Notes on the Rate of Industrial Growth in Italy, 1861–1913

STEFANO FENOALTEA

This article reconsiders industrial growth in post-Unification Italy in light of a new set of sector-specific production estimates. Though still in part provisional, the new series confirm that the production of durables (and related materials) was dominated by the Kuznets cycle. A similar cycle is documented in the growth rate of the residual, excluding foodstuffs, and extended by reasonable assumption to foodstuffs as well. The new series thus support the traditional view of the 1880s as a period of widespread prosperity and above-trend consumption rather than the opposite, now dominant view.

The title of this piece is of course a recent copy of an Old Master. Almost 50 years have passed since Alexander Gerschenkron's classic article first presented his index of industrial production in post-Unification Italy, and his interpretation of its movements; and over 30 have passed since the present writer began unwarily to tread in his teacher's footsteps.[1]

Now, as then, the very facts to be explained remain to a large extent uncertain. The present writer has devoted considerable effort to their reconstruction; and though this work is still proceeding enough material has accumulated to warrant a provisional reconsideration. This essay presents a new series for Italy's aggregate industrial output obtained from a comprehensive set of sectoral production estimates. The larger part of these have been carefully reconstructed from hundreds of elementary series; a far from insignificant minority are only interim estimates put together to rough out the residual and allow a peek at what is likely eventually to appear.

In general, and not surprisingly, the critical distinction seems to be that between the production of durables (and related materials) on the one hand, and that of (other) nondurables on the other. The former alternates periods of growth and periods of decline; the latter grows practically without interruption (and at a secularly increasing rate, thanks to the growing weight of the more dynamic sectors). The fluctuations of the aggregate index are ac-

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Stefano Fenoaltea is Professor of Economics at the Università de Roma "Tor Vergata," 00133 Roma, Italy.

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[1] Gerschenkron, "Notes"; and Fenoaltea, "Public Policy" and "Decollo." As my contemporaries will recall, the footsteps I stepped in had not quite been vacated by Gerschenkron's own feet.

cordingly in muted form those of the "durables" group; and these in turn follow the Kuznets cycle of the construction industry, identified and analyzed a good number of years ago.

The more novel results refer to the "nondurables" group. The combined product, excluding foodstuffs, shows a clear growth cycle parallel to that of the "durables" group: in essence, nonfood consumption appears to have grown faster when investment was rising, and more slowly when investment was falling off. The production and consumption of foodstuffs are instead poorly documented by direct evidence. The present estimates assume very simply that these followed, with a reduced elasticity, the cycle displayed by the rest of the "nondurables" group.

In the Italian context this straightforward assumption is contentious. The recent literature describes the 1880s as a period of mass hardship caused by the fall in grain prices (the "agrarian crisis") and confirmed by the surge in emigration. This view is supported by the extant official series, which show a sharp decline in food consumption (and therefore total consumption) over the years in question. As has long been known, however, those series are essentially devoid of empirical content; and the arguments that would validate them all the same seem similarly flawed. The 1880s used to be seen as a period of widespread prosperity: this older view seems altogether closer to the mark.

THE NUMBERS AND THE ISSUES

The Rosy-Fingered Dawn

In the 1960s, when the present author entered the field, the literature offered two recently compiled indices of Italian industrial production up to the First World War. The first, beginning in 1881, was Gerschenkron's 1955 index, obtained as an improvement over an earlier effort by Guglielmo Tagliacarne.[2] Gerschenkron's index was a weighted sum of separate indices for mining, metalmaking, textiles, engineering, chemicals, and foodstuffs; it displayed "moderate growth" (4.6 percent per annum) in 1881–1888, "stagnation" in 1888–1896, "very rapid growth" in 1896–1908 (6.7 percent per annum), and a "reduced rate of growth" (2.4 percent per annum) in 1908–1913 (Table 1, row 1, and Figure 1A).[3] Shortly thereafter Istat (the

[2] Gerschenkron, "Notes" and "Description"; and Tagliacarne, "Sviluppo."

[3] Gerschenkron, "Notes," p. 76. From 1881 to 1913 measured output growth averaged 3.8 percent per annum. Gerschenkron, "Description," indicates that the mining index incorporated seven basic series (iron ore, zinc ore, lead ore, copper ore, solid mineral fuel, sulphur, and pyrites); the metalmaking index, four (iron and steel, copper, lead, and refined petroleum products); the textile index, two (raw silk and imported raw cotton); the engineering index, one (iron and steel consumed, net of rails); the foodstuffs index, three (beer, sugar, and milling); and the chemical index, one (sulphuric acid).

Istituto centrale di statistica) published its comprehensive reconstruction of Italy's national accounts from 1861 to 1956.[4] The current-price series extensively disaggregated both aggregate value added and aggregate spending on final goods and services, but the 1938-price series covered only the latter; exceptionally, however, a 1938-price index of manufacturing production was also included.[5] That index displayed minor cyclical fluctuations around a slowly rising trend (under 1.1 percent per annum) from 1861 to 1898, rapid growth to 1908 (5.9 percent per annum), and then again near-stagnation in the run-up to the war (Table 1, row 2, and Figure 1A).

Whereas Gerschenkron soon published the details of his sources and calculations, Istat accompanied its index (and all its other estimates) with only the sketchiest of explanations.[6] Istat concurrently published a relatively thin abstract of historical statistics containing a mixture of old data and new estimates, again with only the briefest of accompanying explanations—and a separate, highly detailed analysis of the historical data which pointed out both the lack of evidence behind many of Istat's new production series, and the at times desperately poor quality of the pre-existing series incorporated in Istat's aggregates.[7]

The interpretations of Italy's early industrial growth were then dominated by the hypotheses of Rosario Romeo and of Gerschenkron himself. Both were cast in terms of stages of growth, following the fashion of the time, and focussed on the domestic developments that satisfied the prerequisites for industrialization.[8] Both also presumed that output growth was limited by supply-side constraints; but in almost everything else they differed, and their evaluations of public policy were diametrically opposed.

Romeo challenged the so-called Gramsci thesis that Italy's economic development had been stunted by the (political) failure to redistribute land, and thus to create a mass market for consumer goods. To his mind, rather, industrialization was held back by a lack of capital, including social overhead capital as well as industrial capital. A ("gramscian") land reform, increasing consumption and decreasing saving and capital accumulation, would therefore have been counterproductive; the state was thus well-advised to protect the flow of land-owners' savings. In the 1860s and 1870s, again appropriately, the state used taxes, railway subsidies, and public works programs to channel these savings into the creation of the ("prerequisite") infrastructure. By the 1880s, with the latter in place, capital could and did flow into industry, which then benefited also from protection and direct

[4] Istat, *Indagine*.

[5] Istat, *Indagine*, pp. 98–99, 218.

[6] Gerschenkron, "Description"; and Istat, *Indagine*.

[7] Istat, *Sommario* (which includes some constant-price breakdowns of aggregate demand, pp. 210–22, but only product-specific agricultural and industrial output series, pp. 106–35) and *Rilevazioni*.

[8] The most notorious work in this tradition (and in retrospect its high-water mark) is of course Rostow, *Stages*.

TABLE 1
INDICES OF INDUSTRIAL PRODUCTION, 1861–1913
(1900 = 100)

	Index	Date	Coverage[a]	1861	1862	1863	1864	1865	1866	1867	1868
1.	Gerschenkron	1955	E M								
2.	Istat	1957	M	57	57	57	57	62	62	59	59
3.	Fenoaltea	1967	M U	37	37	37	37	36	37	39	39
4.	Istat–Vitali	1969	E M C U	58	58	58	58	63	63	60	60
5.	Fenoaltea	1972	M	59	59	60	60	60	60	61	62
6.	Carreras	1983	E M U	49	46	48	46	46	48	49	52
7.	Maddison	1991	E M C U	41	41	42	41	40	40	41	41
8.	Fenoaltea	2001	E M C U	52	53	54	54	56	55	54	53

	1869	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883
1.													54	57	64
2.	65	68	62	65	70	73	73	73	73	70	70	68	76	73	76
3.	40	42	42	43	45	46	47	47	48	48	48	53	57	61	65
4.	65	66	62	65	70	72	72	73	73	71	71	69	77	75	78
5.	63	64	64	65	66	67	67	69	69	69	69	72	74	77	79
6.	55	58	54	60	62	64	61	55	60	58	56	66	64	68	69
7.	42	45	46	47	50	51	51	50	50	51	51	57	61	64	70
8.	54	56	57	59	61	62	61	62	63	64	64	67	70	73	76

	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898
1.	63	65	67	73	74	72	72	67	64	70	72	73	75	78	86
2.	78	81	78	84	81	81	81	76	76	76	81	84	81	84	84
3.	67	72	76	88	88	86	82	73	69	72	76	78	79	82	88
4.	81	84	82	87	84	83	82	77	78	78	82	84	82	84	85
5.	80	83	85	91	91	91	89	85	84	85	87	89	89	91	94
6.	71	72	77	84	73	80	81	79	74	80	83	85	88	83	92
7.	71	77	81	91	91	89	86	77	74	76	80	80	81	84	88
8.	79	82	85	87	88	87	87	86	84	85	87	88	89	91	94

	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913
1.	92	100	104	109	114	117	126	139	152	163	168	169	174	182	184
2.	89	100	97	105	108	111	116	127	141	149	149	149	151	162	159
3.	97	100	101	104	113	119	133	152	172	196	203	211	218	222	220
4.	90	100	99	106	109	112	118	129	142	150	150	151	153	164	161
5.	98	100	101	102	106	109	116	124	133	144	148	151	153	154	153
6.	96	100	109	110	117	119	127	145	157	158	157	160	168	180	181
7.	96	100	102	104	111	118	131	147	163	182	190	197	202	205	202
8.	98	100	103	107	111	116	122	131	140	148	156	163	165	174	175

[a] major groups: extractive industries (E), manufacturing (M), construction (C), and utilities (U).
Sources: See the text.

subsidies: Italy's industrial transformation thus got under way in that decade, and it continued, at an accelerating pace, after the depression of the 1890s.[9]

Gerschenkron instead approached the Italian case from the perspective of prerequisite substitution in conditions of relative backwardness.[10] In his view, in

[9] Romeo, *Risorgimento* and *Breve Storia*; and Gerschenkron, "Rosario Romeo."
[10] Gerschenkron, "Economic Backwardness" and "Approach."

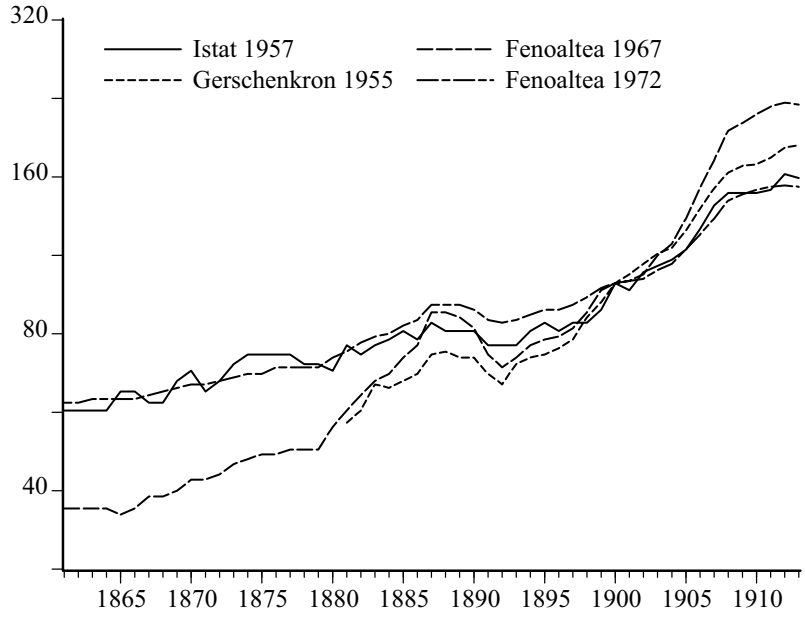

FIGURE 1A
INDICES OF INDUSTRIAL PRODUCTION, 1861–1913 (1900 = 100)
(manufacturing plus at most one other major group)

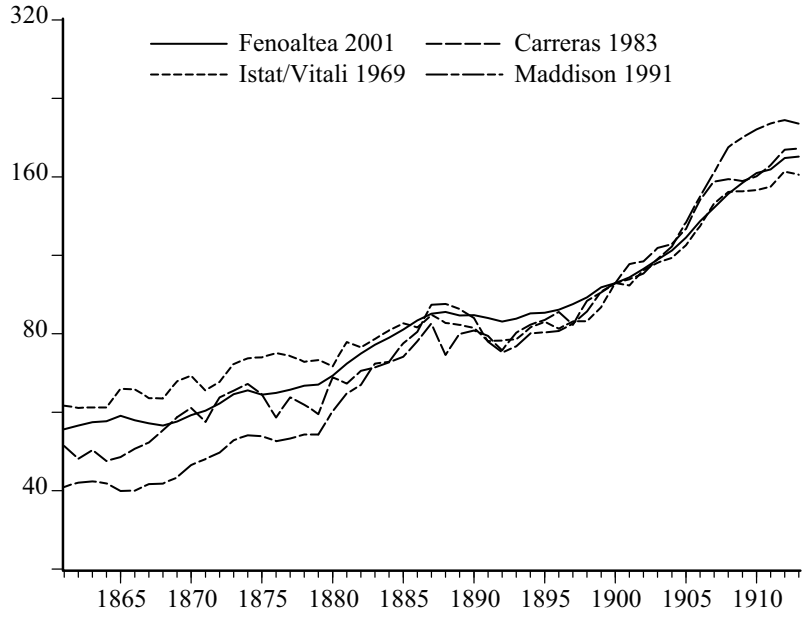

FIGURE 1B
INDICES OF INDUSTRIAL PRODUCTION, 1861–1913 (1900 = 100)
(manufacturing plus at least two other major groups)

Source: Table 1.

the 1880s Italian industry experienced only a false start, as the State failed to play the then necessary leading role: the State did little, and in fact more harm than good by protecting grain, steel, and textiles rather than chemicals and engineering. The "great spurt" was delayed until the appearance of the German-style "mixed banks," which channeled capital, and provided entrepreneurial guidance, to Italy's industry. Even then, the growth rate actually achieved was less than the experience of other countries would have led him to expect: because of the continuing negative influence of the tariff, because the railroads had already been built and thus generated little demand, because the labor force was already militant, and because a specific "industrialization ideology" never took root.[11]

When We Were Very Young

The present author's earliest work was an investigation of these hypotheses.[12] It began with the construction of an index of industrial production (Table 1, row 3, and Figure 1A); this was essentially a revision of Gerschenkron's index, made possible by his full description of his sources and methods, with the benefit of the source material since published by Istat.[13] The revisions were of three orders. First and most simply, the index was carried back to 1861: this would specifically remedy the weakness of Gerschenkron's characterization of the initial growth spurt, based on an index that began too late to reveal its beginning, duration, and overall strength.

Second, the sample of elementary series was modified, in three ways. First, the mining sector was dropped altogether, as it was deemed an export-oriented enclave essentially separate from domestic manufacturing. Second, numerous series were added: the number of elementary manufacturing series was trebled, and the coverage of the index was extended to the utilities.[14] Third, the series were examined and evaluated. The most significant revision here was that to the grain-consumption figures, used as the index for milling. The historical statistics incorporated by Gerschenkron's index and reproduced with trivial revisions by Istat show very similar levels of per-capita consumption in the late 1870s, when their overall level is confirmed by the grist tax, and in the early 1900s, when they are based on relatively sound agricultural statistics. Over the 1880s and early 1890s, when the data-gather-

[11] Gerschenkron, "Notes." The ensuing debate between Gerschenkron and Romeo proved vigorous, illuminating, and finally acrimonious. An amusing exchange occurred when Gerschenkron quoted Istat's index as evidence that the upswing of the 1880s did not amount to much, and Romeo, as evidence to the contrary, quoted Gerschenkron's. See Gerschenkron, "Industrial Development."

[12] Fenoaltea, "Public Policy" and "Decollo."

[13] Gerschenkron, "Description"; and Istat, *Sommario* and *Rilevazioni*. The Istat index cannot be recalculated and revised, as the underlying sources and methods have not been revealed; one can only take it or leave it.

[14] The index incorporated 37 series, covering various foodstuffs and tobacco (nine series), textiles (two series, for cotton yarn and cloth), metalmaking (six series), engineering (a single, comprehensive input-consumption series, like Gerschenkron's), chemicals (14 series), and utilities (five series).

ing process was so notoriously poor that the output figures were generally disbelieved, measured per-capita grain consumption declined to roughly half its previous level; it then recovered in a sudden surge around the turn of the century, apparently as the result of interpolation.[15] The extended decline and the subsequent rapid recovery in grain consumption, clearly improbable in their own right, thus seemed entirely bogus; the revised series eliminated these spurious fluctuations in favor a simple trend.[16]

This critique of the grain production and consumption series largely undercut, by itself, the patterns suggested by the previous indices. In 1900 milling accounts for over a quarter of Gerschenkron's index.[17] The spurious surge in grain consumption gives a strong boost to measured growth around the turn of the century, and underpins Gerschenkron's initial argument for characterizing 1896–1908 as "a period of 'long-term' growth": to wit, "the ease with which it rode horse and foot across the intervening depression of 1900."[18] The Istat index, of course, could not be recalculated; but it too surely much exaggerated the acceleration of industrial growth in the mid-1890s. Indeed, Istat's national income series displays a similar break in trend, with per capita income stagnating from 1861 into the mid-1890s, and then rising 35 percent from 1897 to 1907 (and 1913).[19] Because grain-growing loomed as large in agriculture as grain-processing did in industry, it seemed a fair presumption that the Istat series grossly underestimated total commodity production in the 1880s and 1890s, and correspondingly exaggerated (or created out of whole cloth) the discontinuity in Italy's economic growth.[20]

[15] On the nature and credibility of the agricultural statistics see Istat, *Rilevazioni*, vol. 7, p. 73. As noted therein, the Ministry of Agriculture finally suspended the publication of the agricultural output figures, pending the organization of a proper agricultural survey, "because of the general skepticism with which they were greeted." Istat's use of figures it dismissed as unreliable is, to say the least, curiously schizophrenic.

[16] Fenoaltea, "Decollo," pp. 97–98. The Gerschenkron-Tagliacarne sulphuric-acid output figures for 1881–1892 were also revised; and Gerschenkron's engineering index (iron and steel consumption net of rails) was corrected by eliminating imported rails, inadvertently included in 1881–1905. The silk-production series was dropped altogether, as reported output consistently fell short of net exports.

[17] Gerschenkron, "Description," pp. 394, 401.

[18] Gerschenkron, "Notes," p. 77. Only his foodstuffs index, with a weight of 30 percent of the total, grows smartly over 1899–1902; all the other sectoral indices register a brief decline, or at least a pause (chemicals).

[19] Istat, *Sommario*, p. 216.

[20] Fenoaltea, "Railroads," pp. 335, 349, and "Ferrovie," pp. 167, 183. Although the Istat series have since been viewed with increasing skepticism, this specific warning does not seem to have been heeded by the various scholars who subsequently tinkered with Italy's national accounts (Cohen and Federico, *Growth*, p. 9). Only Federico has made the criticism of the grain data his own (Federico, "Per una valutazione"; and Cohen and Federico, *Growth*, pp. 32–33); and only the most recent national income estimate for 1891 (by a team sponsored by the Bank of Italy, with Federico himself responsible for agriculture and the present author for industry) is constructed with grain production and consumption figures that are reasonable estimates rather than bad data (Federico, "Stima," pp. 21–23; and Fenoaltea and Bardini, "Valore aggiunto," p. 129).

Third and last, in the author's index the elementary series were combined (with value added weights) directly into the aggregate, without first calculating intermediate, sectoral series as Gerschenkron had done. The theoretical reason for this was simple mistrust of the attendant imputation, as there is no valid reason to assume, for example, that the (unknown) combined production of wool, hemp, and linen varied with the ("known") combined production of cotton and silk. The practical reason was that the index itself was designed first and foremost to identify the industries that most warranted further investigation; Gerschenkron's two-stage process could easily point to the dominating role of an industry whose time path was in fact unknown.[21]

In the event, the new index revealed three main groups of series: old consumer-goods industries that grew with no visible discontinuity (cotton, and of course milling); new industries that suddenly grew rapidly, but in highly specific circumstances that did not point to industry-wide constraints (electric power, which depended on world-wide technology—Milan's plant was second only to New York's—and the extraction of beet sugar, which displaced imported cane sugar when afforded suitable protection); and a cyclical group of durable-goods industries that in fact dominated the aggregate index (engineering, and, altogether secondarily, metalmaking).[22]

The output of the engineering industry, in turn, expanded and contracted with the sharp fluctuations in the total consumption of its products: to the extent that Italian industrial growth was revealed by the available evidence, clearly, its dominant feature was not the supply-side discontinuity presumed both by Gerschenkron and by Romeo, but a simple investment cycle. Because the index included engineering but not construction it suggested a cycle specifically in industrial investment; and because investment in Italy had recently collapsed in the wake of the "opening to the Left" that brought the socialists into the government, this strand of the work concluded with the hypothesis that the post-Unification cycle could similarly be attributed to political changes.[23]

[21] This would happen naturally if an important sector was included in the index, but represented by no more than a small component. In evaluating his index, oddly, Gerschenkron excluded from its supposed 65-percent coverage ("No less than 35 percent of Italian industry has remained outside the scope of the index": Gerschenkron, "Description," pp. 405–06) only the missing sectors, and counted as present in his index all the industries that were missing from the included sectors (ibid.).

[22] The upswing of the 1880s seemed to have begun in the late 1870s, and to have lasted about a decade, with sectoral growth rates comparable to those achieved during the second upswing; the trend acceleration of the aggregate was due to the secularly increasing weight of the more rapidly growing sectors (Fenoaltea, "Riflessioni," pp. 146–47).

[23] Fenoaltea, "Public Policy," p. 179, "Decollo," pp. 111–12, and "Riflessioni," pp. 129–35. The specific hypothesis that political developments altered entrepreneurs' expectations has been relatively well received; see Cafagna, "Problemi," and note 41. The broader interpretation in terms of a cycle rather than successive stages of growth has been repeatedly described as the new conventional wisdom, and attributed also to Bonelli and Cafagna; see for example Federico and Toniolo, "Italy," p. 149, Federico, "Introduction," p. xiii, Zamagni, *Economic History*, p. 80, and Cohen and Federico, *Growth*, pp. 17–22. This reading seems superficial. Bonelli and Cafagna do point to a series of upswings and intervening declines, in contrast to the single, sharp break suggested by the Istat index. However, their

But there was more. The engineering industry appeared not only to have absorbed most of the domestic market, but to have been constrained by it, as the tariff on steel raised its costs and priced it out of world markets. This implied that the protection of engineering advocated by Gerschenkron could not have had major effects. Rather, the evidence suggested that the overriding constraint on growth (in Italy, and by extension in poor countries generally) was not on the supply side—which was in any case rendered elastic by the intersectoral and international mobility of labor, capital, enterprise, and technically skilled personnel—but on the demand side: the royal road to growth was not the substitution of a small volume of imports, but the production of a large volume of exports. The main fault of the tariff, in this light, was that the protection of steel prevented growth led by the export of engineering products.[24]

The contribution of Gerschenkron's "mixed banks" was examined by verifying the extent to which growth was associated with a supply push (revealed by import-substitution or export growth) that was itself correlated with the growth of those banks' total assets. No evidence to that effect was found; Gerschenkron's resounding claim that "the upsurge of 1896–1908 was made possible by the importation of the great economic innovation of German banking in its most developed and mature form" was thus as resoundingly rejected.[25] Romeo's hypothesis proved more difficult to test,

"waves" of growth are not merely cyclical fluctuations: they are characterized by a sequence of leading sectors, involve structural change, and follow the creation of the necessary preconditions over an extended period of "agrarian accumulation." They accordingly appear to be the successive phases of a drawn-out but ultimately successful Rostowian take-off; the overall interpretation remains similar to Romeo's, albeit in slow motion, and with a new emphasis on the pre-Unification roots of subsequent developments. See in particular Bonelli, "Capitalismo," pp. 1196, 1204, 1210–15, 1219–20, 1239; Cafagna, "Questione," pp. 206, 213–17, "Industrial Revolution," pp. 297–99, 321–22, "Prima onda," pp. 361, 370–71, and "Modelli," pp. 396–99; and Fenoaltea, "Contro tre pregiudizi."

[24] Fenoaltea, "Public Policy," p. 179, "Decollo," pp. 108–12, "Railroads," p. 342, and "Riflessioni," pp. 136–45. The subsequent literature has not smiled on this counterfactual hypothesis, which is typically rejected on the grounds that Italy's engineering industry was too backward to compete on world markets (Toniolo, "Effective Protection," pp. 665, 672; Cafagna, "Problemi," pp. 276–77; Zamagni, *Economic History*, p. 116; and Cohen and Federico, *Growth*, p. 65). Against this, one can recall on the one hand that late-comers typically enter markets with cheap, "low-tech" products, and on the other that from around the turn of the century Italy actually exported "high-tech" warships. The essential argument, however, is from revealed preference. Italian engineering firms were agitating for the right to process duty-free steel for re-export at least as early as 1891; if they knew their markets and capacities, and had no time to waste, the export opportunities had to be there for the taking. Toniolo also points out that the industry did not import duty-free metal for re-export even when it was allowed to do so; but that opportunity was long frustrated by the administrative process, and when that obstacle was finally removed (1903) the domestic market was growing so rapidly (some 20 percent per annum) that domestic producers were hard-pressed even to keep up with it (Toniolo, "Effective protection," pp. 661, 665).

[25] Gerschenkron's interpretation seems now generally discounted—not however because of this early cliometric result, which the subsequent literature seems entirely to have overlooked, but rather because Confalonieri's massive research into the archives of the "mixed banks" showed that these were not leaders at all. See Gerschenkron, "Notes," p. 88; Fenoaltea, "Public Policy," pp. 178–79, and "Decollo," pp. 100–11; Confalonieri, *Banca e industria . . . 1894–1906* and *Banca e industria . . . [dal] 1907 [al] 1914*; Federico and Toniolo, "Italy," pp. 204–06; and Cohen and Federico, *Growth*, pp. 59–60.

mainly because his stylized facts seemed awry. On the one hand, indeed, "the infrastructure" is not a monolithic *quid* that yields services only once completed; on the other, Romeo's sense that it was essentially completed by 1880 seemed based on the railway map (which by 1880 covered, more or less, the entire country), and not on the figures (which showed instead that railway construction continued unabated).[26] To capture the effects of transport improvements, the regressions investigating the source of supply-side changes included the extent of the railway net among the independent variables; but it was too close to a simple trend to yield useful results.[27]

The aggregate index itself revealed generally higher growth rates than those calculated by Gerschenkron, and of course Istat (Figure 1A). Its coverage, however, was estimated at perhaps half of total production (say between two- and three-fifths, in 1903 and again in 1911, depending on the relative weight to be attributed to labor on the one hand and horsepower on the other); and the intercorrelation of its component series was relatively low. It could not be considered, and in fact was not designed to be, a meaningful index of aggregate output: it presumably identified the dominant pattern of output growth, but certainly not its overall pace, as the path of the large residual remained essentially unknown.[28]

[26] Romeo, *Risorgimento*, pp. 173–74, duly noted that expenditure on railways and other public works actually *increased* in the 1880s; but he simply reaffirmed that by 1880 "the creation of the fundamental infrastructure" had been completed, and added that with the shift in the tax base the new investments were increasingly financed by industry and commerce rather than, as in the critical preceding phase, by agriculture. Even if one accepts these claims, however, his broader model faces the problem that the completion of the essential infrastructure cannot have released capital for industrial investment if investment in ("nonessential") infrastructure then actually increased.

[27] Fenoaltea, "Public Policy," p. 179, "Decollo," p. 104, and "Railroads," p. 351. The specifically railway-related aspects of Romeo's and Gerschenkron's hypotheses were examined in subsequent work (Fenoaltea, "Italy"). The analysis of the railways' forward linkages suggested that the minor railway lines built after 1880 were far more useful than the (water-competing) peninsular trunks built between 1861 and 1880; arguably, therefore, Romeo's emphasis on the role of the infrastructure could be rescued by tying the industrial upswing of the 1880s to *concurrent*, rather than prior, transport improvements. The analysis of the railways' backward linkages did not support Gerschenkron's view that the early completion of the railway net reduced the market for industrial goods during the "great spurt": after 1895 total spending on the railways was significantly below earlier levels, but its composition shifted massively away from the pick-and-shovel work that dominated new construction toward the manufactured goods needed for maintenance and improvements, so the railways' demand for these actually increased. Gerschenkron's claim that growth was then also slowed by labor militancy, and by the lack of a suitable ideology, has also been rejected; see Federico and Toniolo, "Italy," pp. 208–10; and Zamagni, *Economic History*, pp. 103–09.

[28] Fenoaltea, "Public Policy," p. 177, and "Decollo," p. 99. In fact, the main implication of the increase in the measured growth rates was to show that they were too sensitive to the underlying sources and methods to warrant attaching significance to international differences of a few percentage points; compare Gerschenkron, "Notes," p. 78.

Time on the March

An immediately following work by the present author presented a revised aggregate index, referring to manufacturing production alone. The original index presumably overstated both industry's overall growth and its cyclical fluctuations, as it seemed to include the entire locus of the investment cycle (engineering and metalmaking), and all the obvious new industries (power, sugar), but only part of the old consumer-goods industries that grew altogether more slowly and regularly, and no declining sectors at all.[29] The revised index, presented as a quinquennial series, accordingly attributed to the group of omitted manufacturing industries a constant growth rate equal to that of Italy's population.[30] This series is presented here as an annual index (Table 1, row 5, and Figure 1A); it bears notice that it is very close to the Istat index, save of course for the 1880s and the 1890s, when the correction to the grain-consumption series yields significantly higher output.[31] Because this corrected index was still terribly crude, a deeper revision was very much in order; and so of course was its extension to nonmanufacturing industry.

Meanwhile, the Ancona group led by Giorgio Fuà had presented 1938-price value added series for all major sectors.[32] These series, calculated by Ornello Vitali, closely followed Istat's reconstruction, and essentially reproduced the 1938-price aggregate of the extant national accounts; the constant-price series for the extractive industries, construction, and the utilities were new, but the manufacturing series was based directly on Istat's earlier index.[33] Because the aggregate of the four industry-group series is dominated by manufacturing, the resulting index is barely distinguishable from the Istat index for manufacturing alone (Table 1, row 4, and Figure 1B).[34]

Since then, as the present author was working to improve his own series, two more indices have appeared. The first of these is the index of Albert Carreras (Table 1, row 6, and Figure 1B). This index is fully described in his

[29] Because 1913 was near a cyclical peak, the overstatement of the aggregate's cyclical variation itself implies an overstatement of its growth from 1861 to 1913.

[30] Fenoaltea, "Railroads," pp. 333, 349, and "Ferrovie," pp. 169, 183. This exercise too seems to have been overlooked, and the subsequent literature routinely identifies the "Fenoaltea index" with the uncorrected 1967 series; see for example Cohen and Federico, *Growth*, pp. 47–48, and especially Maddison, "Revised Estimate," discussed in what follows. The fault lies at the door of the present author, as the disclaimers that accompanied the subsequent publication of the 1967 index (Fenoaltea, "Italy," pp. 54–56) were clearly inadequate.

[31] The original quinquennial series was presented in (2-digit) value added terms. Because the original work sheets have been lost, the annual index presented in Table 1 was recalculated from scratch. Its immediate components are the index in row 3, recomputed to exclude the utilities, and the trend attributed to the residual (itself attributed a value added equal to that covered by the original index, including the utilities, in 1903).

[32] Ercolani, "Documentazione."

[33] Vitali, "Stima."

[34] The only perceptible difference appears over the 1880s and early 1890s, when cyclically high construction raises the aggregate index slightly above that for manufacturing alone.

1983 Barcelona dissertation; it covers all of industry except construction from 1861 to 1980, and is all the more remarkable for being only half of a comparative work on Italy and Spain.[35] The index directly combines (without calculating intermediate sectoral indices) time series for no fewer than 84 products, with weights proportional to value added in 1970; for all that, however, in that year it still covers less than 60 percent of industry (excluding construction).[36] The elementary series are built up from a variety of historical sources as well as culled from Istat's compilations (or estimated, as usual, from the apparent consumption of raw materials). Many of these series are new, or significant corrections to existing ones; oddly, however, the Istat grain-consumption series is incorporated with no correction at all, even though its apparent weaknesses were recognized.[37] Overall, the resulting index tends to lie near an average of the two earlier indices computed by the present author, though its late-1880s peak is of course flattened by the downward bias of the milling series.

The second and latest index is that presented in 1991 by Angus Maddison (Table 1, row 7, and Figure 1B). That index was part of a recalculation of Italy's national product, itself but a small piece of Maddison's impressive study of world development.[38] Like the Istat–Vitali index, that series covers all four major industrial groups; but it does so with components derived exclusively by the present author. The extractive industries, construction, and the utilities were covered by the new 1911-price sectoral aggregate series, about which more anon; the dominant manufacturing sector, attributed the new estimate of aggregate value added in 1911, was indexed instead by the original 1967 index, recalculated without the utilities and with the addition of the new silk series.[39] The 1972 trend-correction to allow for the omitted industries was ignored, however, and Maddison's series was unsurprisingly close to the 1967 index itself.

The analysis progressed alongside the numbers. The present author's 1967 index had identified a cycle in industrial investment, which seemed plausibly attributable to domestic political change. That hypothesis died a violent death at a relatively young age: the author's subsequent work on the construction industry (and the benefits of continued education at the hands

[35] Carreras, "Producció" and "Producción."

[36] The Carreras index covers energy production (8 series, including utilities), mining and quarrying (14 series), metalmaking (10 series), nonmetallic mineral products (one series, for cement), chemicals (15 series), engineering (15 series), foodstuffs and tobacco (8 series), textiles (10 series), and paper products (3 series).

[37] Carreras, "Producció," pp. 922–23. The silk series was instead brought up to reasonable levels by allowing for reprocessed waste (pp. 955–78).

[38] Maddison, "Revised Estimate," "Crecimiento," *Monitoring*, and *World Economy*.

[39] The new series were those presented in Fenoaltea, "Extractive Industries," "Construction," "Growth of the Utilities," and "Growth of Italy's Silk." The value added estimates appeared in Fenoaltea, "Valore aggiunto."

of his colleagues) showed that the cycle was apparent in construction as well, and indeed in all its major components—and that from ca. 1870 on it exactly paralleled the "Kuznets" construction cycle in the lands of recent settlement.[40] The Italian cycle was clearly a general cycle in capital formation, and itself part of something much broader: purely domestic explanations, of any sort, were clearly inadequate.[41]

The subsequent examination of the relative movements of the exchange rate, the trade balance, the interest rate, investment, and the public deficit suggested that the construction cycle in Italy (and, by extension, overseas) was caused by changes in the availability of foreign (British) capital to the financial periphery as a whole.[42] Because the real exchange rate appreciated as the balance of trade deteriorated, financial flows were clearly driving commodity flows (as in the seemingly novel experience of the Reagan dollar); and because the domestic interest rate softened as capital flows increased (and rose as these declined) capital was clearly being pushed into Italy by episodes of external abundance rather than pulled into it by episodes of internal scarcity. Demographic change was comparatively insignificant: rising capital inflows and domestic investment coincided with rising *out*-migration, and construction movements were clearly tied to changes in amenities per capita against a background demographic trend rather than to demographic change against a background trend in amenities per capita. In sum, construction appeared to be "finance-sensitive" rather than (as the Kuznets tradition had it) "population-sensitive"; migration within the financial periphery (within the old lands, within the new, and across the Atlantic from the old to the new) appeared in turn to be sensitive to construction movements, not least because construction is the employer of first resort for farm boys who leave the land.[43]

The pioneering hypotheses of Gerschenkron and Romeo had been cast in terms of stages of growth, and focussed on the domestic developments that satisfied the prerequisites for industrialization; a cycle induced by external

[40] The author had emerged from his graduate studies woefully ignorant of the Kuznetsian stream; his first glimpse of its relevance to his own work (and the death-blow to his initial hypothesis) came with the belated, shattering discovery that the industrial investment cycle in Italy closely paralleled the residential construction cycle in Australia. See Kelley, "Demographic Change," p. 243.

[41] Or maybe not so clearly. The subsequent literature has displayed a curious attachment to the old political-cycle hypothesis, at times in obvious preference to the new. See for example Federico and Toniolo, "Italy," p. 212; Zamagni, *Economic History*, p. 81; and Cohen and Federico, *Growth*, pp. 20–21.

[42] Country-specific considerations seem particularly relevant only in the 1860s: the initial capital-import and construction boom seems to have been fueled by enthusiasm for the newly unified nation, and killed by the budget crisis and military defeats of 1866.

[43] Fenoaltea, "International Resource Flows." Because the fluctuations of the interest rate in Italy (and elsewhere in the periphery) seem essentially opposite to those of the interest rate within Britain itself, the driving force behind the international Kuznets cycle seems to lie in the varying expectations of British investors, and in the risk premium they required to invest overseas; but the interpretation of the Italian case stands independently of this extension to the world-wide cycle.

shocks might seem entirely at odds with their views. In Gerschenkron's scheme, however, the German-style "mixed banks" represented an improvement in financial intermediation (as well as in managerial skills); in Romeo's, capital flowed into industry once it was no longer absorbed by public works.[44] Both Gerschenkron and Romeo thus tied the changes in the rate of industrial growth to changes in the supply of capital; and that central point sensed by those eminent scholars reappears fully, if in different terms and by different means, in this Kuznets-cycle interpretation of Italy's industrial progress.

Now We Are Sixty

The new index presented here (Table 1, row 8, and Figure 1B) is conceptually very close to Maddison's recent index. Like Maddison's, the new index covers all four major industrial groups with series derived by the present author; indeed, the series for the extractive industries, construction, and the utilities are exactly those already used by Maddison. Again like Maddison's, the new index is a provisional index, in that substantial components of the manufacturing group are estimated very crudely; it is presented here as one might preview the final appearance of a public square, with buildings completed on three sides, by erecting plywood false fronts on the fourth. On the other hand, the new total-manufacturing series improves on Maddison's in two basic ways. First, it incorporates far more information: it is obtained from almost 200 product-specific series, many themselves built up from a number of elementary components, rather than from a few dozen. Second, it does not simply assume that the paths of the industries that have yet to be reconstructed varied, collectively, like the sum of the others; rather, these are estimated *ad hoc*—as in the previous index of manufacturing output calculated by the present author (Table 1, row 5), but altogether less crudely. A partial exception is the series for the foodstuffs industry, which is indexed directly by the time path of an aggregate of other industries (the total excluding durables and related materials: in essence, nonfood consumption), albeit with a reduced elasticity (estimated from the benchmark estimates for 1891 and 1911); its special significance will shortly be made clear.[45]

Over the long term, the new index is closest to the Carreras index; it tends therefore to confirm the suspicion that secular growth was overstated by the Maddison index (and by the present author's first index), and understated by the Istat–Vitali index (and by the present author's second index). The most

[44] Gerschenkron, "Notes"; and Romeo, *Risorgimento*.

[45] The series for the leather-working industries is also very weak, as it incorporates only four census-based benchmarks, and is otherwise simply interpolated or extrapolated; but this industry was too small to have a major impact on the estimated totals.

noteworthy change from the Carreras series is perhaps to be seen in the far lower short-term volatility of the new index; this seems due to its broader underlying sample, which much reduces the impact of industry-specific shocks. Prior to 1880, in particular, the Carreras index seems dominated by silk, depressed by poor cocoon harvests in the mid-1860s and again in the later 1870s; the path of the new index is altogether smoother.[46]

The new index is derived from the sector-specific figures reported in Table 2.[47] From 1861 to 1913 aggregate industrial production (and aggregate manufacturing, which dominates the total) increased by a factor of 3.3, for an average annual growth rate of 2.3 percent.[48] Comparable growth rates were manifested by the extractive industries, which increased by a factor of 4.3, and by construction, which despite the prewar boom increased by a factor of only 2.5. The utilities, which benefited far more from technical and social progress, increased in contrast by a factor of almost 30.

Within manufacturing, too, the spectrum of sectoral growth rates was relatively broad. The most dynamic sectors were metalmaking and chemicals, which thanks to technical progress (and growing protection, in the case of metalmaking) grew by a factor of almost 15; paper and printing grew by a factor near 10, thanks presumably to growing literacy. Lower but still above-average growth rates were displayed by nonmetallic mineral products, engineering, and textiles, which grew by factors of almost 6, 5, and 4, respectively. Below-average growth rates were displayed instead by clothing and leather, which did not so much as triple; by foodstuffs and woodworking, which more nearly doubled; and by tobacco, which barely grew at all. The relative weight of the different groups and sectors accordingly varied significantly over time, as illustrated, at decadal intervals, by Table 3.

Similar variation is to be found even within these groups and sectors, which are in fact no more than accounting units. At times, their components are simply independent: thus for example within the mining sector the production of ores, typically for export, and the production of low-grade materials, tied to domestic construction. At times, like different textile fibers, they are direct rivals, and respond in opposite directions to changes in relative costs and prices. Moreover, even ostensibly "new" industries contain tradi-

[46] The Carreras silk series appears in Carreras, "Producció," p. 964. The new index is even closer to the Carreras index if it is recalculated to exclude construction, as the latter does. From 1880 to 1900, in particular, the new aggregate index lies above the Carreras index; but the difference is due almost entirely to the impact of construction, and not, as one would have suspected, to the depressing influence on the Carreras index of the then underestimated Istat grain-consumption figures.

[47] The sectors are those (or subaggregates of those) identified in Fenoaltea, "Valore aggiunto." The only significant modification is the transfer of cast iron production from engineering to metalmaking. The derivation of the corresponding series is briefly described in the Appendix.

[48] To avoid encumbering the present text with cautionary disclaimers the new estimates are here discussed as if they were facts. Given the large size and uncertain path of the foodstuffs industry, in particular, the summary statistics derived from the new index involve a considerable margin of uncertainty; *caveat lector*.

TABLE 2
ITALIAN INDUSTRIAL PRODUCTION, 1861–1913
(million lire of value added at 1911 prices)

Year		1861	1862	1863	1864	1865	1866	1867	1868	1869	1870	1871
1	Mining	35	37	40	41	41	41	43	47	49	49	49
2.01	Foodstuffs	434	433	435	437	438	439	441	443	446	450	455
2.02	Tobacco	20	20	20	20	20	20	20	20	19	20	21
2.03	Textiles	122	118	121	119	114	117	117	118	125	128	140
2.04	Clothing	88	87	87	89	92	90	91	91	93	93	94
2.05	Leather	110	113	116	119	122	125	129	132	136	139	143
2.06	Wood	155	132	127	127	156	169	160	131	136	146	136
2.07	Metalmaking	7	7	6	6	6	6	6	6	6	6	7
2.08	Engineering	188	190	195	197	199	202	206	211	219	226	231
2.09	Nonmet. minerals	46	53	54	56	57	48	47	46	47	49	51
2.10	Chemicals, rubber	15	15	15	17	16	17	17	17	18	18	19
2.11	Paper, printing	25	26	26	27	29	30	31	33	34	36	37
2.12	Sundry manuf.	8	8	8	8	8	8	8	8	8	8	9
2.	Manufacturing	1,218	1,202	1,211	1,222	1,257	1,272	1,273	1,257	1,288	1,320	1,343
3.	Construction	285	324	336	331	334	287	262	259	253	266	274
4.	Utilities	8	8	9	9	9	10	10	11	11	12	13
Total industry		1,547	1,572	1,596	1,603	1,641	1,609	1,588	1,573	1,601	1,646	1,678

Year	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899
1.	82	80	81	83	85	85	86	85	83	78	80	87	90	98
2.01	520	526	533	535	542	545	547	554	565	577	584	591	601	616
2.02	24	23	23	22	22	21	22	22	22	22	21	21	21	21
2.03	192	203	220	221	229	228	224	228	252	267	273	279	293	310
2.04	143	145	142	140	143	141	140	144	148	157	162	162	164	170
2.05	208	212	217	222	227	232	237	243	248	254	259	265	271	277
2.06	219	228	204	176	176	176	171	171	175	180	194	204	223	242
2.07	25	30	35	37	32	28	25	27	27	29	29	32	35	39
2.08	401	442	447	434	412	383	363	374	380	396	395	403	418	447
2.09	95	93	94	94	97	96	92	94	95	89	89	91	93	97
2.10	36	38	39	40	42	45	47	49	52	54	56	61	64	69
2.11	73	76	80	83	87	91	96	99	103	108	111	114	116	119
2.12	11	12	12	12	12	13	13	13	13	14	14	14	14	15
2.	1,947	2,030	2,045	2,016	2,022	1,997	1,975	2,018	2,079	2,145	2,188	2,239	2,314	2,423
3.	444	437	439	423	418	410	389	375	374	321	307	311	308	312
4.	27	29	31	32	34	36	38	41	41	44	47	49	55	59
Total	2,500	2,575	2,596	2,555	2,559	2,529	2,489	2,519	2,578	2,587	2,621	2,686	2,767	2,892

tional components, such as soap and candle-making within chemicals, or vice versa, such as the extraction of beet sugar within foodstuffs, or the production of worsteds within the wool industry. Nor is that all, for even some old industries with traditional technologies grew relatively rapidly: thus the distribution of water, which increased approximately ten-fold.[49]

[49] Fenoaltea, "Extractive Industries," "Textile Production," "Growth of Italy's Wool," and "Growth of the Utilities."

TABLE 2 — continued

Year	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885
1.	54	59	58	52	57	58	61	67	70	71	80	82	82	84
2.01	459	463	467	468	469	470	474	474	481	491	494	500	506	513
2.02	23	23	24	22	24	25	22	21	22	21	20	21	24	24
2.03	140	147	149	149	137	135	143	140	150	166	166	175	177	185
2.04	97	101	103	104	106	106	106	104	110	120	122	124	131	137
2.05	147	151	155	159	163	167	172	176	181	186	190	194	199	203
2.06	141	142	137	141	156	156	156	141	136	151	156	156	171	190
2.07	7	7	8	9	9	9	10	10	12	15	15	18	20	22
2.08	234	240	245	255	260	267	274	278	292	317	329	370	374	380
2.09	55	64	68	59	57	61	61	63	68	71	80	85	89	93
2.10	21	21	22	22	24	25	25	27	28	31	32	33	34	35
2.11	39	39	42	44	46	47	49	51	53	56	59	62	65	69
2.12	9	9	9	9	10	10	10	10	10	11	11	11	11	11
2.	1,372	1,407	1,428	1,442	1,460	1,476	1,503	1,495	1,545	1,636	1,674	1,730	1,790	1,860
3.	294	325	336	293	284	292	297	305	329	340	387	412	423	434
4.	13	13	14	14	15	16	16	17	18	19	20	21	22	24
Total	1,733	1,805	1,836	1,802	1,816	1,842	1,876	1,883	1,961	2,066	2,161	2,245	2,317	2,402

Year	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913
1.	98	102	106	111	113	118	121	122	123	127	136	142	148	149
2.01	631	644	661	680	684	706	739	776	799	799	823	827	872	909
2.02	22	22	22	23	23	24	24	25	26	27	28	28	29	26
2.03	308	324	339	343	358	371	402	442	450	450	433	428	475	475
2.04	170	173	181	187	189	194	214	241	248	250	243	243	255	253
2.05	284	290	291	292	293	294	295	296	297	298	299	300	301	302
2.06	233	247	257	272	277	301	311	331	360	389	410	386	367	362
2.07	40	39	39	44	49	58	69	73	85	97	104	105	119	115
2.08	464	453	456	484	514	557	627	675	762	796	821	828	880	856
2.09	102	109	121	131	141	153	163	174	186	213	242	260	273	276
2.10	75	78	83	90	99	104	113	122	136	145	159	168	184	192
2.11	121	123	128	130	150	177	206	211	224	237	248	242	270	273
2.12	15	16	17	18	19	20	21	22	23	24	25	27	28	29
2.	2,464	2,519	2,595	2,693	2,796	2,959	3,185	3,388	3,597	3,726	3,826	3,843	4,052	4,067
3.	322	339	368	386	405	433	460	483	513	586	661	697	713	707
4.	62	66	72	80	90	98	107	122	138	154	169	190	211	233
Total	2,947	3,026	3,141	3,270	3,404	3,608	3,874	4,115	4,371	4,592	4,793	4,872	5,124	5,155

Sources: See the text.

At the level of disaggregation evidenced here the most meaningful distinction appears to be once again that between the production of durables (and their inputs), tied to investment, and that of (other) nondurables, tied to consumption: on the one hand the extractive, woodworking, metalmaking, engineering, nonmetallic mineral processing, and construction industries, on the other the foodstuffs, tobacco, textiles, clothing, leather, paper, and sun-

TABLE 3
PERCENTAGE SHARES OF TOTAL INDUSTRIAL PRODUCTION

		1861	1871	1881	1891	1901	1911
1.	Mining	2.3	2.9	3.5	3.3	3.4	2.9
2.01	Foodstuffs	28.0	27.1	23.8	21.6	21.3	17.0
2.02	Tobacco	1.3	1.3	1.0	0.8	0.7	0.6
2.03	Textiles	7.9	8.3	8.1	9.0	10.7	8.8
2.04	Clothing	5.7	5.6	5.8	5.6	5.7	5.0
2.05	Leather	7.1	8.5	9.0	9.2	9.6	6.2
2.06	Wood	10.0	8.1	7.3	6.9	8.2	7.9
2.07	Metalmaking	0.5	0.4	0.7	1.1	1.3	2.2
2.08	Engineering	12.1	13.7	15.4	15.1	15.0	17.0
2.09	Nonmet. minerals	3.0	3.1	3.5	3.8	3.6	5.3
2.10	Chemicals, rubber	1.0	1.1	1.5	1.8	2.6	3.5
2.11	Paper, printing	1.6	2.2	2.7	3.6	4.1	5.0
2.12	Sundry manuf.	0.5	0.5	0.5	0.5	0.5	0.5
2.	Manufacturing	78.8	80.0	79.2	79.0	83.2	78.9
3.	Construction	18.4	16.3	16.5	16.2	11.2	14.3
4.	Utilities	0.5	0.8	0.9	1.4	2.2	3.9
Total industry		100.0	100.0	100.0	100.0	100.0	100.0

Sources: See the text.

dry manufacturing industries, plus the utilities. As can be seen from Figure 2 the first group displays a clear cycle, alternating periods of growth and periods of decline, whereas the second grows altogether more regularly; the cycle in the aggregate, with its peaks in 1865, 1874, 1888, and 1913 is therefore, in dampened form, the cycle in the production of durables (and related inputs).

That the production of nondurables and related materials (in essence, consumption) varied less than the stock-adjusting production of durables and related materials (in essence, investment) comes of course as no surprise. A closer look at the nondurables series reveals two sorts of deviations from a simple log-linear trend. Over the long term, growth appears to have accelerated, as the natural result of the falling weight of the slower-growing sectors (in essence, and as noted by construction, the foodstuffs industry). In the short term, growth rates varied from year to year, and seem generally higher when the growth rates of the durables group were also cyclically high.[50] The two groups' year-to-year growth rates are illustrated in Figure 3. The series diverge after 1907, as the growth of nondurables slowed sharply and then recovered, while that of durables accelerated further to a peak in 1908, slowed, and then collapsed; but before that they are broadly parallel. As the adage had it, *quand le bâtiment va, tout va*.[51]

[50] The variation in these growth rates would of course be greater if the leather-working industries too were assumed to vary with, say, clothing; for the moment, as noted, they enter the index only as a simple trend between the census benchmarks.

[51] "When construction prospers, everything prospers."

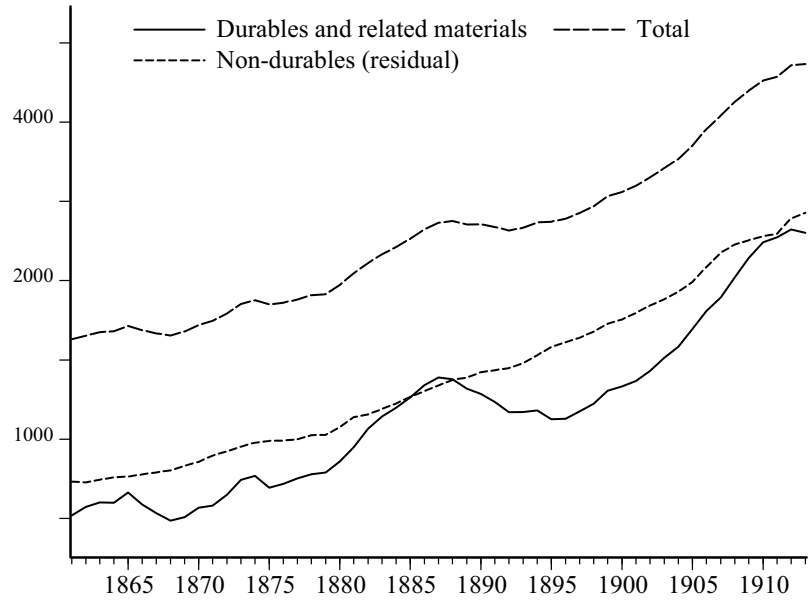

FIGURE 2
ESTIMATED INDUSTRIAL PRODUCTION, 1861–1913
(million lire of value added at 1911 prices)

Note: See the text.

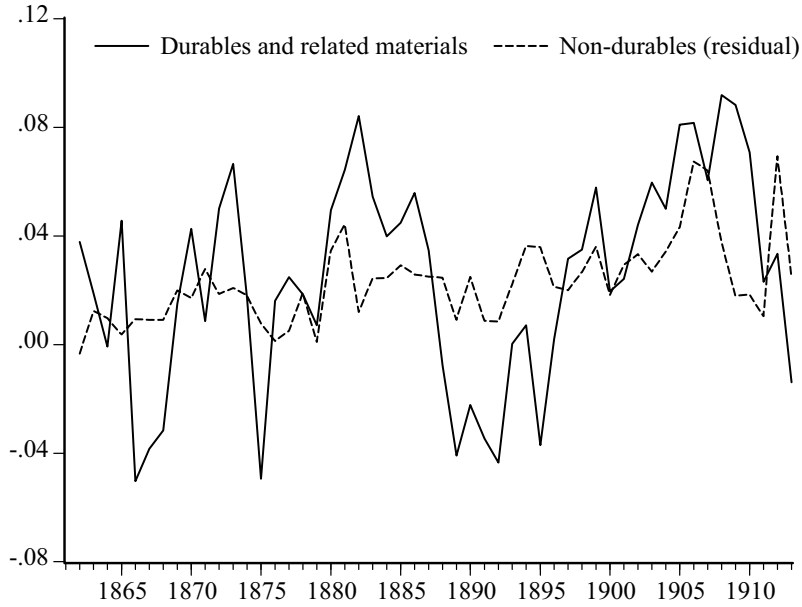

FIGURE 3
ESTIMATED ANNUAL CHANGES IN PRODUCTION, 1862–1913
(percentages)

Note: See the text.

Consumption too thus appears to display the Kuznets-cycle periodization, at least in its growth rate, with relatively rapid progress not only in the prewar boom but also in the early 1870s and the early and mid-1880s. To confirm this one would need to reconstruct the path of consumption as such; the present production aggregate only approximates it, quite apart from the foreign-trade wedge between production and consumption, because it is itself largely conjectural. The foodstuffs series, as noted, reproduces by construction the cycle in the other nondurables together; and it represents by itself no less than a third of the nondurables group in 1911, two-fifths of it in 1891 (the other benchmark), and (with the assumed elasticity) no less than half in 1861. Strictly speaking, therefore, the evidence of a growth cycle parallel to the investment cycle is limited to nonfood nondurables; that the production and consumption of foodstuffs, and of consumer goods in general, followed a similar path can for the moment be claimed only as a reasonable extension.

Why We Fight

That claim bears elaboration, however, because it goes to the heart of the continuing dispute over the effects on the Italian economy of the collapse in world grain prices in the early 1880s, and, correspondingly, the merits of Italy's protectionist response of 1887. The earlier flurry on the Italian tariff was concerned essentially with the industrial side of the tariff; but Gerschenkron had also strongly condemned the protection of grain.[52] Because Italy's introduction of the grain tariff was the mirror-image of Britain's repeal of the Corn Laws—with which it embraced its industrial vocation and became the workshop of the world—this evaluation was intuitively appealing; and it echoed a distinguished strain in the writings of Italy's own economists.[53] Italian economic historians have continued nonetheless to voice their approval of the grain tariff: Federico and Zamagni in particular because it ensured equilibrium in the balance of payments, Zamagni also, more seriously, because it limited the disruption and poverty caused by the fall in grain prices.[54]

[52] Gerschenkron, "Notes," p. 81.

[53] See, for example, Mazzola, "Aumento"; Sensini, *Variazioni*, pp. 89–90, 145–46; and Sylos Labini, *Problemi*, pp. 138–41.

[54] Federico, "Commercio dei cereali," pp. 79, 85; and Zamagni, *Economic History*, pp. 62, 116. Much of the recent historiography is wedded to the pre-Humian notion that "the equilibrium of the balance of payments in the long run [was] a necessary condition for Italy's economic development," and accordingly believes that domestic economic growth would have been impossible without rising foreign earnings (agricultural exports, emigrants' remittances) or policy measures to curb the demand for imports (protection). See in particular Federico, "Per una analisi" (which opens with the quoted assertion, p. 379; my translation); Bonelli, "Capitalismo," pp. 1220–28; and Cafagna, "Industrial Revolution," pp. 300–03, "Modelli," pp. 396–99, and "Contro tre pregiudizi," pp. 298–99 (and, for a more extended discussion, Fenoaltea, "Contro tre pregiudizi"). There are, however, encouraging signs of progress: see Cohen and Federico, *Growth*, p. 22.

That the fall in grain prices was a major shock, like the rise in oil prices a century later, was hard to dispute. That the grain tariff usefully limited the attendant disruption also seemed hard to dispute: within the standard comparative-advantage model changes in relative output prices (and therefore in tariffs) can have significant effects on individual sectors and factor prices, but these inevitably cancel up to a relatively trivial net effect.[55] In the case at hand the grain tariff surely stunted industry (and reduced wages, about which more forthwith), but free trade in grain would have stunted agriculture (and reduced rents). The net gain from maintaining duty-free grain imports at very different relative prices would have been small, and the cumulation of such gains might well have fallen short of the attendant adjustment costs, which the model altogether neglects. Because the only significant changes were distributional, the tariff could be judged good, or bad, according to one's practical politics.[56]

A different and possibly more insightful analysis emerged however from Ricardo's other model, ostensibly concerned with long-term growth. Assume two sectors—one producing the wage good, "corn," and the other manufactures, "cloth"; assume a uniform real ("corn") wage across the "corn" sector (where it is directly equal to the physical marginal product of labor) and the "cloth" sector (where it equals the physical marginal product of labor, in units of cloth, divided by the relative price of "corn," itself exogenously determined by world prices and tariffs); and assume further that the real wage is exogenously given—not by subsistence, in this case, but by opportunity earnings overseas (net, of course, of the costs of migration). Disturb the equilibrium with an exogenous fall in the relative price of "corn": that raises the real wage in the "cloth" sector, and equilibrium is restored by expanding the sector's labor force and reducing its real wage. With the comparative-advantage assumption of a fixed labor force and a variable real wage, the "cloth" sector expands only as the "corn" sector contracts, and the new equilibrium is reached at a higher real wage. With the mirror-image growth-model assumption the increase in "cloth" employment (and output) continues until the real wage returns to its previous level; and there is no countervailing reduction in employment (and output) in the "corn" sector, as its equilibrium is defined entirely in units of "corn" and therefore unchanged (though the "cloth" equivalent of the "corn" rent obviously declines). The grain tariff worked in the opposite direction. It raised the real cost of living and producing ("cloth") in Italy: from a mobile-resource, location-theoretic perspective it was equivalent to a punitive tax on Italy alone, and it cut not the wage of an immobile labor force but the num-

[55] This result is *in ipsis rebus*, and emerges both from simple calculations on the back of an envelope and complex solutions of CGE models: compare Fenoaltea, "Politica," and Williamson, "Impact."

[56] Romeo, as noted, had favored constraining labor income to maintain the flow of savings; similarly, in a different context, Zamagni, *Economic History*, pp. 245–46.

ber of jobs available at the sustainable wage. It diverted production and employment overseas, arguably by enough to be considered the primary cause of the Italian diaspora.[57]

This simple demonstration of the potentially disastrous long-term effects of grain protection did not of course sweep all before it. Federico in particular has continued his attacks on the anti-protectionist position, albeit with a shift from his former direct defense of the grain tariff to the broader argument that the issue is vastly overblown: protection in general did not amount to much, and the grain tariff itself had only small effects on the labor market.[58] If the tariff on grain did not much affect the real wage (at given employment), neither, logically, did the exogenous change in its relative price which the tariff offset. The protectionists believe the fall in world grain prices in the early 1880s caused widespread harm, and logically praise the 1887 tariff for containing it; the anti-protectionists believe the tariff was itself harmful, and logically consider the prior fall in grain prices widely beneficial. The two schools agree that the grain-price shock was indeed severe: the middle ground reached by Federico's arguments is very much a no-man's-land between the opposing trenches.[59]

These trenches have been exchanging fire since the battle was political rather than historical. At present, the prevailing orthodoxy reflects the protec-

[57] Fenoaltea, "Politica." Thus reinterpreted, the Ricardian growth model extends the comparative-advantage model in other ways as well. The division of the product between wages (spent on "corn") and surplus (rents, spent on "cloth") determines the allocation of labor between agriculture and industry, but only in a closed economy; and the only closed economy is that of the entire world. Any given region can deviate from the closed-economy equilibrium: it can export its surplus as "corn" to import "cloth" (Poland) or import the world's surplus "corn" to feed an urban-industrial labor force that produces "cloth" for the whole world (the Netherlands, England). The distinction between the "periphery" and the "core" is thus brought home to those of us who considered it, from the perspective of comparative advantage, entirely meaningless. In the context of labor mobility, too, it becomes clear that "the periphery" is relatively underpopulated *because* it exports "corn" (and its suppliers of "cloth" are located beyond its borders), and not, as the comparative-advantage approach would have it, vice versa: Ricardo's comparative-advantage model is taken to have killed mercantilist thought, but his growth model promptly revives it. See Fenoaltea, "Manchester," pp. 503–10.

[58] Federico and Tena, "Was Italy?" and "Did Trade Policy?"; Federico and O'Rourke, "Much Ado?"; and Federico, "Protezione." The (fixed-factor) CGE model presented in these last two papers suggests that the grain tariff cut the real wage by no more than some 2 percent, so that its impact on migration was surely trivial (Cohen and Federico, *Growth*, p. 41). Why this effect should have been so much smaller than the 20 percent obtained for Britain by Williamson's model ("Impact"), and indeed so much smaller even than the comparable first-order effect implied by the duty, grain prices, and the likely share of grain in workers' expenditure, remains unexplained; and the argument from the presumed effect on the supply of labor misses the point that the tariff cut the *demand* for (industrial, and total) labor in Italy.

[59] The assumption that grain consumption never deviated from trend, built into the present author's first index, was of course a similar middle ground; but it was based only on ignorance as to what the plausible deviations might have been, and was thus a starting point rather than a conclusion. The new index presumes instead that the 1880s were a period of rising per-capita consumption (in general, and specifically of food), and is thus squarely in the anti-protectionist camp. The arguments and evidence that support this view of the 1880s, briefly summarized in the following paragraphs, are developed in Fenoaltea, "Production."

tionists' pessimistic evaluation of the 1880s; but that was not always so, and as the big battalions moved to that side they seem to have left God behind. Though the grain-price shock was immediately said to have caused an "agrarian crisis," indeed, the path of the overall economy (and labor-market conditions) in the wake of that shock used to be judged, by general historians and economists alike, in very rosy terms.[60] As far as the present author has been able to tell, the notion that the "agrarian crisis" was in fact a *general* crisis was first put forth by Rosario Romeo. Romeo reached that conclusion very cautiously, not to say reluctantly: he naturally stressed the prosperity of the industrial sector, and dismissed even the sector-wide "agrarian crisis" as a piece of protectionist propaganda that masked the differential impact of falling grain prices on different parts of Italy's agriculture. His overall assessment of the 1880s is nonetheless very dark, apparently because an overall decline in consumption seemed to have been established, beyond a reasonable doubt, by the then brand-new Istat series.[61]

As has increasingly been recognized, those estimates do not warrant such respect. Given the nature of the available figures, in fact, the interpretation of the crisis of the 1880s cannot be based on credible production and consumption series; rather, that interpretation has to come first, and it determines the cyclical movements that one considers credible. Romeo's pessimistic conclusion has come nonetheless to dominate the literature, apparently on the strength of its intuitive appeal: because the rise in emigration in the 1880s seems proof enough of mass impoverishment; and because if grain production suffered from the fall in grain prices surely agriculture suffered, and if agriculture suffered surely the whole economy did. Indeed, the fish in Romeo's story has grown bigger in the re-telling: the most recent version by Valerio Castronovo throws caution to the winds, and describes conditions in the 1880s in absolutely catastrophic terms.[62]

These intuitive arguments are frankly surprising. The first surge in Italian emigration did come in the 1880s, but as is well known the second coincided with the prewar boom, when general prosperity is beyond dispute: Italian historians have no reason to tie emigration to growing hardship.[63] Again, Italy was indeed agricultural, and largely devoted to grain-growing; but its exports were the products of labor-intensive, specialized agriculture (silk),

[60] See for example Croce, *Storia*, p. 46; and Sensini, *Variazioni*, p. 23. The latter piece has been all but forgotten, and I myself came to know of it only very recently, through the kindness of Pierluigi Ciocca. It is a remarkable piece of work (written, astonishingly, when the author was in his early 20s), and much deserves to be rediscovered.

[61] Romeo, *Risorgimento*, pp. 168–70. As noted, the weakness of those consumption series was pointed out only a decade later.

[62] Castronovo, *Storia*, pp. 51–53. See also Luzzatto, *Economia*, pp. 165–73; and Zamagni, *Economic History*, p. 62. The account in Toniolo, *Storia*, pp. 119–37, is much more balanced.

[63] For recent analyses of Italian migration, see Faini and Venturini, "Italian Emigration"; and Hatton and Williamson, *Age*, pp. 95–122.

and grain was an import item. Scholars old enough to remember the oil shocks, and the damage wrought by rising import prices, have no reason to associate such damage with *falling* import prices: our own experience suggests that the fall in the price of imported grain in the 1880s represented an *increase* in overall supply and consumption opportunities, over and above that represented by the (Kuznets-cycle) capital inflows and growing trade deficit of those years. Moreover, as noted, the overall prosperity induced by falling grain prices should have been accompanied by a rise in the real wage, and an increase in labor's share of national income: the reasonable presumption is surely that food and total consumption then deviated from trend not downward but upward.[64]

The textile-consumption and real wage series newly compiled by the present author speak directly to this issue. Cotton consumption, which had remained between 1.4 and 1.9 kilograms per capita through the 1860s (the cotton famine apart) and 1870s, soared from 1.6 kilograms in 1880 to 2.4 in 1885; wool consumption, which had slowly grown from 0.7 to 0.8 kilograms per capita over the 1860s and 1870s, popped up to 1.0 in 1885 and 1.1 in 1887. Both figures then grew at slower rates, only to surge again during the prewar boom.[65] In the 1880s, as in the *belle époque*, Italy's consumers were improving their wardrobes: they can hardly have been eating less.[66]

The new real wage series tell a similar story. Until very recently the few extant nominal series tracked the earnings of industrial workers with sector-specific skills, and were not necessarily representative of the return to labor in general.[67] Istat's cost-of-living index was also problematic, not least because it oddly varied more than the (clearly more reliable) wholesale price index as prices rose to 1873, but less as prices then fell back.[68] That cost-of-living index has now been somewhat improved; and a nominal wage series

[64] In the context of labor mobility these are of course short-run effects: the long-run equilibrium real wage in Italy rises only with a rise in the real wage obtainable overseas, or a fall in the cost of migration. They are instead long-run effects if labor is considered immobile, and simply reallocated from land-intensive to labor-intensive production.

[65] Fenoaltea, "Growth of Italy's Cotton," pp. 152–53, and "Growth of Italy's Wool," pp. 124–25. The consumption of other fibers is less significant. Silk was obviously a luxury good, beyond the reach of the laboring masses; and hemp and linen consumption is largely conjectural, because the variations in domestic fiber production are unknown. The present estimates of hemp consumption assume that about half the growth in cotton consumption in the earlier 1880s represented substitution away from (inferior) hemp; the subsequent sharp decline in hemp consumption is attributed to the 1890s, when its relative price rose sharply. The linen estimates are based on a simple interpolation of the domestic flax output benchmarks; allowing for international trade, they yield flat consumption in the 1880s, and again a decline in the 1890s (Fenoaltea, "Textile Production").

[66] The consumption of sugar, coffee, and beer was adequately documented by the foreign trade or production-tax statistics. In all three cases per-capita consumption was above trend in the 1880s, and again after the depression of the 1890s (Istat, *Sommario*, pp. 172, 198, 228); but all three were comparative luxuries consumed on a very limited scale, and correspondingly less significant than cotton or wool.

[67] Fenoaltea, "Public Works," pp. 18–19; and Federico, *Filo*, pp. 524–25.

[68] Istat, *Sommario*, pp. 18–22, 172. The characteristically brief description provided there raises more questions than it answers.

for *unskilled* labor has also been constructed.[69] Nominal wages clearly *rose* in the 1880s (contrary to the now prevailing presumptions), albeit less than after 1895. The cost of living also rose after 1895, however, whereas it fell in the 1880s; the real wage displays significant and similar growth (near 40 percent) over those two upswings, and is generally flat at other times. Once again, therefore, the 1880s appear entirely similar to the later upswing.

The economy-wide crisis of the 1880s in Italy seems in sum of a piece with the "crisis" of fifteenth-century England: a period when low grain prices made for mass prosperity and low land rents, and which seemed to historians a time of hardship because the documents recorded the voices of the land-owners.[70] The new index assumes that food and total consumption rose with nonfood consumption over the 1880s as after the turn of the century: that assumption may be unpopular, but it is neither imprudent nor unjustified.

CONCLUSION

In the present state of knowledge, the path of aggregate industrial production in post-Unification Italy appears dominated by the Kuznets cycle. That cycle in construction, the production of other durable investment goods, and related materials is relatively well documented, and beyond reasonable dispute.

The path of the broad residual covering the production of nondurable goods and coinciding essentially with consumption is less clear, because of the uncertainty surrounding agricultural output movements over most of the period at hand. The present estimates of the nonfood elements follow a growth cycle parallel to the Kuznets cycle in durables; the same cycle is here attributed to foodstuffs as well, and therefore to the total production and consumption of nondurables. As such the new series present a picture of the 1880s entirely at odds with the now prevailing views, and the official reconstruction of the national accounts; but the latter appear based on shoddy data, and the former on shoddy logic.

Thirty years ago, a prudent estimate of grain consumption simply removed the obviously spurious variations of the official series in favor of a simple trend. The evidence now available on the consumption of major textile fibers and on the path of wages, and our experience of the effects of

[69] Fenoaltea, "Production." The new cost-of-living index is an average of Istat's own index, for whatever it may represent, the retail price of bread, and the wholesale prices of wheat and corn flour. It is reasonably symmetric with respect to the Istat wholesale price index before and after 1873; and though it may be excessively volatile, it is at least homogeneous over time. The unskilled-wage series refers to unskilled workers in industry, but because that was the alternative wage for rural workers it should be broadly representative. This is confirmed by a separate series for agricultural workers, in Lombardy alone, beginning in the early 1880s; when both series are available they move virtually in unison.

[70] Postan, "Fifteenth Century."

external supply shocks, suggest that the 1880s were like the early 1900s a period of relatively high consumption; and so they had been seen by historians and economists alike, prior to the diffusion of the opposite view over the last few decades.

The cyclical variations in the production of nondurables in general, and foodstuffs in particular, remain conjectural; but the conjectures incorporated by the present series appear reasonable, and the burden of proof seems now to rest with those who would continue to espouse the contrary views that dominate the recent literature.

Appendix: The Construction of the Production Estimates

THE GENERAL APPROACH

Measuring "Real Value Added"

The present index of industrial production is an index "of real value added" obtained by combining physical output series with estimates of value added referred to a single year. This is what it is; the extent to which it therefore only approximates what it should be depends on one's sense of what "real value added" actually means.

To the present author's mind, as argued at length elsewhere, the traditional notion that "real value added" should be understood as a constant-price aggregate of things is misguided. It stems, understandably, from the original context which prompted the deflation of current values into "real" ones: the devaluation of the monetary standard, when things (*res*, whence "real") keep their value in terms of each other, and "money" loses value in terms of everything else. But relative prices also change, and individual things are no more "real," in the technical sense of "of constant worth," than money. Properly understood, "real values" are current values, converted to the unit which is itself of constant worth: the fact that that unit is not self-evident (though an hour of common labor is widely popular) is vexing but secondary. What remains is the practical conclusion that real value added should be measured by deflating the current value added of each and every sector by the *same* deflator; and with that all the traditional "index-number problems" that stem from deflation by sector-specific indices (and obviously the further problems that may occur if the deflator includes negative weights, as in traditional "double deflation") simply disappear.[71]

Within a complete system of accounts that restricts "industry" to the transformation of goods into other goods (for sale in the goods market), and recognizes both speculation in assets and rent-seeking (typically output restriction by taxation or monopolization) as separate activities—and with value properly measured at current spot prices (which means that the services of capital assets are valued by their rental [shadow-]price, and not, as in the still standard theory of the firm, by their historical cost)—industrial value added coincides unequivocally with *both* "the value of activity" and "the value of the results of activity": the second pillar that underpins the traditional "double-deflated" measure thus also comes tumbling down.[72]

[71] Fenoaltea, "Real Value Added"; similarly Fuà, *Crescita*.

[72] Fenoaltea, "Real Value Added." In a minor key, the extractive industries are in turn to be defined as spanning the transformation of stuff-below-ground into stuff-above-ground, and their value added

From this perspective the simple sum of value added–weighted physical series is no more than a first approximation to the index one would obtain by first constructing (appropriate) current-price value added estimates for every year in the series, and then deflating them by the monetary value of the selected "real" unit; but the derivation of those estimates requires significantly more research than the decades already absorbed by the present effort.[73] Interestingly, though, the present simple construct often approximates the desired measure with a smaller error than the more costly traditional indices; with a sufficient disaggregation by production process as well as by product, in fact, it would coincide with a constant-price measure of the value of activity, which is itself the best (again from the present standpoint) of the traditional "quantity" indices.[74]

The present index specifically combines physical outputs with 1911 value added weights. Value added is indifferently estimated, for the reasons given, from evidence on the value of activity (factor use and cost) and on the value of its results (output price less materials cost and, if relevant, monopoly rents or excise taxes); the year 1911 was selected because that was the year of Italy's first industrial census, and of a complementary demographic census, and these sources together allow a useful verification of the sector-wide estimates built up from the disaggregated series.[75] The choice of a year so near the end of the period covered by the index is otherwise unfortunate, not from the present perspective because of any traditional index-number bias, but simply because relative prices change over time. To limit the attendant error pending the burdensome recalculation of a full set of current-price value added estimates, the present index could usefully be improved by calculating a second set of year-specific value added estimates for a year near the beginning (probably 1871, marked by the first demographic census with usefully disaggregated labor force data), and recalibrating the time series to interpolate those benchmarks; but this effort too is in the future.

Coping with the Lack of Data

The Italian sources include the detailed labor force figures in the (1871, 1881, 1901, and 1911) censuses; increasingly detailed and by all accounts relatively reliable foreign-trade figures; and precious little direct evidence of industrial production. Because the sub-soil belonged to the crown, the Corpo delle miniere monitored the extractive industries, producing rich data on mining output (but little on quarrying); fortunately, they also concerned themselves increasingly with related industries (metalmaking, nonmetallic mineral products, industrial chemicals). Production taxes generated a few more series, mostly for foodstuffs; and that is nearly all.[76]

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properly excludes the value of their raw material (Fenoaltea, "Extractive Industries"). Current practice, which treats the output of this sector as if it were created out of thin air, much overstates the income of the oil-rich areas.

[73] In essence, therefore, the present approach is justified by its minimal data requirements. The physical-output series reconstructed here are in any case a stepping-stone to the recalculation of current-price value added, as year-specific information on factor use is typically lacking; and they allow the calculation of consumption series, of interest in their own right.

[74] The reaction of different indices to various types of exogenous changes is examined in Fenoaltea, "Real Value Added."

[75] These and related sources are cited and discussed in Fenoaltea, "Valore aggiunto," pp. 105–12. The census-based verification of the disaggregated figures is of no small moment: the author's first estimate of value added in construction was close to Istat's, and only the censuses showed that it was grossly incomplete; it took two more years of research to plug the gaps (mostly related to nonrailway social overhead capital not covered by the public-works budgets).

[76] For a more extended discussion and the relevant citations see Fenoaltea, "Valore aggiunto."

The coverage of the existing indices is correspondingly limited. Some, like Gerschenkron's, stretch the elementary series' apparent coverage by sub-aggregating them into indices for entire sectors, which are then considered "covered"; the omitted sectors together are then implicitly attributed the path of the summed "covered" sectors.[77] Other indices, like that of Carreras, combine the elementary series directly, and the omitted industries together are then implicitly attributed the time path of the sum of the included ones. In the presence of major lacunae in the data, guesswork is of course unavoidable; but the guess that the sum of the missing parts moved exactly as the sum of the included parts would be nobody's best guess, and these guesses survive only because they are in fact implicit.[78] The present index instead boasts complete coverage. The boast is in a sense hollow, clearly, since it too incorporates a good deal of guesswork; what it really means is that the guesses which here stretch the data base are the result of reflection, and, if not always thoroughly educated, at least always defensible.[79]

The improvement over the previous indices does not of course stem only from superior guesswork, and the new index receives it strongest support directly from the labor theory of value. Most significantly, it probes the surviving sources more deeply than its predecessors: even the familiar series provided by the Corpo delle miniere have typically been reconstructed from the local data, and improved in detail (for example where the repetition of an output figure followed by a sudden jump shows that the data were not in fact updated annually). To reduce the heterogeneity of the elementary series it uses previously neglected ancillary evidence to disaggregate them further (for example, to distinguish woolens from worsteds, or soda nitric acid from arc nitric acid), or simply to improve the unit of measurement (for example, to replace weight-based measures of cotton yarn and cloth output with length-based measures sensitive to quality change). Many new series are generated by a more extensive use of the import-export data to separate different stages of production (for example, to distinguish wool carding or combing from spinning); some introduce physical measures where none seem to have existed before (for example, the output of the water utilities); and some existing series have been entirely reconstructed with new evidence (for example, silk reeling, estimated by working back from loom-based estimates of silk weaving rather than forward from the cocoon-crop figures).

The substantial residual that is dominated by guesswork has all been estimated, as noted, with due deliberation. The guesses are most solid in the presence of relatively rigid input-output coefficients, which (allowing for international trade) are used to generate estimates across industries and sectors (for example, from construction to construction materials) exactly as they have long been used for successive stages of production within a single industry (for example, from cotton yarn to cotton cloth). Where these are lacking, an initial production or consumption series (whence technically related series can then be derived) must be constructed *ad hoc*; such new series typically incorporate evidence of changes in relative prices, in effect assuming that production varied along a stable supply function, or consumption along a stable (multi-product) demand function. Simple interpolation at

[77] This procedure is quite traditional, and sometimes described as inevitable; for a broad international sample see Fenoaltea, "Growth of the Utilities," pp. 607–10.

[78] The traditional two-stage procedure is doubly pernicious, because it randomly leverages the different elementary series. Assume for example that, as in Gerschenkron's index, sulphuric acid represents the entire chemicals group. If rubber and petroleum products are considered chemicals, they will be assumed to move like sulphuric acid; if they are considered separate sectors, they will be assumed to move as a weighted sum of sulphuric acid and whatever else is in the index—all depending on the arbitrary accounting system in use, and without a moment's thought.

[79] With complete coverage, too, a change in the system of accounts involves only a different subaggregation, with no effect on the aggregate unless the scope of the latter is altered as well.

constant growth rates is also relied upon, of course, but typically in a minor key, to bridge gaps in otherwise better-documented series.

By a combination of art and labor, then, the number of product-specific series has been raised to a few hundred, and the claimed coverage of the index to 100 percent. A residual bit of cheating should be admitted: full coverage of an industry with a small number of series is achieved only by distributing its entire value added over those series. The corresponding products are chosen, by design, to coincide with those most actively traded (across as well as within national borders); but the procedure obviously assumes that all the raw material was in fact processed from one end to the other (or at least in an unvarying fraction) of what was in fact not a single transformation but a sequence of steps. Cotton-working, for example, is represented by two series alone, for "yarn" and "cloth": these properly track spinning and weaving, but such ancillary steps as doubling, dyeing and finishing are "covered" only because they are assumed to vary in a constant ratio to spinning or weaving. The great detail of the foreign-trade statistics would allow one to push the vertical disaggregation of production well beyond what has been done here; but the additional effort would again be substantial. Saul hath slain his thousands; David has our best wishes.

THE NEW ESTIMATES

The Nonmanufacturing Series

The new series covering the extractive industries, construction, and the utilities have already been published, with more or less extended descriptions of the underlying sources and methods.[80]

The utilities industries are covered by eight basic series. Power production is covered by separate series for hydro power and thermal power, built up in the main from data on the corresponding power plants, allowing for changing average utilization. The gas utilities are represented by separate series for gas, coke, and tar; these were reconstructed from the local data provided by the Corpo delle miniere, and prior to ca. 1890 rely heavily on simple interpolation. The water utilities are covered by three separate series. The Apulian aqueduct is tracked by the growth of its (deflated) capital, based on the company's reports; other aqueducts are tracked by a single series built up from aqueduct-specific figures obtained by multiplying the daily yield (or more precisely its square root, to allow for economies of scale) and the aqueduct's length; and local distribution nets are tracked by their length (as reported for the major cities, and otherwise as estimated on the basis of the growth of the corresponding aqueducts), increased by allowances for wells and cisterns. The measured growth rate of the utilities sector is much reduced by the inclusion of separate series for the water-supply industry; the previous series (for Italy as for other countries) covered only gas and power, and implicitly assumed that the age-old water supply industry grew as rapidly as its much newer cousins.[81]

Construction is divided in turn into three components. Railway construction is covered by 13 basic series. Six refer to new construction, respectively of major railway lines, minor railway lines, urban and suburban machine tramways, urban and suburban horse tramways; all are based on data on new mileage completed, distributed over the relevant construction period. Another series refers to improvements (essentially of major railway lines); it is estimated from rail consumption, net of that absorbed by new lines. Six further series cover the maintenance of railway and tramway networks, respectively. Railway track maintenance is indexed by a weighted sum of track use (itself a weighted sum of separate series for

[80] A full description of the sources and methods underlying the published and unpublished series is provided in Fenoaltea, *Italian Industrial Production*, in progress.

[81] Fenoaltea, "Growth of the Utilities."

locomotive-kilometers, passenger-car axle-kilometers, and freight car-kilometers) and track length; tramway track maintenance is indexed by the corresponding track lengths (with a crude correction to allow for increasing use), distinguishing the four systems to allow for their very different unit costs.[82]

The construction of nonrailway social overhead capital is estimated primarily from the corresponding expenditure, deflated by indices of labor and materials costs constructed *ad hoc*. The main expenditure series are nine in number, and refer respectively to maintenance, new buildings, and other new construction at the three relevant levels (State, provinces, municipalities, corrected for changes in Italy's political borders); these are built up from the public budgets, and include expenditure in the health budgets (hospitals), the education budgets (schools), and so on as well as that in the public-works budgets. Four further series cover privately-financed construction. Two series cover private expenditure respectively for maintenance and new construction, mainly for land-reclamation and water-control projects; these are estimated from the matching funds in the public budgets, and are also deflated into constant-price series. The other two cover the new construction and maintenance, respectively, of other privately owned systems, including gas and power distribution networks, private aqueducts and irrigation works, and hydroelectric dams; these are all indexed directly in physical units. The resulting aggregate series differs from the Istat–Vitali series mostly in its level: it is up to twice as high, mainly because the old series seems to have been constructed from the public-works budgets alone. Moreover, the great collapse of nonrailway and total public works in 1870 registered by that series disappears altogether: it turns out to be a quirk due to changes in public accounting methods.[83]

The construction of private buildings, finally, is represented by four basic series. One represents the new construction of taxed (essentially urban) buildings; it is estimated from 1872 from the changes in the tax rolls, suitably shifted and deflated, and brought back to 1861 on the basis of an index of urban construction estimated from the archival records of the municipal taxes levied on construction materials in a sample of (mainly Northern) cities. A second represents the maintenance of taxed structures, indexed by the corresponding stock (again estimated from the tax rolls). These series are then used to generate the corresponding estimates for exempt (essentially rural) structures, allowing for the redistribution of the population from census to census.[84]

The extractive industries are covered by 32 series. The larger number of these are the familiar series derived from the reports of the Corpo delle miniere, albeit with the corrections suggested by the underlying local data; these cover the output of the mining sector (and salt pans and peat bogs), but only marble extraction within the quarrying sector. Italy's ores, and its marble, were largely exported; the large residual represented by low-grade materials consumed by domestic construction is here indexed by separate series for gypsum, limestone, sand, and other low-grade materials that incorporate the occasional benchmarks provided by the Corpo delle miniere, interpolated on the basis of construction movements. Quarrying, pulled along by domestic construction, apparently grew much more rapidly than mining, and the path of the new series is very different from that of the corresponding Gerschenkron and Istat–Vitali indices, based essentially on mining alone.[85]

[82] Fenoaltea, "Railway Construction."

[83] Fenoaltea, "Public Works." Prior to 1870 each fiscal year included significant disbursements from the neighboring calendar years, and these roughly offset each other from year to year; fiscal 1870 excluded the disbursements of that year attributed to fiscal 1869, following the old system, but included none of the disbursements of 1871, following the new system.

[84] Fenoaltea, "Construction."

[85] Fenoaltea, "Extractive Industries." For the reasons indicated (note 72), moreover, the present estimates of value added exclude the value of the in-ground materials consumed by the industry.

The Textile Series

Within the broad manufacturing sector, only the textile industry is covered by new published series.

The new series for the silk industry assume that the extant output data were simply wrong (and not, as Carreras believed, correct but misinterpreted). Since the essential problem was the excess of net exports of thread over apparent production, the re-estimation began by using loom data to fix the approximate path of internal thread consumption, and then used the international trade data to work back to the earlier stages of production. The industry is covered by eight separate series, which refer respectively to dried cocoons, reeled silk, thrown silk, dyed silk, cloth (in all-silk equivalent), combed waste, spun waste, and dyed waste. Aggregate value added grows noticeably more rapidly than is suggested by the extant partial series, especially after ca. 1890.[86]

The wool industry is in turn represented by ten series. The output of clean foreign virgin wool (from greasy wool) is estimated directly from the import figures. The output of clean domestic virgin wool (from fleece-washed wool) is based on new estimates of the sheep herd, which interpolate the two available animal-census benchmarks not with a simple sinusoid (as do the Istat estimates), but on the assumption of a constant elasticity with respect to the relative yield of grazing and cultivation; the puzzle of rising wool output in the face of falling world prices is explained by the joint production of *pecorino* cheese and wool, with the latter as the by-product. The output of reclaimed wool is estimated as a simple trend consistent with the limited evidence on the stock of tearing machines. The output of other wool goods is represented by separate series for carded wool, combed wool, woolen yarn, worsted yarn, covers and rugs, woolen cloth, and worsted cloth; these are estimated by using the international trade figures to estimate total wool consumption, assuming that the shares consumed as cloth, felt, and so on remained as those documented at the end of the period at hand, and working back allowing for international trade. The further distinction between woolens and worsteds is based on periodic spindle data, and extended, allowing for international trade, upstream and downstream. The main results of these new series are, as noted, to place the surges in total consumption in the 1880s, and again after 1900—and to reveal the astonishing growth of the worsted industry, which grew over half a century by almost two full orders of magnitude.[87]

The cotton industry is represented by just two series, for "yarn" and "cloth," as in the previous indices. The main innovation, as noted, is to measure output by the length of the yarn spun, and of the yarn converted into cloth, rather than by the corresponding weight. The transformation uses the detailed international trade data to estimate the average count (length per unit weight) of imports and exports, and obtains the average count of the domestic stuff as a residual on the assumption that the average count consumed (known only at the end of the period at hand) remained constant over time. The new estimates, which thus allow for quality change, grow considerably faster than the crude weight-based estimates, which implicitly assume a constant average count in production; they show the strong, enduring effect of protection in the middle of the quality range, contradicting the widespread view that the tariff was without noticeable effects; and they prompt a reconsideration of the technical aspects of Italy's tariff on cotton goods.[88]

[86] Fenoaltea, "Growth of Italy's Silk."

[87] Fenoaltea, "Growth of Italy's Wool."

[88] Fenoaltea, "Growth of Italy's Cotton," "Manchester," and "Product Heterogeneity." As noted, these estimates too identify two consumption booms, in the 1880s and after 1900; but this result is independent of the change in the measured dimension of output.

Other textiles are represented by 14 further series. Two refer respectively to artificial silk thread, estimated from the abundant evidence on the origins of the industry, and the corresponding cloth, estimated from the apparent consumption of thread. Three series refer respectively to combed jute, jute thread, and jute cloth; all three are derived directly or indirectly from import data. Hemp and flax were instead traditionally grown in Italy, but useful agricultural output data are available only as a few benchmarks. The linen industry is represented by four series, respectively for combed fiber, tow, yarn, and cloth. Since linen goods were mostly imported, the estimates are obtained by a simple interpolation of the flax output figures, and then working through the production process allowing for imports (and netting out household production, allowed a constant share, estimated near one quarter, of fiber production); the resulting estimates are crude, but receive a measure of support from the anecdotal evidence. The hemp industry is represented by five series, covering the same four listed for linen, plus rope. Since hemp goods were largely exported, and in relatively crude form, production is best estimated by working back through the production process (as in the case of silk). Absent better evidence, final consumption is estimated at the benchmarks generated by the agricultural data, and extrapolated with the aid of a simple index that allows for population growth and construction movements. Two alternative calculations were performed: one applies that index to the benchmark consumption of hemp, linen, jute, and cotton, and then deducts everything but hemp; the other applies the index to the benchmark consumption of hemp and jute alone, and then deducts jute. The former estimate of hemp consumption seems to behave more reasonably in the early decades, the latter in the later ones; this is consistent with the rise in the relative price of hemp in the early 1890s, which seems to have displaced it from its nonindustrial uses. The alternative consumption estimates are accordingly spliced together at that point; production is then estimated by working back through the production process, allowing for international trade (and for household production, attributed a constant share, estimated near one-quarter, of household consumption, itself estimated as the difference between the two consumption estimates previously described plus a minor part of the second). The estimate so obtained for rope and cloth together is in turn disaggregated on the assumption that rope consumption represented a constant share, near one-half, of the industrial consumption of fiber.[89]

The estimates for the textile industry as a whole obtained from these series grow relatively smoothly; the periodic supply crises of the silk industry reappear in the aggregate, but in very muted form. The most significant feature of the new series lies perhaps in their internal differences: the old linen and hemp industries declined while the others industries grew, and the cotton famine actually increased total production by diverting consumption to fibers with higher processing costs. This result underscores the already noted unreasonableness of the standard assumption that a subset of a sector can be taken to represent the whole. It may be worth noting, however, that Gerschenkron's cotton index, based on fiber imports alone, tracks the industry's total output relatively well, as the neglected shift from yarn imports to yarn exports (which reduced growth) and the similarly neglected shift to higher-quality yarn and cloth (which increased growth) largely offset each other. Moreover, Gerschenkron's silk series was as noted an unacceptable index of silk production; but it turns out to have been a good index of aggregate noncotton production, and over most of the period at hand his index of total textile production is surprisingly close to the present aggregate. In estimating time series, as in love and war, much the most important thing is luck.

[89] Fenoaltea, "Textile Production."

The Other Reconstructed Manufacturing Series

The already reconstructed but not previously published time series cover clothing, wood products, metalmaking, nonmetallic mineral products, chemicals and rubber, and paper and printing.

The clothing sector is covered by 13 basic series. Seven series refer to finished cloth products, respectively of pure silk, mixed silk, cotton, wool, hemp, linen, and jute. Estimates of total production are obtained directly as the sum of cloth output and net imports. Summing these with value added estimates derived from input and output prices yields a total, in 1911, far in excess of the total suggested directly by the census labor force data; the difference presumably reflects widespread household production. Industrial production is estimated on the assumption that the relative share of the available cloth transformed by professionals increased with the unit value of the raw material, and the entire scale of fiber-specific relatives is then fixed to reproduce the census-based estimate of total value added.[90] Six series refer to felts and hats (net of cloth caps), and specifically to wool felts, wool hats, wool caps, fur hats, straw hats, and straw braid. All six are derived by first estimating output and consumption at the end of the period at hand, when abundant documentation is available; consumption is then extrapolated on the basis of a suitable index, and net exports are then added to estimate output (of final goods, and of intermediate goods like felt and straw braid). In the case of wool products, to maintain consistency with the textile estimates, consumption is assumed to represent a constant share of aggregate wool consumption; the consumption of fur hats and straw hats is instead assumed to vary as a weighted sum of wool and silk consumption.

The wood products industry is very poorly documented, and accordingly represented by just two crude time series. The first series represents the output of finished lumber; it is obtained by combining rather disparate estimates of lumber consumption on the one hand and raw material supply on the other. The consumption-side estimates are calculated from the evidence yielded by the tax on construction materials in a sample of urban areas, correcting for the differences in the path of the consumption of such materials in those urban areas and in Italy as a whole; the input-side estimates are calculated as the sum of the outputs obtained from imported and domestic timber, on the assumption that timber production varied, along a stable supply curve, in response to relative prices. The second series represents the output of finished wood products; it is estimated from lumber production and consumption, deducting an allowance for the lumber absorbed as such by the construction industry.

The metalmaking industry is covered by 15 series. Three refer to ferrous metals (pig iron, rails, and semi-finished metal), and 12 to nonferrous metals and their alloys: two each to (ingot and semi-finished) aluminum, lead, and copper, and one each to antimony, mercury, gold, silver, semi-finished tin, and semi-finished zinc. The data provided by the Corpo delle miniere, suitably corrected, yield the series for the ferrous metals, copper and its alloys, and other ingot metal; the residual estimates for semi-finished goods are estimated from input availabilities, allowing for extraneous consumption (as alloy, or for chemicals).

The nonmetallic mineral products industry is covered by 11 series. Eight represent kiln products: plaster, lime, cement, bricks and tiles, terra cotta, ceramics, glass, and other products (plaster and cement goods). The other three series cover processed marble, ground

[90] In the event, household production is assumed to absorb the following shares of consumption (ignoring trade in finished goods, which is generally trivial): pure silk, 5 percent; mixed silk, 10 percent; cotton, 75 percent; wool, 60 percent; hemp, 10 percent; linen, 80 percent; jute, 0 percent. The hemp and jute figures reflect the further assumption that the cloth of these fibers produced by industry was mostly consumed by industry itself (awnings, sacking, and so on); the household processing of purchased hemp and linen cloth is also additional to that of cloth worked up directly from the fiber.

sulfur ore, and other construction stone. These series too are built up from occasional benchmarks provided by the Corpo delle miniere, interpolated by construction movements. The Corpo delle miniere actually provided annual series from 1901; but a reconstruction of these at the local level shows that they were dominated by the simple repetition of earlier figures, with the result that the published series (and the indices that incorporate them) largely miss the prewar boom.

The chemical industry was documented by the Corpo delle miniere in great detail. These data, reconstructed as usual from the local data, yield time series for over 80 products, including acids, fertilizers, explosives, pigments, organic and inorganic salts, electrochemicals and gases, and coal and petroleum products. Together, however, these covered no more than half the industry in 1911; the omitted sectors were the traditional ones, based on animal or vegetable materials, and these surely grew much more slowly. These are represented here by a dozen crudely estimated series. Match production is documented by tax data from 1896; earlier figures are obtained as the sum of net exports and consumption, estimated by extrapolating its subsequent growth rate. The production of fats, soap, and the like on the one hand, and of pharmaceuticals on the other, is estimated instead as a simple interpolation of four benchmarks derived from the labor-force data in the censuses. Paint and ink production is estimated from the apparent consumption of domestic and imported natural and artificial coloring materials; and the production of rubber goods is estimated directly from the imports of the raw material. The international trade figures also underpin the other, much less significant series estimated for goods that were primarily exported, or obtained from imported materials: essential oils, acetic acid, calcium citrate and concentrated lemon juice, tanning extracts, tartaric acid and cream of tartar, and also photosensitive film and plates (estimated from the imports of silver nitrate).

The paper and printing industry is in turn disaggregated, vertically, into three components. The central estimates refer to paper production; these include a few output figures for the last prewar years, scattered benchmarks calculated from data on the industry's stock of equipment, and extensive interpolations. Pulp production is estimated from paper production, allowing for net imports of pulp; and the output of the paper products, printing, and publishing industries is estimated together on the basis of paper consumption, itself obtained as the sum of output and net imports.

The Interim Manufacturing Series

The present index complements the previously mentioned series with *ad hoc* estimates for the remaining sectors: foodstuffs, tobacco, engineering, and sundry manufacturing. These interim series are crude extrapolations of the (carefully constructed) estimates of value added in 1911.[91]

The tobacco series extrapolates the 1911 value added estimate on the basis of the Istat series for the total weight of output.[92]

The leather-products series is even more rudimentary: it is a simple log-linear interpolation (and extrapolation) that incorporates only the four data points obtained from the 1871, 1881, 1901 and 1911 census figures for the corresponding labor force. Productivity growth is assumed to equal 1.25 percent per annum, by analogy to the figure calculated, over the long term, for the clothing industry, which similarly relied increasingly on sewing machines. The odd feature of this series is the sharp reduction in its growth rate after the turn of the century, which seems to exceed that plausibly attributable to the replacement of belting by electric wiring; on the other

[91] Fenoaltea, "Valore aggiunto."

[92] Istat, *Sommario*, p. 127; growth is assumed negligible before 1868.

hand, the labor force was always essentially all-male, and thus immune to the variations that might have stemmed from the uncertain labor-force participation of women.

The engineering series is obtained as the sum of four components. The 1911 value added estimates for the maintenance of tools and the working of precious metals are extrapolated in the same way as the leather series, using the census data on blacksmiths and goldsmiths (but assuming constant productivity, as there seems to be no evidence of change in the age-old techniques employed by these artisans). The estimates for other new production are extrapolated together on the basis of the consumption of semi-finished iron and steel, net of rails; and the estimates for other maintenance, essentially of machines, are extrapolated together on the basis of the energy consumed to drive those machines.[93] The third of these four components is essentially what was considered representative of engineering as whole in the author's early work (and in Gerschenkron's); it is the only cyclical element of the lot, and grows much faster than the rest of the industry.

The estimates for the small residual manufacturing sector are the sum of two series: one for the photographic industries, indexed by the estimated production of photosensitive plates, the other for the rest, which simply assumes a constant growth rate (1.25 percent per annum). Nothing of significance rides on this figure.

The critical estimates are rather those for the foodstuffs industry: as noted, it was a very significant part of total manufacturing and total industry, and the path of food production and consumption is the object of very considerable disagreement. At the time of writing, detailed output estimates were available only for the two benchmark years (1891 and 1911) reexamined under the auspices of the Bank of Italy. These were obtained by the present author, in close consultation with Federico, who was responsible for the underlying agricultural production figures; and while the 1891 estimates were produced at current prices it is of course a simple matter to reweight the physical production figures with the estimates of unit value added at 1911 prices generated by the other benchmark.[94]

Foodstuffs production is here essentially identified with consumption, and assumed to vary with the production–consumption of nonfood nondurables; in this fashion the consumption side of the index varies with the better-documented nonfood component, and accordingly establishes the *presumptive* path of foodstuffs too.[95] The only correction to the direct indexing of foodstuffs (consumption) by nonfood nondurables (consumption) allows for the presumed lower variability of food consumption, both over the cycle and over the long term; and this correction was obtained directly from the 1891 and 1911 benchmarks. A further correction allows for the major discrepancies between food production and consumption; but this is altogether secondary.

The resulting calculation is straightforward. The output estimates for 1891, combined with value added calculated at 1911 prices rather than current prices, yield a total of 545.1 million lire; the corresponding figure for 1911 is 827.3 million lire. Correcting these to eliminate the output growth due to growing exports (of pasta, flour, and tomato products: in value added terms, 0.1 million lire in 1891 and 20.9 million in 1911) or import substitution (raw sugar, the production of which accounted for 0.4 million lire in 1891 and 40.5

[93] The latter is calculated as a moving average of the total consumption of energy, excluding that from firewood; see Bardini, "Economia," p. 90.

[94] Federico, "Valore aggiunto" and "Stima," pp. 20–53; Fenoaltea, "Valore aggiunto," pp. 118–29; and Fenoaltea and Bardini, "Valore aggiunto," pp. 127–33. See also note 20.

[95] A subsidiary consideration was the uncertain significance of the wage series available when these calculations were carried out (2001). The version of Fenoaltea, "Production," that had already been circulated was based essentially on the new evidence from textile consumption, the existing wage series for skilled workers, and the anthropometric evidence; the revision of the cost of living index and the calculation of wage series for unskilled workers, prompted in no small measure by the desire to verify the presumptions built into the production series described here, were added in 2002.

million in 1911) one obtains net figures equal to 544.6 million in 1891 and 765.9 million in 1911, incidentally implying considerable growth in per capita consumption. The corresponding figures for nonfood nondurables (sectors 2.02-2.05, 2.10-2.12, and 4 in Table 2) equal 806.9 million lire in 1891 and 1,626.7 million lire in 1911; the elasticity of food consumption to nonfood production–consumption thus works out to almost exactly 0.40.

The main component of the food-production estimates in Table 2 is the invariant-trade production–consumption series obtained from these consumption benchmarks, extrapolated on the basis of the sum of the nonfood nondurables series, with the indicated elasticity. The final estimates add back in the growth in 1911-price value added attributable to the indicated changes in international trade: in the previously noted exports, as reported annually by the trade statistics, and in raw sugar production, indexed directly by the tax-based Istat series.[96]

THE PRESENT INDEX: AN APPRAISAL

In appraising his own index Gerschenkron wrote that "[it] is probably capable of being improved by further study. But such improvements would be spotty." A few series might be added, different weights could be used; but "the main features of the present index would remain unchanged and so would its shortcomings."[97] No such claim to near-perfection, even in its purely etymological sense, is advanced here.

The present product-specific estimates, first of all, can be improved all along the line. Most obviously, as noted, further horizontal and especially vertical disaggregation would bring into the index far more of the enormous amount of information contained in Italy's international trade statistics, and correspondingly reduce the still irritatingly extensive imputation that survives in the present estimates. Further sources, too, can be found: much information on Italy's chemical industry was discovered for example in an old textbook on industrial chemistry, and similar treasures surely still lie buried. The value added estimates, too, can be refined: best of all by turning up actual records of processing costs, but even failing that merely by replicating the present estimates with a clearer grasp of the underlying technologies.

For all that, the product-specific series built up over the years can be considered exceedingly robust, if only for the worst of reasons. A broad-scale revision is most unlikely, for no one, surely, will be daft enough to take it on. There may be more hope in the slow accretion of many minor efforts, especially if revising a very small subset of the present series were to become a popular topic for student theses; but even if this were to happen at all nothing of significance to the resulting aggregate would be likely to emerge in the reader's lifetime, to say nothing of the writer's.

The broad *ad hoc* estimates that complete the index are of course much less sturdy, and in any case slated for revision in reasonably short order. Of these, the aggregate engineering series is the most likely to retain its broad features. The leather-products series may well change drastically; given its puzzling path, indeed, one rather hopes so. Tobacco does not matter much, and will presumably only change as it is improved by disaggregation; and the "n.e.c." group does not matter at all. The critical series, once again, are those for foodstuffs, and especially for grain products; and how these may change will depend more on how the arguments play out, and what different scholars will choose to believe, than on any new direct evidence.

Further improvements to the overall index can come of course from the calculation of current-price value added estimates for an early benchmark. These will allow at least a

[96] Istat, *Sommario*, p. 126.

[97] Gerschenkron, "Description," p. 412. A surprising statement, from such a scholar.

rough correction for the changes in technology, and in relative prices, that the present series neglect; and because this improvement can be obtained with a reasonably limited effort one can look forward to it with a fair degree of confidence.

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