The growth of the Italian economy, 1861–1913: Preliminary second-generation estimates

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This article presents new estimates of aggregate production in post-unification Italy: the first since the original Istat-Vitali estimates of some forty years ago not to recombine their component series, and to be based entirely on new research. The new 1911-price GDP series incorporates the recent Federico series for agriculture, the author's recent series for industry, and newly derived series for services that extrapolate the recent Zamagni estimates of their value added in 1911. The new time series for the 11 sectors specified by the original estimates often differ widely from their predecessors. The new aggregate yields a long-term growth rate well above that of the original series, but not as high as that of Maddison's revision. The end-of-the-century acceleration that characterised all the earlier aggregates disappears: total production followed in muted form the long swing in industrial production, which in turn reflected a simple investment cycle. The implications of the new series in the context of the ongoing debates in the literature are also briefly discussed.

Italy was among the very first countries to boast a complete set of historical national accounts, from Unification (1861) on. As was soon pointed out, however, the estimates for the initial half-century were based on very poor data, and appeared seriously to misrepresent the path of total product. Quantitative historians have devoted considerable effort to the reconstruction of the national accounts' basic building blocks; and enough material is now available to permit the first thoroughgoing recalculation of Italy's aggregate product from Unification to the First World War.

1. The time series and the historians' debates

Italy's historical national accounts were compiled in the mid-1950s by Istat, the Istituto Centrale di Statistica. These estimates included a detailed reconstruction of both the production side and the expenditure side at current prices, and of the latter alone at constant (1938) prices; 1938-price product series were however also provided for core agriculture (cultivation and herding) and for manufacturing industry (Istat 1957). A decade later,
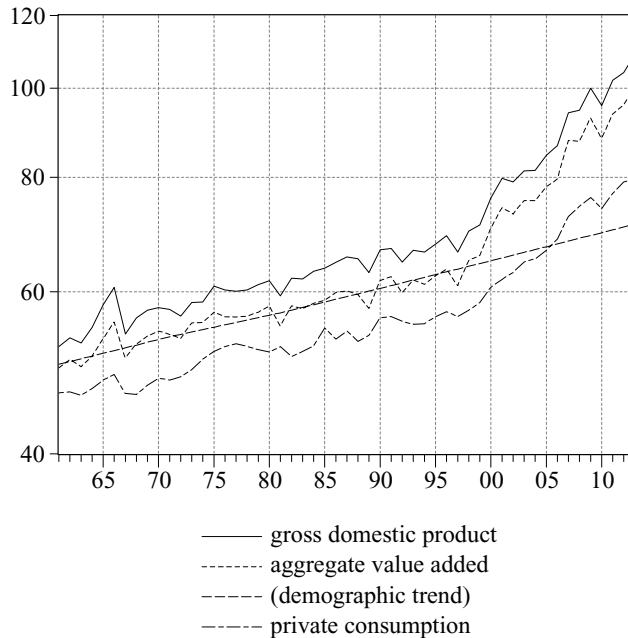
Figure 1. *Istat-Vitali aggregate estimates (bn lire at 1938 prices).*

Source: Table 1.

1938-price estimates of the production side consistent with the Istat series were compiled by Ornello Vitali, the statistician of the 'Ancona group' organised by Giorgio Fuà under the auspices of the SSRC (Ercolani 1969; Fuà 1965, 1969; Vitali 1969).[1] The 'Istat-Vitali' estimates of production (and private consumption) in 1861–1913 are collected in Table 1.[2]

The message of these estimates was that growth accelerated sharply in the mid-1890s; up to that point real *per capita* output barely drifted up, while real *per capita* consumption actually drifted down (Figures 1 and 2). Vitali's sector-specific figures locate this discontinuity in commodity production (Figure 3). Agriculture (dominated by the Istat cultivation-and-herding series) grows in rough step with population until 1880, then stagnates through the mid-1890s; it then pops back up to its previous trend line, and in the last decade before the Great War again grows (on average) about as fast as population. Industry (dominated by the Istat manufacturing series) grows somewhat faster than population into the mid-1880s, stagnates

[1] Vitali's estimates were based in so far as possible on Istat's own data and estimates; minor discrepancies survived the attempt to reconcile the aggregates, but for present purposes these can be ignored.

[2] The sources of the series in Table 1 are described in Appendix A. The value added series in cols. 10, 14 and 15 exclude the otherwise double-counted non-final component of banking and insurance services.
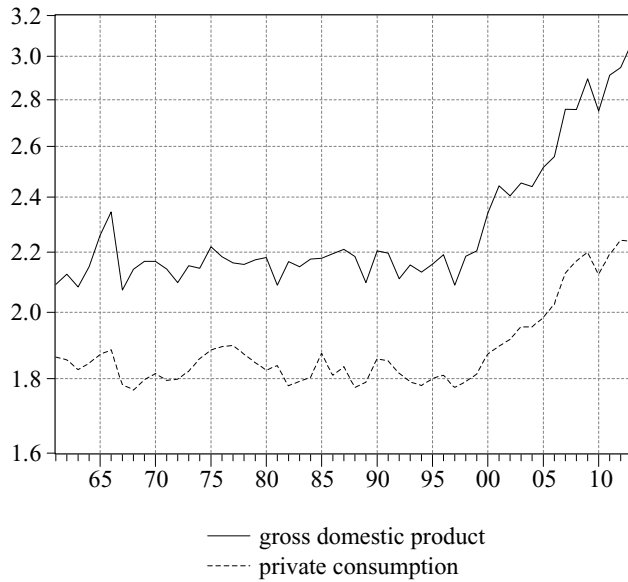
Figure 2. *Istat-Vitali* per capita *estimates (thousand lire at 1938 prices)*.
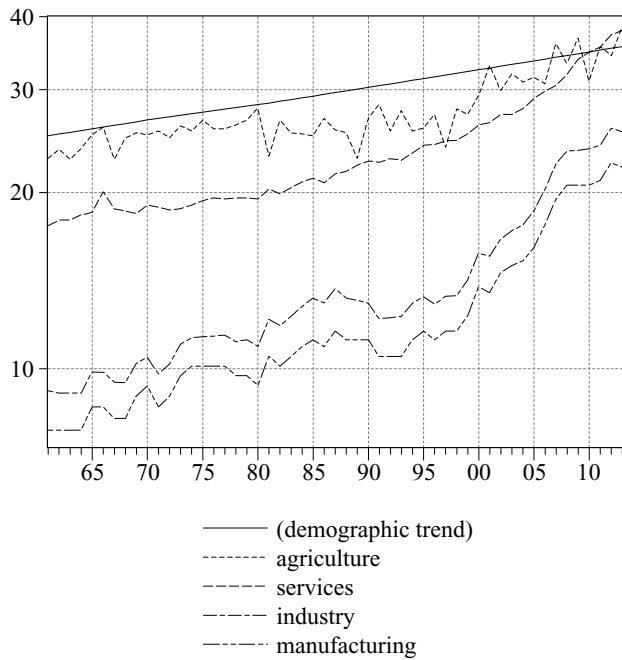
Source: Table 1.

Figure 3. *Istat-Vitali value added estimates, by major sector (bn lire at 1938 prices)*.

Source: Table 1.

for a decade, and then grows significantly faster than before. The path of services (estimated by deflating the Istat series at current prices) instead displays a relatively smooth acceleration, surpassing the rate of population growth from about 1880.

These time series were immediately drawn into the historians' debate. On the one hand, the production estimates fit Alexander Gerschenkron's view that Italy's industrial take-off was due to the foundation of the German-style mixed banks in 1894: so much so that Gerschenkron himself was willing to consider Istat's industrial index superior to his own, which indicated significant growth in 1881–88 as well as after 1895. On the other hand, the consumption estimates suggested that the 'crisis of the 1880s' due to the fall in world grain prices was not merely a crisis of the grain-growing sector in an otherwise prosperous economy, as the earlier literature had it, but a general crisis, marked by widespread hardship. Gino Luzzatto, who had claimed as much, was apparently vindicated; Rosario Romeo was reluctantly convinced by the quantitative evidence.[3]

The Istat-Vitali edifice was in fact challenged as soon as it was completed. The present writer's dissertation included a revision of Gerchenkron's index of industrial production that made use of the new material presented by Istat in its abstract of historical statistics, and its excellent guide to Italy's data sources (Istat 1957–59, Istat 1958; Gerschenkron 1962, Fenoaltea 1967). Following Gerschenkron's example, the new index represented the milling industry by the human consumption of wheat and corn. The corresponding Istat series, which incorporate the historical data used by Gerschenkron and extend them back to the 1860s and '70s, yielded the graph here reproduced as Figure 4. The figures for the 1870s were confirmed by the grist tax, those for the 1900s were based on the crop estimates generated by an entirely new statistical service; and these point to very similar *per capita* figures. The data for the 1880s and early 1890s were also derived from current crop estimates, but these were so notoriously unreliable that their publication was suspended in 1896 (Istat 1957–59, vol. VII, p. 73).[4] In *per capita* terms, the decline around 1880 is of the order of a fifth, the increase at the turn of the century of the order of a half (Barberi 1961): both swings are impossibly large, both are tied to a change in the underlying sources, both are, as far as one can tell, statistical fictions. The production and processing of grain were significant parts of the Italian economy, and even greater parts of its measured subset; in the 1880s and 1890s the Istat series increasingly underestimate both agricultural and industrial production (and private consumption), and the

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[3] See Gerschenkron (1955), Romeo (1959), Gerschenkron and Romeo (1961), Gerschenkron (1968), and Luzzatto (1963); for a review of these debates, Fenoaltea (2003). Luzzatto's work emerged from a lengthy gestation, and was clearly drafted before the Istat series appeared.

[4] The basis for the earliest estimates could not be traced, as Istat described its procedures only in very general terms. Vitali's account is similarly hermetic.
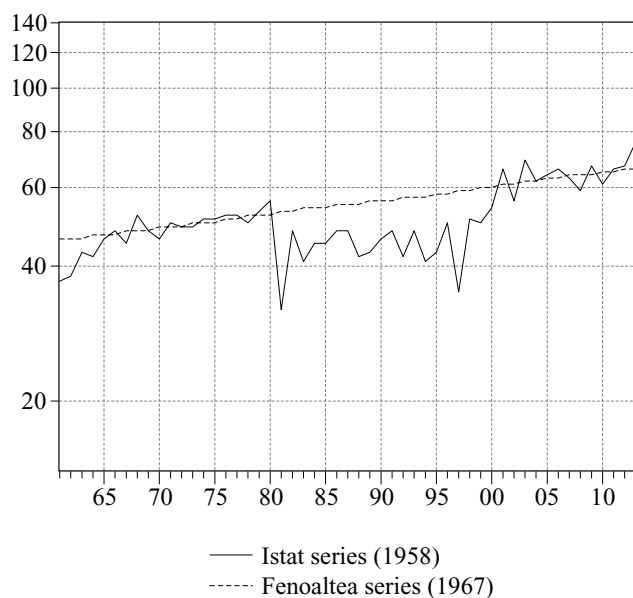
──── Istat series (1958)
╌╌╌╌ Fenoaltea series (1967)

Figure 4. *Wheat and corn for human consumption (m. quintals).*

Source: Fenoaltea (1967), p. 37.

turn-of-the-century discontinuity in the growth rate is essentially the removal of that error (Fenoaltea 1969, 1972, 2003).

The author's own index (with a milling series that assumes constant *per capita* grain consumption) picked up the manufacturing surge of the 1880s (and the subsequent decline into the mid-1890s) even better than Gerschenkron's index, and far more than the Istat series borrowed by Vitali. But that index aimed at tracking recorded output, and did not attempt to be representative; since it missed most of the traditional, largely artisanal consumer-goods sectors that presumably grew slowly if at all, it clearly exaggerated both the cycle and the end-to-end growth rate (Fenoaltea 1967, 1969). The present author's own initial correction to obtain a *representative* index for manufacturing assumed that the omitted sectors grew (on average) in step with total population; and that reduced the end-to-end growth rate right back to Istat's (Fenoaltea 1972, 2003).

There the numbers essentially rested, for the better part of some thirty years. The present author continued to improve his industrial estimates for 1861–1913, occasionally publishing individual series; a separate index of industrial production from 1861 to 1980 was put together by Albert Carreras (Carreras 1983, 1992, 1999); and that was pretty much the extent of the revision of the national accounts' basic components. The new series referred to industry alone, and the only set of comprehensive estimates remained the Istat-Vitali series.

The early 1990s saw a flurry of revisions of the aggregate figures, but these typically limited themselves to reassembling the Istat-Vitali series, with predictably limited results (Bardini *et al.* 1995, Cohen and Federico 2001; also Canullo 2000).

The only new aggregate measure based at least in part on new time series was Angus Maddison's (Maddison 1991), here reproduced in Table 2. Maddison used Istat's current-price estimates for 1870 to combine the Istat-Vitali series for agriculture and services (Table 1, cols. 2 and 8–13) and industrial series by the present author: the new series for the extractive industries, construction, and utilities (Fenoaltea 1982, 1987, 1988a), and an index for manufacturing based on the author's first index (Fenoaltea 1967), corrected to remove the utilities, and expanded to include the new series for the silk industry (Fenoaltea 1988b).[5] In this fashion Maddison noticeably increased the overall growth rate: his GDP series increases between 1861 and 1913 by a factor of 2.5, against just 2.1 for the Istat-Vitali estimates. On the other hand, that series remains dominated by the Istat components, and apart from a trend correction its path remains extremely close to that of the Istat aggregate (see below, Figure 18).

Meanwhile, the literature evolved a curiously schizoid reaction to the early critique of the Istat estimates. The general criticism of the Istat series was widely accepted: these fell into disrepute, to the point that the overhaul of the historical accounts was among the projects sponsored by the Bank of Italy in view of its centenary in 1993.[6] The specific suggestion that the Istat series badly underestimated industrial growth in the 1880s (because they were dragged down by the growing downward bias in the grain-production and consumption data) was also well received, not least because it confirmed the prevailing impression derived from traditional sources. The conventional wisdom quickly became that the industrial upsurge of the 1880s was as meaningful as that of the early 1900s, and such senior scholars as Franco Bonelli and Luciano Cafagna recast Romeo's stages-of-growth interpretation to encompass a drawn-out take-off with successive 'waves' (Bonelli 1978, Cafagna 1983a, 1983b).[7]

[5] The banking and insurance series used by Maddison is gross of double-counted business services, and the construction series he used does not seem to be the appropriate one; but those sectors are small, and the consequences are not serious. See below, Appendix A.

[6] The heirs of the Ancona group continue however to this day to analyse the cyclical fluctuations of the original Vitali series, either out of filial piety or – in the absence of comprehensive alternative estimates – a Nelsonian talent for exploiting a blind eye; see most recently Delli Gatti *et al.* (2005).

[7] The extant reviews of the literature typically fail to recognise the nature of the Bonelli-Cafagna interpretation, and erroneously claim that the stages-of-growth approach has been abandoned (for example, Zamagni 1993, Cohen and Federico 2001; see Fenoaltea 2004).

Table 1. *Istat-Vitali estimates of Italian GDP, 1861–1913 (bn lire at 1938 prices).*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Istat-Vitali: value added in commodity production				
			Industry				
	Population (millions)	Agriculture	Extr.	Manuf.	Constr.	Util.	Total
1861	25.0	22.900	0.605	7.860	0.696	0.006	9.167
1862	25.2	23.700	0.535	7.860	0.681	0.006	9.082
1863	25.4	22.800	0.554	7.860	0.674	0.006	9.094
1864	25.5	23.800	0.528	7.860	0.687	0.009	9.084
1865	25.7	25.100	0.539	8.610	0.722	0.009	9.880
1866	25.9	25.900	0.518	8.610	0.718	0.012	9.858
1867	26.1	22.800	0.562	8.230	0.677	0.012	9.481
1868	26.3	24.800	0.560	8.230	0.662	0.015	9.467
1869	26.4	25.300	0.557	8.980	0.659	0.015	10.211
1870	26.6	25.100	0.541	9.350	0.558	0.018	10.467
1871	26.8	25.500	0.553	8.610	0.627	0.017	9.807
1872	27.0	24.800	0.573	8.980	0.614	0.019	10.186
1873	27.1	26.000	0.604	9.730	0.665	0.021	11.020
1874	27.3	25.500	0.587	10.100	0.589	0.022	11.298
1875	27.5	26.600	0.559	10.100	0.668	0.024	11.351
1876	27.6	25.700	0.591	10.100	0.652	0.026	11.369
1877	27.8	25.700	0.589	10.100	0.700	0.027	11.416
1878	28.0	26.100	0.609	9.730	0.756	0.028	11.123
1879	28.1	26.600	0.651	9.730	0.810	0.028	11.219
1880	28.3	27.900	0.648	9.350	0.882	0.030	10.910
1881	28.5	23.100	0.666	10.500	0.945	0.031	12.142
1882	28.7	26.600	0.700	10.100	1.020	0.034	11.854
1883	28.9	25.300	0.701	10.500	1.070	0.035	12.306
1884	29.0	25.200	0.679	10.900	1.160	0.039	12.778
1885	29.2	25.000	0.684	11.200	1.280	0.039	13.203
1886	29.4	26.800	0.657	10.900	1.360	0.038	12.955
1887	29.7	25.600	0.647	11.600	1.400	0.042	13.689
1888	29.9	25.300	0.665	11.200	1.300	0.043	13.208
1889	30.1	22.900	0.664	11.200	1.180	0.045	13.089
1890	30.3	26.800	0.666	11.200	1.010	0.052	12.928
1891	30.5	28.300	0.688	10.500	0.942	0.053	12.183
1892	30.7	25.500	0.728	10.500	0.942	0.053	12.223
1893	30.9	27.600	0.722	10.500	0.993	0.059	12.274
1894	31.1	25.500	0.712	11.200	0.974	0.059	12.945
1895	31.3	25.800	0.684	11.600	0.936	0.053	13.273
1896	31.5	27.200	0.722	11.200	0.895	0.064	12.881
1897	31.8	23.900	0.781	11.600	0.841	0.073	13.295
1898	32.0	27.800	0.790	11.600	0.854	0.077	13.321
1899	32.2	27.200	0.834	12.300	0.942	0.090	14.166
1900	32.4	29.300	0.829	13.800	1.020	0.096	15.745
1901	32.7	33.000	0.844	13.500	1.120	0.115	15.579
1902	32.9	29.900	0.831	14.600	1.110	0.135	16.676
1903	33.1	31.900	0.861	15.000	1.200	0.163	17.224
1904	33.4	30.900	0.875	15.300	1.260	0.177	17.612
1905	33.6	31.500	0.890	16.100	1.440	0.192	18.622
1906	33.8	30.700	0.860	17.600	1.550	0.238	20.248
1907	34.1	36.000	0.837	19.500	1.730	0.304	22.371
1908	34.3	33.300	0.814	20.600	1.790	0.354	23.558
1909	34.6	36.700	0.799	20.600	1.820	0.395	23.614
1910	34.8	31.000	0.800	20.600	1.910	0.452	23.762
1911	35.0	35.500	0.788	21.000	1.790	0.522	24.100
1912	35.3	34.300	0.814	22.500	1.880	0.580	25.774
1913	35.5	38.400	0.822	22.100	1.860	0.623	25.405

Table 1. *Continued.*

	(8)	(9)	(10)	(11)	(12)	(13)	(14)
			Istat-Vitali: value added in services				
	Transport.	Commerce	Banking and ins.	Misc. serv.	Buildings	Public admin.	Total
1861	0.587	5.670	0.000	3.280	5.450	2.530	17.517
1862	0.618	5.610	0.000	3.340	5.490	2.810	17.868
1863	0.670	5.630	0.006	3.270	5.520	2.750	17.846
1864	0.690	5.660	0.000	3.520	5.550	2.810	18.230
1865	0.721	5.690	0.012	3.550	5.590	2.780	18.343
1866	0.711	5.720	0.017	3.770	5.620	4.050	19.888
1867	0.587	5.640	0.017	3.980	5.690	2.650	18.564
1868	0.618	5.400	0.021	3.850	5.720	2.740	18.349
1869	0.783	5.550	0.027	3.340	5.770	2.740	18.210
1870	0.834	5.720	0.028	3.520	5.800	2.920	18.822
1871	0.742	5.630	0.032	3.630	5.850	2.740	18.624
1872	0.721	5.770	0.031	3.570	5.880	2.420	18.392
1873	0.731	5.800	0.033	3.580	5.910	2.450	18.504
1874	0.773	6.080	0.027	3.590	5.950	2.350	18.770
1875	0.803	6.140	0.042	3.780	5.980	2.330	19.075
1876	0.773	6.320	0.040	3.750	6.020	2.370	19.273
1877	0.711	6.410	0.042	3.750	6.050	2.230	19.193
1878	0.793	6.290	0.050	3.830	6.110	2.170	19.243
1879	0.824	6.160	0.051	3.870	6.150	2.170	19.225
1880	0.886	5.950	0.054	3.870	6.210	2.140	19.110
1881	0.906	6.620	0.063	3.890	6.270	2.110	19.859
1882	0.906	6.010	0.060	3.940	6.330	2.220	19.466
1883	0.927	6.270	0.065	3.980	6.400	2.270	19.912
1884	0.979	6.400	0.088	4.050	6.450	2.350	20.317
1885	1.060	6.850	0.106	4.070	6.530	1.940	20.556
1886	1.080	6.380	0.123	3.970	6.610	1.980	20.143
1887	1.250	6.690	0.144	4.000	6.680	2.070	20.834
1888	1.350	6.510	0.142	4.070	6.750	2.240	21.062
1889	1.410	6.880	0.136	4.070	6.790	2.290	21.576
1890	1.420	6.900	0.147	4.080	6.850	2.590	21.987
1891	1.480	6.780	0.150	3.990	6.910	2.540	21.850
1892	1.570	6.940	0.164	4.010	6.950	2.520	22.154
1893	1.580	6.670	0.183	4.060	6.900	2.540	21.933
1894	1.670	6.910	0.166	4.060	7.040	2.840	22.686
1895	1.670	7.040	0.162	4.090	7.090	3.360	23.412
1896	1.800	7.000	0.165	4.030	7.140	3.320	23.455
1897	1.770	7.270	0.178	4.060	7.200	3.300	23.778
1898	2.000	6.980	0.182	4.080	7.250	3.300	23.792
1899	2.170	7.220	0.202	4.140	7.320	3.330	24.382
1900	2.280	7.410	0.217	4.180	7.390	3.810	25.287
1901	2.400	7.230	0.217	4.270	7.480	3.910	25.507
1902	2.490	7.780	0.243	4.480	7.560	3.800	26.353
1903	2.470	7.810	0.255	4.450	7.640	3.680	26.305
1904	2.590	8.070	0.271	4.460	7.740	3.750	26.881
1905	2.840	8.280	0.310	4.510	7.840	4.150	27.930
1906	3.240	8.710	0.320	4.270	7.940	4.230	28.710
1907	3.290	8.920	0.340	4.480	8.040	4.270	29.340
1908	3.650	9.480	0.350	4.610	8.140	4.410	30.640
1909	4.740	9.480	0.310	5.260	8.230	4.470	32.490
1910	5.010	9.720	0.430	5.230	8.320	4.700	33.410
1911	5.620	9.840	0.430	4.760	8.390	5.070	34.110
1912	6.170	10.400	0.400	4.940	8.460	5.490	35.860
1913	6.710	10.100	0.380	5.150	8.550	5.590	36.480

Table 1. *Continued.*

	(15)	(16)	(17)	(18)	(19)	(20)
			Istat-Vitali: aggregate estimates			
	Value added	Net ind. taxes	GDP	GDP *per capita*[a]	Private cons.	Priv. c. *per cap.*[a]
1861	49.584	2.700	52.300	2.091	46.600	1.863
1862	50.650	2.830	53.500	2.124	46.700	1.854
1863	49.740	3.020	52.800	2.082	46.300	1.825
1864	51.114	3.770	54.900	2.150	47.100	1.844
1865	53.323	4.790	58.100	2.259	48.100	1.870
1866	55.646	5.000	60.700	2.344	48.800	1.885
1867	50.845	3.110	54.000	2.071	46.500	1.783
1868	52.616	3.560	56.200	2.141	46.400	1.767
1869	53.720	3.520	57.300	2.168	47.500	1.797
1870	54.389	3.320	57.700	2.168	48.300	1.815
1871	53.931	3.480	57.400	2.142	48.100	1.795
1872	53.378	3.110	56.500	2.096	48.500	1.799
1873	55.524	2.870	58.400	2.153	49.400	1.821
1874	55.568	3.000	58.500	2.144	50.700	1.858
1875	57.026	3.840	60.900	2.218	51.700	1.883
1876	56.342	3.920	60.300	2.183	52.300	1.894
1877	56.309	3.760	60.100	2.163	52.700	1.897
1878	56.466	3.840	60.300	2.157	52.300	1.871
1879	57.044	4.040	61.100	2.173	51.900	1.846
1880	57.920	3.790	61.700	2.181	51.600	1.824
1881	55.101	4.310	59.400	2.087	52.300	1.838
1882	57.920	4.210	62.100	2.167	51.000	1.780
1883	57.518	4.470	62.000	2.149	51.700	1.792
1884	58.295	4.990	63.200	2.176	52.400	1.804
1885	58.759	4.890	63.700	2.178	54.800	1.874
1886	59.898	4.710	64.600	2.194	53.300	1.810
1887	60.123	5.360	65.500	2.209	54.400	1.835
1888	59.570	5.640	65.200	2.184	53.000	1.775
1889	57.565	5.350	63.000	2.096	53.800	1.790
1890	61.715	4.950	66.700	2.204	56.200	1.857
1891	62.333	4.650	66.900	2.196	56.400	1.851
1892	59.877	4.800	64.700	2.109	55.700	1.815
1893	61.807	4.810	66.600	2.156	55.300	1.790
1894	61.131	5.150	66.300	2.131	55.400	1.781
1895	62.485	5.180	67.600	2.158	56.400	1.800
1896	63.536	5.480	69.100	2.190	57.100	1.810
1897	60.973	5.290	66.300	2.087	56.400	1.775
1898	64.913	4.940	69.900	2.185	57.300	1.791
1899	65.748	5.130	71.000	2.204	58.400	1.813
1900	70.332	5.540	75.900	2.340	60.700	1.871
1901	74.086	5.770	79.800	2.443	61.900	1.895
1902	72.929	6.230	79.100	2.405	63.000	1.915
1903	75.429	5.910	81.300	2.454	64.700	1.953
1904	75.393	5.910	81.400	2.440	65.200	1.954
1905	78.052	6.480	84.500	2.515	66.600	1.982
1906	79.658	7.010	86.600	2.560	68.500	2.025
1907	87.711	6.370	94.000	2.759	72.500	2.128
1908	87.498	7.070	94.600	2.757	74.400	2.168
1909	92.804	7.250	100.000	2.894	76.000	2.199
1910	88.172	7.580	95.700	2.750	73.900	2.124
1911	93.710	8.140	102.000	2.910	76.800	2.191
1912	95.934	7.940	104.000	2.947	79.100	2.241
1913	100.285	8.260	109.000	3.067	79.500	2.237

Note: [a]Lire.
Sources: See Appendix A.

Table 2. *Maddison estimates of Italian GDP, 1861–1913 (m. lire at 1870 prices).*

	(1)	(2)	(3)	(4)	(5)	(6)
			Value added in commodity production			
				Industry		
	Agriculture	Extr.	Manuf.	Constr.	Util.	Total
1861	4,471	37	1,322	168	8	1,535
1862	4,628	39	1,312	205	8	1,564
1863	4,452	42	1,315	209	8	1,574
1864	4,647	43	1,300	208	8	1,559
1865	4,901	43	1,249	208	9	1,509
1866	5,057	43	1,293	165	9	1,510
1867	4,452	45	1,357	143	10	1,555
1868	4,842	49	1,360	139	10	1,558
1869	4,940	52	1,404	136	10	1,602
1870	4,901	51	1,483	145	11	1,690
1871	4,979	51	1,518	155	12	1,736
1872	4,842	57	1,546	171	12	1,786
1873	5,077	62	1,609	202	13	1,886
1874	4,979	61	1,641	213	13	1,928
1875	5,194	55	1,679	172	14	1,920
1876	5,018	60	1,644	160	14	1,878
1877	5,018	61	1,660	165	15	1,901
1878	5,096	64	1,692	165	15	1,936
1879	5,194	70	1,679	170	16	1,935
1880	5,448	73	1,866	187	17	2,143
1881	4,510	75	2,027	199	17	2,318
1882	5,194	84	2,144	238	18	2,484
1883	4,940	87	2,283	258	19	2,647
1884	4,921	86	2,292	269	21	2,668
1885	4,881	88	2,504	280	23	2,895
1886	5,233	87	2,650	285	25	3,047
1887	5,038	84	3,051	270	27	3,432
1888	4,940	85	3,067	263	29	3,444
1889	4,471	87	3,001	249	30	3,367
1890	5,233	89	2,868	249	32	3,238
1891	5,526	89	2,549	243	34	2,915
1892	4,979	91	2,428	223	36	2,778
1893	5,389	90	2,514	214	38	2,856
1894	4,979	87	2,685	212	39	3,023
1895	5,038	82	2,745	167	41	3,035
1896	5,311	84	2,773	154	44	3,055
1897	4,667	92	2,865	154	46	3,157
1898	5,428	95	3,036	151	51	3,333
1899	5,311	103	3,320	155	55	3,633
1900	5,721	103	3,447	166	58	3,774
1901	6,444	107	3,488	182	62	3,839
1902	5,838	112	3,551	208	66	3,937
1903	6,229	117	3,782	227	74	4,200
1904	6,034	119	3,991	244	83	4,437
1905	6,151	124	4,449	270	90	4,933
1906	5,994	128	5,012	293	99	5,532
1907	7,029	128	5,587	316	112	6,143
1908	6,502	129	6,286	342	126	6,883
1909	7,166	133	6,492	414	140	7,179
1910	6,053	143	6,662	483	154	7,442
1911	6,932	149	6,808	511	172	7,640
1912	6,697	156	6,884	521	191	7,752
1913	7,498	156	6,751	510	210	7,627

Table 2. *Continued.*

	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
				Value added in services					GDP *per capita* (lire)
	Transport.	Commerce	Banking and ins.	Misc. serv.	Buildings	Public admin.	Total	GDP[a]	
1861	135	566	12	658	425	395	2,191	8,197	328
1862	142	560	15	670	428	439	2,254	8,446	335
1863	154	562	22	656	430	429	2,253	8,280	326
1864	159	565	18	706	433	439	2,320	8,525	334
1865	166	568	32	712	436	434	2,348	8,758	341
1866	164	571	35	756	438	632	2,596	9,163	354
1867	135	563	39	798	443	414	2,392	8,399	322
1868	142	539	51	772	446	428	2,378	8,778	334
1869	180	554	46	670	450	428	2,328	8,870	336
1870	192	571	48	706	452	456	2,425	9,016	339
1871	171	562	55	728	456	428	2,400	9,115	340
1872	166	576	58	716	458	378	2,352	8,980	333
1873	168	579	59	718	461	383	2,368	9,331	344
1874	178	607	57	720	464	367	2,393	9,300	341
1875	185	613	67	758	466	364	2,453	9,566	348
1876	178	631	68	752	469	370	2,468	9,364	339
1877	164	640	66	752	471	348	2,441	9,360	336
1878	183	628	73	768	476	339	2,467	9,498	340
1879	190	615	81	776	479	339	2,480	9,608	342
1880	204	594	85	776	484	334	2,477	10,067	356
1881	209	661	91	780	489	330	2,560	9,388	330
1882	209	600	94	790	493	347	2,533	10,210	356
1883	213	626	103	798	499	354	2,593	10,181	353
1884	225	639	119	812	503	367	2,665	10,254	353
1885	244	684	134	816	509	303	2,690	10,467	358
1886	249	637	145	796	515	309	2,651	10,931	371
1887	288	668	160	802	521	323	2,762	11,232	379
1888	311	650	157	816	526	350	2,810	11,195	375
1889	325	687	160	816	529	358	2,875	10,713	356
1890	327	689	155	818	534	404	2,927	11,398	377
1891	341	677	158	800	539	397	2,912	11,352	373
1892	361	693	163	804	542	394	2,957	10,714	349
1893	364	666	182	814	538	397	2,961	11,205	363
1894	384	690	165	814	549	444	3,046	11,047	355
1895	384	703	161	820	553	525	3,146	11,218	358
1896	414	699	164	808	556	518	3,159	11,526	365
1897	407	726	168	814	561	515	3,191	11,016	347
1898	460	697	181	818	565	515	3,236	11,998	375
1899	500	721	193	830	570	520	3,334	12,278	381
1900	525	740	193	838	576	595	3,467	12,962	400
1901	553	722	197	856	583	611	3,522	13,803	423
1902	573	777	212	899	589	593	3,643	13,418	408
1903	569	780	219	893	595	575	3,631	14,058	424
1904	596	806	234	895	603	586	3,720	14,189	425
1905	654	827	253	905	611	648	3,898	14,981	446
1906	746	869	266	856	619	661	4,017	15,543	459
1907	757	890	283	899	627	667	4,123	17,296	508
1908	840	946	293	925	634	689	4,327	17,713	516
1909	1,091	946	304	1,055	641	698	4,735	19,081	552
1910	1,153	970	338	1,049	648	734	4,892	18,389	528
1911	1,294	982	338	955	654	792	5,015	19,586	559
1912	1,420	1,038	331	991	659	857	5,296	19,745	559
1913	1,545	1,008	338	1,033	666	873	5,463	20,589	579

Note: [a]At factor cost.
Sources: See Appendix A.

On the other hand, the profession at large rejected the further suggestion that – for exactly the same reason – the Istat series badly underestimated the growth of agricultural production and aggregate consumption over the 1880s and early '90s. On this point, the conventional wisdom became the view supported by the Istat series: that the 1880s were a decade of crisis and hardship, with an agricultural collapse that offset the industrial boom, and a reduction of consumption that offset the growth of investment. Even Italy's most numerate historians subscribed to this new interpretation: thus Gianni Toniolo (Toniolo 1990) and Vera Zamagni (Zamagni 1993), even though the only statistics that can be cited to support it are the very Istat-Vitali series they too criticise in other chapters.

The steady exception here has been Giovanni Federico. He has made the criticism of the agricultural data his own, and he has taken on the thankless task of re-estimating the time series for agricultural production (Federico 1982, 2003a, 2003b; Cohen and Federico, 2001). He has shared the certainty that the Istat-Vitali series badly underestimated agricultural production and food consumption in the 1880s and 1890s, and a deep scepticism of the new conventional wisdom on the 'crisis of the 1880s'.

The older view that the fall in grain prices in the early 1880s benefited the economy at large and the working poor in particular has recently received very strong statistical support: the newly constructed series for textile production imply cyclically *high* consumption levels in the 1880s, and the newly constructed series tracking the wages of unskilled labor show *rising* nominal wages even as falling grain prices cut the cost of living. The movements in *per capita* food consumption over the 1880s recorded by the Istat-Vitali series were not only impossibly large, they were to all accounts of the wrong sign; in the 1880s the crisis was of the landowners alone, the *general* crisis of those years was so much nonsense (Fenoaltea 2002a, 2003).[8]

2. The state of the art and the new time series

The Bank of Italy's project on the revision of the historical accounts, entrusted to Guido Rey, led initially to the re-estimation of aggregate product at current prices in 1911; the calculation of the sectoral value-added estimates was assigned to Federico (agriculture), the present author (industry), and Zamagni (services). These estimates were retouched almost a decade later, when parallel current-price estimates were compiled for 1891, 1938, and

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[8] The controversy concerns the 1880s alone, as the 1890s were clearly dismal, and the early 1900s clearly prosperous. Strictly speaking, the dispute is even narrower than that: the old view which has now been revived placed the cyclical downturn in 1887, when the real-estate bubble burst, while the now dominant view places it in the early years of the decade, when wheat prices collapsed. For an extended critique of the arguments and evidence adduced to support the currently popular interpretation, see Fenoaltea (2002a).

1951 (Federico 1992, 2000; Fenoaltea 1992, Fenoaltea and Bardini 2000; Rey 1992, 2000; Zamagni 1992, Zamagni and Battilani 2000).

Meanwhile, as noted, the laborious calculations aimed at re-estimating the time paths of industrial and agricultural production were proceeding; they are still proceeding, and still some distance from completion. At a certain point, however, the work is far enough along that the temptation to preview the likely outcome becomes irresistible; and that point has been reached.

Not long ago the present author published a preliminary index of industrial value added at 1911 prices, obtained by adding to the numerous sector-specific series carefully compiled over the decades a set of preliminary estimates for the remaining sectors. The latter include foodstuffs production, provisionally estimated on the assumption that food consumption followed non-food consumption with the 40 per cent elasticity suggested by the new benchmarks for 1911 and (converted to 1911 prices) 1891; in the 1880s food and non-food consumption are accordingly taken to have grown together, whereas Istat had them going in opposite directions, with the decline in food consumption swamping the rise in non-food consumption (Barberi 1961; Fenoaltea 2002a, 2002b, 2003).

Soon thereafter Federico published his preliminary estimates of agricultural production, again at 1911 prices (Federico 2003b; the series presented there refers to gross saleable production at current borders, but the conversion to value added at constant borders is straightforward).

A third step is taken here. This article presents preliminary constant-price series for the services sector that extrapolate Zamagni's value added estimates for 1911; and it combines these with the new preliminary estimates of agricultural and industrial production to estimate the path of aggregate value added at 1911 prices. The Istat-Vitali estimates are also used, but only to set the time path of the relatively trivial correction (for indirect taxes) that converts aggregate value added to GDP; even this last series, therefore, is 99.44 per cent pure.[9]

The new series are collected in Table 3; a brief description of their derivation can be found in Appendix B. Figures 5–19 compare them to the series they would replace, scaled to interpolate the Istat current-price estimates for 1911 (Appendix A); the joint effect of the new time paths and the new current-price estimates for 1911 is thus immediately apparent.

Figure 5 compares the agricultural series; it strongly resembles Figure 4, even though the latter refers to grain consumption alone. In both figures the Istat or Istat-Vitali series collapse after 1880, fail to grow (and vary similarly) for almost twenty years, and then jump back up around the turn of the

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[9] The new GDP series is also of course preliminary, because its components are, and also, specifically, because the production estimates for agriculture on the one hand and industrial foodstuffs on the other have yet to be reconciled.

Table 3. *New estimates of Italian GDP, 1861–1913 (m. lire at 1911 prices).*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				Value added in commodity production			
				Industry			
	Agriculture	Extr.	Manuf.	Constr.	Util.	Total	Total
1861	4,488	56	1,218	285	8	1,568	6,056
1862	4,620	59	1,202	324	8	1,593	6,214
1863	4,768	64	1,211	336	9	1,619	6,387
1864	4,659	65	1,222	331	9	1,627	6,286
1865	4,978	65	1,257	334	9	1,665	6,643
1866	5,126	65	1,272	287	10	1,633	6,759
1867	4,924	69	1,273	262	10	1,614	6,538
1868	5,009	75	1,257	259	11	1,601	6,611
1869	5,157	79	1,288	253	11	1,631	6,788
1870	5,476	78	1,320	266	12	1,676	7,152
1871	5,328	78	1,343	274	13	1,707	7,035
1872	5,188	86	1,372	294	13	1,765	6,953
1873	5,110	94	1,407	325	13	1,840	6,950
1874	5,585	92	1,428	336	14	1,871	7,456
1875	5,483	84	1,442	293	14	1,833	7,317
1876	5,219	92	1,460	284	15	1,851	7,070
1877	5,297	94	1,476	292	16	1,877	7,174
1878	5,670	97	1,503	297	16	1,913	7,583
1879	5,663	108	1,495	305	17	1,924	7,587
1880	5,795	112	1,545	329	18	2,004	7,798
1881	5,912	115	1,636	340	19	2,110	8,021
1882	6,020	128	1,674	387	20	2,209	8,230
1883	6,075	132	1,730	412	21	2,295	8,370
1884	5,725	131	1,790	423	22	2,366	8,091
1885	5,896	134	1,860	434	24	2,453	8,349
1886	6,215	132	1,947	444	27	2,549	8,764
1887	6,293	127	2,030	437	29	2,622	8,915
1888	6,184	130	2,045	439	31	2,645	8,829
1889	5,904	133	2,016	423	32	2,604	8,508
1890	6,153	135	2,022	418	34	2,610	8,763
1891	6,479	136	1,997	410	36	2,580	9,059
1892	6,456	138	1,975	389	38	2,541	8,997
1893	6,658	137	2,018	375	41	2,571	9,230
1894	6,658	134	2,079	374	41	2,628	9,286
1895	6,775	125	2,145	321	44	2,634	9,410
1896	6,837	129	2,188	307	47	2,670	9,507
1897	6,822	141	2,239	311	49	2,740	9,562
1898	6,806	146	2,314	308	55	2,823	9,629
1899	6,775	157	2,423	312	59	2,952	9,727
1900	6,962	159	2,464	322	62	3,007	9,969
1901	7,063	164	2,519	339	66	3,089	10,152
1902	7,148	171	2,595	368	72	3,206	10,354
1903	7,273	178	2,693	386	80	3,337	10,609
1904	7,483	181	2,796	405	90	3,472	10,955
1905	7,592	189	2,959	433	98	3,678	11,270
1906	7,716	194	3,185	460	107	3,946	11,663
1907	7,973	195	3,388	483	122	4,188	12,161
1908	7,918	196	3,597	513	138	4,444	12,363
1909	7,887	201	3,726	586	154	4,667	12,554
1910	7,685	215	3,826	661	169	4,872	12,557
1911	7,778	224	3,843	697	190	4,954	12,733
1912	8,051	233	4,052	713	211	5,209	13,260
1913	8,587	235	4,067	707	233	5,241	13,829

Table 3. *Continued.*

	(8)	(9)	(10)	(11)	(12)	(13)	(14)
				Value added in services			
	Transport.	Commerce	Banking and ins.	Misc. serv.	Buildings	Public admin.	Total
1861	230	675	6	854	828	639	3,231
1862	240	700	6	857	832	651	3,287
1863	254	735	6	860	836	664	3,355
1864	253	730	6	863	841	677	3,370
1865	270	777	7	866	845	690	3,454
1866	282	805	6	869	853	703	3,518
1867	280	794	6	872	861	716	3,530
1868	291	818	6	875	869	730	3,590
1869	307	856	7	878	875	744	3,667
1870	330	914	7	881	880	759	3,769
1871	339	928	7	884	884	773	3,815
1872	349	946	8	887	888	788	3,865
1873	364	975	8	890	892	803	3,931
1874	378	1,021	9	893	894	819	4,012
1875	381	1,024	8	896	902	835	4,046
1876	388	1,027	8	899	908	851	4,081
1877	397	1,050	9	902	918	867	4,144
1878	410	1,091	9	905	931	884	4,230
1879	418	1,106	9	908	937	901	4,280
1880	442	1,162	10	911	945	918	4,389
1881	462	1,211	10	914	951	936	4,485
1882	482	1,258	11	917	957	943	4,569
1883	505	1,309	12	919	962	951	4,657
1884	513	1,314	12	921	970	958	4,689
1885	525	1,347	13	923	978	966	4,753
1886	549	1,410	15	926	988	974	4,860
1887	557	1,432	15	928	996	981	4,911
1888	576	1,466	16	930	1,007	989	4,984
1889	575	1,454	17	933	1,019	997	4,995
1890	587	1,487	17	935	1,031	1,005	5,062
1891	594	1,512	18	937	1,039	1,013	5,113
1892	597	1,515	19	940	1,044	1,021	5,134
1893	617	1,563	20	942	1,048	1,029	5,218
1894	625	1,581	20	944	1,058	1,037	5,264
1895	632	1,599	20	946	1,068	1,045	5,311
1896	648	1,635	21	949	1,074	1,054	5,381
1897	669	1,680	22	951	1,087	1,062	5,472
1898	685	1,714	25	953	1,097	1,070	5,545
1899	707	1,762	26	956	1,105	1,079	5,635
1900	736	1,827	28	958	1,113	1,087	5,749
1901	762	1,887	30	961	1,123	1,096	5,859
1902	794	1,958	32	973	1,132	1,110	6,000
1903	825	2,028	35	986	1,142	1,125	6,140
1904	855	2,102	38	999	1,152	1,139	6,286
1905	866	2,135	42	1,012	1,162	1,154	6,372
1906	915	2,246	45	1,026	1,177	1,169	6,578
1907	943	2,320	50	1,039	1,193	1,184	6,731
1908	985	2,412	56	1,053	1,214	1,200	6,919
1909	1,033	2,515	63	1,067	1,222	1,215	7,115
1910	1,074	2,597	70	1,081	1,240	1,231	7,292
1911	1,126	2,708	77	1,095	1,267	1,247	7,520
1912	1,179	2,832	84	1,109	1,292	1,263	7,758
1913	1,244	2,983	90	1,124	1,320	1,280	8,042

Table 3. *Continued.*

	(15) Total value added	(16) Net indirect taxes	(17) Gross domestic product	(18) GDP *per capita* (lire)
1861	9,288	478	9,765	390
1862	9,501	501	10,001	397
1863	9,743	534	10,277	405
1864	9,656	667	10,323	404
1865	10,097	847	10,945	426
1866	10,277	885	11,162	431
1867	10,067	550	10,617	407
1868	10,201	630	10,831	413
1869	10,454	623	11,077	419
1870	10,921	587	11,508	432
1871	10,851	616	11,466	428
1872	10,818	550	11,369	422
1873	10,882	508	11,389	420
1874	11,468	531	11,999	440
1875	11,363	679	12,042	439
1876	11,151	693	11,845	429
1877	11,317	665	11,983	431
1878	11,814	679	12,493	447
1879	11,866	715	12,581	447
1880	12,187	670	12,857	454
1881	12,506	762	13,269	466
1882	12,799	745	13,544	473
1883	13,027	791	13,817	479
1884	12,780	883	13,662	470
1885	13,102	865	13,967	478
1886	13,625	833	14,458	491
1887	13,826	948	14,774	498
1888	13,813	998	14,810	496
1889	13,503	946	14,449	481
1890	13,825	876	14,700	486
1891	14,173	823	14,995	492
1892	14,131	849	14,980	488
1893	14,448	851	15,299	495
1894	14,550	911	15,462	497
1895	14,721	916	15,637	499
1896	14,888	969	15,857	503
1897	15,034	936	15,969	503
1898	15,174	874	16,048	502
1899	15,362	908	16,270	505
1900	15,718	980	16,698	515
1901	16,011	1,021	17,032	521
1902	16,354	1,102	17,456	531
1903	16,750	1,046	17,795	537
1904	17,241	1,046	18,286	548
1905	17,642	1,146	18,789	559
1906	18,240	1,240	19,481	576
1907	18,892	1,127	20,019	588
1908	19,282	1,251	20,533	598
1909	19,669	1,283	20,952	606
1910	19,849	1,341	21,190	609
1911	20,253	1,440	21,693	619
1912	21,018	1,405	22,422	635
1913	21,870	1,461	23,332	656

Sources: See Appendix B.
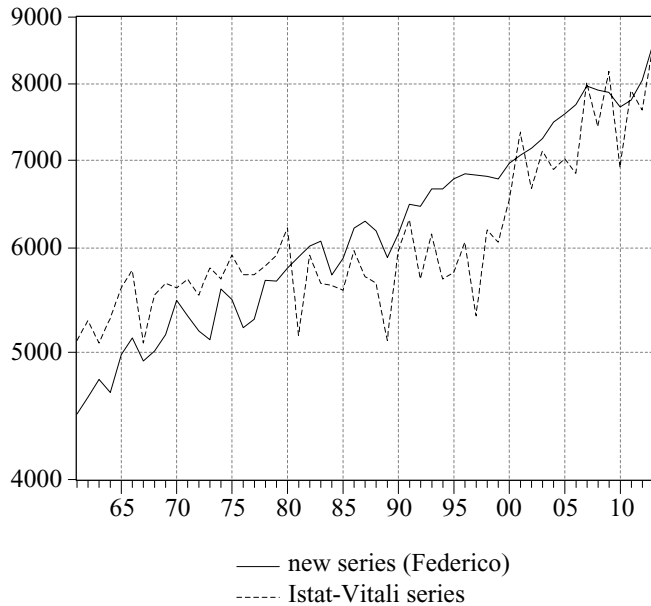
Figure 5. *Old and new estimates of value added: agriculture (m. lire at 1911 prices)*.
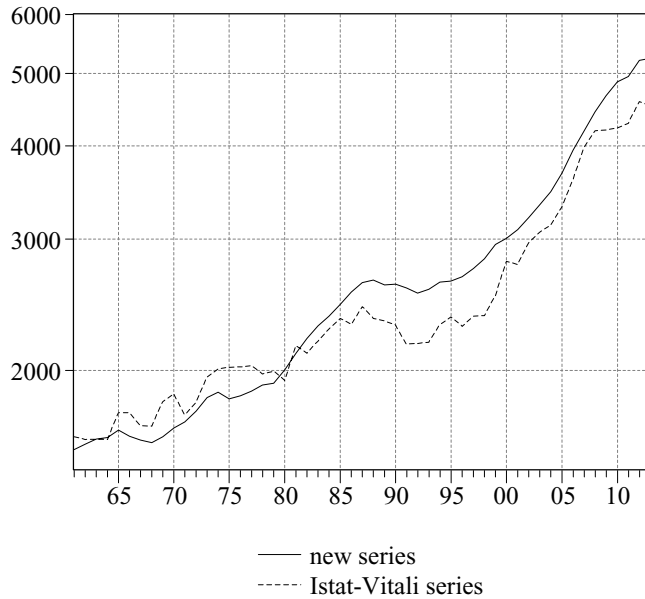
Sources: Table 3 and Appendix A.

century; grain production was a minor part of Italy's agriculture (Federico 1992), and over those data-poor decades Istat must have used the defective grain series to represent a much broader whole. In both figures the alternative estimates are plausible extrapolations of the limited reliable data, and they too are clearly kin. The author's early grain-consumption series was a simple trend; Federico's new series covers all the major products, and it allows cyclical variations by having producers and consumers react appropriately to price and income changes (Federico 2003b). But those cycles are short, and mild: the major deviations from trend of the Istat series have not in fact resurfaced.[10]

The industrial series are compared in Figures 6–10. As detailed elsewhere (Fenoaltea, 1982, 1987, 1988a), the extractive-industry series differ because the Istat-Vitali estimates track mining alone, and miss the growth of quarrying; the construction-industry series seem to differ in the main because the Istat-Vitali series miss infrastructure investment not in the 'public works'

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[10] In the 1860s and 1870s, the new estimates grow somewhat faster than the Istat-Vitali series; and this may comfort those who see in that growth the source of the accumulation that had to precede the growth of industry (for example, Pescosolido 1994, heir to Romeo, 1959).
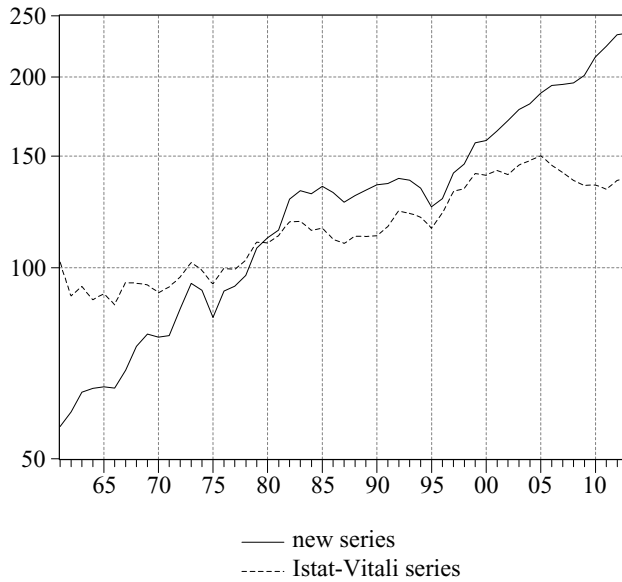
Figure 6. *Old and new estimates of value added: extractive industries (m. lire at 1911 prices).*

Sources: Table 3 and Appendix A.
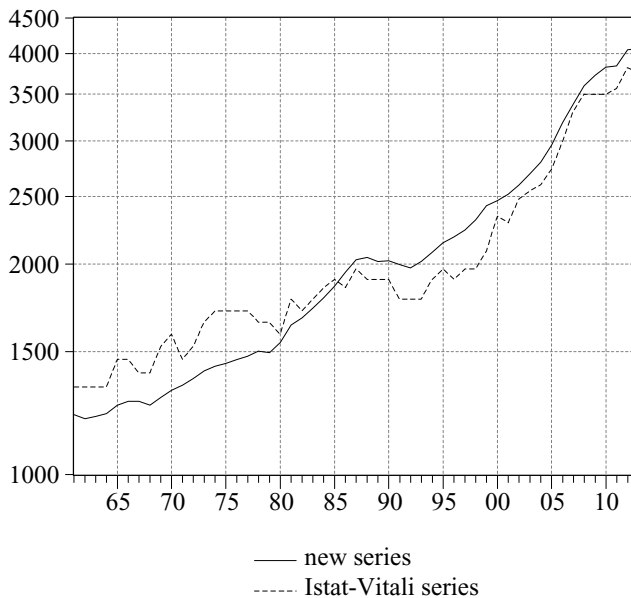
Figure 7. *Old and new estimates of value added: manufacturing (m. lire at 1911 prices).*

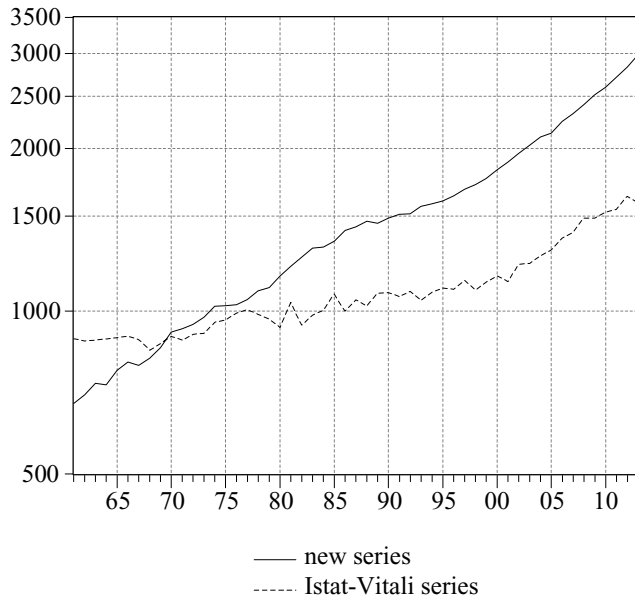*Sources*: Table 3 and Appendix A.
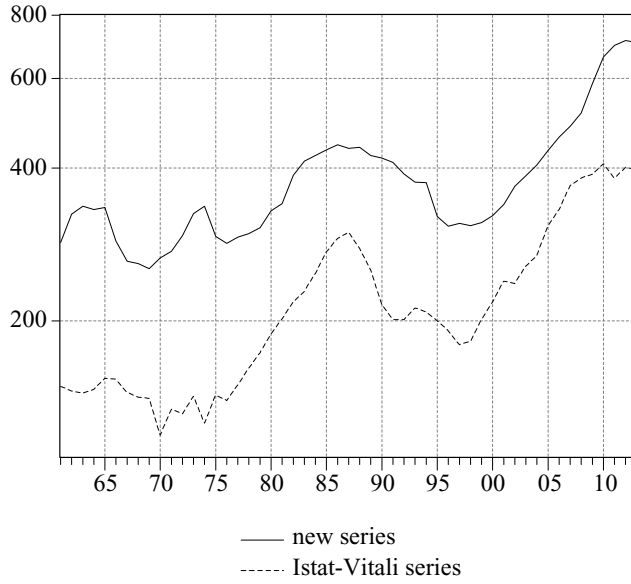
Figure 8. *Old and new estimates of value added: construction (m. lire at 1911 prices).*
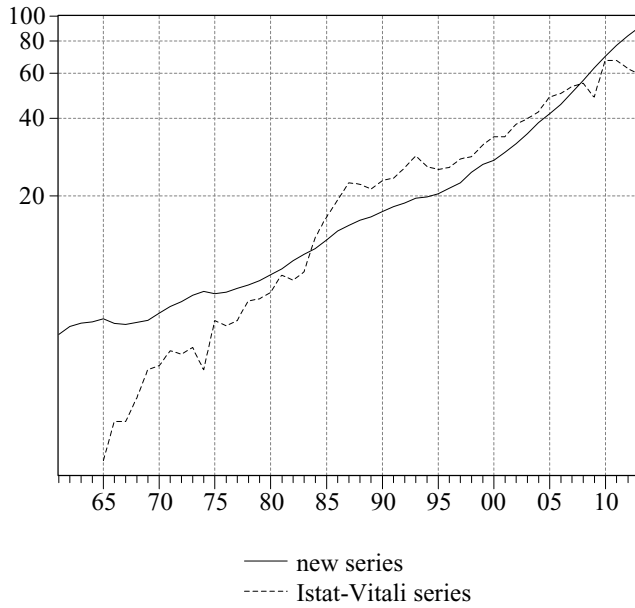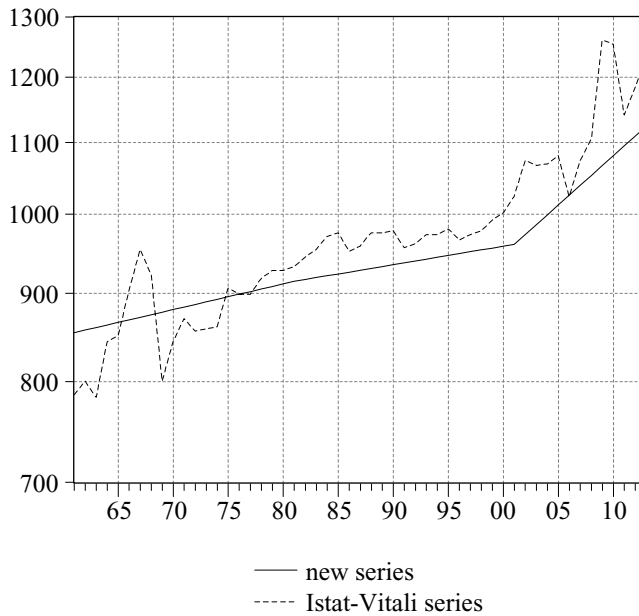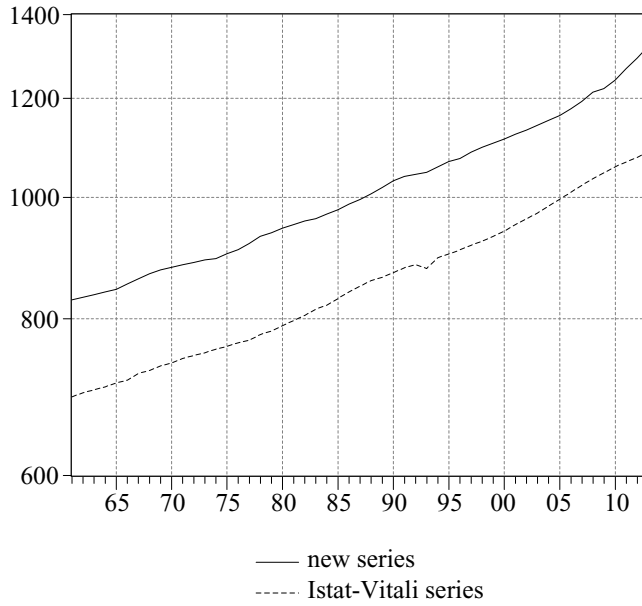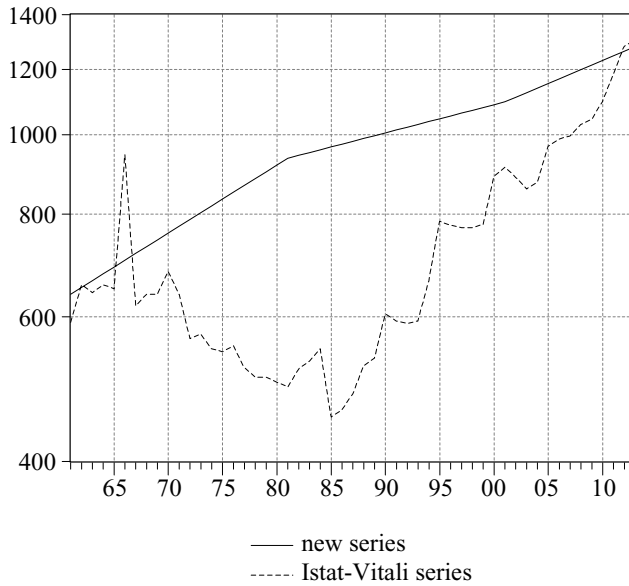
Sources: Table 3 and Appendix A.
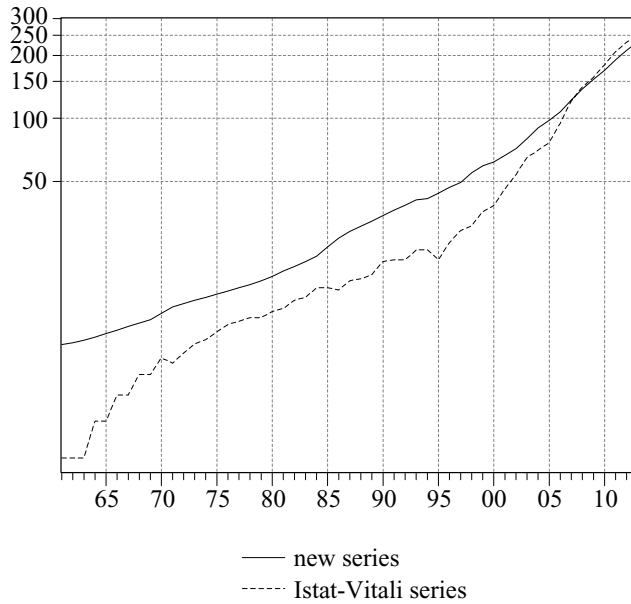
Figure 9. *Old and new estimates of value added: utilities (m. lire at 1911 prices).*
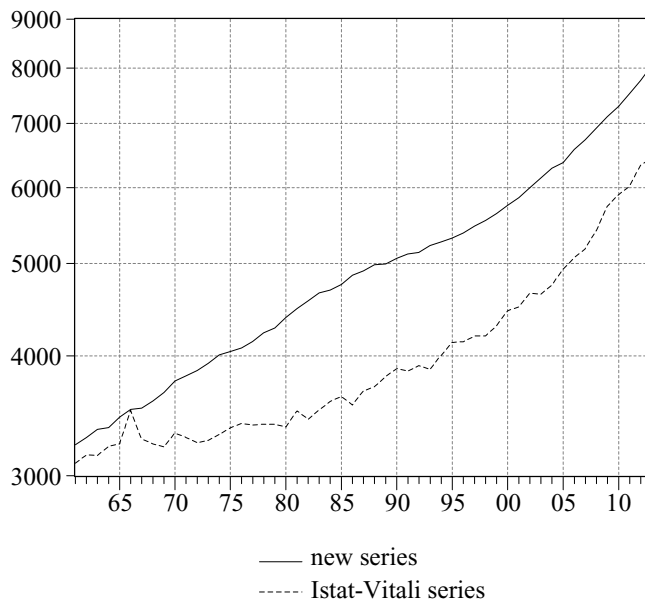
Sources: Table 3 and Appendix A.

Figure 10. *Old and new estimates of value added: all industry (m. lire at 1911 prices).*

Sources: Table 3 and Appendix A.

budgets; and the utilities' series differ because the Istat-Vitali series track gas and power alone, and miss the (relatively slower) growth of water distribution.[11] Most of the difference in the aggregate stems of course from the difference in the series for manufacturing; but Vitali there borrowed Istat's own index, and its description is too scanty to be of use (Vitali 1969, Istat 1957).

The service-sector series are compared in Figures 11–17.[12] The new series are normally indexed by suitable real indicators; where these are lacking (miscellaneous services, government), the present indices simply interpolate census-year labour-force benchmarks. The derivation of the Vitali series is described only in the most summary terms. In general, Istat's current-price estimates either combine real series and price series, or derive directly from expenditure figures; Vitali seems to have attempted to recover the real series where he could, and, failing that, to have deflated the Istat figures by a price index (Istat 1957, Vitali 1969). His 'government' series, in particular,

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[11] For the reasons noted in Appendix B the value added attributed to the extractive industries is here adjusted; the other industrial series remain as previously published.

[12] The Istat-Vitali series for credit and insurance yields zero values in the early 1860s; these have been dropped from Figure 13 to permit the use of a logarithmic scale.
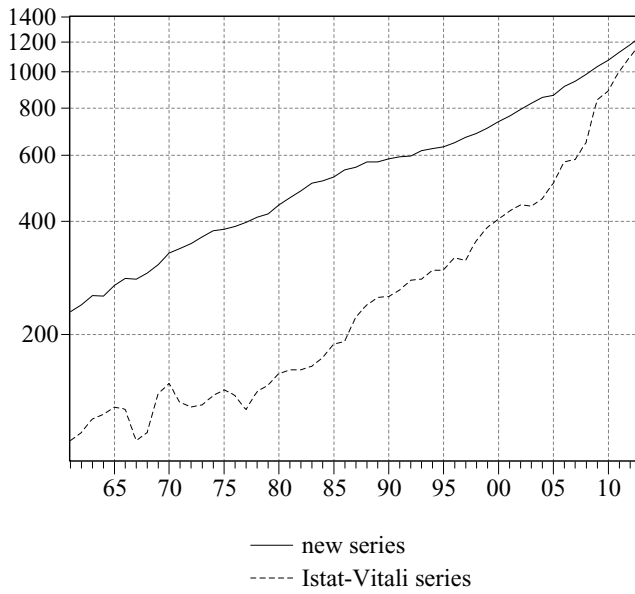
Figure 11. *Old and new estimates of value added: transportation and communication (m. lire at 1911 prices).*

Sources: Table 3 and Appendix A.

Figure 12. *Old and new estimates of value added: commerce (m. lire at 1911 prices).*

Sources: Table 3 and Appendix A.

Figure 13. *Old and new estimates of value added: banking and insurance (m. lire at 1911 prices).*

Sources: Table 3 and Appendix A.

Figure 14. *Old and new estimates of value added: miscellaneous services (m. lire at 1911 prices).*

Sources: Table 3 and Appendix A.

Figure 15. *Old and new estimates of value added: buildings (m. lire at 1911 prices).*

Sources: Table 3 and Appendix A.

Figure 16. *Old and new estimates of value added: government (m. lire at 1911 prices).*

Sources: Table 3 and Appendix A.

Figure 17. *Old and new estimates of value added: all services (m. lire at 1911 prices)*.

Sources: Table 3 and Appendix A.

presumably declines over the early decades, even as public employment was rapidly increasing, because his deflator then grows excessively fast.

In the main, the *ex novo* recalculation of the service-sector series thoroughly alters the time paths of the original Istat-Vitali estimates, which appear no more reliable than the corresponding series for agriculture and for industry. This is of course a faint damnation: the initial effort was produced under considerable time pressure, and relied perforce as much as possible on the numbers that were already available; and since it aimed at a reconstruction covering a full century, even medium-term distortions could be taken in stride. Progress has come by concentrating on the early decades, and by devoting endless time to the effort: an opening *blitzkrieg* conquers a lot of territory, but the weight of resources eventually gets it back.[13]

3. The new aggregate estimates

The new aggregate estimates (Table 3, cols. 17–18) are compared to the rescaled Istat-Vitali series, and to the similarly rescaled Maddison series

[13] The new estimates for the services are also largely built with materials accumulated in the revision of the series for agriculture and for industry (Appendix B).
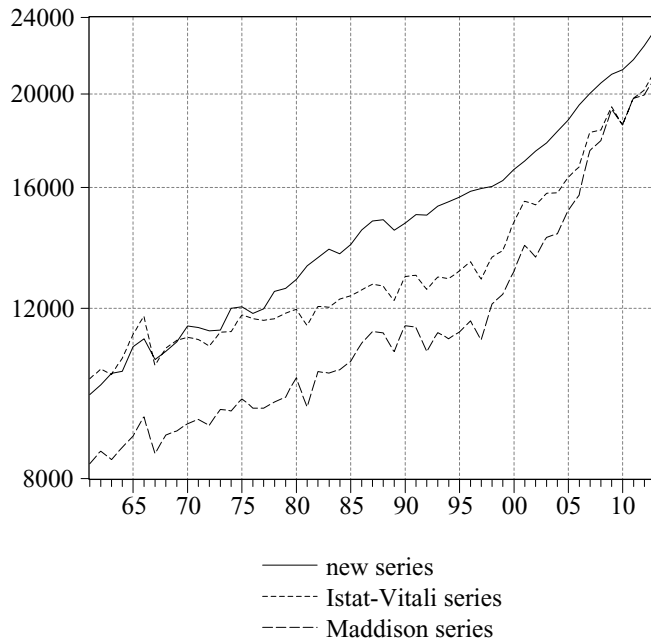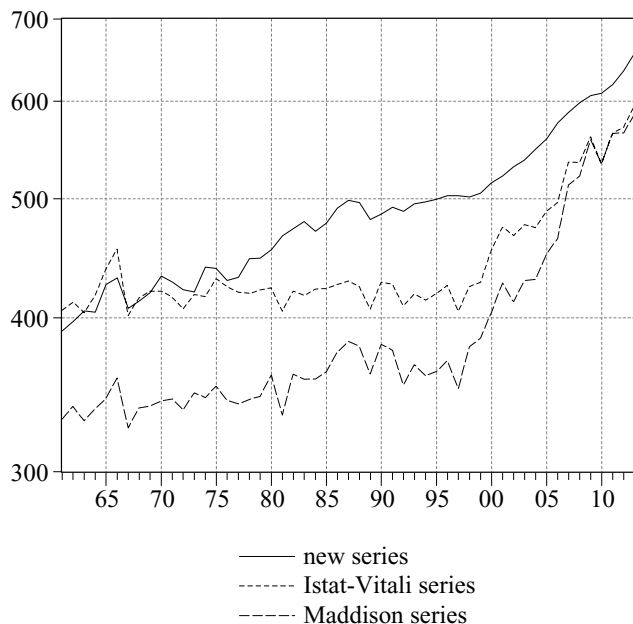
Figure 18. *Old and new estimates of gross domestic product (m. lire at 1911 prices).*

Sources: Table 3 and Appendix A.

(Appendix A), in Figure 18 and, in *per capita* terms, in Figure 19; the population series differs little from a simple trend, and the second figure is basically a rotation of the first.[14]

The Istat-Vitali and Maddison series differ in their trend growth rates, but the latter retained the sharp turn-of-the-century acceleration of the former. The new series point to relatively steady growth: as argued over thirty years ago, the kink in the Istat (and thence Vitali and Maddison) series seems altogether bogus.

The new estimates deviate from their fifty-year trend much less than the old from theirs, and in a different way.[15] The dominant feature of the new series is a long swing, with above-average growth from the late 1870s to the

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[14] To avoid clutter the aggregate value added series are omitted; they closely parallel the GDP series (see Figure 1).

[15] The new series are strictly speaking excessively smooth, as some components are estimated by interpolating census-year benchmarks, with no short-term fluctuations at all; but these are relatively minor. The culprits are miscellaneous and government services, as seen above, and the leather-working industry (Fenoaltea 2003). The estimates for the gas industry similarly interpolate an early benchmark (1865) and the first annual data (ca. 1890: Fenoaltea 1982).

Figure 19. *Old and new estimates of* per capita *gross domestic product (lire at 1911 prices)*.

Sources: Table 3 and Appendix A.

late 1880s, followed by a decade of stagnation and then a second upswing even stronger than the first. Figure 20 collects the new estimates for the main aggregates, and shows them to scale. Agriculture grew relatively steadily, with short (and presumably natural) cycles; services grew somewhat faster, and even more steadily. The long cycle in the aggregate is that of industry; and within industry, as argued elsewhere, the cycle is in the production of investment goods, and traceable to the varying supply of foreign capital (Fenoaltea 1988c, 2003).

The new estimates impinge directly on the contrasting interpretations of the 1880s. Both the author's industrial series and Federico's agricultural series assume that food consumption then grew at above-trend rates: because the consumption of non-food items clearly did (even according to the Istat-Vitali estimates, which have food and non-food consumption moving in opposite directions), and because nominal wages rose while prices in general fell, and grain prices fell particularly sharply. That is of course the heart of the revisionist view: it is clearly suggested by the more reliable data, and the new estimates reflect that evidence.

But the new estimates are robust: the bulk of the correction to the Istat-Vitali series stems from the removal of their spurious variations, noted thirty years ago and more, and the impact of the recently recovered 'optimist'
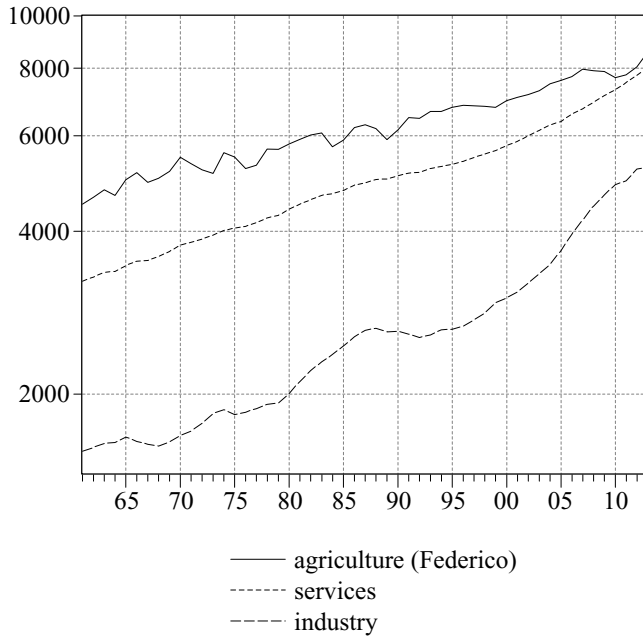
Figure 20. *New estimates of value added, by major sector (m. lire at 1911 prices).*

Source: Table 3.

view of the 1880s is altogether minor. Over that decade *per capita* non-food production and consumption grew strongly. There is every reason to believe that *per capita* food consumption also rose, but even if it were assumed constant, GDP growth would be above trend; a return to the below-trend growth of the Istat series would require a decline in *per capita* food consumption that only a certifiable 'pessimist' could endorse.

The new estimates follow a cyclical path very different from the discontinuous growth common to the Istat-Vitali and Maddison series; but they yield a cumulative increment between those of the earlier estimates. From end to end the new measure of GDP increases by a factor of 2.4, below Maddison's 2.5, but far closer to his figure than to the 2.1 of the Istat-Vitali series.

In one sense, the downward revision of Maddison's growth rate was inevitable. As noted above, the 1967 industrial index which he used clearly exaggerated both the cycle and the end-to-end growth rate (Fenoaltea 1967, 1969). The present author's own first estimate for *total* (and not just 'recorded') manufacturing grew no faster than the corresponding Istat series (Fenoaltea 1972); but Maddison chose to ignore it, and purposely selected a manufacturing series that surely grew too fast.

Moreover, the Istat 1870 weights which Maddison used were obtained not from 1870 data, but by working back from 1938; the relatively large weight of industry in 1870 was the product of the slow growth rate calculated for the intervening years. The retention of the 1870 estimate despite the strong upward revision of the subsequent growth rate is simply illogical; and by the same token it yields a wildly overstated industrial share of GDP on the eve of the First World War (Bardini *et al.* 1995; Tables 2 and 3).

Maddison's statistical legerdemain was not however without a deeper justification, derived from his international perspective (Maddison 1995). As he points out, the low growth rate of the Istat series implies, given the relatively reliable figures for the later years, an initial level that is impossibly high, next to that of surely more advanced European countries (Maddison 1991): in reworking the Italian series his purpose was somehow to raise the growth rate and reduce the initial GDP estimate to a reasonable level, and the end no doubt justified the means. The present estimates approach Maddison's growth rate, but reach final pre-war levels beyond those of the older series; the result is that the estimate of GDP in 1861 is altogether closer to the original Istat figure than to Maddison's (Figure 19). The new estimates therefore largely recreate, in international perspective, the very problem Maddison sought to eliminate.

The present author's sense is that Maddison was entirely right in aiming for a reasonable ratio of united Italy's initial GDP to that of other countries, but only partly right in putting the burden of the revision entirely on the Italian figures. The Istat series do indeed appear to understate long-term growth, but in this they are entirely exceptional; the common feature of such early indices as Walter Hoffman's for Germany or Charles Feinstein's for the United Kingdom (and Gerschenkron's for Italian industry) is their tendency to *overstate* growth rates, for the good and simple reason that unrecorded output is taken to have moved with recorded output, and the latter tends everywhere to be dominated by the new, the growing, the large-scale, the highly visible.[16] Modern factory-based industries are typically over-represented, the traditional activities that grew slowly or declined are under-represented if they appear at all. If this is in fact so, Maddison's series overstates Italian growth, but for that very reason it remains a better guide to international relatives than the new series presented here.

4. Conclusion

The first reconstruction of post-unification Italy's national accounts showed a sudden increase in the growth rate as the nineteenth century came to

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[16] Feinstein (1972, p. 207) actually claims that unrecorded output cannot be estimated in any other way; compare Fenoaltea (1972). For a discussion of a broad sample of national indices see Fenoaltea (1982).

an end. That discontinuity appeared to derive from the uncritical use of unreliable data, and was soon denounced as suspect.

The new estimates point to much steadier growth. The medium-term fluctuations in the growth rate appear to derive from the industrial sector, and more specifically from the production of investment goods. In the first half-century of the Kingdom of Italy the path of the economy seems dominated not by a sudden transition to sustained growth, but by a garden-variety business cycle.

Acknowledgements

References

BARBERI, B. (1961). *I consumi nel primo secolo dell'Unità d'Italia*. Milan: Giuffrè.

BARDINI, C., CARRERAS, A. and LAINS, P. (1995). The National Accounts for Italy, Spain and Portugal. *Scandinavian Economic History Review* **43**, pp. 115–47.

BONELLI, F. (1978). Il capitalismo italiano. Linee generali di interpretazione. In R. Romano and C. Vivanti (eds), *Storia d'Italia. Annali, 1: Dal feudalesimo al capitalismo*. Turin: Einaudi.

CAFAGNA, L. (1983a). Protoindustria o transizione in bilico? (A proposito della prima onda dell'industrializzazione italiana). *Quaderni storici* **54**, pp. 971–84.

CAFAGNA, L. (1983b). La formazione del sistema industriale: ricerche empiriche e modelli di crescita. *Quaderni della Fondazione G. G. Feltrinelli* **25**, pp. 27–38.

CANULLO, G. (2000). Una nuova stime del PIL italiano di lungo periodo. *Moneta e Credito* **212**, pp. 483–506.

CARRERAS, A. (1983). La producció industrial espanyola i italiana des de mitjan segle XIX fins a l'actualitat. Unpublished Ph.D dissertation, Universitat Autònoma de Barcelona.

CARRERAS, A. (1992). La producción industrial en el muy largo plazo: una comparación entre España e Italia de 1861 a 1980. In L. Prados and V. Zamagni (eds), *El desarrollo económico en la Europa del Sur: España e Italia en perspectiva histórica*. Madrid: Alianza Editorial.

CARRERAS, A. (1999). Un ritratto quantitativo dell'industria italiana. In F. Amatori, D. Bigazzi, R. Giannetti and L. Segreto (eds), *Storia d'Italia. Annali, 15: L'industria*. Turin: Einaudi.

COHEN, J. S. and FEDERICO, G. (2001). *The Growth of the Italian Economy, 1820–1960*. Cambridge: Cambridge University Press.

Delli Gatti, D., Gallegati, M. and Gallegati, M. (2005). On the nature and causes of business fluctuations in Italy, 1861–2000. *Explorations in Economic History* **42**, pp. 81–100.

Ercolani, P. (1969). Documentazione statistica di base. In G. Fuà (ed.), *Lo sviluppo economics in Italia,* vol. 3. Milan: Franco Angeli.

Federico, G. (1982). Per una valutazione critica delle statistiche della produzione agricola italiana dopo l'Unità (1860–1913). *Società e storia* **15**, pp. 87–130.

Federico, G. (1992). Il valore aggiunto dell'agricoltura. In G. M. Rey (ed.), *I conti economici dell'Italia*, vol. 2. Bari: Laterza.

Federico, G. (2000). Una stima del valore aggiunto dell'agricoltura italiana. In G. M. Rey (ed.), *I conti economici dell'Italia*, vol. 3**. Rome-Bari: Laterza.

Federico, G. (2003a). Heights, calories and welfare: a new perspective on Italian industrialization, 1854–1913. *Economics and Human Biology* **1**, pp. 289–308.

Federico, G. (2003b). Le nuove stime della produzione agricola italiana, 1860–1910: primi risultati e implicazioni. *Rivista di storia economica* **19**, pp. 357–81.

Feinstein, C. H. (1972). *National Income, Expenditure and Output of the United Kingdom, 1855–1965,* Studies in the National Income and Expenditure of the United Kingdom, vol. 6. Cambridge: Cambridge University Press.

Fenoaltea, S. (1967). Public policy and Italian industrial development, 1861–1913. Unpublished Ph.D dissertation, Harvard University.

Fenoaltea, S. (1969). Decollo, ciclo e intervento dello Stato. In A. Caracciolo (ed.), *La formazione dell'Italia industriale*. Bari: Laterza.

Fenoaltea, S. (1972). Railroads and Italian industrial growth, 1861–1913. *Explorations in Economic History* **9**, pp. 325–51.

Fenoaltea, S. (1982). The growth of the utilities industries in Italy, 1861–1913. *Journal of Economic History* **42**, pp. 601–27.

Fenoaltea, S. (1987). Construction in Italy, 1861–1913. *Rivista di storia economica* **4**, International Issue, pp. 21–53.

Fenoaltea, S. (1988a). The extractive industries in Italy, 1861–1913: general methods and specific estimates. *Journal of European Economic History* **17**, pp. 117–25.

Fenoaltea, S. (1988b). The growth of Italy's silk industry, 1861–1913: a statistical reconstruction. *Rivista di storia economica* **5**, pp. 275–318.

Fenoaltea, S. (1988c). International resource flows and construction movements in the Atlantic economy: the Kuznets cycle in Italy, 1861–1913. *Journal of Economic History* **48**, pp. 605–38.

Fenoaltea, S. (1992). Il valore aggiunto dell'industria italiana nel 1911. In G. M. Rey (ed.), *I conti economici dell'Italia*, vol. 2. Bari: Laterza.

Fenoaltea, S. (2002a). Production and consumption in post-unification Italy: new evidence, new conjectures. *Rivista di storia economica* **18**, pp. 251–98.

Fenoaltea, S. (2002b). Lo sviluppo dell'industria dall'Unità alla Grande Guerra: una sintesi provvisoria. In P. Ciocca and G. Toniolo (eds.), *Storia economica d'Italia*, vol. 3.1: *Le strutture dell'economia*. Rome-Bari: Laterza.

Fenoaltea, S. (2003). Notes on the rate of industrial growth in Italy, 1861–1913. *Journal of Economic History* **63**, pp. 695–735.

FENOALTEA, S. (2004). Contro tre pregiudizi. *Rivista di storia economica* **20**, pp. 87–106.

FENOALTEA, S. and BARDINI, C. (2000). Il valore aggiunto dell'industria. In G. M. Rey (ed.), *I conti economici dell'Italia*, vol. 3**. Rome-Bari: Laterza.

FUÀ, G. (1965). *Notes on Italian Economic Growth 1861–1964.* Milan: Giuffrè.

FUÀ, G., ed. (1969). *Lo sviluppo economico in Italia*, vol. 3. Milan: Franco Angeli.

GERSCHENKRON, A. (1955). Notes on the rate of industrial growth in Italy, 1881–1913. *Journal of Economic History* **15**, pp. 360–75.

GERSCHENKRON, A. (1962). Description of an index of Italian industrial development, 1881–1913. In A. Gerschenkron, *Economic Backwardness in Historical Perspective*. Cambridge, MA: Harvard University Press.

GERSCHENKRON, A. (1968), *Continuity in History and Other Essays*. Cambridge, MA: Harvard University Press.

GERSCHENKRON, A. and ROMEO, R. (1961). Lo sviluppo industriale italiano. *Nord e Sud* **23**, pp. 30–56.

ISTAT (ISTITUTO CENTRALE DI STATISTICA). (1957). *Indagine statistica sullo sviluppo del reddito nazionale dell'Italia dal 1861 al 1956, Annali di statistica*, serie VIII, vol. 9. Rome: ISTAT.

ISTAT (ISTITUTO CENTRALE DI STATISTICA). (1957–59). *Le rilevazioni statistiche in Italia dal 1861 al 1956, Annali di statistica*, serie VIII, vols 5–8. Rome: ISTAT.

ISTAT (ISTITUTO CENTRALE DI STATISTICA). (1958). *Sommario di statistiche storiche italiane, 1861–1955*. Rome: ISTAT.

LUZZATTO, G. (1963). *L'economia italiana dal 1861 al 1894*. Milan: Banca Commerciale Italiana.

MADDISON, A. (1991). A revised estimate of Italian economic growth, 1861–1989. *BNL Quarterly Review* **177**, pp. 225–41.

MADDISON, A. (1995). *Monitoring the World Economy, 1820–1992*. Paris: OECD Development Centre.

PESCOSOLIDO, G. (1994). *Agricoltura e industria nell'Italia unita*. Rome-Bari: Laterza.

REY, G. M., ed. (1992). *I conti economici dell'Italia*, vol. 2. *Una stima del valore aggiunto per il 1911*. Bari: Laterza.

REY, G. M., ed. (2000). *I conti economici dell'Italia*, vol. 3**. *Il valore aggiunto per gli anni 1891, 1938, 1951*. Rome-Bari: Laterza.

ROMEO, R. (1959). *Risorgimento e capitalismo*. Bari: Laterza.

TONIOLO, G. (1990). *An Economic History of Liberal Italy, 1850–1918*. London: Routledge.

VITALI, O. (1969). La stima del valore aggiunto a prezzi costanti per rami di attività. In G. Fuà (ed.), *Lo sviluppo economico in Italia*, vol. 3. Milan: Franco Angeli.

ZAMAGNI, V. (1992). Il valore aggiunto del settore terziario italiano nel 1911. In G. M. Rey (ed.), *I conti economici dell' Italia*, vol. 2. Bari: Laterza.

ZAMAGNI, V. (1993). *The Economic History of Italy, 1860–1990: Recovery after Decline*. Oxford: Clarendon Press.

ZAMAGNI, V. and BATTILANI, P. (2000). Stima del valore aggiunto dei servizi. In G. M. Rey (ed.), *I conti economici dell' Italia*, vol. 3**. Rome-Bari: Laterza.

Appendix A: The Istat-Vitali and Maddison series

A1. The Istat-Vitali estimates

The Vitali series in Table 1, cols. 2–6, 8–9, 11–13, 16–17, and 19 are transcribed from Ercolani (1969), Tables XII.1.1.A (value added, by sector), XII.1.4 (indirect business taxes and GDP), and XII.4.1.A (private consumption, identical to the series in Istat 1957, p. 262). For banking and insurance Vitali reports both gross value added (Table XII.1.1.A, col. 8) and its double-counted (non-final) component (Table XII.1.4, col. 2); the series in Table 1, col. 10 refers to net value added, obtained as the difference between the two Vitali series. The series in cols. 7 and 14 are the sums of cols. 3–6 and of cols. 8–13, respectively; col. 15 is the sum of cols. 2, 7, and 14. Because the published series report only three significant digits, the GDP series in col. 17 is not the exact sum of cols. 15 and 16. The *per capita* figures in cols. 18 and 20 are calculated using the demographic series in Table 1, col. 1, obtained as described in Fenoaltea (2002a), note 27.

The 'Istat-Vitali' series at 1911 prices in Figures 5–19 are normally the Vitali series at 1938 prices (and present-day borders) in Table 1, scaled to interpolate the corresponding estimate for 1911 at current prices (and current borders) in Istat (1957). The 1938-price estimates are in billions of lire, the 1911-price estimates in millions.

The conversions of the disaggregated Vitali series are, as a rule, perfectly straightforward: taking the numerators from Istat (1957) and the denominators from Table 1, the ratios used to rescale the series are (7,912/35.5) for agriculture (col. 2), (133/0.788) for the extractive industries (col. 3), (3,565/21.0) for manufacturing (col. 4), (382/1.79) for construction (col. 5), (208/0.522) for the utilities (col. 6), (998/5.62) for transportation and communication services (col. 8), (1,067/8.39) for the services of buildings (col. 12), and (1,183/5.07) for government services (col. 13).

The conversion of the Vitali series for commerce and for miscellaneous services is only marginally complicated by the fact that Istat (1957) did not separate the two; in 1911, they are attributed, together, a value added of 2,684 million lire at current prices. The net product that corresponds to that value added is disaggregated, however; in 1911 commerce accounts for 1,426 m lire out of 2,537, but probably accounted for a larger proportion of total depreciation, equal to 147 m. Zamagni (1992, p. 239) allocates 117 m lire of depreciation to commerce, and 30 million to miscellaneous services; since that estimate is as good as any, the Vitali series for commerce (col. 9) is here multiplied by ((1,426 + 117)/9.84), and the Vitali series for miscellaneous services (col. 11) by (((2,537 − 1,426) + 30)/4.76).

In the case of banking and insurance, finally, both Vitali and Istat report not net value added, but gross value added on the one hand and double-counted business services on the other. The 1938-price net value added series (col. 10) is accordingly scaled by the ratio of the respective differences, equal to ((382 − 294)/(1.79 − 1.36)).

Given the purpose of these illustrations, the 1911-price Istat-Vitali aggregate series are also obtained by direct conversion of the corresponding 1938-price series, and not by summing over their 1911-price components; but there is very little difference between these alternative measures. The series for all industry (col. 7) is thus

multiplied by (4,288/24.10), and that for all services (col. 14) by (6,020/34.11). The corresponding series for aggregate value added (col. 15) would be multiplied by (18,220/93.71), and that for indirect business taxes (col. 16) by (1,568/8.14).

The GDP series (col. 17), finally, is multiplied by (19,788/102.0). A bit of uncertainty surrounds the numerator, as Istat (1957) reports not GDP but GNP, and even that on a definition that (logically but unusually) excludes government services supplied to the producing sector. The 1911 GDP here attributed to Istat is total net value added in agriculture, industry, and services (net only of banking and insurance business services), or 7,912 + 4,288 + 6,020 = 18,220 m lire, plus the 1,568 m lire estimate of indirect business taxes, net of subsidies. Vitali (1992, p. 318, Table 7), instead calculates the Istat estimate of GDP in 1911 at 19.863 billion lire. The minor difference (75 m lire) is the Istat estimate of production subsidies (Istat 1957, p. 242), which Vitali adds to the sum of the Istat estimates of value added (as he explains in a note) before adding net indirect taxes; he accordingly obtains the Istat GDP estimate as the sum of value added and gross (rather than net) indirect taxes. Vitali (2002, p. 114) reproduces his earlier Istat estimate (19.863 bn lire), but Rey (2002, p. xxxi) reports the figure obtained here (19.788 bn); and Vitali's own calculation of the new estimates of GDP in 1911 is analogous to that adopted here to calculate the Istat estimate.

The *per capita* GDP series in Figure 19 is again obtained from the corresponding aggregate and the population series in Table 1, col. 1.

A2. The Maddison estimates

The series in Table 2, cols. 1–5, 7–12, and 14 are transcribed from Maddison (1991), p. 236; cols. 6 and 13 are the sums of cols. 2–5 and 7–12, respectively. Maddison ignores indirect business taxes; his measure of GDP (col. 14), obtained by summing the value added series, is 'at factor cost'. The *per capita* figures in col. 15 are obtained from col. 14 and the demographic series in Table 1, col. 1.

Maddison's elementary series are scaled to interpolate the current-price value added estimates for 1870 in Istat (1957). His series for agriculture and most services (cols. 1, 7–8, 10–12) are scalar transforms of the corresponding Vitali series reproduced in Table 1; his series for banking and insurance services (col. 9) is a rescaling of the Vitali series of 1938-price value added gross of double-counted business services (Ercolani 1969, Table XII.1.1.A, col. 8). His series for the extractive industries and the utilities (cols. 2 and 5) rescale the series which reappear, with minor emendations, in Table 3; his manufacturing series (col. 3) is essentially a rescaling of the 1967 index described in Fenoaltea (2003). His construction series (col. 4) should be an exact rescaling of the corresponding value-added series in Table 3 (originally Fenoaltea 1987, Table 4, col. 6); in fact, he seems to have used the value-of-new-construction series (Fenoaltea 1987, Table 5, col. 4, and again Fenoaltea, 1988c), which varies more over the business cycle (and grows more from end to end) because it excludes maintenance. These series, and the resulting totals for industry (col. 6) and services (col. 13), are not separately illustrated here.

Maddison's own GDP estimate for 1911 is moot. Since his GDP series virtually reproduces the path of the Istat estimates from c. 1909 to c. 1953 (Maddison 1991, Graph 3), and the new current-price estimates of aggregate value added in 1938

virtually reproduce the Istat figures (Federico 2000, Fenoaltea and Bardini 2000, Zamagni and Battilani 2000), the 1911-price 'Maddison' series in Figure 18 is simply his GDP series (col. 14) multiplied by (19,788/19,586) to reproduce the 'Istat' figure for 1911 described above. The corresponding *per capita* series in Figure 19 is again obtained from that aggregate and the population series in Table 1, col. 1.

Appendix B: The new estimates

B1. Introduction

The present estimate of aggregate real product is a sum of physical output series, weighted by value added at 1911 prices. This is not the theoretically correct measure, which deflates the current-price value added of each and every sector by same price index, and thus properly reflects changes in relative values (Fenoaltea 1976, Fuà 1993); the physical output series are themselves stepping-stones to current-price value added estimates, and with the limited information now available the present quantity indices are the best that can be generated.

B2. Agriculture

The time series in Table 3, col. 1 is the preliminary Federico estimate of value added at 1911 prices within constant borders. The corresponding index was kindly provided by the author, who himself adjusted the published index of gross saleable production at 1911 prices within current borders (Federico 2003b); the present series is that index of value added, applied to the corresponding estimate of value added in 1911 (Federico 2000, p. 19).

Vitali (2002) presents aggregate estimates for 1911 based on the revised sector-specific figures in Federico (2000), Fenoaltea and Bardini (2000), and Zamagni and Battilani (2000); the value added figures for industry and services are those in the source, but the value added attributed to agriculture (pp. 99, 104) is slightly different (7.819 bn lire instead of 7.784). Since no reason (that one could find) is given for this modification, the present estimate of value added in 1911 adheres to Federico's benchmark.

B3. Industry

The time series for industry in Table 3, cols. 2–5 replicate those in Fenoaltea (2003), with an adjustment to the figures for the extractive industries (col. 2). The series for the latter in Fenoaltea (2003), transcribed from Fenoaltea (1988a), measure their value added in the theoretically correct manner: these industries are taken to transform goods-in-the-ground into goods-above-ground, and the value of the former is excluded from value added. The conventional measures instead treat these industries as if they produced goods-above-ground out of thin air; and since the present estimates aim at a conventional measure the time series for mining on the one hand and quarrying on the other have each been rescaled to include the corresponding value of the goods-in-the-ground actually consumed (Fenoaltea 1992, pp. 113–14, respectively groups 1, 2, 3, 6 and groups 4, 5). The scale factors

are respectively (99.7/59.5) and (124.1/82.4), sufficiently similar that the time path of the inflated aggregate series is virtually identical to that of the original aggregate.

The estimates for 1911 in Fenoaltea (1992) and Fenoaltea and Bardini (2000) already include the above adjustment. The total for industry obtained here is marginally higher than the later of those (4.954 bn lire, against 4.948); like the series in Fenoaltea (2002b, 2003) it reflects a subsequent adjustment to the estimate of value added in the generation of hydroelectric power (Fenoaltea 2001, p. 39).

B4. Services

B4.1. Transportation and communication. The series in Table 3, col. 8 sums over the partial estimates in Table B.1.

B4.1.1. Inland transportation. Zamagni (1992) and Zamagni and Battilani (2000) allow 524 m lire to rail-guided transportation in 1911: 454.1 to railways, 68.9 to tramways, and 0.8 to minor systems. The present estimates index these figures with time series developed to calculate the path of railway rolling-stock maintenance (Fenoaltea 1992 and Fenoaltea, forthcoming).[17] The present series for railway transportation (Table B.1, col. 1) extrapolates value added in 1911 by total passenger- and freight-car axle-kilometres.[18] The corresponding series for other machine-powered tramways and minor systems (Table B.1, col. 2) extrapolates Zamagni's estimate for the two together by the simple sum of steam tramways' passenger and freight cars, and electric tramways' passenger cars (rail-cars and trailers) and freight cars.[19]

Zamagni neglects horse tramways, which were indeed negligible by 1911, but of some significance in earlier years. The present index is an adaptation of the track-length series already used to index track maintenance; it is calculated by cumulating the network extensions of urban and suburban horse tramways, net of the lengths converted to machine power (Fenoaltea 1984). In 1900, suburban and urban horse tramway networks equalled 91 and 260 km, respectively, against 3,025 and 183.5 km, respectively, for their machine-powered counterparts. The 1911-price transportation value added then attributed to machine-powered tramways equals 37.1 m lire; the fleet of steam (suburban) tramways totalled 4,717 cars, that of electric (urban) tramways 1,412 vehicles. On the assumption that, per km of track, horse tramways then provided one-quarter of the transportation provided by their machine counterparts, 1911-price value added in 1900 is estimated for urban horse tramways as $(37.1/4)(1,412/(1,412 + 4,717))(260/183.5) = 3.028$ m lire, and for suburban horse tramways as $(37.1/4)(4,717/(1,412 + 4,717))(91/3,025) = 0.215$ m lire. The resulting 1911-price series for all horse tramways is transcribed in Table B.1, col. 3.

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[17] The cited elementary series taken from Fenoaltea (forthcoming) are available on request.

[18] The freight-car figures assume a constant average number (2.0) of axles per vehicle; the corresponding figure for passenger cars grows slightly from 2.0 in the early decades to 2.1 in the later ones.

[19] The electric-tramway figures include a small number of locomotives, not separately counted after 1910.

Zamagni (1992) and Zamagni and Battilani (2000) estimate value added in 1911 at 265.7 m lire in road transport proper, and 89.1 million lire in auxiliary services; a further 19.7 m lire are allowed for inland navigation. The present 1911-price time series (Table B.1, col. 5) simply extrapolates the sum of these (374.5 m lire) in proportion to aggregate 1911-price value added in commodity production (Table 3, col. 7).

B4.1.2. Maritime transportation. The Zamagni (1992) and Zamagni and Battilani (2000) estimates of value added in 1911 allocate 103.7 m lire to water-borne transportation, exclusive of inland navigation. The present time series (Table B.1, col. 6) simply extrapolates that figure with an index obtained as a weighted sum of the reported total tonnage of Italy's steam- and sail-powered fleets (Istat 1958, p. 138), assuming zero growth between 1861 and 1862. Overall, steam tonnage grows rapidly, sail tonnage soon declines; to allow for technical progress over time, as well as the steamships' generally higher operating speed (and, presumably, greater annual utilisation), one steam ton is treated as the equivalent of five sail tons.

B4.1.3. Communication. Zamagni (1992) and Zamagni and Battilani (2000) estimate value added in communication at 124 m lire in 1911; the estimates of net product suggest that 92.3 per cent of that was in mail and telegraph services, and 7.7 per cent in telephones. The present estimates (Table B.1, col. 7) incorporate time series made available by Istat (1958, pp. 149–51); for simplicity, the fiscal-year figures for 1884–85ff. are referred directly to 1884ff. The reported number of urban telephone subscribers is used to extrapolate a value added of 9.5 m lire in 1911. The residual (114.5 m lire) is indexed by a simple sum of the reported pieces of correspondence and the reported private telegrams; the latter are insignificant (about 1 per cent of the total in 1911), and their weight is not adjusted.

B4.2. Commerce. The revised estimates in Zamagni and Battilani (2000) allow commerce, broadly defined, a value added of 2,708 m lire (2,300 in trade proper, 408 in hotels and restaurants). The present estimates in Table 2, col. 9 extrapolate that figure with the aid of the commodity-production estimates in col. 7 and the transportation estimates in col. 8. These series are scaled to set 1911 = 1.00, and then summed, giving the latter five times the weight of the former. Since col. 8 grows much faster than col. 7, their relative weight affects the growth rate of col. 9; the weights selected here allow commerce to grow with respect to total commodity production, without however growing with respect to industrial production alone, as suggested by the latest current-price estimates for 1891 and 1911 (Federico 2000, Fenoaltea and Bardini 2000, Zamagni and Battilani 2000).

B4.3. Banking and insurance. The revised estimates in Zamagni and Battilani (2000) allow banking and insurance services a value added of 288 m lire in 1911; of these, 211 m were in double-counted business services, for a net figure of 77 m. The present estimates in Table 3, col. 10 extrapolate this last figure.

The trend of this new series is set by Vitali's reconstruction on the corresponding employment in the census years: 8,000 people in 1881, 14,000 in 1901, and 32,000 in 1911 (Vitali 1970). His own 1938-price estimates imply a declining share of double-counting, for a ratio of net to gross value added near 13 per cent in 1881, 21 per cent in 1901, and 24 per cent in 1911 (similar to Zamagni and Battilani's ratio). Together,

these figures yield estimates of 'net' employment near 1,040 in 1881, 2,940 in 1901, and 7,680 in 1911.

Italy's financial cycle was correlated, not surprisingly, with the construction cycle (Fenoaltea 1988c): major bank expansions occurred in step with the construction booms, the periods of construction decline saw a reduction in the growth rate, if not always in the level, of financial intermediation. In the circumstances, the useful indices are the construction series (Table 3, col. 4) on the one hand, and the utilities series (Table 3, col. 5) on the other: the first is essentially a flow variable, the second tracks a stock that essentially cumulates the underlying construction flows.

These series are weighted to interpolate the net-employment benchmarks. From 1901 to 1913, the construction and utilities series (rescaled to set 1911 = 1.00) receive relative weights equal to 1 and 3, respectively; from 1861 to 1901 the construction series and the utilities series (rescaled to set 1901 = 1.00) receive relative weights equal to 1 and 9.

B4.4. Miscellaneous services. This group includes the world's oldest professions, ranging from the meanest domestic help to the highest clergy; average value added per person varies significantly from sub-group to sub-group.

The present reconstruction is based on the revised value-added estimates for 1911 in Zamagni and Battilani (2000), supplemented by the census-year labour force data. Vitali (1970) reassembled the census figures from 1881 on into homogeneous categories (identified by the 1961 census code). His estimates for 1881, 1901, and 1911 (Vitali 1970, p. 330) are transcribed, with some subaggregation, in Table B.2.

The figures for 1871 are estimated. The total (line 1) varies very little over time; it is here extrapolated backward on the assumption that the absolute increment between 1871 and 1881 equalled that over the succeeding intercensal period. The number in the professions (line 2) is estimated by applying to Vitali's figure for 1881 the ratio of the 1871 census total for the legal and learned professions (categories X and XIV) to the corresponding 1881 census total (categories XI and XV). The number in health, entertainment, and private education (line 3) in 1871 is similarly estimated by applying to Vitali's figure for 1881 the ratio of the 1871 census figure for the most closely corresponding categories (XI, XIII) to the 1881 census figure for those self-same categories (XII, XIV). The 1871 figure for the clergy (line 4) in 1871 is taken directly from the census (category IX), as was Vitali's figure for 1881 (category X). The residual (line 5) includes enormous numbers of unskilled persons (mostly washerwomen in 9.01, domestic servants in 9.08); but the 1871 census includes a large residual category grouping unskilled workers (category XVI), and the numbers attributed to domestic service and the like (category VI) appear seriously underestimated. The residual for 1871 is accordingly obtained as such, from the estimates in lines 1–5; it thus inherits the error in the estimated total. The weighted total in line 6 is obtained very simply as the sum of lines 2, 3, 4, and 5, divided respectively by 1, 2, 4, and 8; the weights reflect the relative category-specific estimates of average value added per person in Zamagni and Battilani (2000, p. 368).

This weighted total is then extrapolated to an annual index on the assumption of constant geometric growth between (and beyond) the census years. This index

is then scaled to set 1911 = 1.00, and applied to the value-added estimate for 1911 in Zamagni and Battilani (2000, p. 245); the resulting series appears in Table 3, col. 11.

   B4.5. Buildings. Zamagni (1992) and Zamagni and Battilani (2000) allow buildings a value added of 1,267 m lire at 1911 prices. The present series in Table 3, col. 12 extrapolates this figure in proportion to the estimated maintenance of private structures (Fenoaltea 1987, p. 38), itself strictly proportional to the estimated real stock to be maintained.

   B4.6. Public administration. The revised estimates in Zamagni and Battilani (2000) allow government services a value added of 1,247 m lire in 1911. Vitali (1970, p. 330) calculates the sector-specific labor force (code 10) at 403,000 in 1881, 472,000 in 1901, and 537,000 in 1911; the ratio of the 1871 census figures (categories VII, VIII, and XII) to the corresponding 1881 census figures (categories VIII, IX and XIII) converts Vitali's 1881 total to an estimate of 333,000 in 1871. These census-year figures are extrapolated into an annual index, again assuming constant geometric growth between (and beyond) the available benchmarks; and this index is applied directly to Zamagni and Battilani's estimate. The resulting series is transcribed in Table 3, col. 13.

B5. Net indirect taxes

The series in Table 3, col. 16 extrapolates the new estimate of net indirect taxes (1,440 m lire) in 1911 obtained by Vitali (1992, p. 302; also p. 304, Table 3) in proportion to the 1938-price Vitali series; it accordingly equals the latter times (1,440/8.14).

   Vitali (2002, p. 104) reports a revised estimate of GDP in 1911, based on the updated value added estimates in Federico (2000), Fenoaltea and Bardini (2000), and Zamagni and Battilani (2000). That calculation returns to the original Istat estimate of 1.568 bn lire of net indirect taxes; since as far as one could tell no reason is given for this substitution, the present calculations retain the Vitali (1992) estimate, justified in detail.

B6. Gross domestic product

The present estimate of GDP in 1911 equals 21.693 bn lire. The corresponding figure in Rey (2002, p. xxx) and Vitali (2002, p. 104) is 21.855 bn. The discrepancy (−0.162 bn lire) is explained as follows: on the one hand, as noted, the present estimates reject Vitali's unexplained adjustment to Federico's estimate for agriculture (−0.041 bn), and his similarly unexplained return to Istat's figure for net indirect taxes in place of his own revision (−0.128 bn); on the other, the Rey-Vitali estimates neglect the recent revision to the estimate for the utilities industries noted above (+0.007 bn: compare Fenoaltea 1982, 1992, and Fenoaltea and Bardini 2000, and Fenoaltea 2001, 2003).

   The *per capita* series (Table 3, col. 18) is calculated on the basis of the population series in Table 1, col. 1.

Table B.1. *New estimates of value added in services, 1861–1913: transportation and communication (m. lire at 1911 prices).*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Rail transportation					
	Railways	Tramways (machine)	Tramways (horse)	Total	Other inland transp.	Maritime transp.	Communication
1861	24.7	0.0	0.0	24.7	178.1	18.5	8.3
1862	28.2	0.0	0.0	28.2	182.8	18.5	10.3
1863	34.1	0.0	0.0	34.1	187.9	19.9	11.9
1864	38.5	0.0	0.0	38.5	184.9	17.9	11.9
1865	42.4	0.0	0.0	42.4	195.4	20.4	12.1
1866	49.2	0.0	0.0	49.2	198.8	21.4	12.8
1867	50.5	0.0	0.0	50.5	192.3	24.1	13.5
1868	57.3	0.0	0.0	57.3	194.4	26.0	13.7
1869	64.3	0.0	0.0	64.3	199.6	27.9	15.0
1870	73.6	0.0	0.0	73.6	210.3	30.3	15.2
1871	82.4	0.0	0.0	82.4	206.9	31.5	18.0
1872	94.8	0.0	0.0	94.8	204.5	31.5	18.2
1873	107.5	0.0	0.0	107.6	204.4	33.1	18.4
1874	108.3	0.0	0.1	108.4	219.3	33.0	16.9
1875	113.3	0.1	0.2	113.6	215.2	33.9	18.8
1876	123.7	0.1	0.4	124.2	208.0	34.9	20.6
1877	126.1	0.1	0.6	126.9	211.0	34.6	24.7
1878	125.9	0.4	0.8	127.1	223.0	34.1	26.3
1879	133.0	2.2	1.0	136.2	223.1	34.5	24.1
1880	146.3	5.2	1.2	152.6	229.4	34.8	25.2
1881	151.1	9.1	1.4	161.6	235.9	36.3	28.5
1882	158.4	12.6	1.6	172.7	242.1	37.5	30.2
1883	172.5	15.0	1.9	189.5	246.2	37.3	32.2
1884	183.6	16.9	2.1	202.6	238.0	38.8	33.4
1885	185.8	17.5	2.4	205.6	245.6	38.7	34.9
1886	191.9	19.7	2.6	214.2	257.8	40.5	36.2
1887	201.1	19.9	2.9	223.8	262.2	41.2	30.0
1888	219.2	20.6	3.1	242.9	259.7	41.9	31.3
1889	226.3	21.7	3.4	251.3	250.2	41.8	32.0
1890	227.3	23.9	3.6	254.8	257.7	41.8	32.7
1891	222.1	24.3	3.9	250.2	266.5	43.3	34.3
1892	223.6	24.8	4.1	252.5	264.6	43.0	36.8
1893	232.3	26.3	4.3	262.9	271.5	43.3	39.3
1894	237.0	27.1	4.5	268.6	273.1	42.9	40.0
1895	236.5	27.3	4.7	268.5	276.8	44.2	42.3
1896	245.4	27.6	4.8	277.8	279.6	45.7	44.6
1897	257.6	28.9	4.7	291.3	281.2	48.6	48.3
1898	263.2	32.2	4.3	299.7	283.2	51.3	51.1
1899	275.5	34.1	3.7	313.3	286.1	56.8	51.2
1900	281.8	37.1	3.2	322.2	293.2	65.3	55.1
1901	287.6	40.7	2.9	331.2	298.6	71.9	60.8
1902	304.1	42.5	2.6	349.2	304.5	74.8	65.7
1903	316.4	43.2	2.4	362.0	312.1	76.9	73.7
1904	333.9	44.4	2.2	380.6	322.2	76.7	75.7
1905	335.0	47.0	1.8	383.7	331.5	78.8	72.4
1906	364.9	50.2	1.6	416.7	343.0	79.7	75.5
1907	363.6	54.5	1.3	419.4	357.7	82.6	83.4
1908	387.7	56.6	1.0	445.3	363.6	87.5	88.8
1909	408.6	62.7	0.8	472.1	369.2	95.7	96.3
1910	433.2	64.0	0.6	497.8	369.3	101.2	105.6
1911	454.1	69.7	0.4	524.2	374.5	103.7	124.0
1912	475.9	75.4	0.3	551.5	390.0	111.4	125.8
1913	501.5	80.7	0.0	582.2	406.7	126.2	129.3

Sources: See Appendix B.

Table B.2. *Estimates of the labour force in miscellaneous services, 1871, 1881, 1901, and 1911 (thousands).*

	(1) Code	(2) Content	(3) 1871	(4) 1881	(5) 1901	(6) 1911
1.	(9)	Miscellaneous services	1,016	1,021	1,026	1,037
2.	(9.05)	Professions	56.2	67.6	71.3	100.3
3.	(9.02-04)	Health, entertainment, private education	93.6	93.3	113.9	138.2
4.	(9.07)	Clergy	150.1	131.6	129.9	124.1
5.	(9.01,08)	Residual	716	728	711	674
6.		Weighted total	230	238	250	285

Sources: See Appendix B.

Appendix References

FENOALTEA, S. (1976). Real value added and the measurement of industrial production. *Annals of Economic and Social Measurement* **5**, pp. 113–39.

FENOALTEA, S. (1984). Railway construction in Italy, 1861–1913. *Rivista di storia economica* **1**, International Issue, pp. 27–58.

FENOALTEA, S. (2001). La crescita industriale delle regioni d'Italia dall'Unità alla Grande Guerra: una prima stima per gli anni censuari. *Quaderni dell'Ufficio Ricerche Storiche*, **1**. Rome: Banca d'Italia.

FENOALTEA, S. (Forthcoming). *Italian Industrial Production, 1861–1913: A Statistical Reconstruction*.

FUÀ, G. (1993). *Crescita economica. Le insidie delle cifre*. Bologna: Il Mulino.

REY, G. M. (2002). Novità e conferme nell'analisi dello sviluppo economico italiano. In G. M. Rey (ed.), *I conti economici dell' Italia*, vol. 3*. Il conto risorse e impieghi (1891, 1911, 1938, 1951). Rome-Bari: Laterza.

VITALI, O. (1970). *Aspetti dello sviluppo economico italiano alla luce della ricostruzione della popolazione attiva*. Rome: Istituto di Demografia dell'Università di Roma.

VITALI, O. (1992). Gli impieghi del reddito nell'anno 1911. In G. M. Rey (ed.), *I conti economici dell' Italia*, vol. 2. Bari: Laterza.

VITALI, O. (2002). Gli impieghi del reddito negli anni 1891, 1938 e 1951. In G. M. Rey (ed.), *I conti economici dell' Italia*, vol. 3*. Il conto risorse e impieghi (1891, 1911, 1938, 1951). Rome, Bari: Laterza.