share of industrial value added (Fenoaltea 2020b, Table 1, col. 18) represented by the investment component estimated here (Table 3, col. 13, for this purpose slightly swollen by the inclusion of agricultural raw materials); interestingly, it was near 50 percent at the long-investment-cycle peaks (1865, 1874, 1888, 1911−12), and nearer 45 percent in "normally" poor years (1868−71, 1875−80), but fell to near 40 percent during the worst of the end-of-the-century crisis (1896-97).

4.3 Investment goods: agriculture

4.3.1 Introduction

Table 8 transcribes the contribution of agriculture to (fixed) investment: estimated, for the reasons noted, not as a share of domestic production, to which net imports must then be added, but directly as the aggregate value of investment-goods consumed.

Agriculture produces, in the main, consumer goods. There are, on the face of it, five (first-order) exceptions: the raw materials (such as timber) entering the production of industrial investment goods, which can here be ignored as they have been included in the industrial estimates above; the fuels (firewood, charcoal) used notably in the processing of metallic and non-metallic minerals; the "urban" animals provided to the transportation sector (and the military); investment in on-farm improvements; and the increments in the herds of livestock.

4.3.2 On-farm improvements

The least troublesome component is the value added in on-farm improvements, estimated as such on the production side (Fenoaltea 2020c, Table 4, panel A, col. 4); it here transcribed for convenience in Table 8, col. 1.

4.3.3 Fuel

Charcoal was something of a specialty fuel, used where its chemical purity was of value. Firewood was instead the main traditional source of inanimate energy (surpassed by coal early in the twentieth century, Bardini 1998, pp. 21−23); but it was used overwhelmingly for domestic heating and cooking, so for present purposes the aggregate figures are essentially useless.

A more useful guide to the appropriate orders of magnitude is provided by the detailed fuel-consumption data for 1865 in the *Statistica mineraria.* These are collected in Table 9, ignoring mineral fuels (and, in one case, straw); the occasional volume figures are converted at the rate of .4 tons per cubic meter of firewood, and .2 tons per cubic meter of charcoal (Colombo 1919, pp. 60−61). The totals come to some .80 million tons of firewood (almost all in kilns), and .09 million tons of charcoal (all in metal-processing). The source's coverage is partial, as some industries are omitted (and others, like the bronze industry, appear covered very partially); but even allowing for that the totals in 1865 are small next to Federico's domestic-production totals for 1911 (7.5 million tons of firewood and .42 million tons of charcoal, Rey 2000, p. 17, converted as above).

The present investment-firewood series takes the 1865 benchmark of .80 million tons, and values it at Federico's 1911 average value (177 million lire/7.5 million tons), for a total of 19 million lire at 1911 prices. This figure is extrapolated using the product of two indices. One is simply the 1911-price value added of the kiln products industry (Fenoaltea 2015c, Summary Table C.3, col. 1), converted to set 1865 = 1. The second is an *ad hoc* index, also with 1865 = 1, that aims to capture the displacement of wood by mineral fuels, presumably as the local price of the latter was reduced by the development of inland railways and tramways (but not by the water-competing coastal routes). Since the inland secondary lines were built mainly between 1880 and 1895, and the (less important) tramways spread mostly from the turn of the century, this second index is tentatively so constructed as to decline by 2 percent p. a. in the 1860s and 1870s, then by 5 percent p. a. from 1880 to 1895, and then by 3 percent p. a. The resulting series is transcribed in Table 12.6, col. 2.

The investment-charcoal series is similarly constructed. The 1865 benchmark is calculated as .09 million tons valued at Federico's 1911 average value (18.5 million lire/.42 million tons), for a total of 4 million lire at 1911 prices. Ignoring minor consumers, 84 percent of that is attributed to the iron industry, and 16 percent to the copper industry, and specifically, again for simplicity, to the reduction of the corresponding ore. The pig iron and ingot copper series are those in Fenoaltea (2015e), Summary Table E.1, cols. 1 and 8, respectively. Both series display a long period of stasis, and then a tenfold and more increase in production that seems to correspond to the transition from traditional charcoal-based techniques to modern coal-and-coke-based techniques. Here, charcoal-

based pig iron production is assumed to equal total production from 1861 (26,551 tons) through 1901 (15,819 tons), and then to have declined by 10 percent p. a. (to under 4,500 tons in 1913); charcoal-based ingot copper production is assumed to equal total production from 1861 (947 tons) through 1886 (408 tons), and then to have declined by 10 percent p. a. (to under 25 tons in 1913). These last two series are rescaled to set 1865 = 1, weighted by 4 million lire times .84 and .16, respectively, and summed. The resulting series is transcribed in Table 8, col. 3.

4.3.4 Off-farm animals

Baffigi (2015), p. 145 considers investment in agricultural goods dominated by that in animals, mainly horses, for urban services. His 1911 benchmark is taken from Vitali, whose flow estimate refers back to Federico's stock estimate of "441,000" private animals; drawing on a near-contemporary animal census, Federico actually counted 328,100 "urban" horses (only 272,100 of them working horses, the rest foals or at stud) and 115,800 donkeys and mules, plus 52,000 (mostly horses) belonging to the State (Rey 2000, pp. 50, 316).

There are in fact three reasons to consider the private stock figures in the literature much overstated. First, Federico appears to have counted all the animals in the major *municipalities*, including their rural areas (whence the significant share of colts and stud horses, presumably not "urban" at all). Second, there is no allowance for the saddle and coach horses of the urban well-to-do. According to the *Censimento demografico*, vol. 4, p. 26, some 240,000 of Italy's males above age 10 declared themselves too rich to work (category 11.11). This moneyed aristocracy was based in urban *palazzi* with still-visible stables and coach houses: the number of horses that were private "consumption" goods, and irrelevant to "investment" (which conventionally excludes consumer durables) easily exceeded 100,000. Third, the *Censimento demografico* (ibid., p. 20) reports just 234,000 workers, almost all male, in category 8.31, "road transportation," which includes drivers of animals and vehicles, and stable hands; deducting perhaps 4,000 drivers of motor vehicles, 46,000 stable hands (20 percent of the residual), and 40,000 coachmen in private service (one for every six "rich" males), the number of public-transport horse (and other equine) drivers falls to some 144,000.[20] They can hardly have averaged significantly more than one horse each, for an estimated stock of transport-sector working animals of perhaps 150,000.

Here, that 1911 stock figure is extrapolated in proportion to the estimated tonnage moved by road (Table 7.2, col. 18), and the annual intake is estimated in year t as the increment in the stock from $t - 1$ to t (for expansion) plus .15 times the stock in $t - 1$ (for replacement, tentatively assuming a 7-to-8-year working life, Federico in Rey 1992, p. 58, footnote 254), with the intake obtained for 1862 attributed to 1861 as well. The 1911-price value of that intake is calculated allowing 800 lire per animal (from the export price of horses, *Movimento commerciale 1911*, category 1055). The resulting private-horse investment series is transcribed in Table 12.6, col. 4; fortunately, it too does not exceed low double-digits.

State-owned horses are public capital goods, and the corresponding flow is not to be excluded from investment.[21] The estimates of the State-purchased component are even more tentative. As noted, Federico estimated a stock of 52,000 horses (and other equines) belonging to the State. Most were presumably in the military, a presumption confirmed by the figures for the Army's theoretical establishment: 40,410 in 1907, 43,824 in 1912, 45,424 in 1913 (*Annuario 1905-07*, p. 1015, *1912*, p. 337, *1913*, p. 401). The readily-available *Annuario* provides additional data only in the earliest editions, in the *Annuario 1878* (part 1, p. 88) and *1884* (p. 291), which report annual purchases from

[20] This estimate is broadly confirmed by the here more detailed *Censimento 1901* (p. 144): some 64,000 coachmen (and other, minor groups, category XVII.9) and some 125,000 carters, muleteers, and stable hands (category XVII.10), from which private coachmen and stable hands are to be deducted.

[21] See Fenoaltea (2020b), §3.2, footnote 37. Here too, the provision of separate estimates allows recalculation with different criteria.

1873 to 1881 (an average of 3,700 p. a., ranging from under 1,500 to over 10,700).[22] Without using further information, the present estimates of the horses purchased by the State is very tentatively obtained as follows. From 1861 to 1872, the number is set at a constant 4,000 p. a.; from 1873 to 1881, as the number of military purchases (*Annuario 1884*, p. 291), augmented by 600 p. a. for other services; from 1882 to 1907, 4,700 p. a.; from 1908 to 1912, 5,400 p.a., and in 1913, 6,300, with these last figures capturing the expansion suggested by the *Annuario 1905-07*, *1912*, and *1913*, cited above. These figures are then weighted as before by 800 lire per animal.

The resulting public-horse investment series, a mere single-digit affair, is transcribed in Table 8, col. 5. Given its poor quality, it is more of a tentative allowance to be added to the private-horse series in col. 4 than a separate estimate in its own right; the two series are here kept separate only to facilitate the exclusion from investment of its public component, by those who may wish to do so.

4.3.5 Herd increments

Investment in herd increments is here estimated very roughly, from the first differences in the herd-stock estimates for sheep, bovines, goats, and pigs transcribed in Table 8, cols. 8−11; horses, rabbits, and barnyard fowl are simply ignored. The sheep-herd series is that estimated by the present author (Fenoaltea 2000, Table 1, col. 6); the other three were kindly provided by Giovanni Federico, a gift horse for which one can only be grateful.

The first differences are weighted by the unit prices indicated or suggested by the *Movimento commerciale*: 25 lire each for sheep and goats (categories 1064 and 1065), 450 for bovines (against 710 for oxen, 460 for cows, and 250 for calves, categories 1059, 1061, and 1063, respectively), and 100 lire for pigs (against 28 to 165 lire per animal, depending on its weight, categories 1066−1070).

The resulting series is transcribed in Table 8, col. 6. Its outlier in 1908 comes from the jump in the bovine herd; it may be correlated with that year's massive return migration from the United States.

4.3.6 All agriculture

Table 8, col. 7 transcribes the aggregate estimate of agricultural value added flowing into investment; it is the simple sum of cols. 1−6. As noted, these estimates include the relevant import component.

4.4 Investment goods: exports and imports

4.4.1. Introduction

The investment content of exports and imports is derived in Table 10, again improving on the algorithms used in Fenoaltea (2012). Table 10 is organized, like the Federico *et al.* (2011) database, by *SITC* category. *SITC* categories 0 and 1 refer to food, drink, and tobacco, and are here irrelevant. Categories 4, 5 and 9 refer to animal and vegetable oils, to chemicals, and to a residual, respectively; their investment-good content is assumed negligible.

4.4.2. The investment content of SITC category 2

SITC category 2 refers to crude (non-fuel) materials, agricultural and mineral. The agricultural (inputs to) investment goods, relevant in principle, are here ignored, as they have already been allowed for above. The mineral (inputs to) investment goods are instead to be counted; because fuel-

[22] A second table reports, by breed, what appear to be exceptional replacement purchases. These averaged some 900 in 1874 and 1875 but 2,400 in 1874−81; they are here presumed to be a specification of, rather than an addition to, the cited reported purchases.

poor Italy was a high-cost processor of ores (its own, and *a fortiori* anybody else's), only the export side is considered here.

Table 10, cols. 1−4 transcribe the exported quantities of mineral ores (of iron, lead, copper, and zinc, ignoring minor items), as reported from 1862 by the *Movimento commerciale*; these are here valued directly at their 1911 export prices (respectively 18, 180, 80, and 140 lire per ton, categories 654, 656, 657, and 660).[23] Cols. 5−8 transcribe the reported exports of marble, respectively in blocks, thick slabs, thin slabs, and unspecified products (worth respectively 80, 105, 112.5, and 550 lire per ton in 1911, categories 890, 892, 895b, and 895c; minor items are again ignored).[24] The difficulty here is that cols. 6 and 8 go back only to 1874 (and that in the five-year retrospective in the *Movimento commerciale 1878*, adapted to the new tariff), and col. 7 to 1883; before 1888 col. 8 includes marble tiles (later separately counted, and worth 80 lire per ton in 1911, category 895a; some 3,800 tons were exported in 1888), and before 1883 it includes thin slabs as well. The upshot is that the estimated 1911-price value of these marble exports is the simple 1911- price-weighted sum of the reported quantities only from 1888; in earlier years, a measure of chaining is introduced, as follows. In 1888, unspecified marble products and tiles together totaled 13,700 tons and, at 1911 prices, 5.749 million lire; in 1883−87, therefore, the tonnages in col. 8 are attributed a unit value reduced to 420 lire per ton. In 1883, again, unspecified marble products (including tiles) and thin slabs together totaled 55,100 tons and, at 1911 prices, 15,516 million lire; in 1874−82, therefore, the tonnages in col. 8 are attributed a unit value further reduced to 282 lire per ton. In 1874, the estimated 1911-price value of these marble exports equaled 15,587 million lire; *faute de mieux*, this figure is extrapolated back to 1862 in proportion to col. 5, in effect assuming a constant mix of block and variously processed marble.

The estimated 1911-price value of the *SITC* category 2 exports covered by cols. 1−8 is of course the sum of the separate figures for metal ores and for marble, obtained as just described. Neglecting imports, as noted, from 1862 Table 10, col. 9 simply reports these exports, with a negative sign, as net imports. The 1861 figure is estimated directly as 80 percent of that calculated for 1862.

4.4.3. The investment content of SITC category 3

SITC category 3 refers to mineral fuels; its investment content is here estimated directly, relying on recently compiled estimates of mineral-fuel (coal or coal-equivalent, henceforth simply "coal") tonnages used, by sector, in Fenoaltea (2015f), Table F.51.

An estimate of coal used for steam power to drive (non-transport) machinery *CSM* is obtained as the sum of Table F.51, cols. 1 (net imports of coal) and 2 (other mineral fuels), less the sum of cols. 3, 4, 6, 8, 10−12, and 14 (in order, railway consumption, gas-works' consumption, consumption not for steam in kilns, chemical works, metalmaking, engineering, and sugar refining, respectively, and consumption for electric lighting).[25] In 1911, judging from the horsepower data, the investment-good categories (3.1, 4, and 5) used some 44 percent of the steam power in use, net of the utilities (category 8.1); that share falls to 39 percent if one allows consumer goods 13 percent of category 4 (metalmaking and engineering, from Table 3, cols. 5 and 6 and Fenoaltea 2020b, Tab1e 1, cols. 9 and 10). For simplicity, *ICSM* (the investment component of *CSM*) is here obtained as *CSM* times an estimated investment share equal to .39 in 1911, and extrapolated in proportion to Table 3, col. 14 (approximately, as noted, the investment share of industrial production). The investment coal used directly for heat *ICDH* is estimated in turn as the sum of Table F.51, col. 6 (kilns) and, again allowing for consumer goods, 87 percent of cols. 10 (metalmaking), and 11 (engineering). Finally, the

[23] The apparently small quantities of pyrite included to 1900 by the iron-ore figures are here ignored.

[24] Category 910b, stone and ores n.e.c., is also ignored: exports were significant, but largely offset by imports.

[25] Table F.51, col. 15 ("net coal for steam") is not used directly, as it is corrected for the growing fuel economy of steam engines, and the declining incidence of transmission losses.

investment component of the coal consumed by railways *ICRR* is calculated as the total in Table F.51, col. 3 times the investment share of railway transportation (rising from .25 in 1861−71 to .28 in 1881−1913) estimated in §12.5.1.1 below. In 1911, coal used for investment *IC* = *ICSM* + *ICDH* + *ICRR* equals some 4.17 million tons, against net imports of 9.77 million tons (Table F.51, cols. 1 + 2).

In 1911, according to Federico *et al.* (2011, pp. 86, 94), *SITC* category 3 net imports were worth 323.9 million lire. Investment net imports are estimated from the above tonnages as (4.17/9.77) of that, or some 138 million lire. Table 10, col. 10 is that benchmark, extrapolated in proportion to *IC*.

4.4.4. The investment content of SITC category 6

SITC category 6 refers to manufactures other than machinery and transport equipment, including consumer goods such as textiles. For simplicity, the investment component is here identified directly with metals and simple metal products ("hardware"), and its 1911-price value is estimated from physical net imports, weighted by 1911 unit values taken from the *Movimento commerciale.* The tonnage series are taken from Fenoaltea (2015e), Table E.03, cols. 1−7 (ferrous metals), Table E.04, col. 2 (aluminum), Table E.06, col. 4 (copper), Table E.09, col. 1 (lead) and col. 2 (antimony), Table E.11, col. 2 (tin), Table E.12, col. 2 (zinc), and Fenoaltea (2015f), Table F.45, cols. 2−9 (semi-finished non-ferrous metals, metalware).[26] The seven ferrous metal products (Table E.03) are assigned lire-per-ton values of 90 (category 664), 85 (663), 325 (665a), 650 (668), 125 (674), 150 (683), and 170 (675/676), respectively; as for the other metals (Tables E.04 to E.12), aluminum is assigned 1,550 lire per ton (category 774), copper 145 (730), lead 370 (757), antimony 760 (780), tin 4,800 (762), zinc 650 (769). The semi-finished non-ferrous metals (Table F.45, cols. 2−5) are assigned lire-per-ton values of 2,350 (category 775), 1,900 (731/732), 3,600 (752), and 750 (770); the four metalware groups (Table F.45, cols. 6−9), lire-per-ton values of 1,150 (category 708), 950 (721/724), 840 (716b), and 3,250 (746).

The resulting net-import totals are transcribed in Table 10, col. 11; to allow for purchases in anticipation of the 1888 tariff hike, imports worth 20 million lire are here transferred from 1887 to 1888.

4.4.5. The investment content of SITC category 7

SITC category 7 refers to (non-precision) machinery and transport equipment. Net imports of investment goods are calculated directly as the sum of partial figures for ships, rail- and tramway vehicles, and other machinery. Net imports of ships are taken from Table 2, as the difference between imports (cols. 9 and 10) and exports (cols. 4 and 5). Net imports of railway vehicles are obtained by summing the tonnages of locomotives, passenger cars, and freight cars, each weighted by the corresponding unit value in 1911 (respectively 1,640, 1,402.5, and 690 lire per ton: Fenoaltea 2015f, Table F.34, cols. 2, 5, and 8, and section F03.08). Net imports of other machinery sum separate 1911-price-weighted tonnage series for machine parts and assembled machines. The tonnage series are those in Fenoaltea (2017), Table 2, cols. 2 and 3 (which transfer some imports from 1887 to 1888, to allow for inventory accumulation in anticipation of the increases in tariffs, Fenoaltea 2015f, section F04.09, also Table F.45, col. 24 and Table F.52, col. 2), with the latter reduced by the tonnage of consumer goods: road vehicles (ibid., Table F.45, col. 11), and an estimated 75 percent (above, §12.2.6.2) of sewing-machine imports (ibid., Table F.51, col. 19). The 1911 value weights equal 1,000 and 1,300 lire per ton, respectively (ibid., section F04.06).

The resulting net-import totals are transcribed in Table 10, col. 12.

[26] Net exports of tin cans are not ignored, as they would otherwise inflate domestic investment.

4.4.6. The investment content of SITC category 8

SITC category 8 includes precision equipment. For simplicity, net imports of investment goods are identified directly with the tonnages in Fenoaltea (2017), Table 2, col. 4, and valued at 22,000 lire per ton (Fenoaltea 2015f, section F04.06). Precious-metal products are ignored, on the presumption that Church and State were supplied from (long-established) domestic sources.

The resulting net-import totals are transcribed in Table 10, col. 13.

4.4.7. The investment content of trade

Table 10, col. 14 transcribes the estimated investment content of Italy's external trade; the aggregate is the simple sum of the partial figures in cols. 9−13.

4.5 Investment services

4.5.1 Introduction

The estimated investment component of value added in the services is presented, by activity group, in Table 11.

4.5.2 Transportation and communications

4.5.2.1 Introduction

Table 11, col. 1, refers to the investment component of the transportation-and-communications sector; it is the sum of the partial estimates transcribed in Table 12, cols. 1−4.

4.5.2.2 Railway and tramway transportation

Table 12, col. 1, refers to rail- and tramways. The railway component is estimated by multiplying the estimated value added (Fenoaltea 2020c, Table 5, col. 1) by a coefficient that equals .25 in 1861−71, then rises by .003 p. a. to .28 in 1881, and then again remains constant. This coefficient is itself obtained from other, data-based coefficients. The first refers to the split between passenger and freight revenue (and, by assumption, value added). Freight is here taken to have accounted for a share equal to 50 percent in 1861−71, by assumption; to have grown by one percentage point p. a. to 60 percent in 1881, closely mimicking the shares yielded by the annual data for 1872−81 for passenger revenue and total revenue (whence freight revenue is obtained as a residual) in the *Annuario 1884*, pp. 661, 667; and thence to have maintained a 60 percent share, as suggested by the comparable data in the *Annuario 1886*, pp. 414−415, for 1884, the *Annuario 1900*, pp. 688−691, for 1897, and the *Annuario 1913*, p. 235, for 1911. The investment-good share in freight traffic is courageously assumed constant, and equal to 40 percent; this round figure is derived from the tonnages transported in 1911 (Fenoaltea 1983, Table 3.9), allowing investment 100 percent of the building-materials and metal tonnage, plus 20 percent of the fuel tonnage, and none of the food, fertilizer, textile, chemical, and paper tonnages.[27] The overall coefficient for railways proper allows investment a uniform 10 percent of the passenger share (from 1881, 4 percent of the total), plus 40 percent of the freight share (from 1881, 40 percent of 60 percent, or another 24 percent of the total, whence the overall 28-percent coefficient). The tramway component is calculated as a simple 12-percent share of their estimated value added (Fenoaltea 2020c, Table 5, cols. 2 plus 3), on the assumption that they were always primarily, but not exclusively, people-movers.

[27] The fuel moved by rail was overwhelmingly coal, some 40 percent of which, on the above estimates, served investment production. That percentage is here halved, on the assumption that the most coal-intensive commodity-producing industries chose coastal locations to minimize their fuel costs; a disproportionate share of the railways' coal ton-kilometers presumably served urban gas lighting plants, here considered producers of consumption goods.

4.5.2.3 Other inland transportation

Table 12, col. 2 refers to other inland transportation, in essence road transport; the investment-good road transport estimates parallel the aggregate road-transport estimates (Fenoaltea 2020c, §4.2.4).

Table 13 transcribes the estimates of the investment-good tonnages actually moved.

Table 13, col. 1, which refers to agricultural goods, concerns in fact only firewood, charcoal, and timber. The firewood and charcoal estimates are obtained simply as the benchmark tonnages of .80 and .09 million tons, respectively, in 1865 (above, §4.3.3), extrapolated using the corresponding constant-price value added series (Table 8, cols. 2 and 3, respectively). The timber series is itself the sum of three components, based on the estimates derived above in §4.2.5. The lumber used to produce investment wood goods is estimated as the 1911 benchmark of (.75 × .66) million tons, extrapolated in proportion to Table 5, col. 1; the lumber used by the engineering industry is estimated as above (§4.2.5); and the lumber used by the construction industry is the implicit 1911 benchmark (118 million lire, divided by 110 lire/ton), extrapolated in proportion Table 5, col. 3. These lumber-tonnage estimates are summed, and scaled up by 12 percent to approximate a mix of rough-hewn and squared-off logs. Table 13, col. 1 transcribes the sum of these firewood, charcoal, and timber estimates.

The investment-good series for industry are calculated like those in Table 3, albeit in tonnage rather than value-added terms. Table 13, col. 2, for the extractive industries, thus sums 50 percent of the tonnages of mineral fuels, here excluding natural gas (Fenoaltea 2015b, Summary Table B.1, cols. 1−3), 100 percent of those of the non-precious metal ores excluding mercury and pyrite (ibid., cols. 5−8, 11−12, and 15−16), again 100 percent for asphalt rock (ibid., col. 22) and all quarry products (ibid., cols. 28−32). The food and tobacco industries are ignored, as before; here, the textile and apparel industries are also ignored, as the relevant tonnage (Table 4) is, in the present context, insignificant. Similar considerations apply to the leather industry. Its investment value was estimated above at some 18 million lire in 1911 (Table 3, col. 3); with belting worth some 9,000 lire per ton (*Movimento commerciale* category 651 and above, §4.2.4), the implied tonnage is again negligible.

Table 13, col. 3 transcribes the estimates of the wood industry's investment-good tonnage. Here, that tonnage is estimated as the sum of the lumber tonnage calculated as described above (with reference to col. 1) and, assuming a separate shipment, the wood-products tonnage obtained as the 1911 benchmark (.75 × .49) million tons, extrapolated in proportion to Table 5, col. 1.

Table 13, cols. 4 and 5 refer to the metal and engineering industries' investment tonnages; both are obtained as the corresponding aggregate tonnage (Fenoaltea 2020c, Table 6, cols. 9 and 10) less the consumer-good component (explicitly or implicitly) estimated above (§4.2.6). The deducted consumer-good metal tonnage is simply the consumer-good value added in Table 6, col. 8, divided by 100 lire per ton. The deducted consumer-good engineering tonnage is in turn calculated as the sum of a fabricated-metal new-production component and a general-equipment new-production component (ignoring the here trivial quantities related to maintenance, precision equipment, and precious metal products); the two components are simply the value added series in Table 6, cols. 2 and 4, divided by 415 and 900 lire (of value added) per ton, respectively.

Table 13, col. 6 refers to the investment tonnage of non-metallic mineral products. The series, calculated analogously to the corresponding value added series described above (§4.2.7), is the sum of two components. One component, taken directly from the production estimates, sums the tonnage estimates for plaster, lime, cement, bricks and tiles, and non-kiln products (Fenoaltea 2015c, Summary Table C.1, cols. 1−4 and 9−10). The other takes 22.5 percent of the 1911 tonnage of terra cotta, ceramic, and glass (ibid., cols. 5−7), or about .085 million tons, and extrapolates it in proportion to the corresponding construction-related index (ibid., Table C.07, col. 1).

Table 13, col. 7 refers to the investment tonnage of chemical and rubber goods together, again calculated analogously to the corresponding value added series described above (§4.2.8−9). The chemical component thus sums, from the output estimates in Fenoaltea (2015d), Summary Table D.1,

the estimates for soda nitric acid (col. 2), the entire explosives group (cols. 10−13), the entire coloring-materials group, excluding natural dyestuffs (cols. 14−20 and 22), arc nitric acid (ibid., col. 25), carbon electrodes (col. 44), saltpetre (col. 64); and all of the coal and petroleum products group, excluding only briquettes (cols. 89 and 91−97). The (tiny) rubber component is correspondingly calculated as two thirds of the industry's product net of the tire component, estimated as above.

The investment tonnage of other industries is zero or negligible.

Table 13, col. 8 refers to imports, specifically those not already counted. For simplicity, their tonnage is calculated as the estimated total tonnage of imports using road haulage (Fenoaltea 2020c, Table 6, col. 17), times the ratio of the 1911-price value of investment-good imports (Table 12.8, col. 15) to the 1911-price landed value of all imports (Table 1, col. 6 plus Table 2, col. 11).

Table 13, col. 9, the total investment tonnage, is the simple sum of cols. 1−8. In 1911, it equals 66.8 percent of the aggregate tonnage (Fenoaltea 2020c, Table 6, col. 18); the present estimate accordingly attributes to investment a 1911 benchmark value added of 66.8 percent of the corresponding total (313 million lire, Fenoaltea 2020c, §4.2.4), or 209 million lire.

Table 12, col. 2 is that 209-million lire benchmark, extrapolated in proportion to Table 13, col. 9.

4.5.2.4 Maritime transportation

Table 12, col. 3, is the estimated investment component of maritime transportation. Col. 3 is obtained as the sum of separate estimates for international and domestic navigation, both obtained as shares of the corresponding value added (respectively Table 2, col. 11, and Fenoaltea 2020c, Table 5, col. 6 less Table 2, col. 11; see above, §2).

In the case of domestic navigation, the investment share of value added is estimated equal to that in road transport net of imports (the ratio of Table 13, col. 9 − col. 8, to Fenoaltea 2020c, Table 6, col. 18 − col. 17).

In the case of international navigation, the relevant share is again that of the investment goods not already included in the production figures; it is here set equal to the ratio of the 1911-price value of investment-good imports (Table 10, cols. 10−13) to the 1911-price landed value of all imports (Table 1, col. 6 plus Table 2, col. 11), as in the derivation of Table 13, col. 8 (§4.5.2.3).

4.5.2.5 Communication

Table 12, col. 4, is the estimated investment component of communication. On the presumption that agriculture was relatively little involved with modern communication, and more generally for lack of a better idea, it is calculated as a share of the estimated value added in communication (Fenoaltea 2020c, Table 5, col. 7) equal to the (approximate) share of investment in industrial production (Table 3, col. 14).

4.5.3 Commerce

Table 11, col. 2, refers to the investment component of the commerce sector; it is here estimated very tentatively. The production-side commerce estimates (Fenoaltea 2020c, §4.3.5) extrapolate a 1911 benchmark of 1,434 million lire, based on an estimated merchants' intake, in that year, of goods worth 10,428 million lire.

A series estimating the merchants' annual intake of investment goods is calculated here as the sum of the investment goods estimated above, excluding those presumably not handled by merchants. The agricultural component thus takes from Table 8 the sum of cols. 2−5 (to the exclusion, therefore, of on-farm improvements and herd increments). The industrial component is derived from the aggregate investment estimates, with suitable adjustments. The estimates for mining include Table 3, col. 1, less the exported ores (Table 10, cols. 1−4, weighted by 18, 180, 80, and 140 lire per ton, above, §4.4.2, and extrapolated to 1861 in proportion to Table 10, col. 9) but not the exported marble. The estimates for textiles and apparel are those in Table 3, col. 2, but exclude sails (Table 4, cols. 2−3, weighted by 4,000 lire per ton, §4.2.3), presumably custom-made, and, to allow for other direct

sales by artisans, 25 percent of the residual. The estimates for leather and wood are similarly obtained as 75 percent of the (value) aggregates in Table 3, cols. 3 and 4, respectively. The estimates for metals are the aggregates in Table 3, col. 5, reduced by the value added in rail production (Fenoaltea 2015e, Summary Tables E.1 and E.2), on the presumption that rails were ordered directly from the factory. On similar grounds, assuming that merchants were not involved in maintenance or in selling new ships or railway vehicles, the estimates for the engineering industry include only the new-production estimates for fabricated metal, general equipment (here ex ships and railway vehicles), precision instruments, and precious-metal products (Fenoaltea 2015f, Summary Table F.3, cols. 1 and 4−6) less the corresponding consumer-good components (Table 6, cols. 2, 4, 6, and 7). The estimates for the non-metallic mineral products, chemical, and rubber industries include Table 3, cols. 7−9 in full. The import component is similarly conceived: the estimates equal the investment aggregate in Table 10, col. 14, less estimated imports of ships (Table 2, cols. 9−10) and of rails (the tonnages in Fenoaltea 2015e, Table E.03, col. 6, valued at the *Movimento commerciale* 1911 price of 150 lire per ton).

The sum of these three components yields the estimates of the merchants' annual 1911-price intake of investment goods. In 1911, these three components sum to 1,751 million lire, against a total intake, recalled above, of 10,428 million lire. Here, the investment component of value added in commerce (Table 11, col. 2) is estimated as (1,751/10,428) times the sector's value added of 1,434 million lire in 1911, or 241 million lire, and extrapolated using the annual-investment-good-intake series just described.

4.5.4 Net banking and insurance

Table 11, col. 3, is the estimated investment component of net banking and insurance. For simplicity, and in the absence of obviously better indicators, it is here estimated as the sector's net value added (Fenoaltea 2020b, Table 1, col. 21), times the ratio of value added in investment-commodity-production (Table 3, col. 13 plus Table 8, col. 7) to value added in all commodity production (Fenoaltea 2015e, col. 1 plus col. 18).

4.5.5 Miscellaneous services

Table 11, col. 4, is the estimated investment component of miscellaneous services: difficult to gauge, but surely a small part of the total, as the listed professions point overwhelmingly to consumption. The *Censimento demografico*, vol. 4, category 10.92, lists 12,125 "engineers, architects, etc." (including 23 women, bless their hearts). Allowing each of them 4,000 to 4,500 lire (including allowances for office space, assistants, etc.), their value added can be estimated at some 52 million lire. This point estimate is here tentatively extrapolated in proportion to the combined new-production value added in construction and, in the engineering industry, in ships, railway vehicles, and general equipment (Fenoaltea 2015h, Summary Table K.1, cols. 4, 10, and 12; Fenoaltea 2015f, Summary Table F.3, cols. 2−4).

4.5.6 Other services

The investment content of other services is considered nil. This makes perfect sense in the case of the services of buildings, as the estimates refer in fact only to residential space (while the value of commercial space was counted in the corresponding activity, Fenoaltea 2020c, §4).

It makes less sense in that of government services, as the design and procurement bureaus of the military and public-works departments should logically be considered engaged in investment; but these were a minimal part of the public sector, and are neglected here as well, with (once more) a bad conscience but good precedent.

4.5.7 All services

Table 11, col. 5, is the estimated investment component of all services; it is the simple sum of cols. 1−4. Col. 6 reports, as a *curiosum*, the share of services value added (Fenoaltea 2020b, Table

1, col. 25) represented by the investment component estimated here. That share was small; it too followed the construction cycle, rising, as measured, from some 4 percent in the 1860s and '70s to 6 percent in the late 1880s, dropping back to 5 percent in the mid-1890s, and then surging to over 10 percent on the eve of the Word War.

4.6 Total fixed investment

Total fixed investment is estimated as the sum of the separate estimates for agriculture (Table 8, col. 7), industry (Table 3, col. 13), the services (Table 11, col. 5), and international trade (Table 10, col. 14). The resulting series is transcribed in Table 1, col. 2.

5. PRIVATE CONSUMPTION AND TOTAL INVESTMENT

The estimates of private consumption and of total investment are transcribed in Table 1, cols. 1 and 3, respectively; they are derived as follows.

Deducting from total resources (*GDP* plus imports) their identified uses (public consumption, fixed investment, and exports), one is left with a residual that includes private consumption C and inventory investment I_i. Without a doubt, that residual is dominated by consumption; but it is relatively volatile, with a mean absolute change of some 3.4 percentage points (twice the end-to-end growth rate), and extreme changes of over 8 percentage points in both directions. This high volatility clearly suggests that our residual's year-to-year movements were significantly affected by inventory flows: as one would in fact expect, despite the opportunities offered by international trade, in the presence of fluctuating harvests and, at times, anticipated tariff increases.

The obvious procedure, adopted here, is to take a smoothed version of the residual as its consumption component, and to attribute the residual variation to inventory investment. The practical problem here is that the residuals of the smoothing process approach a zero mean, implying negligible long-term inventory investment: an implication that seems reasonable enough for the inventories that are held to smooth consumption, but not for the inventories of goods held because production and distribution both take time. The present algorithm accordingly involves a direct estimate of production-and-distribution inventory investment I_{ipd}, and its subtraction from the residual ($C + I_i$) to obtain a net residual that includes only consumption C and consumption-smoothing inventory investment I_{ics}. Consumption is then estimated as the smoothed version of that net residual; the residuals from that smoothing process are identified with I_{ics}, I_i is estimated as $I_{ics} + I_{ipd}$, and total investment I as $I_f + I_i$.[28]

Investment in the production inventory of goods-in-process is estimated, simply and no doubt simplistically, as follows. In the case of agriculture that (year-end) inventory is simply set to zero, as if the productive process were started and completed between January and December; the annual change in that inventory is also, therefore, set to zero. Inventory investment is also set to zero in the case of construction and the utilities; in the case of construction, it may be recalled, value added and therefore fixed investment already allow for the period of production, and count a half-completed road, for example, as half a completed road. In mining and manufacturing, the production process is taken to average half a year, so the average inventory of goods-in-process is estimated as a quarter of a year's output; the corresponding inventory (dis)investment is here calculated simply as a quarter of the annual change in value added. In 1861, absent information on 1860, this inventory investment is

[28] To reabsorb any rounding error, total investment I (Table 1, col. 3) is actually obtained as $GDP - C - G - X + M$.

simply set to zero; in 1862−1913, it is estimated in year *t* as a quarter of Fenoaltea (2020b), Table 1, $(\text{col. 2} + \text{col. 15})_t - (\text{col. 2} + \text{col. 15})_{t-1}$.

Investment in the distribution inventory of goods-for-sale (which includes imports) is in turn calculated from the annual estimate of the 1911-price value of the goods handled by merchants (Table 7.3, col. 1). Since goods were there assumed to be held in stock an average of 4.5 months (§7.3.4), merchants' inventory investment is estimated, in 1862−1913, as (4.5/12) times the annual increment in the estimate of the 1911-price value of the goods they handled; in 1861 it is again set equal to zero.

The estimate of production-and-distribution inventory investment I_{ipd} is the sum of these two series. The cumulation of I_{ipd} equals some 3,500 million lire (80 percent of it attributed to merchants, 20 percent to industry); it equals some 27 percent of the end-to-end increment in *GDP*, which does not seem unreasonable.

The next step is the smoothing of the net residual ($C + I_i - I_{ipd}$). We lack strong priors, let alone shared ones, as to the appropriate volatility of consumption in post-Unification Italy (and presumably any priors at all concerning the volatility of inventory investment). Here, consumption is so estimated as to limit its extreme annual variations to under 5 percent. The selected algorithm applied to the net residual takes, where it can, a five-year moving average, with triangular weights (.4 on the current year, .2 on the immediately preceding and succeeding, and .1 on those twice removed); for the second and penultimate year, a three-year average (with the weights rescaled to .5 on the current year and .25 on each neighboring year); for the first and last years, an average with the only neighbor (with a weight of .75 on the current year and .25 on the neighbor).

The net residual, thus smoothed, serves as the consumption series transcribed in Table 1, col. 1. The extreme variations attributed to consumption do not seem unreasonable. On the down side, the greatest decline is 1.0 percent (in 1867), the next ones near 0.5 percent (in 1888 and 1889), against a mean demographic growth rate near .7 percent p. a. (between the censuses of 1871 and 1911, from the *Sommario*, p. 39, col. 1). On the up side, the peak increment is some 4.5 percent, in 1907 (a year marked not just by considerable prosperity, but by massive return migration from the United States); the next highest is 4.1 percent in 1913 (the end point, where the smoothing process essentially fails), the others do not exceed 3.3 percent.

As noted, the difference between the raw and smoothed net residual is taken as the estimate of consumption-smoothing inventory (dis)investment I_{ics}; it is added to production-and-distribution inventory investment I_{ipd} to obtain total inventory investment I_i (in Table 1, the difference between col. 3 and col. 2).

6. THE COMPOSITION OF INVESTMENT AT 1911 PRICES

6.1 The available 1911-price investment series

The disaggregated 1911-price investment series Fenoaltea (2020b) presented in Table 5 and illustrated in Figure 6 are reproduced here in Table 14 and illustrated in Figure 2.

Table 15 collects the 1911-price value estimates of aggregate fixed investment (col. 1, from Table 1, col. 2), of its directly identifiable components (cols. 2–14), and more (cols. 15–17); to keep the number of components within bounds these are already subaggregated as far as the literature allows.[29] In general, it will be recalled, the production estimates for goods that were a long time a-

[29] The present estimates include maintenance. The latter is attributed to the construction and engineering industries alone; and ships and railway vehicles apart the engineering industry is here defined as a metal-processing activity. The wood-processing industry also produced durables, but its maintenance activity is not here separated out. The maintenance of the wooden elements of structures is included in the construction

building distribute the value added estimates over the corresponding period, and so do the "fixed" investment value estimates (as opposed to counting the investment in a yet-uncompleted railway or battleship as inventory investment, attributing its entire value to fixed investment in the year of completion, and in that year reducing inventories by the cumulation of prior investment).[30]

Table 15, col. 2 refers to the investment by agriculture in agriculture itself, that is, to improvements and herd increments. It is the simple sum of Table 8, cols. 1 (improvements) and 6 (herd increments), without further adjustment.

Cols. 3–4 refer to investment in structures, in new construction and maintenance, respectively; these estimates are in principle exhaustive. The new-construction value figures in col. 3 are taken directly from Fenoaltea (1988), Table 1, col. 5. The maintenance value figures in col. 4 are estimated as the sum of the value added estimates for the maintenance of railways, other public works, and private structures (Fenoaltea 2015h, Summary Table K.1, respectively cols. 7, 11, and 13), divided by the corresponding ratio of value added to value (an estimated .6 throughout, ibid., sections K05.04, K06.05, and K09.06).

Cols. 5−9 refer to the other identifiable components of investment in transportation systems: col. 5 to investment in off-farm horses (including those for the army, with all due respect to the cavalry) and harnesses, cols. 6−9 to new-equipment and maintenance investment in ships and in rail-(and tram)way rolling stock. These estimates fall short of an exhaustive tally of investment in vehicles, as they omit the boats and carts produced by the ill-documented wood-products industry.

Col. 5 thus covers investment in off-farm horses and, for convenience, their complementary harnesses. Its first component is the simple sum of Table 8, cols. 4 (civilian) and 5 (military); its second, the 1911-price value-of-harnesses series obtained as described above (§4.2.4).

Col. 6 (investment in new ships) is the simple sum of the separate (1911-price-value-of-purchases) estimates for naval and merchant vessels in Fenoaltea (2018c), Table 1, col. 56 and Table 5, col. 12. Col. 7 (investment in ship maintenance) is similarly the sum of two components. The first refers to naval vessels; it is obtained as the value added series (Fenoaltea 2015f, Summary Table F.1, col. 30), divided by .5 (to allow for the relatively high cost of upgrading equipment, ibid., section F02.04 and the public budgets there cited). The second refers to merchant vessels; it is obtained as the sum of the three partial value added series (ibid., Summary Table F.1, cols. 31−33), divided by a more conservative .6.

Col. 8 (investment in new railway rolling stock) is obtained as the sum of separate net import and production series for locomotive, passenger car, and freight-car tonnages (Fenoaltea 2015f, Table F.34, cols. 2, 5, and 8 and Table F.38, cols. 1−3) weighted by 1911-price values per ton (respectively 1,640, 1,402.5, and 690 lire per ton: ibid., section F03.08). Col. 9 (investment in railway rolling stock maintenance) is a value aggregate that sums over the nine components of the corresponding value added series, which refer respectively to the locomotives, passenger car, and freight cars of the railways, the electric tramways, and the steam tramways. The three railway-vehicle components are the value added series (ibid., Summary Table F.1, cols. 34−36), each divided by the estimated ratio

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industry; wooden tools are not amenable to the sharpening and reforging typical of metal tools, and to a first approximation when broken or worn out they are replaced rather than repaired. Wood machines (e.g., a water wheel) may well undergo repair; that activity is undocumented, and here neglected.

[30] Because investment goods that involve inordinately long production processes are thus counted on an accrual basis, the complementary estimates of inventory investment include only changes in the inventories of final goods (to smooth consumption), and ordinary goods in process and held for sale (because production and distribution take time).

of value added to value (locomotives, 25.38/30.22; passenger cars, 13.39/16.07; freight cars, 18.69/24.38, ibid., section F03.09). For simplicity, and in the absence of more direct evidence (ibid., section F03.10), the tramway-vehicle value added series (ibid., Summary Table F.1, cols. 37−42) are here scaled up using these self-same ratios; the extension of the first from steam power to electric power is a stretch, but as the relevant electric-tramway value added figure peaks at some 4 million lire it should not introduce significant error.

Cols. 10−15 refer to investment in the other products of the (metal-processing) engineering industry. Cols. 10 and 11 refer to investment in maintenance, respectively of fabricated metal (in the main, tools) on the one hand, and of other (general and, negligibly, precision) equipment on the other.

Col. 10 (investment in fabricated-metal maintenance) is aggregate value added in fabricated-metal maintenance (Fenoaltea 2015f, Summary Table F.3, col. 8), net of the consumer-good component (Table 6, col. 1), scaled up assuming a ratio of value added to value equal to .75. Col. 11 (investment in general-equipment and precision-equipment maintenance) sums over two components. The general-equipment series is obtained from the corresponding value-added aggregate (Fenoaltea 2015f, Summary Table F.3, col. 11), net of the consumer-good component (Table 6, col. 3), again assuming a ratio of value added to value equal to .75; the precision-equipment maintenance series is similarly obtained from the corresponding value-added aggregate (Fenoaltea 2015f, Summary Table F.3, col. 12), net of the consumer-good component (Table 6, col. 5), assuming a ratio of value added to value equal to .9. As it turns out, the precision-equipment value estimates are always insignificant, and col. 11 captures in fact the maintenance of general equipment (ordinary machinery) alone.

Cols. 12−14 cover investment in new products: in general equipment (ordinary industrial and agricultural machinery) and in precision equipment (precision instruments) – net, in both cases, of those installed in ships − and in precious-metal products (these last measured by value added rather than value, to be net of metal-inventory disinvestment).

Col. 12 (investment in new general equipment, i.e., ordinary machinery) is derived in Table 16. Table 16, col. 1 transcribes the estimated tonnage of such machines produced and imported (Fenoaltea 2017, Table 1, cols. 3 plus 4, Table 23, col. 3); cols. 2 and 3, the estimated tonnage of motor vehicles and bicycles acquired, estimated as described in §4.2.6.2 (the motor-vehicle series is a stock estimate for 1911 extrapolated to 1891−1913 assuming constant growth, the bicycle series is based on licensing-fee data); col. 4 is obtained as col. 1 less cols. 2 and 3, and thus tracks the tonnages of investment goods alone. This last series, however, remains gross of the (propulsion and other machinery) incorporated in ships, and therefore already counted in Table 15, col. 6 (and, in the case of replacement equipment, col. 7). In the case of merchant steamships, one can with some confidence allow .1 tons of propulsion and other machinery per gross ton built (Fenoaltea 2015f, section F02.03); assuming negligible replacement use, and that imported ships were fully outfitted, the estimated annual tonnage of merchant-ship machinery acquired transcribed in Table 16, col. 5 is derived as the estimated gross tonnage built (Fenoaltea 2018c, Table 5, col. 5) times .1 tons per gross ton. Table 16, col. 6 transcribes the estimates of the machinery (including weapons) incorporated in new naval ships; for simplicity, it is obtained as the sum of the type-specific deadweight-tonnages-constructed series in Fenoaltea (2015f), Table F.16, cols. 1−13, variously weighted, as suggested by sample data (ibid., Table F.17), by .03 (cols. 12−13), .1 (cols. 1−2 and 11), .2 (cols. 3−5), .3 (cols. 8 and 10), .4 (col. 6), .5 (col. 7), and .6 (col. 9). Table 16, col. 7 transcribes the estimates of the machinery (including weapons) incorporated in existing naval ships, as they were maintained and progressively improved. For simplicity these figures are obtained as the estimated tonnage of metal-hulled naval vessels maintained (Fenoaltea 2015f, Table F.23, col. 11), times .2 (the rough overall average for new ships) divided by 20 (the assumed life, in years, of the equipment). Col. 8 is the investment tonnage in col. 4, less the sum of the shipboard machinery in cols. 5−7; it is the estimated investment in agricultural and industrial machinery, measured in tons. Those tonnages are then assigned a unit

value of 1,300 lire (Fenoaltea 2015f, section F04.06); the resulting 1911-price value series is transcribed in Table 15, col. 12.

Table 15, col. 13 (investment in new precision instruments) is also derived in Table 14.2. For simplicity, the aggregate tonnage consumed is estimated as production plus net imports (Fenoaltea 2017, Table 1, col. 5 plus Table 2, col. 4), and the consumer-good component is simply neglected; these figures appear in Table 16, col. 9. Table 6, col. 10 transcribes the estimated shipborne tonnage; grasping at straws, it is estimated as 3.5 percent of the merchant marine's general equipment tonnage (Table 16, col. 5) plus 7.5 percent of the navy's (Table 16, cols. 6 plus 7). Table 15, col. 13 is the residual tonnage (Table 16, col. 9 less col. 10), valued at 22,000 lire per ton (Fenoaltea 2015f, section F04.06).

Table 15, col. 14 (investment in new precious-metalware) is a crude estimate. Again neglecting the value of the raw materials to avoid dealing with changes in the related inventories of metal, these figures are simply estimated total value added (Fenoaltea 2015f, Summary Table F.3, col. 19) less the estimated consumer-good component (Table 6, col. 7).

Table 15, col. 15 refers to investment in new fabricated metal (hardware), but it is a horse of a different color, as the present figures remain gross of the hardware absorbed by the construction industry (and others, e.g., shipbuilding): it partly duplicates the other series in the table, and cannot be simply added to them. To highlight this peculiarity, the figures in col. 15 are presented in italics. Col. 15 is estimated as the aggregate tonnage produced and imported (Fenoaltea 2017, Table 1, col. 1, Table 2, col. 1), valued at 810 lire per ton (Fenoaltea 2015f, section F04.06), less the implied value of the estimated consumer-good component (the value added figures in Table 6, col. 2, divided by 415/810).

Table 15, col. 16 refers to investment in wood products. These figures are in italics, like those of col. 15, and for exactly the same reason: they are gross of the components absorbed by other investment, in particular in structures. Col. 16 simply transcribes the value estimates in Table 5, col. 1.

Table 15, col. 17 transcribes the estimated investment value added of the services group, here considered, for simplicity, as a single aggregate. These figures too are italicized, as they too contain the transport and intermediation costs that burdened the raw materials of the commodity-producing (and maintaining) industries, and are therefore already included, to that extent, in cols. 1−16. But they are not entirely double-counted, for the estimated values of new mobile final goods other than vehicles (in essence, those covered by cols. 12−16) are essentially at f.o.b. prices (at the border or the factory), and exclude the cost of domestic transportation and intermediation. It also bears notice that from end to end the contribution of the services grew near sevenfold, where total (fixed) investment barely quadrupled: a disparity that reflects the improvement in transportation, and the increase in transportation (and in the complexity of commercial distribution) that accompanies the concentration of production where it is in fact cheapest. Col. 17 simply transcribes the extant value added estimates (Table 11, col. 5).

6.2 Intermediate 1911-price estimates

Table 17 presents some manipulations of the time series in Table 15. Col. 1 is the ratio of Table 15, col. 17 (investment services) to the sum of Table 15, cols. 3−16. It is not a ratio of distribution costs to production costs, for as just explained the denominator includes the distribution costs of raw materials and intermediate goods, and double-counts some production costs; but it should serve as a rough index of such a ratio, and in that light comfort can be taken both from its rough doubling from 12 percent in 1861 to 23 percent in 1913, and from the mildness of its deviations from a steady trend (Figure 3).

Col. 2 is instead the difference between aggregate fixed investment in Table 15, col. 1 and its properly identified components in cols. 2−14; this residual corresponds to the sum of cols. 15−17 (hardware, wood products, services), net of the components of these last already counted in cols. 2−14. Recalling the content of Table 14.1, cols. 15−17, specified above, Table 14.3, col. 2 covers, in essence, metal tools (f.o.b.); wood tools and machines (again f.o.b.); the distribution costs of the preceding; and the distribution costs of the other finished mobile goods in Table 14.1, to wit, horses and harnesses (col. 5) and new engineering-industry general equipment, precision instruments, and precious-metal products (cols. 12−14).

Col. 3 transcribes the c.i.f. estimates of investment in those four product groups, obtained as the sum of the f.o.b. estimates in Table 15, cols. 5 and 12−14 inflated by a distribution margin itself calculated as simply four times the margin-proxy in Table 17, col. 1 (and accordingly rising from 48 percent of the f.o.b. value in 1861 to 92 percent in 1913). Possible differences between the product groups are ignored: ordinary machinery appears to have incurred relatively high transport costs (Giordano 1864, p. 419), but this was likely offset by the relative proximity of consumers and producers, both disproportionately northern.

Col. 4 transcribes the analogous c.i.f. estimates of gross investment in fabricated metal and wood products, including those incorporated in structures, ships, etc.; these are obtained just like col. 3 from the sum of the corresponding f.o.b. estimates, here those in Table 15, cols. 15 and 16. Of that sum, it may be noted, the wood-products component is the major one, albeit by a cyclically variable (and slowly declining) margin: it accounts for some four fifths of the total in the 1860s and ’70s, dips over the boom of the 1880s to just over one half, recovers to near four fifths around the turn of the century, and drops again to near half over the boom of the *belle époque* (suggesting that of the two the fabricated-metal industry was much the more closely tied to construction, cf. Fenoaltea 2017).

Col. 5 transcribes the analogous c.i.f. estimates of investment in fabricated metal and wood products, net of those incorporated in structures, ships, etc.; these are obtained as a residual, much like that in col. 2, save that total fixed investment (Table 15, col. 1) is reduced by its properly identified components uniformly valued c.i.f. (still Table 15, cols. 2−4 and 6−11, as these are immobile goods, but for the mobile goods Table 17, col. 3 rather than Table 15, cols. 5 and 12−14). No attempt is made here to disaggregate this residual into its own components: *il faut quand même un peu de pudeur*.

Col. 6, finally, reports the ratio of col. 5 to col. 4, that is, the implied share of fabricated metal products and wood products that were final goods in their own right (tools, wood machines), and not goods incorporated in structures or ships. Col. 5 is a residual that inherits all the blemishes of its parent series, and neither it nor col. 6, obviously, can taken *au pied de la lettre*.[31] Col. 6 serves here as a test of the intrinsic reasonableness of col. 5 itself; and the latter would seem to pass that test, as the share of truly final goods grows from ca. half to over two thirds over the initial decades of the period at hand, and then remains roughly constant. What drives that path cannot be determined; but it bears notice that investment in metal machinery grew especially rapidly (Table 15, col. 12), and it is reasonable to imagine similarly rapid growth in investment in wood machinery (or in the wood components of mixed-material machines), at least until the coming of cheap steel altered the mix of cost-minimizing materials.

[31] The early dip and recovery after 1861 looks much like the mirror-image of estimated construction of new private structures (Fenoaltea 1988), derived in those years from a very small (and, the present results suggest, perhaps unrepresentative) sample; see *IIPK*, ch. K.08 and section K10.02.

6.3 The disaggregation of investment at 1911 prices

Table 14 is a user-friendly summary of the estimates of investment at 1911 (c.i.f.) prices. Cols. 1 and 2 disaggregate total fixed investment (Table 15, col. 1) to distinguish maintenance from investment in new goods. Col. 1 is the sum of Table 15, cols. 4, 7, and 9−11; col. 2 is the residual, equivalent to the sum of Table 15, cols. 2−3, 6, and 8 and Table 17, cols. 3 and 5.

Cols. 3−10 decompose fixed new-good investment at 1911 (c.i.f.) prices. Col. 3 refers to investment by and in agriculture (improvements, herd increments); it simply transcribes Table 15, col. 2. Cols. 4 and 5 relate to new construction; the total in Table 15, col. 3 is here decomposed to separate private structures (Fenoaltea 1988, Table 1, col. 5) from other construction (transport systems, other social overhead capital). Col. 6 refers to investment in off-farm horses and harnesses; it is Table 15, col. 5, scaled up by 1 + 4(Table 17, col. 1) to approximate c.i.f. values, as described above. Col. 7 refers to transport systems' mobile hardware, ships and railway vehicles (Table 15, cols. 6 and 8). Col. 8 refers to general and precision machinery together (the sum of Table 15, cols. 12 and 13, again scaled up to c.i.f. values). Col. 9 refers to tools, of metal and wood, and wood machines (again valued c.i..f.: Table 17, col. 5). Col. 10, finally, refers to display goods (precious-metalware, Table 15, col. 14, again brought up to c.i.f. values). Together, within rounding error, cols. 3−10 sum to col. 2.

The estimates in Table 14, at constant prices, document the movements of quantities; they are illustrated in Figure 2. Over the half-century from 1861 to 1911 population increased by some 40 percent (*Sommario*, p. 39). Against that, we see a doubling of the quantity of maintenance work (col. 1), and of social-overhead new construction (col. 5); closer to a trebling in the quantity of investment by and in agriculture (col. 3) and in off-farm horses and harnesses (col. 6), and in display goods (col. 10); a near fivefold increase in aggregate investment in new goods (col. 2); a near sixfold increase in the quantity of new private structures (col. 4), social-overhead vehicles (col. 7), and tools-plus-wood machines (col. 9); and nearer a thirty-sixfold increase in the quantity of (other) metal equipment (col. 8).

Three time series display idiosyncratic paths. Aggregate investment in maintenance (col. 1) is practically a steadily-rising trend. Aggregate investment by and in agriculture goes much its own way, growing in the 1870s but generally stagnating from 1880, with occasional brief collapses (in the late 1880s when tariff increases and the tariff war with France halted conversions to vineyards, again around the turn of the century when herds were apparently culled, Table 8), and an upside outlier in 1908 (tied to a 6 percent increase in the herds' overall value at 1911 prices, twice the next highest figure, ibid.). Aggregate investment in (metal) machinery (col. 7) grew very rapidly, with brief setbacks at roughly decadal intervals; this path has been established only recently (Fenoaltea, 2017), and has yet to be explained.

Aggregate new-good investment (col. 2) followed the Kuznets-cycle long swing of construction activity, established and analyzed decades ago (Fenoaltea 1988; also 2011, ch. 2). On the evidence that was brought to bear it seems tied to international finance: first to the willingness to invest specifically in Italy in the immediate aftermath of Unification (until the fiascos of 1866), and then to variations in the more general willingness to invest in the periphery, with no specifically Italian features at all (until, perhaps, the victorious war with Turkey, not by chance on the very eve of the World War). As has been pointed out this path is largely shared by the private and public components of investment in structures (Figure 2); the main difference is over the late 1880s, as private construction collapsed immediately the bubble burst in 1887 (and then partly recovered), while public construction fell a bit later and more slowly, as declining capital imports and the spreading crisis curtailed the State's own capacity to borrow and spend.

A similar long swing is found here, unsurprisingly, in investment in vehicles (col. 7). Over the long upswing from the mid-1890s it displays two idiosyncratic intermediate peaks, the first around

the turn of the century (due it would seem to merchant-shipping subsidies and to the electrification of tramways), the second in 1907 (and patently tied to the renovation of the railway system after the creation of the State railways in 1905). The long swing is also found here, most interestingly, in investment in tools and wood machines (col. 9): the medium-term path follows a relatively steady trend, save for the characteristic marked upswing through most of the 1880s, and the ensuing decline.[32]

The inclusion of wood machines may curb this series' growth rate, especially over the later decades; but judging by the path of investment in metal machinery the sharp cycle over the 1880s and early 1890s was not in machinery at all, but in tools. But that the cycle in investment in tools should parallel that in structures is not self-explanatory: if the tools were needed to build the structures they should have moved not like the structures series but like its first derivative, the need for *added* tools being greatest not when construction peaked, but as it expanded most rapidly.[33]

To this old dog, the most likely explanation does not require a new trick. The vagaries of investment in Italy appear to be explained not by variations in output, but by variations in the desired capital/output ratio (Fenoaltea 1969). That ratio, and therefore investment, may have varied with investors' confidence (ibid.: the "political cycle" hypothesis, since abandoned), or, more convincingly, with the supply and cost of capital (Fenoaltea 1988, 2011, ch. 2).[34] The State borrowed from the public and from leading banks, at home and abroad, builders borrowed from banks; the artisans who used and bought tools presumably could not. Their source of finance, one presumes, was their retained earnings; and if that is so it is not surprising that they should have invested most in adding to their stock of tools when the *level*, and not the growth rate, of their activity was at a peak.

The productivity-enhancing motivation for such investment may bear comment. Machinery is obviously labor-saving, in industrial factories, in agriculture, in artisans' shops too, as when a sewing machine replaced a hand-held needle. Tools save labor from time immemorial, sewing with a needle is much easier than sewing without one; but the evidence here points to an increase in the stock of tools *per worker*, and this investment saves labor in subtler ways. One imagines here two typical scenarios. One is that of a carpenter, say, passing from a single hammer to a battery of differentiated hammers, calibrated to the size of the nail that must be driven. The other is that of a five-person tailor's shop, say, passing from a single pair of scissors to five: the tool is no longer shared, each worker now has one, and work is no longer interrupted as one worker waits for another to finish using the tool and hand it over.

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[32] The upswing in the 1880s may be overstated, but not entirely fictitious: see Fenoaltea (2020b), §3.3, footnote 42.

[33] Tool use and replacement naturally follow the structure-investment cycle, but tool purchases as a whole would not unless tools were so short-lived as to behave as raw materials.

[34] The early "political cycle" hypothesis was based on the then-available "engineering" series, which grew fairly regularly across the 1860s and '70s, while the "Old Right" held sway, boomed with Depretis, fell with Crispi, and boomed again with Giolitti. The subsequently-derived construction series were the first to document the parallel long swing in construction, and the sharp cycle of the early 1870s, which didn't fit that hypothesis at all.

7. THE COMPOSITION OF INVESTMENT AT APPROXIMATE CURRENT PRICES

7.1 Allowing for changes in relative prices

There is something deeply wrong-headed with examining the composition of a value aggregate calculated, and disaggregated, with inappropriate relative prices. That is why the disaggregated 1911-price figures in Table 14 are a poor guide to the actual composition of investment; and that is of course (yet another reason) why we want our "real" measures to maintain a constant price *level*, but to reflect *current* relative prices (i.e., why we want the not-yet-available "third-generation" estimates rather than the present "second-generation" interim figures: Fenoaltea 2020a, §3.1). Conceptually, the problem is that if we use constant (1911) prices, as we go back in time the technologically more progressive activities are increasingly undervalued relative to the less progressive ones; the conceptually simple solution is to correct the various constant-price series to reflect relative technical progress.

In general, of course, the best evidence we have of relative technical progress is the evolution of relative prices; but credible price series are not yet available (e.g., Fenoaltea 2020b, §2.4, footnotes 21, 24), and their construction here is *ultra vires*. In the interim the practical solution is to lower one's standards, and to accept a quick-and-dirty calculation that is at least a step in the right direction.

The results of such a calculation are presented in Fenoaltea (2020b), Table 6, and illustrated in Figure 7; these are reproduced here as Table 18 and Figure 4. Table 18 is organized exactly like Table 14, but differently derived from Tables 15 and 17. The basic algorithm is as simple as could be: the various components of fixed investment are divided into two categories only, to separate goods and activities that benefited from (significant) technological progress from those that did not. In the case of the latter, the 1911-price series are taken over as they are. In the case of the former, heroically, a uniform correction is applied: assuming a productivity growth rate τ, with V_k identifying the 1911-price estimate, V the corrected estimate, and t the year, $V_t/V_k = (1 + \tau)^{(1911 - t)}$. Here, τ is set equal to 2.44 percent per year, an evidence-based figure used in generating the production estimates for the engineering industry (Fenoaltea 2015f, section F04.11); in 1861, the resulting correction V_t/V_k equals approximately 3.34.

Here, the new production of metal vehicles, machines, tools, and display goods is considered technologically progressive; cols. 7−10 in Table 18 are accordingly cols. 7−10 in Table 14, multiplied through by V_t/V_k. Other new production – agricultural improvements, breeding, harness-making, construction – is considered technologically stagnant; cols. 3−6 in Table 18 accordingly reproduce cols. 3−6 in Table 14. In Table 18, col. 2 (total investment in new goods) is the simple sum of cols. 3−10. Correcting for the progressive cheapening of the investment goods, from 1861 to 1911 investment in metal machines (col. 8) increased nearer elevenfold than thirty-sixfold, total investment in new goods (col. 2) nearer threefold than fivefold.

The derivation of the maintenance series in Table 18, col. 1 is more complex. In general, maintenance is a manual process, essentially devoid of technical progress; the major exception is the maintenance of ships and railway vehicles, carried out in ever-more-capital-intensive yards and shops similar to those used to produce those vehicles in the first place. Table 18, col. 1 is accordingly the sum of two components. One is Table 14, col. 1, reduced by the sum of Table 15, cols. 7 and 9; the other is that very sum, multiplied through by V_t/V_k. At 1911 prices (Table 15), from 1861 to 1911 the maintenance of ships and railway rolling stock grew over tenfold, other maintenance less than doubled; as one goes back in time the component that gets scaled up is an ever smaller part of the total. Total maintenance is accordingly not much affected: from 1861 to 1913 it grows by a factor of 2.1 at 1911 prices (Table 14), at the 1911 price *level* (Table 18) that factor is reduced only marginally, to 2.0.

15.2 The burden of the evidence

Figure 4 illustrates the estimated composition of investment, as derived from Table 18; the composition of investment at 1911 prices, from Table 14, is also illustrated, to bring out the attendant distortion. Panel A illustrates the share of new-product investment in total investment; since the maintenance component is close to a simple trend, the path of that share is similar to the path of new-product investment itself (Figure 2, panel A2), characterized, as usual, by the long cycle. At 1911 prices, cyclical movements apart, the share of new-product investment appears to be generally rising; in fact, it appears to have been more nearly constant, with a mid-cycle value between 70 and 75 percent. Figure 4, panel B illustrates, in separate graphs to avoid clutter, the path of the major components of new-product investment.

The share of agricultural improvements and breeding varied widely, typically between 5 and 15 percent, but with a maximum near 17 percent in 1878 and 1879 (well under the 23 percent of the 1911-price series), and minima near zero in 1889 and 1899. The share of private structures also displayed sharp cyclical variations. Over the period at hand its trend value seems to have risen by a few percentage points, from perhaps 11 percent to 15 percent over fifty years; the 1911-price series point to a mild decline rather than a mild increase.

The next graph illustrates the share of investment in social-overhead infrastructure, and in largely complementary horses, ships and rolling stock, together (Table 18, cols. 5−7); going back in time the correction for changes in relative prices would reduce the former component, and increase the latter. The net effect is dominated of course by the major component, infrastructure; over the period at hand the share of this social-overhead investment declined from some 40 percent and more (and not 50 percent and more, as the 1911-price series would have it) to 25-to-30 percent.

A clear upward trend is instead evident, as expected, in the share of machinery. That share was apparently over 6 percent in 1861 (and not half that, as the 1911-price series suggest), and grew and grew to over 20 percent in 1913; it peaked at some 30 percent in 1907-08, after which machinery investment fell while construction continued to increase.

The share of tools (and wood machinery) displays short-term variations that, for the reasons recalled above (Fenoaltea 2020b, §3.3, footnote 42; also above, §6.3, footnote 32), cannot be taken altogether seriously. Over the longer term it appears to have drifted down from some 30–35 percent over the later nineteenth century to nearer 25 percent by the eve of the Great War; the 1911-price series would have it drifting *up*, and then flattening out.

The share of investment in display goods was ever trivial, by either measure.

Figure 4, panel C takes a closer look at the composition of productivity-enhancing new-good investment, which here excludes investment in agricultural improvements and herd increments (and in off-farm horses), in private structures (essentially housing), in precious-metal display goods, and in naval vessels (Table 18, cols. 3, 4, 6 and 10, and V_t/V_k times Fenoaltea 2018c, Table 1, col. 56); its three components are investment in (other) infrastructure and related vehicles excluding naval vessels, in metal machines, and in tools and wood machines (Table 18, respectively cols. 5 plus 7, reduced by the just-noted naval ship figures, col. 8, and col. 9), with the *caveat* that infrastructure still includes fortifications and more, and machinery weapons.

Figure 4, panel C illustrates the shares of investment in (for brevity) "infrastructure," "machinery," and "tools" in their joint total. Tools emerge as long the largest single component: they remained near 40 to 50 percent of the total from Unification through the turn of the century, only to the dip to some 30 percent in 1908, and recover to some 35 percent in 1913. Infrastructure was long a close second: from 1861 to the early 1890s it drifted down from over 40 percent to just under that, only to drop sharply to less than 30 percent and finally partly recover to just over 35 percent in 1913. Machinery, by the same token, was long a distant third, roughly doubling from under 10 percent in

1861 to 20 percent in 1894; it then soared to 30 percent and more, peaked well in first place with an over-40 percent share in 1908, and then drifted back down to a third-place 30 percent in 1913.

It would be well to refine the underlying series, to remove military weapons as well as naval ones, to remove from infrastructure fortifications and prestige projects (like the hideous, and hideously expensive, Victor Emmanuel monument in Rome). How far one could actually go in that endeavor is not clear; but the endeavor itself is here again *ultra vires*, and all one can say is that the share of tools would presumably appear even larger, once the other series were cleaned up and scaled down.

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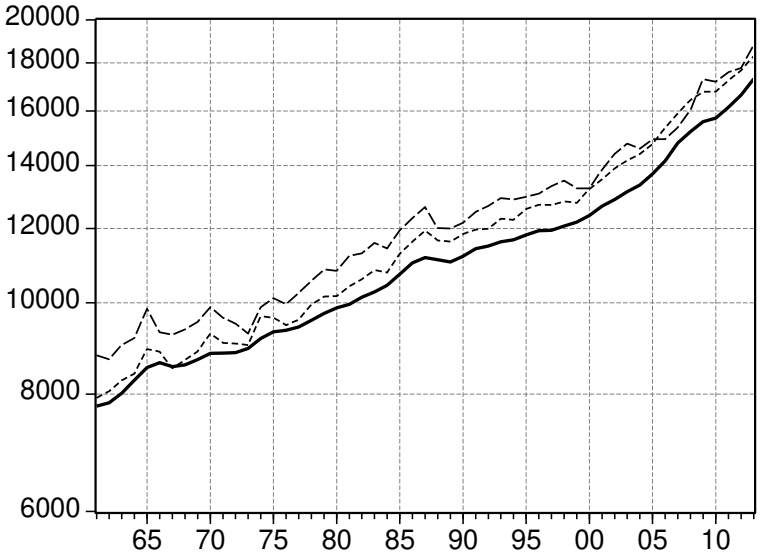
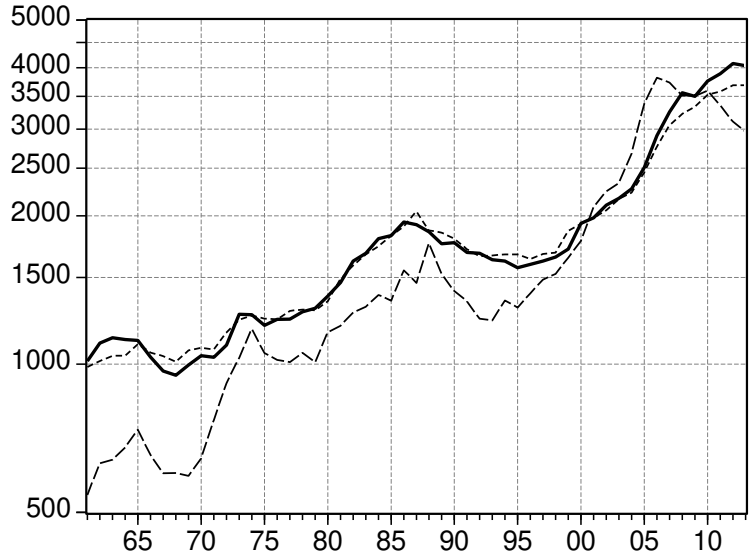
Figure 1
Expenditure series at 1911 prices, 1861–1913 (million lire)

A. Consumption



-------- preliminary second-generation (Fenoaltea 2012)
— — — sesquicentenary (Baffigi 2011)
▬▬▬ revised second-generation

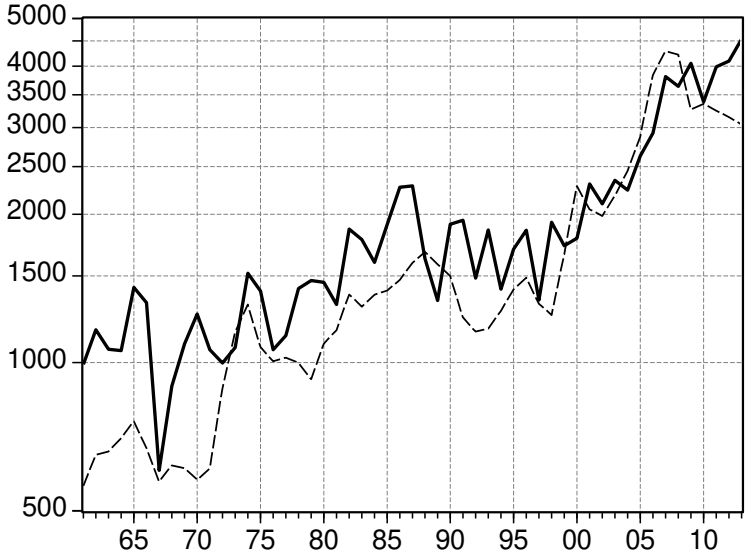
B. Fixed investment



-------- preliminary second-generation (Fenoaltea 2012)
— — — sesquicentenary (Baffigi 2011)
▬▬▬ revised second-generation

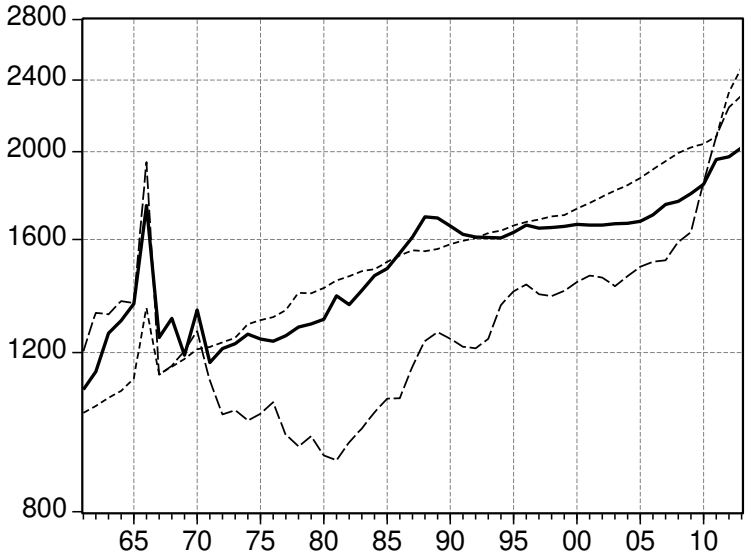
Figure 1, continued

C. Investment (total)



— — — sesquicentenary (Baffigi 2011)
revised second-generation

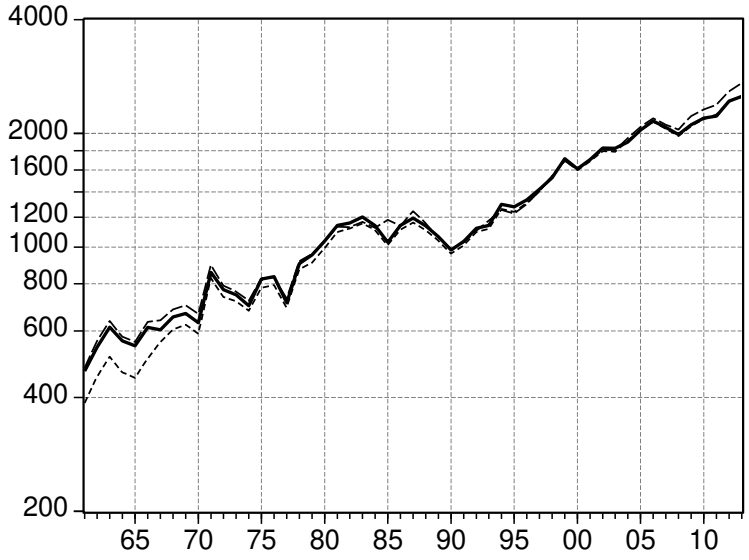
D. Government



-------- preliminary second-generation (Fenoaltea 2012)
— — — sesquicentenary (Baffigi 2011)
revised second-generation

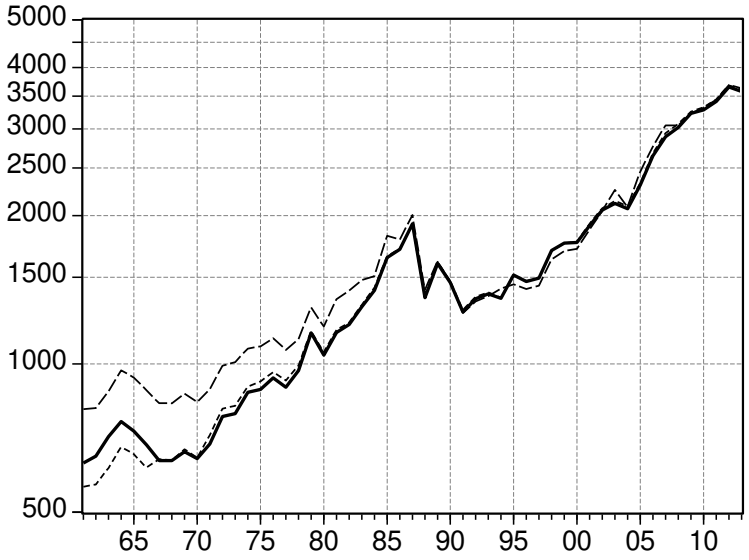
Figure 1, continued

E. Exports



-------- preliminary second-generation (Fenoaltea 2012)
— — — sesquicentenary (Baffigi 2011)
▬▬▬ revised second-generation

F. Imports

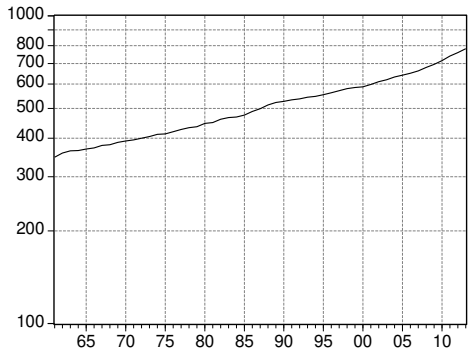


-------- preliminary second-generation (Fenoaltea 2012)
— — — sesquicentenary (Baffigi 2011)
▬▬▬ revised second-generation

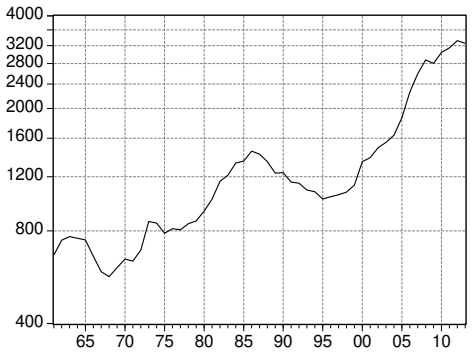
Figure 2
Components of investment at 1911 c.i.f. prices, 1861–1913 (million lire)

A. Aggregate investment

A1. Maintenance



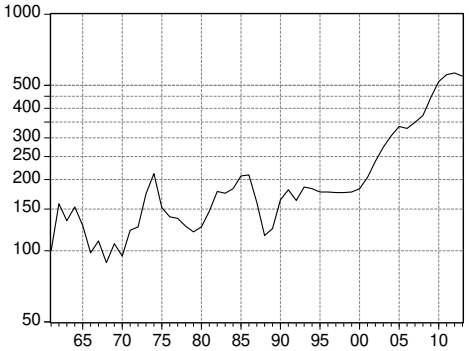
A2. New-good investment



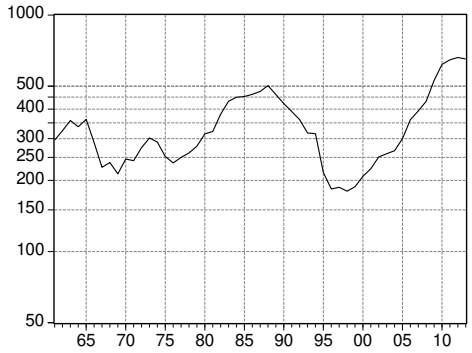
B. New-good investment

B1. By and in agriculture

B2. Private structures



B3. Other fixed infrastructure



B4. Vehicles, horses, harnesses

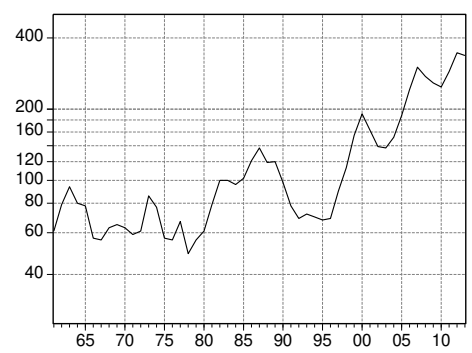
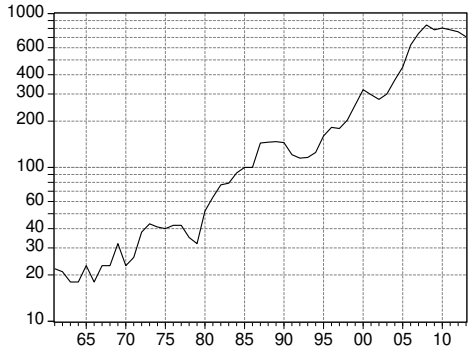
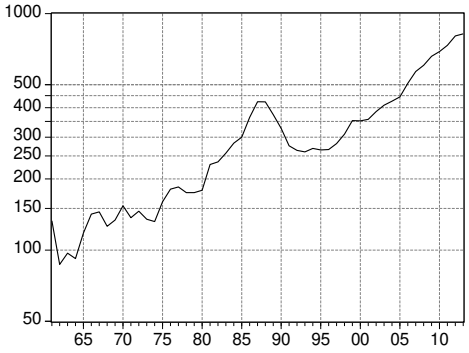


Figure 2, continued

B5. Metal (ordinary/precision) machinery



B6. Tools, wood machinery



B7. Precious-metalware

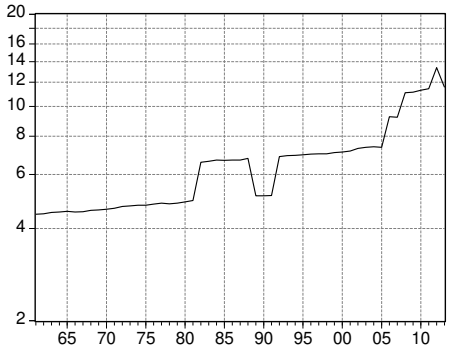


Figure 3
Approximate index of the ratio of distribution costs to production costs
at 1911 prices, 1861-1913

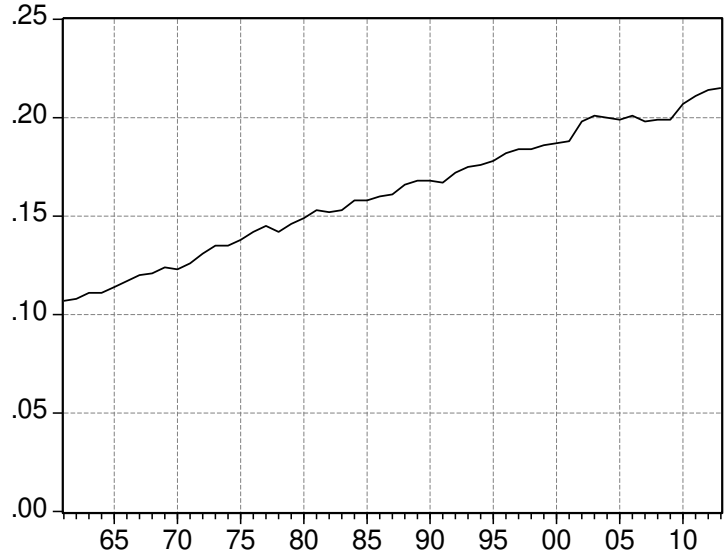
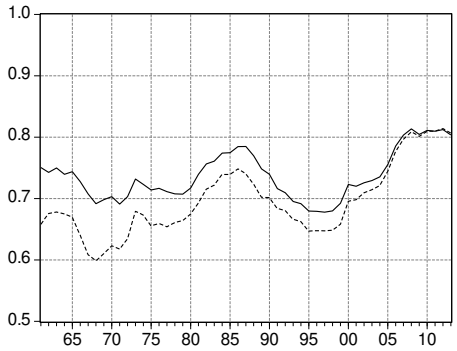


Figure 4
Conjectural composition of investment at the 1911 price level, 1861–1913

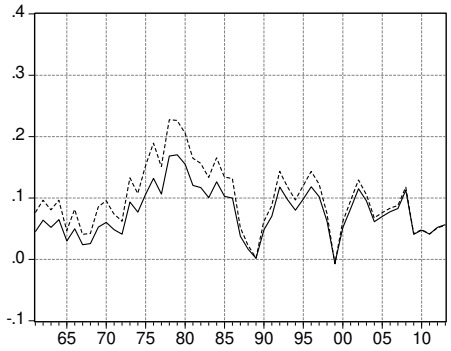
A. Share of new-product investment in aggregate investment



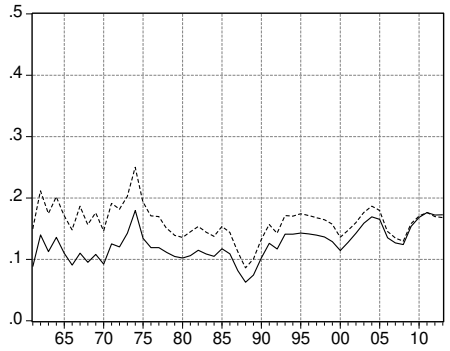
——— share at approximate current prices -------- share at 1911 prices

B. Shares of new-product investment

B1. By and in agriculture



B2. Private structures



B3. Other fixed infrastructure

B4. Vehicles, horses, harnesses

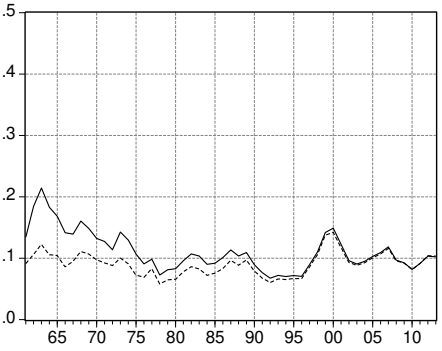
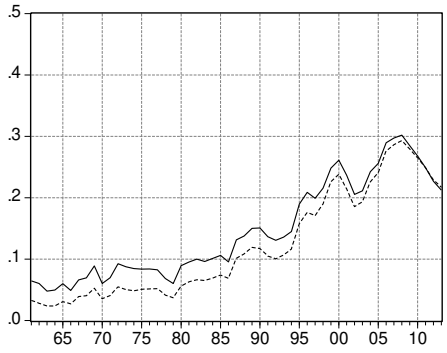
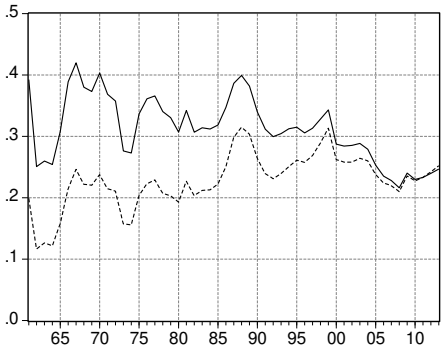


Figure 4, continued

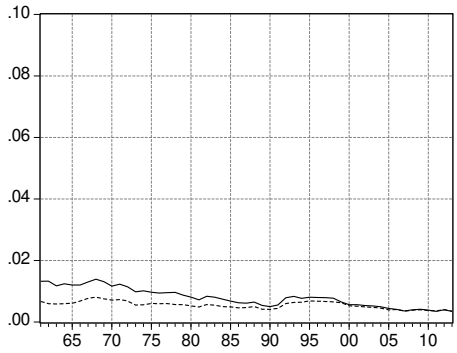
B5. Metal (ordinary/precision) machinery



B6. Tools, wood machinery

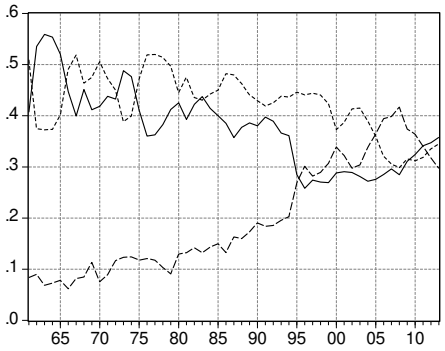


B7. Precious-metalware



——— share at approximate current prices -------- share at 1911 prices

C. <u>Relative shares of productivity-enhancing investment, 1861–1913</u>



——— public infrastructure, merchant ships, rolling stock
-------- tools, wood machinery
— — — metal (ordinary/precision) machinery

Table 1. Expenditure series at 1911 prices, 1861-1913 (million lire)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		I					
	C	fixed	total	*G*	*X*	*M*	*GDP*
1861	7,766	1,015	992	1,092	470	629	9,691
1862	7,831	1,104	1,166	1,143	544	650	10,034
1863	8,016	1,131	1,064	1,260	614	712	10,242
1864	8,278	1,122	1,057	1,301	565	764	10,437
1865	8,537	1,117	1,421	1,358	548	730	11,134
1866	8,640	1,034	1,323	1,744	613	685	11,635
1867	8,554	968	604	1,247	604	636	10,373
1868	8,593	949	896	1,309	653	636	10,815
1869	8,707	996	1,091	1,192	668	663	10,995
1870	8,837	1,040	1,255	1,337	631	642	11,418
1871	8,843	1,033	1,062	1,170	857	688	11,244
1872	8,851	1,093	998	1,212	772	782	11,051
1873	8,942	1,263	1,073	1,227	748	793	11,197
1874	9,166	1,260	1,519	1,257	700	876	11,766
1875	9,316	1,199	1,397	1,242	823	888	11,890
1876	9,350	1,233	1,062	1,235	835	937	11,545
1877	9,428	1,234	1,135	1,252	712	897	11,630
1878	9,582	1,277	1,414	1,280	905	969	12,212
1879	9,747	1,298	1,467	1,290	954	1,156	12,302
1880	9,877	1,375	1,455	1,306	1,039	1,042	12,635
1881	9,964	1,464	1,312	1,386	1,141	1,159	12,644
1882	10,138	1,620	1,866	1,355	1,159	1,203	13,315
1883	10,272	1,680	1,777	1,405	1,201	1,306	13,349
1884	10,440	1,799	1,598	1,459	1,140	1,411	13,226
1885	10,730	1,825	1,907	1,486	1,030	1,644	13,509
1886	11,028	1,943	2,270	1,546	1,141	1,709	14,276
1887	11,172	1,920	2,285	1,610	1,194	1,925	14,336
1888	11,111	1,857	1,626	1,694	1,138	1,363	14,206
1889	11,054	1,756	1,336	1,690	1,066	1,600	13,546
1890	11,209	1,765	1,910	1,656	982	1,463	14,294
1891	11,416	1,686	1,946	1,621	1,035	1,275	14,743
1892	11,491	1,680	1,484	1,610	1,121	1,356	14,350
1893	11,610	1,630	1,858	1,608	1,141	1,388	14,829
1894	11,667	1,620	1,409	1,606	1,298	1,359	14,621
1895	11,811	1,569	1,701	1,629	1,279	1,516	14,904
1896	11,934	1,595	1,856	1,659	1,334	1,470	15,313
1897	11,948	1,620	1,339	1,646	1,423	1,493	14,863
1898	12,067	1,649	1,927	1,649	1,526	1,700	15,469
1899	12,190	1,712	1,727	1,654	1,715	1,759	15,527
1900	12,385	1,931	1,788	1,662	1,611	1,764	15,682
1901	12,670	1,982	2,306	1,659	1,704	1,909	16,430
1902	12,882	2,103	2,101	1,659	1,829	2,054	16,417
1903	13,128	2,171	2,345	1,665	1,827	2,119	16,846
1904	13,343	2,271	2,240	1,667	1,896	2,067	17,079
1905	13,713	2,507	2,627	1,675	2,039	2,309	17,745
1906	14,161	2,912	2,925	1,703	2,155	2,648	18,296
1907	14,792	3,255	3,809	1,749	2,073	2,895	19,528
1908	15,206	3,556	3,638	1,763	1,987	3,023	19,571
1909	15,588	3,498	4,053	1,798	2,108	3,226	20,321
1910	15,723	3,756	3,384	1,841	2,195	3,279	19,864
1911	16,143	3,888	3,986	1,961	2,221	3,413	20,898
1912	16,632	4,079	4,094	1,974	2,434	3,651	21,483
1913	17,306	4,037	4,539	2,021	2,505	3,577	22,794

Source: see text.

Table 2. Exports and imports, 1861-1913 (million lire at 1911 prices)

	(1)	(2)	(3) exports	(4)	(5)
	reported total	Latium, Venetia	reported ships	naval ships	merchant ships
1861	396.8	72.7		.0	.5
1862	465.5	78.4	.0	.0	.5
1863	526.8	86.5	.0	.0	1.1
1864	476.9	87.6	.0	.0	.3
1865	462.6	84.7	.0	.0	.5
1866	525.9	86.6	.0	.0	.5
1867	580.8	21.8	.0	.0	1.5
1868	628.7	22.6	.0	.0	1.2
1869	643.0	23.3	.0	.0	1.6
1870	606.9	22.3	.0	.0	1.9
1871	855.1		.0	.0	1.4
1872	766.9		.0	.0	4.8
1873	744.9		.0	.0	3.2
1874	692.7		.0	.0	7.1
1875	820.6		.0	.0	2.7
1876	832.7		.0	.0	2.1
1877	710.4		.0	.0	1.6
1878	902.3		.0	.0	2.7
1879	951.6		.0	.0	2.4
1880	1,036.9		.0	.0	1.6
1881	1,139.0		.2	.0	1.9
1882	1,158.1		.1	.0	.7
1883	1,200.4		.2	.0	.8
1884	1,139.0		.3	.0	1.1
1885	1,031.1		3.6	.0	2.6
1886	1,139.0		.3	.0	2.0
1887	1,191.1		.3	.0	3.4
1888	1,133.9		.0	.0	3.7
1889	1,062.2		.6	.0	4.0
1890	980.4		.3	.0	2.3
1891	1,031.2		.0	.0	4.2
1892	1,117.4		.0	.3	3.4
1893	1,137.0		.0	1.2	2.9
1894	1,284.2		.0	6.7	7.2
1895	1,257.7		.6	18.4	3.0
1896	1,324.3		17.9	25.5	2.4
1897	1,418.1		23.8	25.0	4.0
1898	1,549.0		42.6	14.1	5.5
1899	1,704.0		3.7	7.9	6.8
1900	1,604.9		3.0	4.5	4.8
1901	1,693.2		2.0	7.4	5.8
1902	1,802.5		1.3	22.8	4.7
1903	1,796.6		1.7	25.3	6.6
1904	1,920.8		39.8	4.9	10.1
1905	2,048.9		22.2	4.7	7.3
1906	2,154.7		8.6	1.9	7.3
1907	2,064.1		.7	3.7	5.8
1908	1,976.2		1.0	7.1	4.8
1909	2,099.9		.9	6.8	1.9
1910	2,185.3		.7	6.9	3.2
1911	2,241.2		27.6	3.9	3.3
1912	2,426.6		6.7	1.2	12.6
1913	2,501.4		5.2	2.6	6.4

Table 2, continued

	(6)	(7)	(8)	(9)	(10)	(11)
	imports					
	reported total	Latium, Venetia	reported ships	naval ships	merchant ships	It.-flag freights
1861	553.5	72.7		9.3	3.1	9.7
1862	559.4	78.4	.0	20.1	3.1	10.7
1863	604.3	86.5	.0	25.6	6.7	10.8
1864	668.6	87.6	.1	18.0	1.7	12.1
1865	644.8	84.7	.0	10.6	3.4	13.1
1866	606.6	86.6	.0	4.6	1.1	14.3
1867	627.6	21.8	.0	.0	2.4	15.5
1868	627.7	22.6	.0	.0	1.5	16.0
1869	654.2	23.3	.0	.0	2.3	16.8
1870	633.6	22.3	.0	.0	4.4	18.4
1871	705.1		.0	.0	2.6	19.7
1872	799.2		.0	.0	3.5	20.5
1873	807.8		.0	.1	5.5	20.9
1874	893.2		.0	.0	2.8	20.3
1875	906.3		.0	.0	2.0	20.1
1876	956.5		.0	.0	1.7	21.5
1877	918.4		.0	.0	1.5	22.5
1878	989.3		.0	.0	2.4	23.2
1879	1,174.4		.0	.2	5.2	23.6
1880	1,060.3		.0	.3	4.7	23.3
1881	1,173.8		3.9	.5	10.1	21.1
1882	1,216.8		3.0	2.8	7.8	21.6
1883	1,320.0		4.3	4.2	8.2	22.1
1884	1,431.2		8.9	4.2	8.0	23.4
1885	1,661.1		7.0	7.7	4.9	23.2
1886	1,723.6		10.4	6.1	13.3	23.6
1887	1,925.5		2.2	15.8	10.0	24.6
1888	1,372.9		2.3	7.9	8.9	24.6
1889	1,620.8		4.3	1.8	6.4	25.1
1890	1,482.5		.7	.0	4.9	24.2
1891	1,292.0		.0	.0	6.4	23.3
1892	1,376.9		.1	.0	3.2	24.1
1893	1,407.8		.0	.0	4.5	24.3
1894	1,373.6		.1	.0	7.5	22.5
1895	1,526.8		2.5	3.8	11.5	23.6
1896	1,486.4		1.7	.0	11.6	26.0
1897	1,506.1		3.4	.0	18.0	27.6
1898	1,713.5		3.4	.0	19.3	29.5
1899	1,771.2		6.2	1.3	25.3	32.4
1900	1,775.9		10.3	4.4	31.2	37.1
1901	1,936.9		6.8	2.1	19.1	42.2
1902	2,088.7		4.3	.2	13.8	44.7
1903	2,158.4		2.9	.0	9.7	46.4
1904	2,100.1		2.3	2.2	12.6	45.6
1905	2,338.6		6.7	6.0	15.7	44.9
1906	2,682.6		11.2	1.8	22.5	47.4
1907	2,929.2		9.4	.0	24.8	49.9
1908	3,062.2		13.4	.0	26.9	53.2
1909	3,258.5		5.2	.0	31.0	58.4
1910	3,318.5		10.9	2.4	26.6	57.6
1911	3,443.8		9.7	.3	36.3	58.0
1912	3,677.9		13.8	6.1	46.7	66.2
1913	3,617.4		25.3	1.4	59.5	75.7

Source: see text.

Table 3. Industrial value added flowing into investment, 1861-1913
(million lire at 1911 prices)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		manufacturing							
	extrac-tive	textiles, apparel[a]	leather[a]	wood[a]	metal	engi-neer'g	non-met. min. pr.	chem.	rubber[a]
1861	38	20	4	185	5	171	40	7	0
1862	42	21	4	173	4	176	46	7	0
1863	45	22	4	171	2	180	48	7	0
1864	45	22	3	171	2	180	49	7	0
1865	47	22	3	197	1	184	50	7	0
1866	42	22	1	201	2	185	41	7	0
1867	45	22	2	189	2	189	39	7	0
1868	49	22	4	164	2	196	39	7	0
1869	51	22	3	168	3	201	40	7	0
1870	50	23	5	178	3	202	42	6	0
1871	51	23	4	170	3	198	43	7	0
1872	56	23	5	177	4	200	47	8	0
1873	63	26	5	184	3	207	55	8	0
1874	64	24	6	182	5	217	57	8	0
1875	58	24	2	178	4	220	49	7	1
1876	59	22	5	188	4	215	47	8	0
1877	60	23	6	188	4	214	50	8	1
1878	59	23	7	188	3	209	50	8	0
1879	62	22	7	176	7	214	50	8	1
1880	70	22	7	176	8	226	55	8	0
1881	72	22	9	191	10	242	58	9	1
1882	77	22	11	204	11	257	65	9	1
1883	81	22	11	208	14	268	70	10	1
1884	83	21	10	222	15	280	73	10	2
1885	84	21	12	241	17	290	76	10	2
1886	85	21	13	268	21	312	79	11	2
1887	84	22	12	275	26	336	77	11	3
1888	83	22	10	255	31	351	76	12	3
1889	84	22	12	228	33	350	75	11	4
1890	85	20	10	226	29	337	76	12	4
1891	83	19	8	224	24	317	75	12	2
1892	82	18	11	217	20	302	71	12	3
1893	80	16	9	214	23	303	71	12	4
1894	80	14	9	217	23	310	70	11	6
1895	74	14	8	212	26	322	64	11	6
1896	74	14	10	222	26	334	63	11	6
1897	77	13	9	232	28	345	65	13	7
1898	79	13	10	248	32	364	66	13	7
1899	84	14	10	266	37	399	69	14	7
1900	88	15	11	260	39	425	72	13	7
1901	92	14	12	275	37	414	77	13	6
1902	100	13	12	289	36	410	86	13	7
1903	105	13	13	305	41	420	93	16	6
1904	109	14	15	313	47	444	99	17	5
1905	114	14	17	338	57	489	108	19	6
1906	124	14	18	353	69	554	116	20	10
1907	131	13	18	375	72	606	123	21	7
1908	134	12	18	406	86	642	132	22	13
1909	142	12	19	443	97	662	154	26	12
1910	158	14	19	465	104	685	177	29	15
1911	164	16	18	460	104	718	189	32	21
1912	174	16	18	447	120	759	195	35	32
1913	173	16	17	441	114	757	195	41	16

Table 3, continued

	(10) total manuf.	(11) construc- tion	(12) utili- ties	(13) total	(14) investment share of industry[b]
1861	432	285	0	755	.45
1862	431	324	0	797	.47
1863	434	336	0	815	.47
1864	434	331	0	810	.47
1865	464	334	0	845	.48
1866	459	287	0	788	.45
1867	450	262	0	757	.44
1868	434	259	0	742	.43
1869	444	253	0	748	.43
1870	459	267	0	776	.44
1871	448	275	0	774	.43
1872	464	294	0	814	.44
1873	488	325	0	876	.46
1874	499	336	0	899	.46
1875	485	293	0	836	.44
1876	489	284	0	832	.43
1877	494	292	0	846	.44
1878	488	297	0	844	.43
1879	485	305	0	852	.43
1880	502	329	0	901	.44
1881	542	340	0	954	.45
1882	580	387	0	1,044	.47
1883	604	412	0	1,097	.47
1884	633	423	0	1,139	.48
1885	669	434	0	1,187	.48
1886	727	444	0	1,256	.48
1887	762	437	0	1,283	.48
1888	760	439	0	1,282	.48
1889	735	423	0	1,242	.47
1890	714	418	0	1,217	.46
1891	681	410	0	1,174	.45
1892	654	389	1	1,126	.44
1893	652	375	1	1,108	.43
1894	660	374	1	1,115	.42
1895	663	321	1	1,059	.40
1896	686	307	1	1,068	.40
1897	712	311	1	1,101	.40
1898	753	308	2	1,142	.40
1899	816	313	3	1,216	.41
1900	842	323	4	1,257	.42
1901	848	339	5	1,284	.41
1902	866	368	6	1,340	.42
1903	907	386	7	1,405	.42
1904	954	405	10	1,478	.43
1905	1,048	433	11	1,606	.44
1906	1,154	460	13	1,751	.44
1907	1,235	484	17	1,867	.44
1908	1,331	513	20	1,998	.45
1909	1,425	586	24	2,177	.47
1910	1,508	661	27	2,354	.48
1911	1,558	697	32	2,451	.49
1912	1,622	713	37	2,546	.49
1913	1,597	707	42	2,519	.48

[a]value
[b]ratio of col. 12 to col. 13; the numerator is swollen by the value of the raw materials included in cols. 2, 4, and 9.

Source: see text.

Table 4. Hemp-industry investment-good products, 1861-1913 (thousand tons)

	(1) rope	(2) sails for new vessels	(3) replace-ment sails	(4) tarpau-lins
1861	15.2	.055	.271	.017
1862	15.8	.071	.274	.017
1863	16.1	.084	.279	.018
1864	16.3	.107	.281	.018
1865	16.3	.128	.301	.018
1866	16.1	.141	.328	.019
1867	15.9	.171	.345	.019
1868	15.8	.195	.369	.019
1869	15.7	.198	.399	.020
1870	16.2	.170	.434	.020
1871	16.4	.143	.460	.021
1872	16.6	.139	.468	.021
1873	18.5	.158	.461	.021
1874	17.2	.185	.456	.022
1875	16.8	.178	.468	.022
1876	15.9	.125	.499	.022
1877	16.4	.078	.517	.023
1878	16.1	.056	.518	.023
1879	15.7	.040	.512	.024
1880	15.7	.029	.503	.024
1881	15.6	.031	.492	.025
1882	15.5	.035	.481	.025
1883	15.7	.033	.473	.026
1884	14.8	.027	.465	.026
1885	15.0	.024	.455	.027
1886	15.5	.019	.444	.027
1887	15.9	.011	.419	.028
1888	16.5	.018	.389	.028
1889	16.3	.042	.358	.029
1890	14.9	.057	.337	.029
1891	14.1	.044	.336	.030
1892	13.4	.034	.331	.030
1893	11.9	.024	.323	.031
1894	10.4	.013	.316	.031
1895	9.7	.010	.308	.032
1896	10.0	.008	.296	.032
1897	9.3	.009	.288	.033
1898	9.4	.014	.290	.034
1899	10.2	.019	.297	.034
1900	11.0	.019	.305	.035
1901	10.0	.034	.306	.036
1902	9.3	.058	.301	.036
1903	9.5	.042	.307	.037
1904	10.3	.018	.313	.038
1905	10.1	.017	.302	.038
1906	10.0	.020	.288	.039
1907	9.2	.020	.277	.040
1908	8.5	.017	.269	.040
1909	8.9	.015	.263	.041
1910	10.4	.013	.259	.042
1911	11.6	.011	.251	.043
1912	11.6	.015	.234	.043
1913	12.2	.020	.218	.044

Source: see text.

Table 5. Value of wood-industry investment-good products, 1861-1913 (million lire)

	(1) finished wood products	(2) lumber consumed: engi-neering	(3) lumber consumed: construc-tion
1861	134.1	2.6	48.2
1862	114.2	3.5	54.9
1863	109.9	4.0	56.9
1864	109.9	4.6	56.0
1865	135.0	5.5	56.5
1866	146.2	5.8	48.6
1867	138.4	6.3	44.4
1868	113.4	7.1	43.8
1869	117.7	7.3	42.8
1870	126.3	6.4	45.2
1871	117.7	5.5	46.6
1872	122.0	5.4	49.8
1873	122.9	6.1	55.0
1874	118.5	6.9	56.9
1875	122.0	6.7	49.6
1876	135.0	5.1	48.1
1877	135.0	3.6	49.4
1878	135.0	2.9	50.3
1879	122.0	2.5	51.6
1880	117.7	2.7	55.7
1881	130.7	3.1	57.6
1882	135.0	3.3	65.5
1883	135.0	3.1	69.8
1884	148.0	2.7	71.6
1885	164.4	2.7	73.5
1886	189.5	3.0	75.2
1887	197.3	3.3	74.0
1888	176.5	3.7	74.3
1889	152.3	3.7	71.6
1890	152.3	3.2	70.8
1891	152.3	2.7	69.4
1892	148.0	2.6	65.9
1893	148.0	2.4	63.5
1894	151.4	2.2	63.3
1895	155.8	2.2	54.3
1896	167.9	2.3	52.0
1897	176.5	2.5	52.7
1898	193.0	3.0	52.1
1899	209.4	3.5	53.0
1900	201.6	3.7	54.7
1901	213.7	4.1	57.4
1902	222.4	4.5	62.3
1903	235.4	4.3	65.3
1904	239.7	4.2	68.6
1905	260.5	4.3	73.3
1906	269.1	5.6	77.9
1907	286.4	7.0	81.9
1908	311.5	7.6	86.8
1909	336.6	6.9	99.2
1910	346.1	6.6	111.9
1911	334.0	7.5	118.0
1912	317.6	8.3	120.7
1913	313.2	8.1	119.7

Source: see text.

Table 6. Metalmaking- and engineering-industry consumer-good value added, 1861-1913
(million lire at 1911 prices)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	engineering							
	fabricated metal		general equipment		precision equip't		precious	metal-
	maint.	new p'n	maint.	new p'n	maint.	new p'n	metalw.	making
1861	2.9	15.3	.0	.0	3.6	.6	11.8	5.0
1862	3.0	15.3	.0	.0	3.9	.6	12.1	5.0
1863	3.0	15.3	.0	.0	4.1	.7	12.3	5.0
1864	3.0	15.3	.0	.0	4.5	.8	12.5	5.0
1865	3.0	15.3	.0	.0	4.9	.7	12.1	5.0
1866	3.1	15.2	.0	.0	5.1	.7	11.3	5.0
1867	3.1	15.5	.0	.0	5.3	.7	10.7	5.1
1868	3.2	15.8	.0	.0	5.5	.7	11.4	5.2
1869	3.2	16.0	.0	.0	5.8	.8	12.0	5.2
1870	3.2	16.4	.0	.0	6.0	.8	12.8	5.4
1871	3.2	16.3	.0	.0	6.2	.8	12.7	5.3
1872	3.3	16.4	.0	.0	6.4	.9	13.0	5.4
1873	3.3	16.3	.0	.0	6.6	.8	12.7	5.3
1874	3.3	16.6	.0	.0	6.8	.9	12.7	5.4
1875	3.3	17.1	.0	.0	6.9	.9	12.8	5.6
1876	3.4	17.1	.0	.0	7.2	1.0	13.0	5.6
1877	3.4	17.3	.0	.0	7.4	1.1	12.7	5.7
1878	3.5	17.2	.0	.0	7.6	1.1	12.2	5.6
1879	3.5	17.5	.0	.0	7.9	1.2	12.2	5.7
1880	3.6	18.1	.0	.0	8.1	1.2	12.9	5.9
1881	3.6	18.9	.0	.0	8.4	1.4	13.6	6.2
1882	3.6	19.6	.0	.0	8.7	1.5	14.2	6.4
1883	3.7	20.3	.0	.0	9.0	1.7	13.8	6.6
1884	3.7	21.1	.0	.0	9.4	1.7	14.3	6.9
1885	3.7	21.6	.0	.0	9.9	1.9	14.5	7.1
1886	3.8	22.6	.0	.0	10.4	2.1	15.5	7.4
1887	3.8	24.1	.0	.0	11.0	2.3	15.4	7.9
1888	3.9	24.7	.0	.0	11.5	2.1	15.1	8.1
1889	4.0	24.3	.0	.0	11.8	1.8	14.1	7.9
1890	4.0	23.0	.0	.1	11.9	1.9	13.8	7.5
1891	4.1	21.6	.0	.0	12.1	2.0	13.9	7.1
1892	4.1	20.6	.1	.2	12.2	2.1	14.4	6.8
1893	4.1	20.4	.1	.5	12.3	2.3	14.7	6.8
1894	4.2	20.6	.2	.6	12.4	2.0	14.7	6.8
1895	4.2	20.7	.3	.6	12.4	2.1	14.8	6.9
1896	4.3	20.7	.4	.5	12.3	2.0	15.2	6.9
1897	4.4	20.6	.5	.6	12.2	2.2	15.6	6.8
1898	4.4	20.9	.6	.9	12.1	2.3	16.2	7.0
1899	4.5	21.6	.8	1.2	12.1	2.6	16.3	7.3
1900	4.5	22.2	1.0	.9	12.1	2.8	17.0	7.4
1901	4.6	22.1	1.1	.6	11.9	2.6	16.8	7.3
1902	4.7	22.0	1.4	1.0	11.7	3.1	17.1	7.4
1903	4.7	22.4	1.6	1.4	11.6	3.1	17.0	7.6
1904	4.8	23.2	2.0	1.7	11.6	3.5	17.5	7.9
1905	4.9	24.3	2.3	1.7	11.5	3.6	17.9	8.2
1906	4.9	26.1	2.7	3.0	11.4	3.7	19.2	9.0
1907	5.0	28.0	3.3	5.3	11.3	3.9	20.7	10.0
1908	5.2	29.7	3.9	7.4	11.3	4.1	23.4	10.8
1909	5.2	31.4	4.8	10.2	11.2	4.3	23.7	11.8
1910	5.3	32.7	6.4	15.2	11.1	4.8	25.1	12.9
1911	5.5	33.4	8.4	20.0	11.1	5.1	25.5	13.8
1912	5.6	34.3	10.3	20.5	11.1	5.5	26.3	14.2
1913	5.8	34.6	12.3	19.8	11.1	5.6	24.6	14.3

Source: see text.

Table 7. Reported labor force and factor employment in engineering in 1911

Census category Code	Content	(1) *Censimento demografico* (labor force) Blue-collar	(2) *Censimento demografico* (labor force) Total[a]	(3) *Censimento industriale* (total) Employment Blue-collar	(4) *Censimento industriale* (total) Employment Total	(5) *Censimento industriale* (total) Unduplicated horsepower in use Primary	(6) *Censimento industriale* (total) Unduplicated horsepower in use Electric
4.31	Blacksmiths, wrought iron work	86,879	150,582	20,230	50,302	3,653	1,218
4.32	Coppersmiths, tinsmiths, braziers	29,736	49,168	10,104	19,435	853	2,099
4.33	Metal furniture	5,717	7,318	5,064	6,085	44	357
4.34	General hardware	7,431	8,856	5,930	6,807	1,326	1,401
4.35	Cables, springs, tin cans	5,500	7,259	3,717	4,548	1,168	809
4.36	Ordinary-metal medals and coins	127	176	17	27		18
4.37	Ordinary table- and kitchen-ware	2,239	2,761	1,958	2,262	699	212
4.38	Knives, scissors, swords	1,871	3,027	1,272	1,996	535	245
4.39	Knife-grinders	1,710	3,922	275	812	34	202
4.3$\underline{10}$	Ordinary bullets, shot, fuses, cases	503	*551*	260	300	86	58
4.3$\underline{11}$	Enamelware, other metal objects	3,045	4,316	2,272	3,125	243	917
4.3ω	(4.31 - 4.3$\underline{11}$)			2,269	2,745	329	436
4.3	Fabricated metal products	144,758	237,936	53,368	98,444	8,970	7,972
4.41	Structural components, machinery	49,245	*61,692*	46,020	58,087	11,237	14,362
4.42	Rail-guided vehicles	44,120	*48,147*	42,049	45,747	17,889	15,284
4.43	Bicycles, automobiles	12,809	*16,781*	11,843	15,556	674	3,432
4.44	Shipyards and boatyards	28,932	*31,347*	26,151	28,227	8,407	8,566
4.45	Aircraft	1,286	*1,434*	403	460	61	118
4.4ω	(4.41 - 4.45)			7,348	7,925	1,325	2,831
4.4	Heavy equipment, machinery	136,392	*159,401*	133,814	156,002	39,593	44,593
4.51	Optical and precision instruments	1,226	1,722	734	1,002	92	260
4.52	Common weights and scales	1,980	2,995	1,537	2,275	39	162
4.53	Clocks and watches	3,861	8,801	1,468	2,417	161	218
4.54	Business machines	145	*226*	97	131	1	13
4.55	Electrical apparatus	7,717	*8,715*	7,157	7,884	259	2,753
4.56	Metal musical instruments	922	1,234	622	771	20	69
4.57	Firearms, grenades, torpedoes	9,551	*11,316*	8,093	9,244	4,196	3,564
4.58	Other apparatus and equipment	10,571	*13,453*	10,294	12,798	1,450	4,390
4.59	Goldsmiths and silversmiths	13,487	21,064	7,993	11,051	64	711
4.5$\underline{10}$	Precious-metal medals and coins	285	446	227	277	25	45
4.5ω	(4.51 - 4.5$\underline{10}$)			434	659		67
4.5	Light equipment, precious-metal products	49,745	69,972	38,656	48,509	6,307	12,252

[a]the italicized figures include no artisans.

Source: *Censimento demografico*, *Censimento industriale*.

Table 8. Agricultural production flowing into investment, 1861-1913
(million lire at 1911 prices)

	(1) on-farm improve-ments	(2) fire-wood	(3) char-coal	(4) off-farm horses private	(5) off-farm horses public	(6) herd incre-ments	(7) total
1860							
1861	17	17	6	8	3	34	85
1862	35	19	6	8	3	37	108
1863	35	19	5	7	3	27	96
1864	52	19	5	7	3	21	107
1865	0	19	4	7	3	35	68
1866	17	16	5	2	3	37	80
1867	0	16	5	4	3	24	52
1868	17	15	5	5	3	7	52
1869	35	15	4	6	3	17	80
1870	35	15	5	7	3	27	92
1871	17	16	4	6	3	30	76
1872	17	17	5	8	3	26	76
1873	70	20	6	9	3	44	152
1874	87	22	6	8	3	4	130
1875	105	18	6	3	3	15	150
1876	122	17	4	6	2	32	183
1877	122	18	3	7	9	0	159
1878	192	18	3	8	2	0	223
1879	157	18	3	9	2	38	227
1880	157	18	4	8	4	34	225
1881	140	19	6	9	4	27	205
1882	157	20	5	11	4	24	221
1883	105	20	5	10	4	57	201
1884	140	20	4	10	4	80	258
1885	122	20	4	11	4	59	220
1886	157	20	3	11	4	34	229
1887	35	18	3	9	4	39	108
1888	0	17	3	7	4	31	62
1889	0	17	3	10	4	3	37
1890	87	17	3	9	4	-10	110
1891	105	17	3	8	4	-4	133
1892	122	16	3	8	4	42	195
1893	70	16	2	9	4	58	159
1894	35	16	2	9	4	69	135
1895	105	14	2	7	4	17	149
1896	122	14	2	8	4	26	176
1897	105	14	2	10	4	24	159
1898	87	14	3	10	4	-7	111
1899	35	14	4	11	4	-43	25
1900	105	14	5	11	4	-22	117
1901	140	15	3	13	4	-8	167
1902	157	16	3	15	4	36	231
1903	87	18	3	14	4	77	203
1904	52	19	2	13	4	59	149
1905	122	20	2	17	4	20	185
1906	140	20	2	17	4	49	232
1907	157	21	2	17	4	71	272
1908	140	22	2	19	4	198	385
1909	105	25	1	25	4	13	173
1910	122	28	1	25	4	25	205
1911	105	29	1	22	4	25	186
1912	175	30	1	23	4	-4	229
1913	175	30	1	20	5	5	236

Table 8, continued

	(8)	(9)	(10)	(11)
	herd stock estimates			
	sheep (Fenoaltea)	bovines (Federico)	goats (Federico)	pigs (Federico)
1860	6,268	4,011.4	1,473.5	921.9
1861	6,797	4,063.3	1,479.3	889.7
1862	7,430	4,112.9	1,492.0	879.8
1863	7,699	4,128.6	1,581.4	993.4
1864	7,704	4,174.3	1,689.9	971.5
1865	8,113	4,217.0	1,892.7	979.8
1866	8,606	4,259.5	1,910.0	1,026.2
1867	8,994	4,284.8	1,890.2	1,058.9
1868	9,211	4,293.1	1,821.9	1,051.6
1869	9,121	4,325.2	1,809.6	1,097.9
1870	9,030	4,354.1	2,059.1	1,199.0
1871	9,352	4,391.7	2,173.6	1,224.0
1872	9,549	4,441.8	2,190.5	1,208.5
1873	9,900	4,492.4	2,096.6	1,360.8
1874	9,510	4,483.6	2,063.2	1,543.5
1875	9,151	4,534.7	2,173.6	1,524.3
1876	9,159	4,602.8	2,289.6	1,505.6
1877	9,150	4,639.6	2,208.4	1,362.9
1878	8,633	4,688.0	2,061.5	1,314.8
1879	8,844	4,764.0	1,965.2	1,323.5
1880	9,130	4,783.0	2,016.0	1,492.4
1881	8,596	4,831.1	2,106.2	1,661.8
1882	8,343	4,917.0	2,139.8	1,572.2
1883	8,650	5,024.4	2,209.2	1,566.2
1884	9,061	5,154.9	2,271.1	1,662.4
1885	9,375	5,287.6	2,311.5	1,561.9
1886	9,566	5,371.8	2,294.0	1,484.4
1887	9,529	5,426.4	2,291.7	1,639.8
1888	9,764	5,453.0	2,297.9	1,770.9
1889	9,768	5,446.7	2,238.1	1,845.3
1890	9,344	5,471.3	2,152.8	1,765.9
1891	9,202	5,484.1	2,218.6	1,684.2
1892	9,454	5,524.9	2,335.3	1,825.9
1893	9,562	5,582.2	2,423.5	2,102.2
1894	9,721	5,694.5	2,410.2	2,249.4
1895	10,199	5,736.4	2,483.4	2,090.1
1896	10,862	5,811.7	2,515.4	1,835.9
1897	11,030	5,849.3	2,472.3	1,872.0
1898	10,502	5,829.8	2,325.1	2,059.4
1899	9,807	5,780.4	2,233.8	2,047.9
1900	9,452	5,772.2	2,233.6	1,953.7
1901	9,154	5,763.1	2,343.2	1,966.7
1902	9,028	5,809.5	2,480.0	2,114.1
1903	9,541	5,902.8	2,502.7	2,332.2
1904	9,991	5,990.5	2,484.4	2,415.0
1905	10,134	6,051.3	2,512.9	2,302.8
1906	10,533	6,134.2	2,664.3	2,281.2
1907	11,008	6,213.2	2,715.0	2,507.8
1908	11,163	6,607.4	2,671.0	2,689.8
1909	11,754	6,590.1	2,591.0	2,772.4
1910	12,252	6,628.2	2,582.0	2,723.9
1911	12,446	6,695.4	2,553.0	2,626.7
1912	12,257	6,687.1	2,536.8	2,671.8
1913	12,401	6,689.5	2,486.7	2,690.5

Source: see text.

Table 9. Firewood and charcoal investment-goods consumption data, 1865

Industry	source pages	firewood consumption (tons)	charcoal consumption (tons)
Metal industries			
iron	pp. 30-31	4,053	68,860
copper	pp. 42-43	1,040	12,873
lead	pp. 44-45	124	3,079
zinc	pp. 54-55	1,480	0
mercury	pp. 54-55	0	114
nickel	pp. 54-55	1,138	446
bronze	pp. 54-55	110	14
total		7,945	85,386
Construction-materials industries			
asphalt	pp. 56-57	256	0
binders and fired clays	pp. 82-83	695,327	0
ceramics	pp. 84-85	23,090	0
glass and glass beads	pp. 88-89	64,442	0
total		783,023	0
Grand total		790,968	85,386

Source: *Statistica mineraria.*

Table 10. Investment-good exports and imports, 1861-1913

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	exports of mine and quarry products (thousand tons)							
	iron ore	lead ore	copper ore	zinc ore	block marble	marble slabs thick	marble slabs thin	other worked marble
1861								
1862	5.1	3.7	1.7	.0	20.4			
1863	5.6	7.3	1.2	.0	39.6			
1864	6.9	17.9	1.8	.0	21.7			
1865	0.7	.7	1.0	.0	40.9			
1866	18.1	25.2	2.7	.0	49.6			
1867	31.6	22.7	3.5	18.7	56.6			
1868	24.5	23.4	4.5	6.9	69.3			
1869	54.1	24.7	3.1	72.0	49.7			
1870	40.6	16.0	8.2	71.3	54.5			
1871	45.3	14.5	6.0	50.7	57.4			
1872	168.5	17.0	4.2	60.4	53.3			
1873	161.9	21.4	4.7	56.6	63.4			
1874	203.4	17.8	7.9	63.1	73.1	3.9		18.9
1875	191.1	18.5	9.1	64.5	63.3	4.1		18.6
1876	197.7	28.5	8.1	66.6	48.1	4.3		15.5
1877	236.7	27.5	9.6	78.3	51.5	4.5		13.0
1878	162.4	29.2	12.1	53.4	46.4	4.5		19.8
1879	213.6	22.8	7.9	62.2	51.3	3.8		44.1
1880	399.7	18.0	11.3	85.3	71.6	3.4		33.6
1881	285.4	17.2	11.0	70.9	52.7	3.6		40.8
1882	206.0	19.0	8.3	102.4	66.6	2.6		41.0
1883	203.7	20.9	9.5	106.4	58.7	2.0	24.8	30.3
1884	166.6	15.9	12.9	89.6	61.0	2.5	26.4	24.1
1885	150.6	16.6	10.9	103.5	58.2	1.9	27.0	24.3
1886	123.5	5.9	9.2	82.1	52.1	1.3	33.3	20.7
1887	171.6	10.3	11.8	82.5	54.9	1.4	39.5	14.1
1888	130.7	7.7	9.9	90.1	53.1	1.4	37.4	9.9
1889	183.3	7.4	9.0	107.1	61.8	1.6	44.0	13.1
1890	136.7	8.2	9.9	80.8	68.4	.9	40.7	10.2
1891	202.3	7.3	10.1	104.7	69.4	.6	32.6	13.7
1892	124.8	6.7	12.7	119.3	77.8	1.3	42.3	8.0
1893	156.3	5.6	12.7	113.2	72.8	1.1	38.6	9.8
1894	159.2	6.4	7.9	123.3	78.8	1.0	35.4	8.8
1895	164.4	6.6	5.9	111.2	75.5	.8	42.4	9.0
1896	187.1	4.7	3.6	115.5	80.8	1.3	49.6	11.0
1897	207.6	4.7	2.4	133.1	83.1	1.6	46.5	11.8
1898	217.6	4.5	2.4	130.1	88.4	4.0	45.2	13.1
1899	234.5	3.1	1.1	140.1	98.5	6.2	51.9	15.0
1900	170.3	4.0	1.2	111.3	91.7	4.5	45.2	16.1
1901	121.6	4.0	.0	103.0	96.6	3.7	47.2	15.5
1902	209.1	3.3	.0	114.9	113.0	2.4	54.0	18.8
1903	98.3	5.0	.0	116.4	130.3	3.9	58.5	16.9
1904	2.6	5.5	.0	126.4	131.1	3.9	58.1	16.0
1905	11.4	4.3	.1	117.8	132.8	5.1	67.7	16.4
1906	1.8	8.4	.2	144.2	148.6	4.7	67.2	16.7
1907	26.0	3.2	.2	142.3	164.5	4.2	81.2	16.7
1908	35.7	2.0	.2	122.5	155.4	3.0	72.9	16.3
1909	.0	1.0	.2	123.9	156.9	3.0	76.4	12.7
1910	8.9	4.1	1.0	127.3	169.4	4.2	91.3	16.0
1911	24.9	15.8	.1	133.5	180.5	2.7	104.5	16.4
1912	12.3	17.1	.2	152.8	200.0	2.3	110.9	16.0
1913	9.7	17.0	.3	144.6	182.9	1.9	105.8	14.2

Table 10, continued

	(9)	(10)	(11)	(12)	(13)	(14)
	net imports (million lire at 1911 prices)					
	SITC cat. 2	*SITC* cat. 3	*SITC* cat. 6	*SITC* cat. 7	*SITC* cat. 8	total
1861	-3.3	5.6	28.0	22.5	4.0	57
1862	-4.1	5.6	28.5	34.3	4.0	68
1863	-7.8	4.8	35.1	45.2	4.3	82
1864	-6.9	6.7	30.5	30.7	6.5	68
1865	-6.7	5.5	29.6	27.9	5.0	61
1866	-12.9	6.0	25.7	15.9	4.2	39
1867	-16.5	5.6	29.9	12.9	4.9	37
1868	-17.0	6.5	27.3	11.6	4.4	33
1869	-23.6	7.1	37.1	16.7	5.5	43
1870	-22.9	10.6	36.0	13.8	3.9	41
1871	-20.1	8.6	36.3	18.2	4.3	47
1872	-23.3	11.5	38.1	22.1	6.2	55
1873	-25.1	10.6	39.3	37.8	6.5	69
1874	-27.9	11.6	46.8	23.3	6.1	60
1875	-27.3	11.6	48.0	18.0	6.8	57
1876	-27.3	16.1	47.2	18.7	6.4	61
1877	-29.2	14.7	51.6	20.7	7.1	65
1878	-26.4	14.5	39.8	16.3	5.3	50
1879	-34.2	17.0	49.5	19.1	4.2	56
1880	-38.8	19.8	54.6	29.2	5.2	70
1881	-35.1	24.3	72.2	40.6	5.7	108
1882	-39.3	26.7	87.1	52.8	6.6	134
1883	-43.5	29.5	95.5	57.2	6.6	145
1884	-37.7	33.0	92.5	54.9	8.5	151
1885	-39.2	38.3	92.8	55.9	9.0	157
1886	-32.3	38.4	102.3	60.4	11.6	180
1887	-32.3	47.6	123.1	80.6	25.1	244
1888	-31.2	51.1	116.1	68.5	19.8	224
1889	-37.6	52.2	102.1	62.3	15.0	194
1890	-31.8	56.1	81.3	44.0	12.7	162
1891	-37.2	50.3	65.9	27.3	9.2	116
1892	-36.7	49.4	60.1	24.7	9.0	107
1893	-36.4	47.8	65.0	24.5	9.2	110
1894	-37.1	60.1	64.7	19.9	7.1	115
1895	-36.0	54.7	62.4	27.9	8.0	117
1896	-38.9	51.4	64.5	18.0	10.6	106
1897	-41.9	53.5	64.0	17.3	14.0	107
1898	-42.9	55.9	68.1	30.8	20.3	132
1899	-47.1	61.0	84.3	61.3	21.1	181
1900	-41.2	62.8	90.1	108.1	23.4	243
1901	-39.3	61.1	84.9	78.0	24.5	209
1902	-46.2	68.7	98.6	42.0	24.9	188
1903	-45.7	70.8	97.9	43.9	27.8	195
1904	-45.0	76.3	99.7	84.6	30.6	246
1905	-45.3	84.1	106.7	101.7	37.4	285
1906	-50.9	102.4	159.3	170.4	57.7	439
1907	-52.9	111.5	209.8	244.4	62.3	575
1908	-48.1	115.6	217.8	235.5	70.9	592
1909	-46.0	126.7	203.2	175.6	62.7	522
1910	-51.9	130.0	205.6	149.2	74.2	507
1911	-57.5	138.0	211.6	150.4	77.9	520
1912	-62.2	144.3	236.3	143.8	85.8	548
1913	-58.0	148.2	214.3	136.4	85.7	527

Source: see text.

Table 11. Services value added flowing into investment, 1861-1913
(million lire at 1911 prices)

	(1) trans-port.	(2) commerce	(3) net b'g and ins.	(4) misc. serv.	(5) total	(6) investment share of services
1861	58	47	0	13	118	.038
1862	67	48	0	16	131	.041
1863	72	49	0	17	138	.042
1864	72	48	1	16	137	.041
1865	75	51	0	17	143	.041
1866	66	46	1	14	127	.034
1867	63	46	1	12	122	.036
1868	64	45	1	12	122	.036
1869	66	46	1	12	125	.037
1870	70	48	1	12	131	.037
1871	75	48	1	12	136	.040
1872	82	52	1	13	148	.042
1873	92	57	1	16	166	.047
1874	96	57	1	17	171	.047
1875	88	53	1	14	156	.043
1876	89	54	1	13	157	.044
1877	94	56	1	13	164	.045
1878	93	53	1	13	160	.043
1879	94	55	1	13	163	.043
1880	103	59	2	15	179	.047
1881	111	68	2	16	197	.051
1882	124	76	2	19	221	.056
1883	133	81	2	21	237	.059
1884	141	85	3	22	251	.061
1885	146	89	3	23	261	.062
1886	152	98	4	24	278	.064
1887	150	108	4	23	285	.065
1888	155	106	4	24	289	.066
1889	153	102	5	23	283	.064
1890	154	96	4	22	276	.062
1891	153	85	4	21	263	.059
1892	149	80	4	19	252	.057
1893	151	80	4	18	253	.056
1894	153	81	3	18	255	.057
1895	146	79	3	16	244	.054
1896	147	80	3	15	245	.053
1897	152	82	3	16	253	.055
1898	156	89	3	16	264	.056
1899	166	102	4	18	290	.061
1900	178	112	4	20	314	.065
1901	188	110	4	20	322	.065
1902	206	112	5	21	344	.069
1903	221	119	5	23	368	.072
1904	236	131	6	25	398	.076
1905	249	147	7	28	431	.081
1906	269	180	8	33	490	.089
1907	289	207	9	36	541	.094
1908	310	221	11	39	581	.099
1909	346	226	11	43	626	.103
1910	389	237	15	49	690	.111
1911	421	241	17	52	731	.113
1912	433	249	20	54	756	.113
1913	443	240	19	53	755	.109

Source: see text.

Table 12. Transport and communications services value added flowing into investment, 1861-1913
(million lire at 1911 prices)

	(1) rail trans-port	(2) other inland transp.	(3) mari-time transp.	(4) com-muni-cation
1861	3	48	3	4
1862	3	55	4	5
1863	4	58	4	6
1864	4	58	4	6
1865	5	60	4	6
1866	6	50	4	6
1867	6	47	4	6
1868	7	46	5	6
1869	7	47	6	6
1870	8	49	6	7
1871	10	51	6	8
1872	11	56	7	8
1873	13	64	7	8
1874	13	67	8	8
1875	14	58	8	8
1876	16	56	8	9
1877	16	59	8	11
1878	16	59	7	11
1879	18	59	7	10
1880	20	64	8	11
1881	21	67	10	13
1882	23	76	11	14
1883	25	81	12	15
1884	28	85	12	16
1885	28	89	12	17
1886	30	92	13	17
1887	32	91	13	14
1888	35	90	15	15
1889	37	88	13	15
1890	38	88	13	15
1891	38	86	14	15
1892	39	81	13	16
1893	41	80	13	17
1894	42	80	14	17
1895	43	73	13	17
1896	45	72	12	18
1897	47	73	13	19
1898	49	74	13	20
1899	52	78	15	21
1900	55	82	18	23
1901	57	87	19	25
1902	61	96	21	28
1903	64	104	22	31
1904	69	110	24	33
1905	71	120	26	32
1906	78	130	28	33
1907	80	140	32	37
1908	87	150	33	40
1909	93	174	34	45
1910	100	198	40	51
1911	107	209	44	61
1912	113	216	42	62
1913	122	215	44	62

Source: see text.

Table 13. Non-rail inland transport of investment goods, 1861-1913 (million tons)

	(1) agri-culture	(2) industry extrac.	(3) industry wood	(4) industry metal	(5) industry eng'g	(6) industry n.m.m.p.	(7) industry chem.[a]	(8) imports	(9) total
1861	1.6	11.6	.8	.0	.0	9.1	.0	.3	23.4
1862	1.7	13.6	.8	.0	.0	10.6	.0	.3	27.0
1863	1.7	14.1	.8	.0	.0	11.1	.0	.4	28.1
1864	1.7	14.3	.8	.0	.0	11.2	.0	.3	28.3
1865	1.7	14.7	.9	.0	.0	11.5	.0	.3	29.1
1866	1.6	12.1	.9	.0	.0	9.4	.0	.2	24.2
1867	1.5	11.4	.8	.0	.0	8.8	.0	.2	22.7
1868	1.5	11.3	.8	.0	.0	8.8	.0	.2	22.6
1869	1.4	11.4	.8	.0	.0	8.8	.0	.3	22.7
1870	1.5	12.0	.8	.0	.0	9.3	.0	.3	23.9
1871	1.5	12.6	.8	.0	.0	9.6	.0	.3	24.8
1872	1.6	13.8	.8	.0	.0	10.6	.0	.4	27.2
1873	1.8	16.0	.9	.0	.0	12.1	.0	.4	31.2
1874	1.9	16.7	.9	.1	.0	12.6	.0	.5	32.7
1875	1.7	14.3	.8	.0	.1	10.8	.0	.4	28.1
1876	1.6	13.8	.8	.0	.1	10.4	.0	.5	27.2
1877	1.6	14.5	.8	.0	.1	11.0	.0	.5	28.5
1878	1.6	14.6	.8	.0	.0	11.1	.0	.4	28.5
1879	1.6	14.7	.8	.1	.1	11.1	.0	.5	28.9
1880	1.6	15.9	.8	.1	.1	11.9	.0	.6	31.0
1881	1.8	16.6	.9	.1	.1	12.4	.0	.7	32.6
1882	1.9	18.9	1.0	.1	.1	14.2	.0	.9	37.1
1883	1.9	20.1	1.0	.1	.1	15.2	.0	.9	39.3
1884	1.9	21.1	1.1	.2	.1	16.0	.0	1.0	41.4
1885	2.0	21.9	1.1	.2	.2	16.6	.0	1.1	43.1
1886	2.0	22.8	1.2	.2	.2	17.2	.1	1.1	44.8
1887	1.9	22.3	1.2	.2	.2	16.9	.1	1.3	44.1
1888	1.9	22.1	1.2	.3	.2	16.8	.1	1.4	44.0
1889	1.8	21.7	1.1	.3	.2	16.4	.0	1.3	42.8
1890	1.8	21.9	1.1	.2	.2	16.4	.1	1.1	42.8
1891	1.8	21.6	1.0	.2	.1	16.1	.1	.9	41.8
1892	1.7	20.4	1.0	.2	.1	15.0	.1	.8	39.3
1893	1.6	20.3	1.0	.2	.1	14.9	.1	.9	39.1
1894	1.6	20.2	1.0	.2	.1	14.8	.1	1.0	39.0
1895	1.5	18.3	.9	.2	.1	13.3	.1	1.1	35.5
1896	1.5	18.0	.9	.2	.1	13.0	.1	1.1	34.9
1897	1.5	18.3	1.0	.2	.1	13.2	.1	1.1	35.5
1898	1.5	18.6	1.0	.3	.1	13.3	.1	1.2	36.1
1899	1.6	19.3	1.1	.3	.2	13.7	.1	1.5	37.8
1900	1.6	20.3	1.1	.3	.2	14.4	.1	1.7	39.7
1901	1.7	21.8	1.1	.3	.2	15.4	.1	1.6	42.2
1902	1.8	24.3	1.2	.3	.2	17.2	.1	1.6	46.7
1903	1.9	26.3	1.2	.4	.2	18.6	.2	1.6	50.4
1904	2.0	28.0	1.3	.4	.2	19.7	.2	1.7	53.5
1905	2.1	30.5	1.4	.5	.2	21.6	.3	2.0	58.6
1906	2.2	32.7	1.5	.7	.3	23.1	.3	2.7	63.5
1907	2.3	34.8	1.5	.7	.4	24.5	.3	3.4	67.9
1908	2.4	37.3	1.7	.8	.4	26.4	.2	3.6	72.8
1909	2.7	43.7	1.8	.9	.5	31.1	.4	3.4	84.5
1910	3.0	50.3	2.0	1.1	.5	35.8	.5	3.2	96.4
1911	3.1	53.2	2.0	1.0	.5	38.0	.5	3.4	101.7
1912	3.1	55.1	2.0	1.2	.5	39.1	.6	3.6	105.2
1913	3.1	54.8	2.0	1.1	.5	38.9	.7	3.5	104.6

[a]includes rubber.

Source: see text.

Table 14. Components of investment at 1911 c.i.f. prices, 1861-1913 (million lire)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	inv. in	investment in new durable goods								
	main-		by and	construction		horses,	ships,	metal	tools,	display
	tenance	total	in ag.	priv.	pub.	harn's	r. veh.	mach.	wood mach.	goods
1861	347	668	51	100	296	22	39	22	133	4
1862	358	746	72	158	324	22	57	21	87	4
1863	364	767	62	134	358	20	74	18	97	5
1864	365	757	73	153	337	20	60	18	92	5
1865	369	748	35	128	362	20	58	23	118	5
1866	372	662	54	98	289	8	49	18	142	5
1867	379	589	24	110	227	12	44	23	145	5
1868	381	568	24	89	238	15	48	23	126	5
1869	388	608	52	107	213	18	47	32	134	5
1870	392	648	62	95	246	20	43	23	154	5
1871	395	638	47	122	242	19	40	26	137	5
1872	400	693	43	126	275	24	37	38	146	5
1873	405	858	114	174	302	27	59	43	135	5
1874	412	848	91	212	290	24	53	41	132	5
1875	413	786	120	152	252	11	46	40	160	5
1876	420	813	154	139	237	18	38	42	181	5
1877	427	807	122	137	250	31	36	42	185	5
1878	433	844	192	127	261	21	28	35	175	5
1879	436	862	195	120	279	24	32	32	175	5
1880	447	928	191	126	314	24	37	52	179	5
1881	450	1,014	167	147	322	28	51	64	230	5
1882	461	1,159	181	178	381	35	65	77	236	7
1883	467	1,213	162	175	432	31	69	79	257	7
1884	469	1,330	220	183	449	30	66	92	283	7
1885	476	1,349	181	207	452	33	69	100	300	7
1886	489	1,454	191	209	462	33	88	100	364	7
1887	499	1,421	74	160	475	28	109	144	424	7
1888	513	1,344	31	116	503	22	97	146	423	7
1889	523	1,233	3	124	461	31	89	147	374	5
1890	527	1,238	77	164	422	29	69	145	327	5
1891	533	1,153	101	181	391	26	52	121	276	5
1892	537	1,143	164	163	361	26	43	115	264	7
1893	544	1,086	128	186	317	29	43	116	260	7
1894	547	1,073	104	183	315	29	41	125	269	7
1895	554	1,015	122	177	216	23	45	160	265	7
1896	562	1,033	148	177	184	26	43	182	266	7
1897	571	1,049	129	176	187	32	58	179	282	7
1898	580	1,069	80	176	180	33	80	203	309	7
1899	585	1,127	-8	177	188	35	120	255	353	7
1900	588	1,343	83	183	208	36	155	320	352	7
1901	598	1,384	132	204	224	41	122	297	357	7
1902	611	1,492	193	239	251	47	92	277	385	7
1903	620	1,551	164	274	259	46	91	300	410	7
1904	633	1,638	111	306	267	43	109	370	426	7
1905	641	1,866	142	335	300	53	135	449	444	7
1906	651	2,261	189	329	361	54	188	624	507	9
1907	662	2,593	228	349	393	53	248	743	569	9
1908	680	2,876	338	373	432	59	216	843	604	11
1909	695	2,803	118	444	529	78	180	783	660	11
1910	715	3,041	147	519	618	79	169	806	691	11
1911	740	3,148	130	555	646	69	219	784	734	11
1912	759	3,320	171	564	661	73	273	761	804	13
1913	782	3,255	180	547	652	65	272	706	821	12

Source: see text.

Table 15. Extant investment series, 1861-1913 (million lire at 1911 prices)

	(1) total fixed	(2) by and in agr.	(3) construction new	(4) construction maint.	(5) horses, harn's	(6) ships new	(7) ships maint.	(8) railway veh.s new	(9) railway veh.s maint.
1861	1,015	51	396	162	15	32	10	7	2
1862	1,104	72	482	170	15	46	11	11	3
1863	1,131	62	492	174	13	59	11	15	4
1864	1,122	73	490	174	13	49	11	11	4
1865	1,117	35	490	175	13	47	11	11	5
1866	1,034	54	387	175	5	39	12	10	5
1867	968	24	337	180	8	37	13	7	5
1868	949	24	327	178	10	40	14	8	6
1869	996	52	320	180	12	39	16	8	7
1870	1,040	62	341	181	13	36	17	7	8
1871	1,033	47	364	183	12	28	17	12	8
1872	1,093	43	401	185	15	24	17	13	10
1873	1,263	114	476	186	17	38	17	21	11
1874	1,260	91	502	192	15	40	17	13	11
1875	1,199	120	404	190	7	39	18	7	12
1876	1,233	154	376	193	11	32	18	6	13
1877	1,234	122	387	199	19	29	18	7	13
1878	1,277	192	388	202	13	24	18	4	13
1879	1,298	195	399	202	15	25	19	7	14
1880	1,375	191	440	208	15	22	19	15	16
1881	1,464	167	469	208	17	31	19	20	17
1882	1,620	181	559	215	21	39	20	26	18
1883	1,680	162	607	216	19	41	20	28	20
1884	1,799	220	632	215	18	47	20	19	22
1885	1,825	181	659	218	20	50	21	19	22
1886	1,943	191	671	227	20	64	21	24	24
1887	1,920	74	635	232	17	69	21	40	26
1888	1,857	31	619	239	13	50	22	47	29
1889	1,756	3	585	245	18	42	23	47	30
1890	1,765	77	586	246	17	47	23	22	31
1891	1,686	101	572	248	15	44	25	8	31
1892	1,680	164	524	249	15	36	26	7	31
1893	1,630	128	503	252	17	37	28	6	32
1894	1,620	104	498	251	17	32	29	9	33
1895	1,569	122	393	254	13	35	30	10	34
1896	1,595	148	361	259	15	32	30	11	35
1897	1,620	129	363	263	18	43	32	15	37
1898	1,649	80	356	266	19	57	33	23	39
1899	1,712	-8	365	266	20	90	34	30	41
1900	1,931	83	391	262	20	108	37	47	43
1901	1,982	132	428	265	23	73	40	49	45
1902	2,103	193	490	271	26	57	41	35	48
1903	2,171	164	533	275	25	50	40	41	51
1904	2,271	111	573	281	23	62	40	47	54
1905	2,507	142	635	285	29	88	39	47	56
1906	2,912	189	690	284	29	99	41	89	61
1907	3,255	228	742	286	29	99	42	149	63
1908	3,556	338	805	292	32	84	44	132	69
1909	3,498	118	973	298	42	79	46	101	73
1910	3,756	147	1,137	309	42	91	47	78	78
1911	3,888	130	1,201	324	36	126	48	93	82
1912	4,079	171	1,225	330	38	177	52	96	87
1913	4,037	180	1,199	338	34	188	58	84	92

Table 15, continued

	(10) fab. met. maint.	(11) equip. maint.	(12) mach. new	(13) instr. new	(14) precious metalw.	(15) fab. met. new[a]	(16) wood prod.s[a]	(17) services[a]
1861	171	2	11	4	3	*24*	*134*	*118*
1862	172	2	10	4	3	*29*	*114*	*131*
1863	173	2	8	4	3	*27*	*110*	*138*
1864	174	2	6	6	3	*30*	*110*	*137*
1865	175	3	11	4	3	*27*	*135*	*143*
1866	177	3	8	4	3	*23*	*146*	*127*
1867	178	3	11	4	3	*26*	*138*	*122*
1868	180	3	11	4	3	*28*	*113*	*122*
1869	181	4	16	5	3	*31*	*118*	*125*
1870	182	4	12	3	3	*37*	*126*	*131*
1871	183	4	13	4	3	*34*	*118*	*136*
1872	184	4	18	6	3	*35*	*122*	*148*
1873	186	5	22	5	3	*32*	*123*	*166*
1874	187	5	22	4	3	*36*	*119*	*171*
1875	188	5	20	5	3	*42*	*122*	*156*
1876	190	6	21	5	3	*41*	*135*	*157*
1877	191	6	21	5	3	*40*	*135*	*164*
1878	193	7	19	3	3	*37*	*135*	*160*
1879	194	7	18	2	3	*38*	*122*	*163*
1880	196	8	28	4	3	*49*	*118*	*179*
1881	197	9	35	4	3	*62*	*131*	*197*
1882	198	10	43	4	4	*78*	*135*	*221*
1883	200	11	44	4	4	*93*	*135*	*237*
1884	201	11	50	5	4	*104*	*148*	*251*
1885	203	12	56	4	4	*111*	*164*	*261*
1886	204	13	54	6	4	*129*	*190*	*278*
1887	206	14	66	20	4	*154*	*197*	*285*
1888	208	15	70	16	4	*166*	*177*	*289*
1889	209	16	75	11	3	*154*	*152*	*283*
1890	211	16	77	8	3	*126*	*152*	*276*
1891	213	16	67	4	3	*92*	*152*	*263*
1892	214	17	63	4	4	*69*	*148*	*252*
1893	215	17	63	4	4	*62*	*148*	*253*
1894	217	17	71	1	4	*61*	*151*	*255*
1895	219	17	91	1	4	*61*	*156*	*244*
1896	221	17	101	3	4	*55*	*168*	*245*
1897	222	17	96	6	4	*51*	*177*	*253*
1898	224	18	104	12	4	*54*	*193*	*264*
1899	226	18	134	10	4	*67*	*209*	*290*
1900	228	18	168	12	4	*78*	*202*	*314*
1901	230	18	150	16	4	*78*	*214*	*322*
1902	232	19	136	16	4	*73*	*222*	*344*
1903	234	20	145	18	4	*81*	*235*	*368*
1904	236	22	178	22	4	*93*	*240*	*398*
1905	238	23	218	26	4	*105*	*261*	*431*
1906	240	25	290	47	5	*135*	*269*	*490*
1907	243	28	350	53	5	*185*	*286*	*541*
1908	245	30	392	64	6	*236*	*312*	*581*
1909	247	31	364	58	6	*272*	*337*	*626*
1910	250	31	361	67	6	*277*	*346*	*690*
1911	253	33	346	66	6	*291*	*334*	*731*
1912	256	34	330	68	7	*299*	*318*	*756*
1913	259	35	299	68	6	*300*	*313*	*755*

[a]gross of elements in cols. 3-7.

Source: see text.

Table 16. Investment-good machinery series, 1861-1913 (thousand tons)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	general equipment				ship machinery				precision equipment	
	gross purchases	motor vehicles	bicycles	investment goods	merchant vessels	naval vessels new	naval vessels maint.	net inv't goods	total purchases	purch'd for ships
1861	8.69	.00	.00	8.69	.00	.50	.06	8.13	.220	.042
1862	8.59	.00	.00	8.59	.00	.54	.07	7.98	.220	.046
1863	7.05	.00	.00	7.05	.02	.70	.07	6.26	.233	.058
1864	5.28	.00	.00	5.28	.02	.72	.07	4.47	.338	.060
1865	9.63	.00	.00	9.63	.04	.80	.08	8.71	.271	.067
1866	7.03	.00	.00	7.03	.07	.75	.09	6.12	.225	.065
1867	9.37	.00	.00	9.37	.04	.72	.10	8.51	.251	.063
1868	9.12	.00	.00	9.12	.07	.70	.13	8.22	.232	.065
1869	12.89	.00	.00	12.89	.20	.58	.18	11.93	.280	.064
1870	9.99	.00	.00	9.99	.14	.48	.23	9.14	.206	.058
1871	10.26	.00	.00	10.26	.02	.33	.27	9.64	.225	.046
1872	14.53	.00	.00	14.53	.02	.25	.29	13.97	.316	.041
1873	18.34	.00	.00	18.34	.26	.80	.29	16.99	.332	.091
1874	18.45	.00	.00	18.45	.35	1.26	.29	16.55	.314	.129
1875	16.93	.00	.00	16.93	.12	1.18	.29	15.34	.348	.114
1876	17.60	.00	.00	17.60	.02	1.34	.29	15.95	.330	.123
1877	17.95	.00	.00	17.95	.02	1.61	.29	16.03	.361	.143
1878	16.23	.00	.00	16.23	.07	1.40	.29	14.47	.281	.129
1879	15.46	.00	.00	15.46	.07	1.42	.29	13.68	.237	.131
1880	22.70	.00	.00	22.70	.05	1.19	.30	21.16	.286	.114
1881	28.88	.00	.00	28.88	.17	1.35	.32	27.04	.312	.131
1882	35.43	.00	.00	35.43	.16	1.94	.33	33.00	.358	.176
1883	36.50	.00	.00	36.50	.16	2.06	.35	33.93	.362	.186
1884	41.49	.00	.00	41.49	.18	2.72	.39	38.20	.453	.240
1885	46.89	.00	.00	46.89	.05	3.29	.44	43.11	.482	.282
1886	45.99	.00	.00	45.99	.03	4.21	.49	41.26	.605	.354
1887	55.67	.00	.00	55.67	.12	4.24	.55	50.76	1.255	.363
1888	58.15	.00	.00	58.15	.16	3.28	.67	54.04	1.029	.302
1889	61.84	.00	.00	61.84	.09	2.95	.81	57.99	.792	.285
1890	64.08	.00	.00	64.08	.45	3.12	.95	59.56	.674	.321
1891	56.49	.01	.00	56.48	.60	2.93	1.10	51.85	.498	.323
1892	52.66	.01	.07	52.58	.24	2.81	1.28	48.25	.481	.315
1893	53.42	.02	.20	53.20	.19	2.82	1.46	48.73	.491	.328
1894	60.05	.02	.26	59.77	.32	2.87	1.59	54.99	.389	.346
1895	75.11	.03	.26	74.82	.52	2.95	1.68	69.67	.430	.365
1896	83.67	.04	.25	83.38	.94	3.22	1.76	77.46	.554	.406
1897	81.31	.05	.26	81.00	1.72	3.45	1.86	73.97	.723	.458
1898	88.58	.07	.36	88.15	3.17	3.03	1.99	79.96	1.031	.487
1899	114.41	.09	.48	113.84	5.25	3.74	2.10	102.75	1.081	.622
1900	141.98	.12	.42	141.44	6.05	3.69	2.15	129.55	1.191	.650
1901	125.53	.16	.39	124.98	4.05	3.06	2.17	115.70	1.247	.534
1902	114.33	.21	.51	113.61	2.45	4.03	2.16	104.97	1.271	.550
1903	121.14	.29	.62	120.23	2.28	4.44	2.13	111.38	1.407	.573
1904	147.41	.38	.70	146.33	3.26	3.79	2.09	137.19	1.544	.555
1905	179.50	.51	.65	178.34	3.69	5.13	2.05	167.47	1.866	.668
1906	236.05	.68	.76	234.61	4.11	5.45	2.01	223.04	2.826	.703
1907	282.08	.90	1.03	280.15	4.02	4.91	1.97	269.25	3.071	.657
1908	312.53	1.20	1.05	310.28	2.77	4.07	1.96	301.48	3.478	.549
1909	290.93	1.60	1.49	287.84	2.55	3.27	2.00	280.02	3.104	.485
1910	292.32	2.14	3.32	286.86	2.02	4.92	2.06	277.86	3.633	.594
1911	285.20	2.85	4.28	278.07	2.14	7.43	2.19	266.31	3.816	.796
1912	277.04	3.80	2.85	270.39	3.83	10.25	2.41	253.90	4.190	1.084
1913	254.28	5.07	2.04	247.17	4.39	9.72	2.71	230.35	4.196	1.086

Source: see text.

Table 17. Derivative investment-related series, 1861-1913

	(1) ratio of 15.1, col.17 to 15.1, sum of cols. 3 through 16	(2) investment (million lire at 1911 c.i.f. prices) net, not identi-fied	(3) in identi-fied mobile goods	(4) in fabricated metal and wood products gross	(5) net	(6) ratio of col. 5 to col. 4
1861	.121	149	49	234	133	.57
1862	.122	103	48	213	87	.41
1863	.126	111	42	206	97	.47
1864	.127	106	42	211	92	.44
1865	.129	134	47	246	118	.48
1866	.127	152	30	255	142	.56
1867	.128	158	39	248	145	.58
1868	.132	141	43	215	126	.59
1869	.133	153	55	228	134	.59
1870	.135	171	48	251	154	.61
1871	.138	155	50	236	137	.58
1872	.143	170	66	247	146	.59
1873	.145	162	74	245	135	.55
1874	.147	158	70	246	132	.54
1875	.147	181	56	260	160	.62
1876	.150	205	64	282	181	.64
1877	.153	214	77	282	185	.66
1878	.151	198	61	276	175	.63
1879	.153	198	61	258	175	.68
1880	.157	210	81	272	179	.66
1881	.161	268	97	317	230	.73
1882	.161	282	118	350	236	.67
1883	.164	304	118	378	257	.68
1884	.168	335	129	421	283	.67
1885	.167	356	140	459	300	.65
1886	.168	420	140	533	364	.68
1887	.168	496	179	587	424	.72
1888	.173	494	174	580	423	.73
1889	.176	449	182	521	374	.72
1890	.176	401	179	474	327	.69
1891	.177	339	152	417	276	.66
1892	.179	326	148	372	264	.71
1893	.182	324	152	363	260	.72
1894	.183	337	161	367	269	.73
1895	.185	346	190	378	265	.70
1896	.187	358	215	390	266	.68
1897	.188	375	217	399	282	.71
1898	.188	414	244	433	309	.71
1899	.192	482	297	488	353	.72
1900	.194	510	362	497	352	.71
1901	.197	509	345	522	357	.68
1902	.206	535	332	538	385	.72
1903	.210	571	353	581	410	.71
1904	.212	618	419	615	426	.69
1905	.210	677	510	673	444	.66
1906	.213	823	687	748	507	.68
1907	.211	938	806	869	569	.65
1908	.212	1,023	913	1,013	604	.60
1909	.214	1,062	872	1,130	660	.58
1910	.221	1,112	897	1,174	691	.59
1911	.226	1,144	864	1,190	734	.62
1912	.228	1,208	847	1,180	804	.68
1913	.231	1,197	783	1,179	821	.70

Source: see text.

Table 18. Conjectural components of investment at the 1911 price level, 1861-1913 (million lire)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	inv. in	investment in new durable goods								
	main-		by and	construction		horses,	ships,	metal	tools,	display
	tenance	total	in ag.	priv.	pub.	harn's	r. veh.	mach.	wood mach.	goods
1861	375	1,129	51	100	296	22	130	73	444	13
1862	390	1,126	72	158	324	22	186	68	283	13
1863	397	1,191	62	134	358	20	235	57	309	16
1864	397	1,127	73	153	337	20	186	56	286	16
1865	401	1,164	35	128	362	20	176	70	358	15
1866	405	1,082	54	98	289	8	145	53	420	15
1867	413	999	24	110	227	12	127	66	419	14
1868	417	935	24	89	238	15	135	65	355	14
1869	428	990	52	107	213	18	129	88	369	14
1870	434	1,028	62	95	246	20	116	62	414	13
1871	436	975	47	122	242	19	105	68	359	13
1872	442	1,047	43	126	275	24	95	97	374	13
1873	447	1,220	114	174	302	27	147	107	337	12
1874	452	1,180	91	212	290	24	129	100	322	12
1875	454	1,133	12	152	252	11	110	95	381	12
1876	461	1,167	15	139	237	18	88	98	421	12
1877	466	1,148	12	137	250	31	82	95	420	11
1878	471	1,140	19	127	261	21	62	78	388	11
1879	474	1,145	19	120	279	24	69	69	378	11
1880	486	1,232	19	126	314	24	78	110	378	11
1881	488	1,385	16	147	322	28	105	132	474	10
1882	499	1,550	18	178	381	35	131	155	475	14
1883	506	1,610	16	175	432	31	136	155	505	14
1884	508	1,741	22	183	449	30	127	176	543	13
1885	513	1,763	18	207	452	33	129	187	561	13
1886	526	1,917	19	209	462	33	161	183	665	13
1887	536	1,956	7	160	475	28	194	257	756	12
1888	551	1,843	3	116	503	22	169	254	736	12
1889	560	1,664		124	461	31	151	250	636	8
1890	563	1,598	7	164	422	29	114	241	543	8
1891	568	1,434	10	181	391	26	84	196	447	8
1892	570	1,392	16	163	361	26	68	182	417	11
1893	577	1,317	12	186	317	29	66	179	401	11
1894	578	1,297	10	183	315	29	62	188	405	11
1895	584	1,239	12	177	216	23	66	235	390	10
1896	590	1,250	14	177	184	26	62	261	382	10
1897	599	1,261	12	176	187	32	81	251	395	10
1898	607	1,289	8	176	180	33	109	278	423	10
1899	610	1,373	-	177	188	35	160	341	471	9
1900	612	1,597	8	183	208	36	202	417	459	9
1901	621	1,597	13	204	224	41	155	378	454	9
1902	633	1,675	19	239	251	47	114	344	478	9
1903	639	1,722	16	274	259	46	110	364	497	8
1904	650	1,806	11	306	267	43	129	438	504	8
1905	656	2,026	14	335	300	53	156	519	513	8
1906	664	2,431	18	329	361	54	212	704	572	10
1907	673	2,751	22	349	393	53	273	818	627	10
1908	688	3,001	33	373	432	59	232	906	649	12
1909	701	2,885	11	444	529	78	189	822	693	12
1910	718	3,081	14	519	618	79	173	826	708	11
1911	740	3,148	13	555	646	69	219	784	734	11
1912	756	3,276	17	564	661	73	266	743	785	13
1913	775	3,169	18	547	652	65	259	673	782	11

Source: see text.